Sunday, July 31

Registration
3:00 PM - 6:00 PM

Monday, August 1

9:00 AM - 11:30 AM Plenary Session 1 (Main Hall)

Lunch

Mid-sized Hall A	Mid-sized Hall B	Small Hall	Room 104&105	Room 201&202	Room 206	Room 207	Conference Hall (Oval Room)	Room 107&108	Room 204
1:30 PM - 3:00 PM [CMP15A] New Technology	**1:30 PM - 3:00 PM** [CMP3A] THz Biology and Imaging	**1:30 PM - 3:00 PM** [CMP4A] High Power, High Energy Lasers I	**1:30 PM - 3:00 PM** [CMP11A] QD Devices and Crystal Growth Technology	**2:00 PM - 3:00 PM** [CMP9A] High Capacity Optical Transport I	**1:30 PM - 3:00 PM** [CMP14A] 2D and Nanocarbon Materials I	**1:30 PM - 2:45 PM** [CMP18A] THz Transmission System	**1:30 PM - 2:30 PM** [CMP2A] Ultrafast Measurement and Control	**1:30 PM - 1:40 PM** [ISOM-OP] Opening Remark **1:40 PM - 2:15 PM** [IMPA] Keynote **2:15 PM - 3:00 PM** [IMPB] Holography I	**1:30 PM - 3:00 PM** [CMP16A] Metamaterial Devices
Coffee Break									
3:30 PM - 5:00 PM [CMP15B] Hardware and System	**3:30 PM - 5:30 PM** [CMP3B] THz Source and Device	**3:30 PM - 4:45 PM** [CMP4B] High Power, High Energy Lasers II	**3:30 PM - 5:15 PM** [CMP11B] III/V Waveguide Devices	**3:30 PM - 4:15 PM** [CMP9B] Optical Transmission in Various Media	**3:30 PM - 5:30 PM** [CMP14B] 2D and Nanocarbon Materials II	**3:30 PM - 5:30 PM** [CMP18B] Devices and Subsystems for Microwave Photonics	**3:30 PM - 4:15 PM** [CMP2B] Strong Field Phenomena	**3:30 PM - 4:45 PM** [IMPC] Special Session: Biological Application **4:45 PM - 5:45 PM** [IMPD] Imaging I	**3:30 PM - 4:45 PM** [CMP16B] Fabrication Technologies for Plasmonics and Metamaterials

6:00 PM - 8:00 PM Poster Session (Main Hall)
[P-CM2] [P-CM3] [P-CM9] [P-CM11] [P-CM15] [P-CM16] [P-CM18]

Tuesday, August 2

Mid-sized Hall A	Mid-sized Hall B	Small Hall	Room 104&105	Room 201&202	Room 206	Room 207	Conference Hall (Oval Room)	Room 107&108	Room 204
9:00 AM - 10:30 AM [CTuA7A] Single Photon Sources		**9:00 AM - 10:30 AM** [CTuA16C] Plasmonics and Metamaterials for Sensing Applications	**9:00 AM - 10:30 AM** [CTuA11C] Thin-film LN and AlN Devices	**9:00 AM - 10:15 AM** [CTuA15C] Photothermal and Optical Force	**9:00 AM - 10:30 AM** [CTuA14C] 2D and Nanocarbon Materials III	**9:30 AM - 10:30 AM** [CTuA9C] Electrical Nonlinear Equalization	**9:00 AM - 10:30 AM** [CTuA1A] MIR Lasers	**9:00 AM - 10:30 AM** [ITuAE] Imaging II	**10:00 AM - 10:30 AM** [CTuA2C] Ultrafast Spectroscopy and Coherent Control I
Coffee Break									
	11:00 AM - 11:45 AM [CTuA18C] Microwave Signal Generation	**11:00 AM - 12:00 PM** [CTuA16D] Optical Trapping and Photon Manipulation	**11:00 AM - 12:00 PM** [CTuA11D] Silicon Photonics	**11:00 AM - 12:00 PM** [CTuA15D] Scattering and Diffuse Reflectance		**11:00 AM - 12:00 PM** [CTuA9D] Space Division Multiplexing	**11:00 AM - 12:00 PM** [CTuA1B] Soliton Fiber Lasers	**11:00 AM - 11:45 AM** [ITuAF] Optical Memory	**11:00 AM - 12:00 PM** [CTuA2D] Ultrafast Spectroscopy and Coherent Control II
Lunch									
1:30 PM - 3:00 PM [CTuP7B] Novel Quantum Systems	**1:30 PM - 3:00 PM** [CTuP1C] High Power Fiber Amplifier	**1:30 PM - 3:00 PM** [CTuP16E] Metamaterial Absorber and Thermal Devices	**1:30 PM - 3:00 PM** [CTuP11E] Novel Light-emitting and Detection Devices	**1:30 PM - 2:45 PM** [CTuP3C] THz Spectroscopy	**1:30 PM - 3:00 PM** [CTuP5A] Beam Manipulation and Applications	**2:00 PM - 3:00 PM** [CTuP9E] High Capacity Optical Transport II	**1:30 PM - 2:45 PM** [CTuP8A] Emission from Atoms, Quantum Wells, and Quantum Dots	**1:30 PM - 2:00 PM** [ITuPG] Special Invited **2:00 PM - 3:00 PM** [ITuPH] Metamaterial	**1:45 PM - 3:00 PM** [CTuP6A] Chip-Scale Comb Sources
Coffee Break									
3:30 PM - 5:30 PM [CTuP7C] Quantum Optics with Atoms	**3:30 PM - 5:15 PM** [CTuP1D] Fiber Lasers	**3:30 PM - 4:00 PM** [CTuP16F] THz Technologies	**3:30 PM - 5:00 PM** [CTuP11F] Novel Semiconductor Lasers	**3:30 PM - 5:15 PM** [CTuP3D] THz Detection, Sensing, and Manipulation	**3:30 PM - 5:00 PM** [CTuP5B] 3D and Volume Processing	**3:30 PM - 5:00 PM** [CTuP9F] Novel Concepts and Fundamentals	**3:30 PM - 5:30 PM** [CTuP8B] 2D Materials in Nanophotonics and Non-Hermitian Nanophotonics	**3:30 PM - 5:15 PM** [ITuPI] Holography II **5:15 PM - 5:45 PM** [ITuPJ] Optical Information	**3:30 PM - 5:30 PM** [CTuP6B] MIR and THz Comb
		6:00 PM - 8:00 PM [CTuW1] 1. Photonics in the fight against COVID-19	**Main Hall** **6:00 PM - 8:00 PM** Poster Session [P-CTu4] [P-CTu8] [P-CTu10] [P-CTu12] [P-CTu14] [P-CTu17]			**6:00 PM - 8:00 PM** Poster Session [P-ITu]	**6:00 PM - 8:45 PM** [CTuW2] 3. State-of-the-Art to Next-Era LiDAR Technologies		

Wednesday, August 3

9:00 AM - 11:30 AM Plenary Session 2 (Main Hall)

Lunch

Mid-sized Hall A	Mid-sized Hall B	Small Hall	Room 104&105	Room 201&202	Room 206	Room 207	Conference Hall (Oval Room)	Room 107&108	Room 204
1:30 PM - 3:00 PM [CWP2E] Ultrashort Pulse Generation and Nonlinear Propagation I	**1:30 PM - 3:00 PM** [CWP16G] Theory and Fundamentals	**1:30 PM - 3:00 PM** [CWP17A] Session of Excellent Papers in Sensors and Systems	**1:30 PM - 2:45 PM** [CWP12A] Silicon Photonics Devices for Communications	**1:30 PM - 3:00 PM** [CWP19A] X-ray Lasers and Their Applications I	**1:30 PM - 3:00 PM** [CWP10A] Fiber Lasers and Amplifier Devices	**1:30 PM - 3:00 PM** [CWP13A] Optical Signal Processing for FSO and Sensing	**1:30 PM - 3:10 PM** [IWPK/OWP] ISOM/ODF Joint Session: Advanced Imaging Technologies		**1:30 PM - 3:00 PM** [CWP4C] High Power, High Energy Lasers III
Coffee Break									
3:30 PM - 5:15 PM [CWP2F] Ultrashort Pulse Generation and Nonlinear Propagation II	**4:00 PM - 5:00 PM** [CWP16H] Photon Emission Devices and Related Technologies	**3:30 PM - 5:15 PM** [CWP17B] Fiber-based Sensors and Systems	**3:30 PM - 5:00 PM** [CWP12B] Hybrid Material Integration for Silicon Photonics I	**3:30 PM - 4:30 PM** [CWP19B] X-ray Lasers and Their Applications II	**3:30 PM - 5:30 PM** [CWP10B] Passive and Active Waveguide Devices		**3:30 PM - 5:05 PM** [OWP1A] Optical Design/Simulation/Fabrication I	**3:30 PM - 4:30 PM** [IWPL] Bio-Imaging **4:30 PM - 4:45 PM** [IPDP] Post Deadline **4:45 PM - 5:00 PM** [ISOM-CL] Award & Closing	

6:30 PM - 8:30 PM Banquet (Sapporo Park Hotel)

Thursday, August 4

8:15 AM - 8:45 AM Plenary Session 3 (Conference Hall (Oval Room))

Mid-sized Hall A	Mid-sized Hall B	Small Hall	Room 104&105	Room 201&202	Room 206	Room 207	Conference Hall (Oval Room)	Room 107&108	Room 204
9:30 AM - 10:30 AM [CThA2G] Attosecond Science and Technology I	**9:00 AM - 10:30 AM** [CThA1E] Wavelength Conversion and Laser Devices	**9:00 AM - 10:30 AM** [CThA8C] High-Q Microresonators and Their Applications	**9:00 AM - 10:15 AM** [CThA17C] LIDAR and Remote Sensing	**9:00 AM - 10:45 AM** [CThA13B] Photonic Computing I	**9:00 AM - 10:30 AM** [CThA10C] Fiber Nonlinearity and Devices	**9:00 AM - 10:30 AM** [CThA15E] Raman Imaging	**8:50 AM - 10:40 AM** [OThA1B] Optical Design/Simulation/Fabrication II	**9:00 AM - 10:30 AM** [CThA7D] Solid State Photonic Quantum Systems	**9:00 AM - 10:30 AM** [CThA6C] Comb Metrology I
Coffee Break									
11:00 AM - 12:00 PM [CThA2H] High Harmonic Generation in Condensed Matters	**11:00 AM - 12:00 PM** [CThA1F] Tutorial - Diamond Lasers -	**11:00 AM - 12:00 PM** [CThA8D] Topological Photonics I	**11:00 AM - 12:00 PM** [CThA17D] Micro/Nano Optical Sensors			**11:00 AM - 12:00 PM** [CThA15F] Localization	**11:00 AM - 12:10 PM** [OThA4A] New Technologies I	**11:00 AM - 12:00 PM** [CThA7E] Quantum Communication and Quantum Information Processing	**11:00 AM - 12:00 PM** [CThA6D] Comb Metrology II
Lunch									
1:30 PM - 3:00 PM [CThP2I] Attosecond Science and Technology II	**1:30 PM - 3:00 PM** [CThP1G] Diamond and Novel Lasers	**1:30 PM - 3:00 PM** [CThP8E] Plasmonics	**1:30 PM - 3:00 PM** [CThP17E] Biomedical Sensors and Systems I	**1:30 PM - 3:00 PM** [CThP12C] New Applications of Silicon Photonics	**1:30 PM - 3:00 PM** [CThP5C] Material Synthesis and Deposition	**1:30 PM - 2:30 PM** [CThP13C] Optical Signal Processing for Communication	**1:30 PM - 3:05 PM** [OThP4B] New Technologies II	**1:30 PM - 3:00 PM** [CThP7F] Generation and Measurement of Quantum States I	**1:45 PM - 3:00 PM** [CThP6E] Comb Metrology III
Coffee Break									
3:30 PM - 5:30 PM [CThP2J] Emerging Attosecond Science	**3:30 PM - 5:30 PM** [CThP1H] Solid State and Vortex Lasers	**3:30 PM - 5:30 PM** [CThP8F] Si and SiN Photonics	**3:30 PM - 5:30 PM** [CThP17F] Biomedical Sensors and Systems II	**3:30 PM - 5:30 PM** [CThP12D] Hybrid Material Integration for Silicon Photonics II	**3:30 PM - 5:15 PM** [CThP5D] Surface Micromachining and Nanostructuring	**3:30 PM - 5:15 PM** [CThP13D] Photonic Computing II	**3:30 PM - 5:10 PM** [OThP2A] Optical Components/Devices I	**3:30 PM - 4:45 PM** [CThP7G] Generation and Measurement of Quantum States II	**3:30 PM - 5:15 PM** [CThP6F] Advanced Comb Sources and Applications
		6:00 PM - 8:00 PM [CThW3] 2. Photonics in the Quantum Era	**Main Hall** **6:00 PM - 8:00 PM** Poster Session [P-CTh1] [P-CTh5] [P-CTh6] [P-CTh7] [P-CTh13]			**6:00 PM - 8:00 PM** Poster Session [P-OTh]	**6:00 PM - 8:00 PM** [CThW4] 4. Perovskite Photonics		

Friday, August 5

Mid-sized Hall A	Mid-sized Hall B	Small Hall	Room 104&105	Room 201&202	Room 206	Room 207	Conference Hall (Oval Room)	Room 107&108	Room 204
9:30 AM - 10:30 AM [CFA7H] Quantum Optics and Information Theory	**9:15 AM - 10:30 AM** [CFA1I] Ultrafast Lasers and Frequency Combs	**9:15 AM - 10:30 AM** [CFA8G] Mestasurface, Radiation Control, and Quantum Dots	**9:00 AM - 10:15 AM** [CFA17G] Interferometric Sensing				**8:30 AM - 9:25 AM** [OFA2B] Optical Components/Devices II **9:35 AM - 10:30 AM** [OFA2C] Optical Components/Devices III	**9:00 AM - 10:15 AM** [CFA12E] Advanced Designs of Silicon Photonics Devices	**9:00 AM - 10:30 AM** [CFA6G] Precision Clock and Network
Coffee Break									
11:00 AM - 12:00 PM [CFA7I] Quantum Frequency Conversion	**11:00 AM - 12:00 PM** [CFA1J] Ultra-high Rep Lasers and Frequency Comb	**11:00 AM - 11:45 AM** [CFA8H] Topological Photonics II	**11:00 AM - 11:45 AM** [CFA17H] Spectroscopy Sensors and Systems				**11:00 AM - 12:25 PM** [OFA3A] Optical Systems I	**11:00 AM - 12:00 PM** [CFA12F] Novel Functional Silicon Photonics Devices	**11:00 AM - 12:00 PM** [CFA6H] Highly Sensitive Quantum Sensing
Lunch									
		1:30 PM - 3:00 PM [CFP8I] Photonic Crystal Waveguide Devices					**1:30 PM - 3:05 PM** [OFP3B] Optical Systems II		**1:45 PM - 3:00 PM** [CFP6I] Ultrafast and Highly Nonlinear Metrology
Coffee Break									
		3:30 PM - 5:00 PM [CFP8J] Nano Laser, Optical Trapping, and Chiral Photonics					**3:30 PM - 4:45 PM** [OFPSSA] Special Session "Optics for Life Sciences" I **4:55 PM - 5:45 PM** [OFPSSB] Special Session "Optics for Life Sciences" II **5:45 PM - 6:15 PM** [ODF-CL] Closing		**3:30 PM - 4:45 PM** [CFP6J] Applied Metrology and Sensing

Plenary | CLEO-PR2022 | ISOM '22
ODF '22 | Workshop | Joint Session

9:00 AM - 9:15 AM (Mon. Aug 1, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

[OP] Opening Remark

9:15 AM - 10:00 AM (Mon. Aug 1, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

[Plenary1-C1] The Revolution of Silicon Photonics
[Presentation Style] Onsite

*Michal Lipson[1] (1. Columbia University (United States of America))

[Presentation Style] Onsite

We are now experiencing a revolution in optical technologies, where one can print and control massive optical circuits, on a microelectronic chip. This revolution is enabling a whole range of applications that are in need for scalable optical technologies and its opening the door to areas that only a decade ago were unimaginable.

10:00 AM - 10:45 AM (Mon. Aug 1, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

[Plenary1-C2] Optical Communication Systems: Scaling Capacity and Energy
[Presentation Style] Online

*Peter J. Winzer[1] (1. Nubis Communications, Inc. (United States of America))

[Presentation Style] Online

We discuss the capacity scaling of optical communications from ultra-long-haul subsea cables to ultra-low-power intra-datacenter interconnects and show that massive spatial parallelism is the only sustainable option for the next decade and beyond.

10:45 AM - 11:30 AM (Mon. Aug 1, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

[Plenary1-I1] Non-volatile memory for data storage and Neuromorphic Computing
[Presentation Style] Onsite

*Chong Tow Chong[1], Rong Zhao[1] (1. Singapore University of Technology and Design (Singapore))

[Presentation Style] Onsite

Non-volatile memories (NVMs) have revolutionized modern data storage systems, especially boosting the performance of latency-sensitive applications. Recently, they have also emerged as an important technical avenue for building neuromorphic computing systems. This plenary will cover recent advances of NVMs and applications in these exciting fields, and discuss opportunities and challenges.

Ultrafast Measurement and Control

Session Chairs: Satoshi Ashihara (Univ. of Tokyo), Tomoya Mizuno (Univ. of Tokyo)

Mon. Aug 1, 2022 1:30 PM - 2:30 PM Conference Hall (Oval Room) (1F)

[CMP2A-01] Spectral phase interferometry for direct electric-field reconstruction of synchrotron light

[Presentation Style] Onsite

*Takao Fuji[1], Masaki Fujimoto[2], Yasuaki Okano[2], Elham Salehi[2], Masahito Hosaka[3], Masahiro Katoh[4,2] (1. Toyota Technological Institute (Japan), 2. Institute for Molecular Science (Japan), 3. Nagoya University (Japan), 4. Hiroshima University (Japan))

1:30 PM - 1:45 PM

[CMP2A-02] Timing stabilization and diagnostic of femtosecond optical laser system for pump-probe experiments in SACLA

[Presentation Style] Onsite

*Tadashi Togashi[1,2], Yuya Kubota[2], Shigeki Owada[1,2], Tetsuo Katayama[1,2], Keiichi Sueda[2], Toshinori Yabuuchi[1,2], Kensuke Tono[1,2], Makina Yabashi[1,2] (1. Japan Synchrotron Radiation Research Inst. (Japan), 2. Riken SPring-8 Center (Japan))

1:45 PM - 2:00 PM

[CMP2A-03] CEP stabilization of a TiS CPA system to sub-100 mrad level

[Presentation Style] Onsite

*Kaito Nishimiya[1], Kento Kubomura[1], Ryoma Ishikawa[1], Akira Suda[1] (1. Tokyo University of Science (Japan))

2:00 PM - 2:15 PM

[CMP2A-04] Ultrafast snapshot imaging at sub-GHz framerate by using recirculation filtering of ultrashort optical pulses

[Presentation Style] Onsite

*Asami Honda[1], Ryota Tamemoto[1], Keisaku Yamane[1], Masato Suzuki[1], Yasunori Toda[1], Takashige Omatsu[2,3], Ryuji Morita[1] (1. Hokkaido Univ. (Japan), 2. Chiba Univ. (Japan), 3. MCRC, Chiba Univ. (Japan))

2:15 PM - 2:30 PM

1:30 PM - 1:45 PM (Mon. Aug 1, 2022 1:30 PM - 2:30 PM Conference Hall (Oval Room))

[CMP2A-01] Spectral phase interferometry for direct electric-field reconstruction of synchrotron light

[Presentation Style] Onsite

*Takao Fuji[1], Masaki Fujimoto[2], Yasuaki Okano[2], Elham Salehi[2], Masahito Hosaka[3], Masahiro Katoh[4,2] (1. Toyota Technological Institute (Japan), 2. Institute for Molecular Science (Japan), 3. Nagoya University (Japan), 4. Hiroshima University (Japan))

[Presentation Style] Onsite

Ultraviolet electric-fields produced by relativistic electrons in an undulator of a synchrotron light source is characterized by using spectral phase interferometry for direct electric-field reconstruction. A 10-cycle rectangular shaped waveform is reconstructed.

1:45 PM - 2:00 PM (Mon. Aug 1, 2022 1:30 PM - 2:30 PM Conference Hall (Oval Room))

[CMP2A-02] Timing stabilization and diagnostic of femtosecond optical laser system for pump-probe experiments in SACLA

[Presentation Style] Onsite

*Tadashi Togashi[1,2], Yuya Kubota[2], Shigeki Owada[1,2], Tetsuo Katayama[1,2], Keiichi Sueda[2], Toshinori Yabuuchi[1,2], Kensuke Tono[1,2], Makina Yabashi[1,2] (1. Japan Synchrotron Radiation Research Inst. (Japan), 2. Riken SPring-8 Center (Japan))

[Presentation Style] Onsite

A synchronized femtosecond laser system, which is controlled by a balanced optical-microwave phase detector (BOMPD), was constructed for pump-probe experiments at SACLA and has been successfully realized to reduce jitter down to 50 fs.

2:00 PM - 2:15 PM (Mon. Aug 1, 2022 1:30 PM - 2:30 PM Conference Hall (Oval Room))

[CMP2A-03] CEP stabilization of a TiS CPA system to sub-100 mrad level

[Presentation Style] Onsite

*Kaito Nishimiya[1], Kento Kubomura[1], Ryoma Ishikawa[1], Akira Suda[1] (1. Tokyo University of Science (Japan))

[Presentation Style] Onsite

We have suppressed the effects of vibration and acoustic waves on the CEP and obtained a CEP stability of 99 mrad (rms) with a pulse energy of 7 mJ at 1 kHz.

2:15 PM - 2:30 PM (Mon. Aug 1, 2022 1:30 PM - 2:30 PM Conference Hall (Oval Room))

[CMP2A-04] Ultrafast snapshot imaging at sub-GHz framerate by using recirculation filtering of ultrashort optical pulses

[Presentation Style] Onsite

*Asami Honda[1], Ryota Tamemoto[1], Keisaku Yamane[1], Masato Suzuki[1], Yasunori Toda[1], Takashige Omatsu[2,3], Ryuji Morita[1] （1. Hokkaido Univ. (Japan), 2. Chiba Univ. (Japan), 3. MCRC, Chiba Univ. (Japan)）

[Presentation Style] Onsite

We successfully demonstrated ultrafast snapshot imaging based on time-to-frequency mapping method with four frames and ~ 5.5 ns time interval (i.e. sub-GHz framerate) by using our newly-developed recirculation system without ultrafast image sensor.

Oral Session | CLEO-PR2022 | Strong Field Phenomena

Strong Field Phenomena

Session Chairs: Tadashi Togashi (JASRI), Takayuki Kurihara (Univ. of Tokyo)

Mon. Aug 1, 2022 3:30 PM - 4:15 PM Conference Hall (Oval Room) (1F)

[CMP2B-01] Optical Field Detector for Sub-Nanojoule Pulses using Insulator-Encapsulated Metal Nanostructures

*Ko Arai[1], Daiki Arai[1], Ikki Morichika[1], Satoshi Ashihara[1] （1. IIS, the University of Tokyo (Japan)）

3:30 PM - 3:45 PM

[CMP2B-02] Degenerate singularities in backward rescattering processes induced by strong infrared fields

[Presentation Style] Onsite

*Tomoya Mizuno[1], Tianqi Yang[1], Takayuki Kurihara[1], Nobuhisa Ishii[1], Teruto Kanai[1], Oleg I. Tolstikhin[2], Toru Morishita[3], Jiro Itatani[1] （1. The University of Tokyo (Japan), 2. Moscow Inst. Phys. and Tech. (Russia), 3. UEC (Japan)）

3:45 PM - 4:00 PM

[CMP2B-03] Laser wakefield acceleration driven by 1-TW laser pulse in a dense, sub-mm nitrogen gas cell

[Presentation Style] Online

*Dang Khoa Tran[1], Po- Wei Lai[1], Kun- Ni Liu[1], Xiang- Yuan Lin[2], Ming- Wei Lin[1,2], Hsu- Hsin Chu[3,4], Jyhpyng Wang[3,4,5] （1. Institute of Nuclear Engineering and Science, National Tsing Hua Univ. (Taiwan), 2. Department of Engineering and Science System, National Tsing Hua Univ. (Taiwan), 3. Department of Physics, National Central Univ. (Taiwan), 4. Center for High Energy and High Field Physics, National Central Univ. (Taiwan), 5. Institute of Atomic and Molecular Science, Academia Sinica (Taiwan)）

4:00 PM - 4:15 PM

3:30 PM - 3:45 PM (Mon. Aug 1, 2022 3:30 PM - 4:15 PM Conference Hall (Oval Room))

[CMP2B-01] Optical Field Detector for Sub-Nanojoule Pulses using Insulator-Encapsulated Metal Nanostructures

*Ko Arai[1], Daiki Arai[1], Ikki Morichika[1], Satoshi Ashihara[1] (1. IIS, the University of Tokyo (Japan))

An all-solid-state optical field detector was developed based on field-induced tunneling emission at a metal-insulator interface using plasmon enhancement. Both high photocurrent generation efficiency and high damage tolerance are achieved by completely encapsulating metal nanoantennas.

3:45 PM - 4:00 PM (Mon. Aug 1, 2022 3:30 PM - 4:15 PM Conference Hall (Oval Room))

[CMP2B-02] Degenerate singularities in backward rescattering processes induced by strong infrared fields [Presentation Style] Onsite

*Tomoya Mizuno[1], Tianqi Yang[1], Takayuki Kurihara[1], Nobuhisa Ishii[1], Teruto Kanai[1], Oleg I. Tolstikhin[2], Toru Morishita[3], Jiro Itatani[1] (1. The University of Tokyo (Japan), 2. Moscow Inst. Phys. and Tech. (Russia), 3. UEC (Japan))

[Presentation Style] Onsite

We measure carrier-envelope phase (CEP)-dependent photoelectron momentum distributions (PEMDs) of Kr and CO_2 with linearly-polarized sub-two-cycle near-infrared laser pulses, to experimentally confirm the universality around the backward rescattering caustic.

4:00 PM - 4:15 PM (Mon. Aug 1, 2022 3:30 PM - 4:15 PM Conference Hall (Oval Room))

[CMP2B-03] Laser wakefield acceleration driven by 1-TW laser pulse in a dense, sub-mm nitrogen gas cell [Presentation Style] Online

*Dang Khoa Tran[1], Po- Wei Lai[1], Kun- Ni Liu[1], Xiang- Yuan Lin[2], Ming- Wei Lin[1,2], Hsu- Hsin Chu[3,4], Jyhpyng Wang[3,4,5] (1. Institute of Nuclear Engineering and Science, National Tsing Hua Univ. (Taiwan), 2. Department of Engineering and Science System, National Tsing Hua Univ. (Taiwan), 3. Department of Physics, National Central Univ. (Taiwan), 4. Center for High Energy and High Field Physics, National Central Univ. (Taiwan), 5. Institute of Atomic and Molecular Science, Academia Sinica (Taiwan))

[Presentation Style] Online

We demonstrate the feasibility of using 1-TW, 40-fs laser pulses to generate electrons with peak energy ≈ 9.4 MeV and charge ≈ 32 pC through the laser wakefield acceleration in a dense, 450-um long nitrogen gas cell.

THz Biology and Imaging

Session Chair: Masahiko Tani (Univ. of Fukui)

Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall B (1F)

[CMP3A-01 (Invited)] Biological effects of MMW and THz radiation.
[Presentation Style] Online

*Vincent Wallace[1] （1. University of Western Australia (Australia)）

1:30 PM - 2:00 PM

[CMP3A-02 (Invited)] Active Demethylation of Cancer Cells using Terahertz Radiation for Potential Cancer Treatment
[Presentation Style] Online

*Joo-Hiuk Son[1] （1. University of Seoul (Korea)）

2:00 PM - 2:30 PM

[CMP3A-03] High-dynamic-range nondestructive testing promoted by 200 W peak-power backward terahertz-wave parametric oscillator
[Presentation Style] Onsite

*Kouji Nawata[1], Yuma Takida[1], Takashi Notake[1], Hiroaki Minamide[1] （1. RIKEN (Japan)）

2:30 PM - 2:45 PM

[CMP3A-04] High-resolution Spectral Imaging at ~ 6 THz
[Presentation Style] Onsite

*Cang-He Guo[1], Ming-Hsiung Wu[1], Yen-Chieh Huang[1] （1. National Tsing Hua University (Taiwan)）

2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CMP3A-01 (Invited)] Biological effects of MMW and THz radiation. [Presentation Style] Online

*Vincent Wallace[1] (1. University of Western Australia (Australia))

[Presentation Style] Online

Since regular radiobroadcasts started in the 1920s, the exposure to human-made electromagnetic fields has steadily increased. These days we are not only exposed to radio waves but also other frequencies from a variety of sources, mainly from communication and security devices. Considering that nearly all biological systems interact with electromagnetic fields, understanding their affects is essential for safety and technological progress. Electromagnetic fields have been shown to affect the activity in cell membranes (sodium vs. potassium ion conductivities) and non-selective channels, transmembrane potential, and even the cell cycle. Particular attention is given to the millimeter and terahertz radiation due to their increasing utilization and hence, increasing human exposure. Millimeter waves are known to alter active transport across cell membranes, and it has been reported that terahertz radiation may interfere with DNA and cause genomic instabilities.

2:00 PM - 2:30 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CMP3A-02 (Invited)] Active Demethylation of Cancer Cells using Terahertz Radiation for Potential Cancer Treatment [Presentation Style] Online

*Joo-Hiuk Son[1] (1. University of Seoul (Korea))

[Presentation Style] Online

Carcinogenesis involves DNA methylation which is a primary epigenetic alteration in DNA in the development of cancer before genetic mutation. The methylation has been directly observed by terahertz time-domain spectroscopy and this epigenetic chemical change could be manipulated to the state of demethylation using resonant terahertz radiation.

2:30 PM - 2:45 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CMP3A-03] High-dynamic-range nondestructive testing promoted by 200 W peak-power backward terahertz-wave parametric oscillator [Presentation Style] Onsite

*Kouji Nawata[1], Yuma Takida[1], Takashi Notake[1], Hiroaki Minamide[1] (1. RIKEN (Japan))

[Presentation Style] Onsite

We demonstrated backward terahertz-wave parametric oscillator with a high peak-power of about 200 W at 0.3 THz via cascaded parametric down-conversion process. Terahertz-wave imaging was performed using the developed source for high-dynamic-range nondestructive testing.

2:45 PM - 3:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CMP3A-04] High-resolution Spectral Imaging at ~ 6 THz

[Presentation Style] Onsite

*Cang-He Guo[1], Ming-Hsiung Wu[1], Yen-Chieh Huang[1] （1. National Tsing Hua University (Taiwan)）

[Presentation Style] Onsite

We demonstrated spectral imaging for various materials between 5.43 and 6.1 THz with a pixel dimension down to 100 μm.

THz Source and Device

Session Chair: Yen-Chieh Huang (National Tsing Hua Univ.)
Mon. Aug 1, 2022 3:30 PM - 5:30 PM Mid-sized Hall B (1F)

[CMP3B-01 (Invited)] Controlling the Non-Hermitian Graphene Dirac Plasmons and Its Application to Terahertz Laser Transistors
[Presentation Style] Onsite
*Taiichi Otsuji[1] (1. Tohoku University (Japan))
3:30 PM - 4:00 PM

[CMP3B-02 (Invited(P))] Manipulating Polarization-division Multiplexed Terahertz Signals with Four-wire Waveguides
[Presentation Style] Online
*Junliang Dong[1], Alessandro Tomasino[1], Giacomo Balistreri[1], Pei You[1], Anton Vorobiov[2], Etienne Charette[1], Boris Le Drogoff[1], Mohamed Chaker[1], Aycan Yurtsever[1], Salvatore Stivala[3], Maria A. Vincenti[4], Costantino De Angelis[4], Detlef Kip[2], Jose Azana[1], Roberto Morandotti[1] (1. Institut national de la recherche scientifique (Canada), 2. Helmut Schmidt University (Germany), 3. University of Palermo (Italy), 4. University of Brescia (Italy))
4:00 PM - 4:30 PM

[CMP3B-03] Tsurupica Axicon Lens for high-order terahertz Bessel beam generation
[Presentation Style] Onsite
*Katsuhiko Miyamoto[1,2], Riku Nomura[1], Shota Tsuji[1], Takashige Omatsu[1,2] (1. Chiba Univ. (Japan), 2. MCRC Chiba Univ. (Japan))
4:30 PM - 4:45 PM

[CMP3B-04] Fast and Low-Cost Fabrication of Large-Area Terahertz Metasurface Devices Using Laser-Induced Graphene Technology
[Presentation Style] Online
Zongyuan Wang[1], *Bin Hu[1] (1. Beijing Inst. of Tech. (China))
4:45 PM - 5:00 PM

[CMP3B-05] High-power Narrow-line far-infrared Parametric Source
[Presentation Style] Onsite
Ming-Hsiung Wu[1], *Cang-He Kuo[1], Chieh-Ru Chen[1], Yen-Chieh Huang[1] (1. National Tsing Hua University (Taiwan))
5:00 PM - 5:15 PM

[CMP3B-06] Stable optical beats in laser chaos for THz wave
[Presentation Style] Onsite
*FUMIYOSHI KUWASHIMA[1], Mona Jarrahi[2], Semih Cakmakyapan[2], Osamu Morikawa[3], Takuya Shirao[1], Kazuyuki Iwao[1], Kazuyoshi Kurihara[4], Hideaki Kitahara[5], Takash FURUYA[5], KENJI WADA[6], Makoto NAKAJIMA[7], MASAHIKO TANI[5] (1. Fukui Univ. of Tech. (Japan), 2. Electrical and Computer Engineering Department, University of California Los Angeles (United States of America), 3. Chair of Liberal Arts, Japan Coast Guard Academy (Japan), 4.

School of Education., University. of Fukui (Japan), 5. Research Center for Development of Far-Infrared Region, University of Fukui (Japan), 6. Department of Physics and Electronics, Osaka Prefecture University (Japan), 7. Institute of Laser engineering, Osaka Univ (Japan))

5:15 PM - 5:30 PM

3:30 PM - 4:00 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CMP3B-01 (Invited)] Controlling the Non-Hermitian Graphene Dirac Plasmons and Its Application to Terahertz Laser Transistors
[Presentation Style] Onsite

*Taiichi Otsuji[1] （1. Tohoku University (Japan)）

[Presentation Style] Onsite

We introduce a new scheme of actively controlling the non-Hermitian Dirac plasmons in a graphene-channel laser transistor structure. Numerical simulation demonstrates the capability of 100-Gbit/s-class ultrafast gain-switching by electrically modulating the PT symmetry.

4:00 PM - 4:30 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CMP3B-02 (Invited(P))] Manipulating Polarization-division Multiplexed Terahertz Signals with Four-wire Waveguides
[Presentation Style] Online

*Junliang Dong[1], Alessandro Tomasino[1], Giacomo Balistreri[1], Pei You[1], Anton Vorobiov[2], Etienne Charette[1], Boris Le Drogoff[1], Mohamed Chaker[1], Aycan Yurtsever[1], Salvatore Stivala[3], Maria A. Vincenti[4], Costantino De Angelis[4], Detlef Kip[2], Jose Azana[1], Roberto Morandotti[1] （1. Institut national de la recherche scientifique (Canada), 2. Helmut Schmidt University (Germany), 3. University of Palermo (Italy), 4. University of Brescia (Italy)）

[Presentation Style] Online

We demonstrate a new metal-wire waveguide topology, namely a four-wire waveguide, which simultaneously acts as a broadband terahertz polarization-division multiplexer and a novel platform to realize the independent manipulation of polarization-division multiplexed terahertz signals

4:30 PM - 4:45 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CMP3B-03] Tsurupica Axicon Lens for high-order terahertz Bessel beam generation
[Presentation Style] Onsite

*Katsuhiko Miyamoto[1,2], Riku Nomura[1], Shota Tsuji[1], Takashige Omatsu[1,2] （1. Chiba Univ. (Japan), 2. MCRC Chiba Univ. (Japan)）

[Presentation Style] Onsite

We develop a Tsurupica axicon lens to generate a terahertz (THz) Bessel beam with non-zero orbital angular momentum. The higher-order THz Bessel beams were efficiently generated within the frequency range of 3-6 THz.

4:45 PM - 5:00 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CMP3B-04] Fast and Low-Cost Fabrication of Large-Area Terahertz Metasurface Devices Using Laser-Induced Graphene Technology

[Presentation Style] Online

Zongyuan Wang[1], *Bin Hu[1] (1. Beijing Inst. of Tech. (China))

[Presentation Style] Online

Using a fabrication system with a focal spot ≤5 μm, the LIG-based terahertz metasurface with a size of 15 mm × 15 mm and a resolution of 30 μm can be fabricated in 34 seconds.

5:00 PM - 5:15 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CMP3B-05] High-power Narrow-line far-infrared Parametric Source

[Presentation Style] Onsite

Ming-Hsiung Wu[1], *Cang-He Kuo[1], Chieh-Ru Chen[1], Yen-Chieh Huang[1] (1. National Tsing Hua University (Taiwan))

[Presentation Style] Onsite

We report the generation of narrow-line far-infrared radiation with 100-kW and 142-kW peak powers at 5.7 THz external and internal to a Si prism coupler atop a KTP crystal as a pulsed difference frequency generator.

5:15 PM - 5:30 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CMP3B-06] Stable optical beats in laser chaos for THz wave

[Presentation Style] Onsite

*FUMIYOSHI KUWASHIMA[1], Mona Jarrahi[2], Semih Cakmakyapan[2], Osamu Morikawa[3], Takuya Shirao[1], Kazuyuki Iwao[1], Kazuyoshi Kurihara[4], Hideaki Kitahara[5], Takash FURUYA[5], KENJI WADA[6], Makoto NAKAJIMA[7], MASAHIKO TANI[5] (1. Fukui Univ. of Tech. (Japan), 2. Electrical and Computer Engineering Department, University of California Los Angeles (United States of America), 3. Chair of Liberal Arts, Japan Coast Guard Academy (Japan), 4. School of Education., University. of Fukui (Japan), 5. Research Center for Development of Far-Infrared Region, University of Fukui (Japan), 6. Department of Physics and Electronics, Osaka Prefecture University (Japan), 7. Institute of Laser engineering, Osaka Univ (Japan))

[Presentation Style] Onsite

Stability of optical beats in a chaotically oscillating laser is compared to that of a free-running continuous-wave laser using a highly efficient plasmonic photomixer. Using a chaotically oscillating laser diode, stable optical beats are observed over an operation current range of 60-90 mA.

Oral Session | CLEO-PR2022 | High Power, High Energy Lasers I

High Power, High Energy Lasers I

Session Chairs: Daniel Albach (Inst. of Radiation Physics, HZDR), Ryo Yasuhara (NIFS)
Mon. Aug 1, 2022 1:30 PM - 3:00 PM Small Hall (2F)

[CMP4A-01 (Invited(P))] Wavefront Evaluation of a 250-J Laser “HELIA” toward 10 Hz Operation
[Presentation Style] Online
*Takashi Sekine[1], Yuma Hatano[1], Yuki Muramatsu[1], Takaaki Morita[1], Masateru Kurata[1], Takashi Kurita[1], Yoshinori Tamaoki[1], Takeshi Watari[1], Takuto Iguchi[1], Ryo Yoshimura[1], Yuki Ikeya[1], Yasuki Takeuchi[1], Kazuki Kawai[1], Yujin Zheng[1], Yoshinori Kato[1], Norio Kurita[1], Toshiyuki Kawashima[1] (1. Hamamatsu Photonics K.K. (Japan))
1:30 PM - 2:00 PM

[CMP4A-02] High Energy (pulsed) Diode-pumped Multi-slab Laser Operated at 1.5kW level
[Presentation Style] Onsite
*Patricie Severova[1], Martin Divoky[1], Jan Pilar[1], Martin Hanus[1], Petr Navratil[1], Ondrej Denk[1], Paul Mason[2], Thomas Butcher[2], Saumyabrata Banerjee[2], Maria Stefania De Vido[2], Chris Edwards[2], John Collier[2], Martin Smrz[1], Tomas Mocek[1] (1. HiLASE Centre Institute of Physics of the Czech Academy of Sciences (Czech Republic), 2. Central Laser Facility STFC Rutherford Appleton Laboratory (UK))
2:00 PM - 2:15 PM

[CMP4A-03] Beam shaping in high-energy high-average-power nanosecond laser system Bivoj
[Presentation Style] Onsite
*Tomas Paliesek[1], Petr Navratil[1], Jan Pilar[1], Martin Hanus[1], Martin Divoky[1], Martin Smrz[1], Tomas Mocek[1] (1. HiLASE Centre, Institute of Physics of Czech Academy of Sciences (Czech Republic))
2:15 PM - 2:30 PM

[CMP4A-04] Generation of High Energy Green Pulse Bursts from a DPSSL Amplifier
[Presentation Style] Online
*Paul Mason[1], Hugh Barrett[1], Saumyabrata Banerjee[1], Chris Edwards[1], John Collier[1] (1. Central Laser Facility, STFC, Harwell Campus (UK))
2:30 PM - 2:45 PM

[CMP4A-05] Ozone gas optics for high energy laser applications
[Presentation Style] Onsite
*Yurina Michine[1], Hitoki Yoneda[1] (1. Univ. of Electro-Communications (Japan))
2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Small Hall)

[CMP4A-01 (Invited(P))] Wavefront Evaluation of a 250-J Laser “HELIA” toward 10 Hz Operation [Presentation Style] Online

*Takashi Sekine[1], Yuma Hatano[1], Yuki Muramatsu[1], Takaaki Morita[1], Masateru Kurata[1], Takashi Kurita[1], Yoshinori Tamaoki[1], Takeshi Watari[1], Takuto Iguchi[1], Ryo Yoshimura[1], Yuki Ikeya[1], Yasuki Takeuchi[1], Kazuki Kawai[1], Yujin Zheng[1], Yoshinori Kato[1], Norio Kurita[1], Toshiyuki Kawashima[1] （1. Hamamatsu Photonics K.K. (Japan)）

[Presentation Style] Online

Over 250 J pulse energy with around 30 ns pulse duration at 0.2 Hz repetition rate was demonstrated by laser diode pumped cryogenically cooled Yb:YAG ceramics laser. In this report, experimental results of wavefront deformation and energy amplification on 10 Hz repetition rate condition will be presented.

2:00 PM - 2:15 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Small Hall)

[CMP4A-02] High Energy (pulsed) Diode-pumped Multi-slab Laser Operated at 1.5kW level [Presentation Style] Onsite

*Patricie Severova[1], Martin Divoky[1], Jan Pilar[1], Martin Hanus[1], Petr Navratil[1], Ondrej Denk[1], Paul Mason[2], Thomas Butcher[2], Saumyabrata Banerjee[2], Maria Stefania De Vido[2], Chris Edwards[2], John Collier[2], Martin Smrz[1], Tomas Mocek[1] （1. HiLASE Centre Institute of Physics of the Czech Academy of Sciences (Czech Republic), 2. Central Laser Facility STFC Rutherford Appleton Laboratory (UK)）

[Presentation Style] Onsite

Abstract: Achieving output energy of 146J in 10ns at 10 Hz repetition rate from multi-Joule cryogenic gas-cooled DPSSL is presented. This is 40% energy and power increase in comparison to the most powerful multi-Joule high power laser system.

2:15 PM - 2:30 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Small Hall)

[CMP4A-03] Beam shaping in high-energy high-average-power nanosecond laser system Bivoj [Presentation Style] Onsite

*Tomas Paliesek[1], Petr Navratil[1], Jan Pilar[1], Martin Hanus[1], Martin Divoky[1], Martin Smrz[1], Tomas Mocek[1] （1. HiLASE Centre, Institute of Physics of Czech Academy of Sciences (Czech Republic)）

[Presentation Style] Onsite

We developed a fail-safe programmable beam shaping system that corrects gain non-uniformity in the laser system Bivoj (150 J, 10 Hz, 10 ns) and successfully tested it in the first power amplifier at 6 J at 10 Hz.

2:30 PM - 2:45 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Small Hall)

[CMP4A-04] Generation of High Energy Green Pulse Bursts from a DPSSL Amplifier

[Presentation Style] Online

*Paul Mason[1], Hugh Barrett[1], Saumyabrata Banerjee[1], Chris Edwards[1], John Collier[1] (1. Central Laser Facility, STFC, Harwell Campus (UK))

[Presentation Style] Online

A burst of five green (515 nm) pulses each separated by 29.4 ns (34 MHz) with 2.0 J total energy has been generated at low IR fluence as an alternative pump source for Ti:Sa amplifiers

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2:45 PM - 3:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Small Hall)

[CMP4A-05] Ozone gas optics for high energy laser applications

[Presentation Style] Onsite

*Yurina Michine[1], Hitoki Yoneda[1] (1. Univ. of Electro-Communications (Japan))

[Presentation Style] Onsite

New high damage threshold gas optics is proposed and demonstrated for high energy laser system. In this scheme, we use mixture ozone gas for diffraction of laser pulse. Up to now, we’ ve achieved 95% average diffraction efficiency with relatively long life time(~10ns) under high damage threshold condition.

Oral Session | CLEO-PR2022 | High Power, High Energy Lasers II

High Power, High Energy Lasers II

Session Chairs: Paul Mason (Sci. &Tech. Facilities Council), Jumpei Ogino (Osaka Univ.)

Mon. Aug 1, 2022 3:30 PM - 4:45 PM Small Hall (2F)

[CMP4B-01 (Invited)] Generation of the Highest Laser Intensity of 10^{23} W/cm^2 by Focusing PW Laser Pulses
[Presentation Style] Online

*Jin Woo Yoon[1,2], Il Woo Choi[1,2], Jae Hee Sung[1,2], Hwang Woon Lee[1], Seong Ku Lee[1,2] （1. IBS (Korea), 2. GIST (Korea)）

3:30 PM - 4:00 PM

[CMP4B-02 (Invited)] Suppression of the temporal noise in SULF-10 PW laser
[Presentation Style] Online

*Xu Yi[1], Wang Xinliang [1], Bai Peile[1], Hu Jiabing[1], Zhang Zongxin[1], Liu Yanqi[1], Yu Lianghong[1], Liang Xiaoyan[1], Leng Yuxin[1], Li Ruxin[1] （1. SIOM (China)）

4:00 PM - 4:30 PM

[CMP4B-03] High-Power Laser-Accelerated Protons for Advanced Material Science

*Patrizio Antici[1] （1. INRS (Canada)）

4:30 PM - 4:45 PM

3:30 PM - 4:00 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Small Hall)

[CMP4B-01 (Invited)] Generation of the Highest Laser Intensity of 10^{23} W/cm^2 by Focusing PW Laser Pulses

[Presentation Style] Online

*Jin Woo Yoon[1,2], Il Woo Choi[1,2], Jae Hee Sung[1,2], Hwang Woon Lee[1], Seong Ku Lee[1,2] (1. IBS (Korea), 2. GIST (Korea))

[Presentation Style] Online

We report a demonstration of laser intensity exceeding 10^{23} W/cm^2 by tight focusing and wavefront correction of the CoReLS petawatt laser. This achievement will enable us to explore strong-field quantum electrodynamics phenomena.

4:00 PM - 4:30 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Small Hall)

[CMP4B-02 (Invited)] Suppression of the temporal noise in SULF-10 PW laser

[Presentation Style] Online

*Xu Yi[1], Wang Xinliang [1], Bai Peile[1], Hu Jiabing[1], Zhang Zongxin[1], Liu Yanqi[1], Yu Lianghong[1], Liang Xiaoyan[1], Leng Yuxin[1], Li Ruxin[1] (1. SIOM (China))

[Presentation Style] Online

In SULF-10 PW laser facility, different methods are adopted to suppress different kinds of noise. Nonlinear pulse temporal filter based cascaded XPWG and fs-OPA techniques is utilized to suppress the ASE noise. While novel multi-pass amplifiers with wedged Ti:sapphire crystals are employed to suppress the pre-pulses in both nanosecond and picosecond domain. Applying these methods, temporal contrast about the ASE noise and the pre-pulses can reach 10^{-11} and 10^{-10} in SULF-10 PW laser, respectively.

4:30 PM - 4:45 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Small Hall)

[CMP4B-03] High-Power Laser-Accelerated Protons for Advanced Material Science

*Patrizio Antici[1] (1. INRS (Canada))

Particle and radiation sources are widely employed in manifold applications. In the last decades, the upcoming of versatile, energetic, high-brilliance laser-based sources, as produced by intense laser matter interaction, has introduced utilization of these sources in diverse areas, given their potential to complement or even outperform existing techniques. In this paper, we show that the interaction of an intense laser with a solid target produces a versatile, nondestructive, fast analysis technique This opens the route for a versatile, non destructive, and fast combined analysis technique.

High Capacity Optical Transport I

Session Chair: Takahito Tanimura (Hitachi, Ltd.)

Mon. Aug 1, 2022 2:00 PM - 3:00 PM Room 201&202 (2F)

[CMP9A-01 (Invited)] Ultra-High Symbol Rate Generation via External DAC Multiplexing
[Presentation Style] Online

*Vivian Xi Chen[1] (1. Nokia Bell labs (United States of America))

2:00 PM - 2:30 PM

[CMP9A-02] Real-time Channel Power Monitoring and Optical Layer Signaling Transmission Over 1500 km G.652.D fiber
[Presentation Style] Online

*Baoluo Yan[1,2], Qiong Wu[1,2], Hu Shi[1,2], Zhenhua Feng[1,2], Yinqiu Jia[1,2], Yan Zhao[1,2], Weizhang Chen[1,2], Mo Zhu[1,2], Yu Fang[1,2], Bing Ye[1,2], Hongbing Zou[1,2], Zhiyong Zhao[1,2], Yong Chen[1,2] (1. WDM system department of wireline product R&D institute, ZTE Corp. Beijing (China), 2. State Key Laboratory of Mobile Network and Mobile Multimedia Technology (China))

2:30 PM - 2:45 PM

[CMP9A-03] A Comparison of Linear Regression and Deep Learning Model for EVM Estimation in Coherent Optical Systems
[Presentation Style] Online

*Yuchuan Fan[1,2], Xiaodan Pang[1,2], Aleksejs Udalcovs[2], Carlos Natalino[3], Lu Zhang[4], Sandis Spolitis[5], Vjaceslavs Bobrovs[5], Richard Schatz[1], Xianbin Yu[4], Marija Furdek[3], Sergei Popov[1], Oskars Ozolins[1,2,5] (1. KTH Royal Inst. of Tech. (Sweden), 2. RISE Res. Inst. of Sweden (Sweden), 3. Chalmers Univ. of Tech. (Sweden), 4. Zhejiang Univ. (China), 5. Riga Technical Univ. (Latvia))

2:45 PM - 3:00 PM

2:00 PM - 2:30 PM (Mon. Aug 1, 2022 2:00 PM - 3:00 PM Room 201&202)

[CMP9A-01 (Invited)] Ultra-High Symbol Rate Generation via External DAC Multiplexing
[Presentation Style] Online

*Vivian Xi Chen[1] (1. Nokia Bell labs (United States of America))

[Presentation Style] Online

In this talk, we will present our latest experimental results on 200-GBaud higher order QAM experiment, and will discuss the available options for extending the symbol rate to even higher for future coherent optical transmitters.

2:30 PM - 2:45 PM (Mon. Aug 1, 2022 2:00 PM - 3:00 PM Room 201&202)

[CMP9A-02] Real-time Channel Power Monitoring and Optical Layer Signaling Transmission Over 1500 km G.652.D fiber
[Presentation Style] Online

*Baoluo Yan[1,2], Qiong Wu[1,2], Hu Shi[1,2], Zhenhua Feng[1,2], Yinqiu Jia[1,2], Yan Zhao[1,2], Weizhang Chen[1,2], Mo Zhu[1,2], Yu Fang[1,2], Bing Ye[1,2], Hongbing Zou[1,2], Zhiyong Zhao[1,2], Yong Chen[1,2] (1. WDM system department of wireline product R&D institute, ZTE Corp. Beijing (China), 2. State Key Laboratory of Mobile Network and Mobile Multimedia Technology (China))

[Presentation Style] Online

Using PT modulation, real-time channel power monitoring with 1.5 dB accuracy and optical layer signaling with receiver sensitivity less than -30 dBm after 1500 km transmission are achieved with negligible penalty to 100G/200G traffic.

2:45 PM - 3:00 PM (Mon. Aug 1, 2022 2:00 PM - 3:00 PM Room 201&202)

[CMP9A-03] A Comparison of Linear Regression and Deep Learning Model for EVM Estimation in Coherent Optical Systems
[Presentation Style] Online

*Yuchuan Fan[1,2], Xiaodan Pang[1,2], Aleksejs Udalcovs[2], Carlos Natalino[3], Lu Zhang[4], Sandis Spolitis[5], Vjaceslavs Bobrovs[5], Richard Schatz[1], Xianbin Yu[4], Marija Furdek[3], Sergei Popov[1], Oskars Ozolins[1,2,5] (1. KTH Royal Inst. of Tech. (Sweden), 2. RISE Res. Inst. of Sweden (Sweden), 3. Chalmers Univ. of Tech. (Sweden), 4. Zhejiang Univ. (China), 5. Riga Technical Univ. (Latvia))

[Presentation Style] Online

We experimentally investigate EVM estimation approaches based on linear regression and deep learning for 28 Gbaud coherent optical systems. We show that the estimation performances are comparable when the modulation format is known.

Optical Transmission in Various Media

Session Chair: Koji Igarashi (Osaka Univ.)

Mon. Aug 1, 2022 3:30 PM - 4:15 PM Room 201&202 (2F)

[CMP9B-01] Real-time UWOC Experiments in Indoor Environment Using Multipoint Real-seawater Channel under Constant Water Vibration Generated by 3 m/s Light Wind

[Presentation Style] Online

Takahiro Kodama[1], *Keita Tanaka[1], Fumiya Kobori[1], Tomoya Nakagawa[1], Momoka Masaoka[1], Ayumu Kariya[1], Tomoya Ishikawa[1], Shota Eguchi[1], Yoshiaki Inoue[2], Tomotaka Kimura[3] （1. Kagawa University (Japan), 2. Osaka University (Japan), 3. Doshisha University (Japan)）

3:30 PM - 3:45 PM

[CMP9B-02] Adaptive Power Compensation Using Cross-Gain Modulation of Saturated EDFA in Optical Relay-Assisted FSO Transmission

[Presentation Style] Onsite

*Young-Jin Hyun[1], Won-Ho Shin[1], Sang-Kook Han[1] （1. Broadband Transmission Network laboratory (Korea)）

3:45 PM - 4:00 PM

[CMP9B-03] On the Performance of High Spectral Efficiency CRIP OFDM Scheme over 15-m GI-POF

[Presentation Style] Online

*Yibin Li[1], Zixian Wei[1], Zhaoming Wang[1], Amjad Ali Amjad[2], Qian Li[2], H. Y. Fu[1] （1. Tsinghua Shenzhen International Graduate School and Tsinghua-Berkeley Shenzhen Institute, Tsinghua University. (China), 2. School of Electronic and Computer Engineering, Peking University. (China)）

4:00 PM - 4:15 PM

3:30 PM - 3:45 PM (Mon. Aug 1, 2022 3:30 PM - 4:15 PM Room 201&202)

[CMP9B-01] Real-time UWOC Experiments in Indoor Environment Using Multipoint Real-seawater Channel under Constant Water Vibration Generated by 3 m/s Light Wind
[Presentation Style] Online

Takahiro Kodama[1], *Keita Tanaka[1], Fumiya Kobori[1], Tomoya Nakagawa[1], Momoka Masaoka[1], Ayumu Kariya[1], Tomoya Ishikawa[1], Shota Eguchi[1], Yoshiaki Inoue[2], Tomotaka Kimura[3] (1. Kagawa University (Japan), 2. Osaka University (Japan), 3. Doshisha University (Japan))

[Presentation Style] Online

In an indoor environment of an underwater optical wireless communication system with six coastal, 74 cm seawater vibration channels under weak winds of 3 m/s, we experimentally achieve real-time-BER = 3.8×10^{-3} for all seawater channels.

3:45 PM - 4:00 PM (Mon. Aug 1, 2022 3:30 PM - 4:15 PM Room 201&202)

[CMP9B-02] Adaptive Power Compensation Using Cross-Gain Modulation of Saturated EDFA in Optical Relay-Assisted FSO Transmission
[Presentation Style] Onsite

*Young-Jin Hyun[1], Won-Ho Shin[1], Sang-Kook Han[1] (1. Broadband Transmission Network laboratory (Korea))

[Presentation Style] Onsite

A novel channel pre-compensation based on all-optical relaying FSO transmission system using cross gain modulation characteristic of saturated EDFA is presented and a significant increase in link performance has been experimentally demonstrated.

4:00 PM - 4:15 PM (Mon. Aug 1, 2022 3:30 PM - 4:15 PM Room 201&202)

[CMP9B-03] On the Performance of High Spectral Efficiency CRIP OFDM Scheme over 15-m GI-POF
[Presentation Style] Online

*Yibin Li[1], Zixian Wei[1], Zhaoming Wang[1], Amjad Ali Amjad[2], Qian Li[2], H. Y. Fu[1] (1. Tsinghua Shenzhen International Graduate School and Tsinghua-Berkeley Shenzhen Institute, Tsinghua University. (China), 2. School of Electronic and Computer Engineering, Peking University. (China))

[Presentation Style] Online

A combining real and imaginary parts (CRIP) OFDM is employed to a 15-m graded-index plastic optical fiber to experimentally achieve a higher spectral efficiency up to 11.7 bit/s/Hz than conventional OFDM with BER below 3.8×10^{-3}.

QD Devices and Crystal Growth Technology

Session Chair: Tomohiro Amemiya (Tokyo Tech)

Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 104&105 (1F)

[CMP11A-01] Temperature insensitivity of emission wavelength of highly-stacked quantum dot laser fabricated on InP(311)B substrate with Bi atoms irradiation

[Presentation Style] Onsite

*Kouichi Akahane[1], Atsushi Matsumoto[1], Toshimasa Umezawa[1], Naokatsu Yamamoto[1], Yoriko Tominaga[2], Satoshi Yanase[3], Tomohiro Maeda[3], Hideyuki Sotobayashi[3], Atsushi Kanno[1] (1. Natl. Inst. of Info. and Comm. Tech. (Japan), 2. Hiroshima Univ. (Japan), 3. Aoyama Gakuin Univ. (Japan))

1:30 PM - 1:45 PM

[CMP11A-02] High Optical Feedback Resistance of 1.55 um 15-Layer-Stacked Quantum Dot Laser using InP(311)B Substrate

[Presentation Style] Onsite

*Atsushi Matsumoto[1], Kouichi Akahane[1], Toshimasa Umezawa[1], Naokatsu Yamamoto[1], Kazutaka Kanno[2], Makoto Naruse[3], Atsushi Uchida[2], Atsushi Kanno[1] (1. National Institute of Information and Communications Technology (Japan), 2. Saitama Univ. (Japan), 3. The Univ. Tokyo (Japan))

1:45 PM - 2:00 PM

[CMP11A-03] Temperature Dependence of Mid-infrared Emission Process of InAs/GaSb Superlattices Grown by MOVPE

[Presentation Style] Onsite

*Masakazu Arai[1], Koji Maeda[1], Yuto Iwakiri[1], Takeshi Fujisawa[2] (1. Univ. of Miyazaki (Japan), 2. Hokkaido Univ. (Japan))

2:00 PM - 2:15 PM

[CMP11A-04] Electrode Thickness Dependence of GaAs based Photovoltaic Device Characteristics for Optical Wireless Power Transmission

[Presentation Style] Onsite

*Akira Kushiyama[1], Yuga Motomura[1], Kensuke Nishioka[1], Masakazu Arai[1] (1. University of Miyazaki (Japan))

2:15 PM - 2:30 PM

[CMP11A-05] Post Growth Annealing and InGaSb Layer Insertion Effects of Metamorphic InAsSb on GaAs Substrate

[Presentation Style] Onsite

*Koki Hombu[1], Shota Nakagawa[1], Yuto Iwakiri[1], Koji Maeda[1], Masakazu Arai[1] (1. Univ. of Miyazaki (Japan))

2:30 PM - 2:45 PM

[CMP11A-06] Near-field Analysis of VCSELs after HTOL test

[Presentation Style] Onsite

*Hao-Tien Cheng[1], Taixian Zhang[2], Yun-Cheng Yang[2], Te-Hua Liu[2], Chao-Hsin Wu[1,2] (1. Graduate Inst. of Electronics Engineering, National Taiwan Univ. (Taiwan), 2. Graduate Inst. of Photonics and Optoelectronics, National Taiwan Univ. (Taiwan))

2:45 PM - 3:00 PM

1:30 PM - 1:45 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 104&105)

[CMP11A-01] Temperature insensitivity of emission wavelength of highly-stacked quantum dot laser fabricated on InP(311)B substrate with Bi atoms irradiation
[Presentation Style] Onsite

*Kouichi Akahane[1], Atsushi Matsumoto[1], Toshimasa Umezawa[1], Naokatsu Yamamoto[1], Yoriko Tominaga[2], Satoshi Yanase[3], Tomohiro Maeda[3], Hideyuki Sotobayashi[3], Atsushi Kanno[1] (1. Natl. Inst. of Info. and Comm. Tech. (Japan), 2. Hiroshima Univ. (Japan), 3. Aoyama Gakuin Univ. (Japan))

[Presentation Style] Onsite

The quantum dot laser diodes grown by molecular beam epitaxy with Bi irradiation exhibit a decrease in temperature dependence on the lasing wavelength.

1:45 PM - 2:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 104&105)

[CMP11A-02] High Optical Feedback Resistance of 1.55 um 15-Layer-Stacked Quantum Dot Laser using InP(311)B Substrate
[Presentation Style] Onsite

*Atsushi Matsumoto[1], Kouichi Akahane[1], Toshimasa Umezawa[1], Naokatsu Yamamoto[1], Kazutaka Kanno[2], Makoto Naruse[3], Atsushi Uchida[2], Atsushi Kanno[1] (1. National Institute of Information and Communications Technology (Japan), 2. Saitama Univ. (Japan), 3. The Univ. Tokyo (Japan))

[Presentation Style] Onsite

In this study, we evaluated optical feedback resistance of a 1.55-mm quantum dot (QD) laser diode (LD). Compared to a commercial MQW Fabry-Perot LD, higher feedback resistance could be obtained in the QD-LD.

2:00 PM - 2:15 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 104&105)

[CMP11A-03] Temperature Dependence of Mid-infrared Emission Process of InAs/GaSb Superlattices Grown by MOVPE
[Presentation Style] Onsite

*Masakazu Arai[1], Koji Maeda[1], Yuto Iwakiri[1], Takeshi Fujisawa[2] (1. Univ. of Miyazaki (Japan), 2. Hokkaido Univ. (Japan))

[Presentation Style] Onsite

The mid-infrared emission of InAs/GaSb superlattices grown by MOVPE was compared with the calculated spectrum by perturbation method. Above 90 K, the emission from higher energy transitions is larger than those from the lowest levels.

2:15 PM - 2:30 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 104&105)

[CMP11A-04] Electrode Thickness Dependence of GaAs based Photovoltaic Device Characteristics for Optical Wireless Power Transmission
[Presentation Style] Onsite

*Akira Kushiyama[1], Yuga Motomura[1], Kensuke Nishioka[1], Masakazu Arai[1] (1. University of Miyazaki (Japan))

[Presentation Style] Onsite

We experimentally investigated the mesh shaped electrode thickness dependence of GaAs based photovoltaic device under laser irradiation. Thick electrode was effective to increase the fill factor even under partial irradiation.

2:30 PM - 2:45 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 104&105)

[CMP11A-05] Post Growth Annealing and InGaSb Layer Insertion Effects of Metamorphic InAsSb on GaAs Substrate
[Presentation Style] Onsite

*Koki Hombu[1], Shota Nakagawa[1], Yuto Iwakiri[1], Koji Maeda[1], Masakazu Arai[1] (1. Univ. of Miyazaki (Japan))

[Presentation Style] Onsite

We investigated the effect of post-growth annealing on metamorphic InAsSb on GaAs. The mid-infrared range photoluminescence intensity was improved, however, the surface flatness was deteriorated. The photoluminescence was also improved by inserting the InGaSb layer.

2:45 PM - 3:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 104&105)

[CMP11A-06] Near-field Analysis of VCSELs after HTOL test
[Presentation Style] Onsite

*Hao-Tien Cheng[1], Taixian Zhang[2], Yun-Cheng Yang[2], Te-Hua Liu[2], Chao-Hsin Wu[1,2] (1. Graduate Inst. of Electronics Engineering, National Taiwan Univ. (Taiwan), 2. Graduate Inst. of Photonics and Optoelectronics, National Taiwan Univ. (Taiwan))

[Presentation Style] Onsite

Investigation on the failure mechanisms of 850 nm vertical-cavity surface-emitting laser (VCSEL) chips in the high-temperature operating life (HTOL) stress tests are presented. Selected failed chips are put into further analysis to study their early failure mechanisms.

III/V Waveguide Devices

Session Chair: Yuqing Jiao (Eindhoven Univ. of Tech.)
Mon. Aug 1, 2022 3:30 PM - 5:15 PM Room 104&105 (1F)

[CMP11B-01 (Invited)] 256-Gbit/s PAM-4 directly modulated membrane lasers on SiC substrate
[Presentation Style] Onsite
*Suguru Yamaoka[1], Nikolaos Panteleimon Diamantopoulos[1], Hidetaka Nishi[1], Takuro Fujii[1], Koji Takeda[1], Tatsurou Hiraki[1], Takuma Tsurugaya[1], Shigeru Kanazawa[2], Hiromasa Tanobe[2], Takaaki Kakitsuka[1], Tai Tsuchizawa[1], Fumio Koyama[3], Shinji Matsuo[1] (1. NTT Device Technology Labs (Japan), 2. NTT Device Innovation Center (Japan), 3. Laboratory for Future Interdisciplinary Research of Science and Technology, Tokyo Institute of Technology (Japan))
3:30 PM - 4:00 PM

[CMP11B-02] Proposal of ReLU activation function using III-V semiconductor membrane laser for optical neural network
[Presentation Style] Onsite
*Naoki Takahashi[1], Weicheng Fang[1], Ruihao Xue[1], Shunto Katsumi[1], Yoshitaka Ohiso[1], Tomohiro Amemiya[1,2], Nobuhiko Nishiyama[1,2] (1. Dept. of Electrical and Electronic Eng., Tokyo Tech (Japan), 2. Inst. of Innovative Research, Tokyo Tech (Japan))
4:00 PM - 4:15 PM

[CMP11B-03] Ultracompact and Broadband InP/InGaAsP Polarization Beam Splitter using Brewster's Law
[Presentation Style] Online
*Abdulaziz E. Elfiqi[1], Dawei Yu[2], Haifeng Shao[2], Takuo Tanemura[1], Yoshiaki Nakano[1] (1. The University of Tokyo (Japan), 2. Hisilicon OptoElectronics Co., Ltd. (China))
4:15 PM - 4:30 PM

[CMP11B-04] Al-Free GaAs Optical Phased Array for Near-Infrared Sensing
[Presentation Style] Onsite
*Chensheng Wu[1], Kento Komatsu[1], Rihoko Tsuchiya[1], Takuo Tanemura[1], Yoshiaki Nakano[1] (1. Univ. of Tokyo (Japan))
4:30 PM - 4:45 PM

[CMP11B-05 (Invited)] III-V-on-Silicon-Nitride Mode-Locked Lasers
[Presentation Style] Online
*Stijn Cuyvers[1,2], Artur Hermans[1,2,3], Stijn Poelman[1,2], Camiel Op de Beeck[1,2], Bahawal Haq[1,2], Gunther Roelkens[1,2], Kasper Van Gasse[1,2,4], Bart Kuyken[1,2] (1. Ghent University - Imec (Belgium), 2. Center for Nano- and Biophotonics (Belgium), 3. Research Lab. of Electronics, MIT (United States of America), 4. E. L. Ginzton Lab., Stanford University (United States of America))
4:45 PM - 5:15 PM

3:30 PM - 4:00 PM (Mon. Aug 1, 2022 3:30 PM - 5:15 PM Room 104&105)

[CMP11B-01 (Invited)] 256-Gbit/s PAM-4 directly modulated membrane lasers on SiC substrate

[Presentation Style] Onsite

*Suguru Yamaoka[1], Nikolaos Panteleimon Diamantopoulos[1], Hidetaka Nishi[1], Takuro Fujii[1], Koji Takeda[1], Tatsurou Hiraki[1], Takuma Tsurugaya[1], Shigeru Kanazawa[2], Hiromasa Tanobe[2], Takaaki Kakitsuka[1], Tai Tsuchizawa[1], Fumio Koyama[3], Shinji Matsuo[1] (1. NTT Device Technology Labs (Japan), 2. NTT Device Innovation Center (Japan), 3. Laboratory for Future Interdisciplinary Research of Science and Technology, Tokyo Institute of Technology (Japan))

[Presentation Style] Onsite

A membrane laser on high-thermal-conductivity SiC exhibits a 42-GHz relaxation oscillation frequency because of the large optical confinement and heat dissipation. Photon-photon resonance increases the bandwidth to 108 GHz capable of 256-Gbit/s PAM-4 signal transmission.

4:00 PM - 4:15 PM (Mon. Aug 1, 2022 3:30 PM - 5:15 PM Room 104&105)

[CMP11B-02] Proposal of ReLU activation function using III-V semiconductor membrane laser for optical neural network

[Presentation Style] Onsite

*Naoki Takahashi[1], Weicheng Fang[1], Ruihao Xue[1], Shunto Katsumi[1], Yoshitaka Ohiso[1], Tomohiro Amemiya[1,2], Nobuhiko Nishiyama[1,2] (1. Dept. of Electrical and Electronic Eng., Tokyo Tech (Japan), 2. Inst. of Innovative Research, Tokyo Tech (Japan))

[Presentation Style] Onsite

We introduced programmable low-power-consumption optical ReLU activation function for the fully optical neural network. Optical ReLU function with contrallable threshold was experimentally demonstrated using GaInAsP membrane distributed reflector laser on Si.

4:15 PM - 4:30 PM (Mon. Aug 1, 2022 3:30 PM - 5:15 PM Room 104&105)

[CMP11B-03] Ultracompact and Broadband InP/InGaAsP Polarization Beam Splitter using Brewster's Law

[Presentation Style] Online

*Abdulaziz E. Elfiqi[1], Dawei Yu[2], Haifeng Shao[2], Takuo Tanemura[1], Yoshiaki Nakano[1] (1. The University of Tokyo (Japan), 2. Hisilicon OptoElectronics Co., Ltd. (China))

[Presentation Style] Online

We propose an ultracompact InP/InGaAsP polarization beam splitter based on the Brewster's law. With a footprint of 30×35 μm^2, >20-dB polarization extinction ratio and<0.4-dB insertion loss are obtained over the *C* and *L* bands.

4:30 PM - 4:45 PM (Mon. Aug 1, 2022 3:30 PM - 5:15 PM Room 104&105)

[CMP11B-04] Al-Free GaAs Optical Phased Array for Near-Infrared Sensing

[Presentation Style] Onsite

*Chensheng Wu[1], Kento Komatsu[1], Rihoko Tsuchiya[1], Takuo Tanemura[1], Yoshiaki Nakano[1] (1. Univ. of Tokyo (Japan))

[Presentation Style] Onsite

Al-free GaAs/InGaP-based optical phased array (OPA) working at 905-nm wavelength is numerically demonstrated. Using high-mesa waveguides, large-scale OPA with 128 phase shifters can fit inside 1-mm^2 footprint generating more than 100 resolvable points.

4:45 PM - 5:15 PM (Mon. Aug 1, 2022 3:30 PM - 5:15 PM Room 104&105)

[CMP11B-05 (Invited)] III-V-on-Silicon-Nitride Mode-Locked Lasers

[Presentation Style] Online

*Stijn Cuyvers[1,2], Artur Hermans[1,2,3], Stijn Poelman[1,2], Camiel Op de Beeck[1,2], Bahawal Haq[1,2], Gunther Roelkens[1,2], Kasper Van Gasse[1,2,4], Bart Kuyken[1,2] (1. Ghent University - Imec (Belgium), 2. Center for Nano- and Biophotonics (Belgium), 3. Research Lab. of Electronics, MIT (United States of America), 4. E. L. Ginzton Lab., Stanford University (United States of America))

[Presentation Style] Online

We demonstrate heterogeneously integrated passively mode-locked lasers by microtransfer printing III-V semiconductor optical amplifiers on a silicon nitride photonic chip. A dense and low-noise optical comb is generated, enabling unparalleled precision for on-chip spectroscopy.

2D and Nanocarbon Materials I

Session Chairs: Kazunari Matsuda (Kyoto Univ.), Yuhei Miyauchi (Kyoto Univ.)
Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 206 (2F)

[CMP14A-01 (Invited)] Probing the momentum-resolved dynamics of excitons in 2D semiconductors(TBD)
[Presentation Style] Online
*Keshav Dani[1] (1. Okinawa Inst. of Sci. and Tech., Graduate Univ. (Japan))
1:30 PM - 2:00 PM

[CMP14A-02] Probing the Emission from Hexagonal Boron Nitride with 2D Magnets
[Presentation Style] Online
*Katarzyna Ludwiczak[1], Johannes Binder[1], Aleksandra Krystyna Dąbrowska[1], Joanna Sitnicka[1], Jacek Jasiński[2], Roman Stępniewski[1], Andrzej Wysmołek[1] (1. University of Warsaw (Poland), 2. University of Louisville (United States of America))
2:00 PM - 2:15 PM

[CMP14A-03 (Invited)] Natural hyperbolic plasmon polaritons in 2D materials
[Presentation Style] Online
*Hugen Yan[1] (1. Fudan University (China))
2:15 PM - 2:45 PM

[CMP14A-04] Exciton-phonon interactions in Janus WSSe
[Presentation Style] Onsite
*Ufuk Erkilic[1], Shengnan Wang[1], Yoshitaka Taniyasu[1] (1. NTT Basic Res. Labs. (Japan))
2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 206)

[CMP14A-01 (Invited)] Probing the momentum-resolved dynamics of excitons in 2D semiconductors(TBD)

[Presentation Style] Online

*Keshav Dani[1] (1. Okinawa Inst. of Sci. and Tech., Graduate Univ. (Japan))

[Presentation Style] Online

Using time- and angle-resolved photoemission spectroscopy of microscopic samples of two-dimensional semiconductors, we study the nature of excitonic excitations.

2:00 PM - 2:15 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 206)

[CMP14A-02] Probing the Emission from Hexagonal Boron Nitride with 2D Magnets

[Presentation Style] Online

*Katarzyna Ludwiczak[1], Johannes Binder[1], Aleksandra Krystyna Dąbrowska[1], Joanna Sitnicka[1], Jacek Jasiński[2], Roman Stępniewski[1], Andrzej Wysmołek[1] (1. University of Warsaw (Poland), 2. University of Louisville (United States of America))

[Presentation Style] Online

We found a strong correlation between the optical emission from hexagonal boron nitride and a magnetic phase transition in two-dimensional magnet. Our approach demonstrates a novel method to locally apply magnetic fields and address defects.

2:15 PM - 2:45 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 206)

[CMP14A-03 (Invited)] Natural hyperbolic plasmon polaritons in 2D materials

[Presentation Style] Online

*Hugen Yan[1] (1. Fudan University (China))

[Presentation Style] Online

In-plane hyperbolic plasmon polaritons naturally exist in some 2D materials, which promise applications in on-chip photonics. In this paper, I'll show our investigation of such plasmons in WTe_2 thin films through far-field infrared spectroscopy.

2:45 PM - 3:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 206)

[CMP14A-04] Exciton-phonon interactions in Janus WSSe

[Presentation Style] Onsite

*Ufuk Erkilic[1], Shengnan Wang[1], Yoshitaka Taniyasu[1] （1. NTT Basic Res. Labs. (Japan)）
[Presentation Style] Onsite
Interactions of excitons with phonons determine the exciton dynamics in semiconductors. In this work, by investigating temperature dependence of exciton transition energies and linewidths, we revealed enhanced exciton-phonon interaction in monolayer Janus WSSe.

2D and Nanocarbon Materials II

Session Chairs: Kazunari Matsuda (Kyoto Univ.), Yuhei Miyauchi (Kyoto Univ.)
Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 206 (2F)

[CMP14B-01 (Tutorial)] Raman Spectroscopy for 2-Dimensional Materials Research
[Presentation Style] Online
*Hyeonsik Cheong[1] (1. Sogang University (Korea))
3:30 PM - 4:30 PM

[CMP14B-02] Observation of Moiré Exciton Dynamics in Twisted $MoSe_2$-WSe_2 Heterstrobilayer
[Presentation Style] Onsite
*Heejun Kim[1], Kumpei Aino[1], Keisuke Shinokita[1], Wenjin Zhang[1], Kenji Watanabe[2], Takashi Taniguchi[3], Kazunari Matsuda[1] (1. Inst. of Advanced Energy, Kyoto Univ. (Japan), 2. Res. Center for Fundamental Materials, National Inst. for material science (Japan), 3. Int'l Center for Material Nanoachitecture, National Inst. for Material Science (Japan))
4:30 PM - 4:45 PM

[CMP14B-03 (Invited(P))] Comparison of Light Emission of Metallic Carbon Nanotubes under Laser- and Joule-Heating Conditions
[Presentation Style] Onsite
*Taishi Nishihara[1], Akira Takakura[1], Yuhei Miyauchi[1] (1. Institute of Advanced Energy, Kyoto University (Japan))
4:45 PM - 5:15 PM

[CMP14B-04] Nonlinear Dynamics in Optical Waveguides with CVD-Grown 2D-Material Coating
[Presentation Style] Online
*Gia Quyet Ngo[1], Emad Najafidehaghani[2], Ziyang Gan[2], Sara Khazaee[3], Malte Per Siems[1], Antony George[2], Ulf Peschel[3], Alessandro Tuniz[4], Heike Ebendorff-Heidepriem[5], Markus A. Schmidt[6], Andrey Turchanin[2], Falk Eilenberger[1,7] (1. Friedrich Schiller Univ. Jena, Inst. of Applied Physics (Germany), 2. Friedrich Schiller Univ. Jena, Inst. of Physical Chemistry (Germany), 3. Friedrich Schiller Univ. Jena, Inst. of Solid State Theory and Optics (Germany), 4. University of Sydney, School of Physics (Australia), 5. University of Adelaide, Inst. for Photonics and Advanced Sensing (Australia), 6. Leibniz Inst. of Photonic Technology (Germany), 7. Fraunhofer Inst. for Applied Optics and Precision Engineering (Germany))
5:15 PM - 5:30 PM

3:30 PM - 4:30 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 206)

[CMP14B-01 (Tutorial)] Raman Spectroscopy for 2-Dimensional Materials Research
[Presentation Style] Online

*Hyeonsik Cheong[1] (1. Sogang University (Korea))

[Presentation Style] Online

Raman spectroscopy is a powerful tool to study various physical properties of 2-dimensional (2D) materials. It is routinely used to determine the number of layers, polytypes, and crystallographic directions and to estimate doping or strain in various 2D materials. Its use is further expanded to investigate magnetic ordering in ferromagnetic or antiferromagnetic materials. On the other hand, strong resonance effects induce peculiarities in the Raman spectra that are often misinterpreted by non-specialists. This tutorial is intended for people who use Raman spectroscopy or interpret Raman data in their research but are not Raman specialists. I will review some typical applications of Raman spectroscopy in 2D materials research with specific examples.

4:30 PM - 4:45 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 206)

[CMP14B-02] Observation of Moiré Exciton Dynamics in Twisted $MoSe_2$-WSe_2 Heterstrobilayer
[Presentation Style] Onsite

*Heejun Kim[1], Kumpei Aino[1], Keisuke Shinokita[1], Wenjin Zhang[1], Kenji Watanabe[2], Takashi Taniguchi[3], Kazunari Matsuda[1] (1. Inst. of Advanced Energy, Kyoto Univ. (Japan), 2. Res. Center for Fundamental Materials, National Inst. for material science (Japan), 3. Int'l Center for Material Nanoachitecture, National Inst. for Material Science (Japan))

[Presentation Style] Onsite

We have studied the moiré excitons with bright and dark states by using a temperature-dependent and time-resolved photoluminescence spectroscopy in twisted $MoSe_2$-WSe_2 heterobilayer. The dynamics of moiré excitons has been revealed.

4:45 PM - 5:15 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 206)

[CMP14B-03 (Invited(P))] Comparison of Light Emission of Metallic Carbon Nanotubes under Laser- and Joule-Heating Conditions
[Presentation Style] Onsite

*Taishi Nishihara[1], Akira Takakura[1], Yuhei Miyauchi[1] (1. Institute of Advanced Energy, Kyoto University (Japan))

[Presentation Style] Onsite

We report high temperature light emission of an individual metallic single-walled carbon nanotube under laser- or Joule-heating conditions, which exhibit different spectral shape reflecting on different population of electrons and phonons.

5:15 PM - 5:30 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 206)

[CMP14B-04] Nonlinear Dynamics in Optical Waveguides with CVD-Grown 2D-Material Coating

[Presentation Style] Online

*Gia Quyet Ngo[1], Emad Najafidehaghani[2], Ziyang Gan[2], Sara Khazaee[3], Malte Per Siems[1], Antony George[2], Ulf Peschel[3], Alessandro Tuniz[4], Heike Ebendorff-Heidepriem[5], Markus A. Schmidt[6], Andrey Turchanin[2], Falk Eilenberger[1,7] (1. Friedrich Schiller Univ. Jena, Inst. of Applied Physics (Germany), 2. Friedrich Schiller Univ. Jena, Inst. of Physical Chemistry (Germany), 3. Friedrich Schiller Univ. Jena, Inst. of Solid State Theory and Optics (Germany), 4. University of Sydney, School of Physics (Australia), 5. University of Adelaide, Inst. for Photonics and Advanced Sensing (Australia), 6. Leibniz Inst. of Photonic Technology (Germany), 7. Fraunhofer Inst. for Applied Optics and Precision Engineering (Germany))

[Presentation Style] Online

We report a nonlinear photonics platform possessing a substantial second-order susceptibility and demonstrate the enhancement of second-harmonic generation in resonance with excitons. Here, exposed-core fibers, functionalized with MoS_2 monolayers provide a long light-matter interaction scheme.

Oral Session | CLEO-PR2022 | New Technology

New Technology

Session Chair: Takashi Katagiri (Univ. of Toyama)

Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall A (1F)

[CMP15A-01 (Invited)] Minimally-Invasive Lensless Computational Microendoscopy
[Presentation Style] Online

*Mark A. Foster[1] (1. Johns Hopkins University (United States of America))

1:30 PM - 2:00 PM

[CMP15A-02] Quantification of Natural Killer Cell Activation using Lens-free Shadow Imaging Technology
[Presentation Style] Onsite

*Ahyeon Lee[1], Inha Lee[1], Sanghoon Shin[1], Samir Kumar[1], Minyoung Baik[1], Hyun Sik Jun[1], Sungkyu Seo[1] (1. Korea Univ. (Korea))

2:00 PM - 2:15 PM

[CMP15A-03] Machine Learning-based Blast Cell Detection Using Lens-free Shadow Imaging Technology
[Presentation Style] Onsite

*Minyoung Baik[1], Sanghoon Shin[1], Jinyoung Kim[1], Yeonghun Chae[2], Samir Kumar[1], Ka-Won Kang[1], Byung-Soo Kim[1], Myung-Hyun Nam[1], Ahyeon Lee[1], Sungkyu Seo[1] (1. Korea Univ. (Korea), 2. Season Inc. (Korea))

2:15 PM - 2:30 PM

[CMP15A-04] Cross Detection of Biomarkers Using Electro-Chemically Controlled Photonic Crystal Nanolaser Sensor
[Presentation Style] Onsite

*Shoji Hachuda[1], Hiroya Taguchi[1], Toshihiko Baba[1] (1. Yokohama Nat'l Univ. (Japan))

2:30 PM - 2:45 PM

[CMP15A-05] Randomly localized plasmonic speckles by disordered nanoislands for super-resolution microscopy
[Presentation Style] Online

*Hajun Yoo[1], Hongki Lee[1], Woo Joong Rhee[2], Gwiyeong Moon[1], Changhun Lee[1], Jeon-Soo Shin[2], Donghyun Kim[1] (1. Yonsei Univ. (Korea), 2. Yonsei Univ. College of Medicine (Korea))

2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CMP15A-01 (Invited)] Minimally-Invasive Lensless Computational Microendoscopy
[Presentation Style] Online

*Mark A. Foster[1] （1. Johns Hopkins University (United States of America)）

[Presentation Style] Online

The distal lens is the primary limitation to the invasiveness of microendoscopes. Here we demonstrate a distal lens-free microendoscope that simultaneously achieves miniaturization and exceptionally wide FOV as well as volumetric imaging with computational refocusing.

2:00 PM - 2:15 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CMP15A-02] Quantification of Natural Killer Cell Activation using Lens-free Shadow Imaging Technology
[Presentation Style] Onsite

*Ahyeon Lee[1], Inha Lee[1], Sanghoon Shin[1], Samir Kumar[1], Minyoung Baik[1], Hyun Sik Jun[1], Sungkyu Seo[1] （1. Korea Univ. (Korea)）

[Presentation Style] Onsite

This study presents a novel method for measuring natural killer(NK) cell activity using 470 nm LED light and a CMOS sensor. By measuring the NK cell activity, we can prepare for weakened immunity and diseases.

2:15 PM - 2:30 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CMP15A-03] Machine Learning-based Blast Cell Detection Using Lens-free Shadow Imaging Technology
[Presentation Style] Onsite

*Minyoung Baik[1], Sanghoon Shin[1], Jinyoung Kim[1], Yeonghun Chae[2], Samir Kumar[1], Ka-Won Kang[1], Byung-Soo Kim[1], Myung-Hyun Nam[1], Ahyeon Lee[1], Sungkyu Seo[1] （1. Korea Univ. (Korea), 2. Season Inc. (Korea)）

[Presentation Style] Onsite

We present a method for detecting CD34, a blast marker required for leukemia diagnosis, using a lens-free shadow imaging system based on machine learning with 96% accuracy.

2:30 PM - 2:45 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CMP15A-04] Cross Detection of Biomarkers Using Electro-Chemically Controlled Photonic Crystal Nanolaser Sensor
[Presentation Style] Onsite

*Shoji Hachuda[1], Hiroya Taguchi[1], Toshihiko Baba[1] (1. Yokohama Nat'l Univ. (Japan))
[Presentation Style] Onsite
Using an electro-chemically controlled photonic crystal nanolaser, we succeeded in 100% cross-detection of four biomarkers and detection of COVID-19 spike protein. Both detection limits are in the range of aM to fM.

2:45 PM - 3:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CMP15A-05] Randomly localized plasmonic speckles by disordered nanoislands for super-resolution microscopy
[Presentation Style] Online

*Hajun Yoo[1], Hongki Lee[1], Woo Joong Rhee[2], Gwiyeong Moon[1], Changhun Lee[1], Jeon-Soo Shin[2], Donghyun Kim[1] (1. Yonsei Univ. (Korea), 2. Yonsei Univ. College of Medicine (Korea))
[Presentation Style] Online
Temperature-annealed metallic nanoislands were used to create randomly localized plasmonic nanospeckles. Experimental studies using nanospeckle illumination microscopy (NanoSIM) confirmed that NanoSIM reconstructs images with improved peak-to-peak localization performance compared to diffraction-limited systems.

Oral Session | CLEO-PR2022 | Hardware and System

Hardware and System

Session Chair: Yuji Matsuura (Tohoku Univ.)

Mon. Aug 1, 2022 4:00 PM - 5:00 PM Mid-sized Hall A (1F)

[CMP15B-02] Rapid Three-Dimensional Imaging Using Visible Bessel Beams Eliminating Side Lobe Effects

[Presentation Style] Onsite

*Yuichi Kozawa[1], Yuuki Uesugi[1], Shunichi Sato[1] (1. IMRAM, Tohoku Univ. (Japan))

4:00 PM - 4:15 PM

[CMP15B-03] Highly Efficient Assembly of Bacteria by Portable Optical Condensation System with Multiple Compact Laser Modules

[Presentation Style] Onsite

*Takuya Iida[1,2], Kota Hayashi[1,2,3], Taichi Suehiro[1,2,3], Yasuyuki Yamamoto[1,2,3], Mamoru Tamura[2,4], Ryota Ishikura[2,3], Kenji Sakurai[2,3], Shiho Tokonami[2,3], Hirohito Washida[5], Tsutomu Yamasaki[5], Hiroki Ishikawa[5] (1. Graduate School of Science, Osaka Prefecture University (Japan), 2. Research Institute for Light-induced Acceleration System (RILACS), Osaka Prefecture University (Japan), 3. Graduate School of Engineering, Osaka Prefecture University (Japan), 4. Graduate School of Engineering Science, Osaka University (Japan), 5. Murata Manufacturing Co., Ltd., (Japan))

4:15 PM - 4:30 PM

[CMP15B-04] Biological Tissue Analysis by Mid-infrared Photoacoustic Spectroscopy Using Piezoelectric Transducer

[Presentation Style] Onsite

*Ryota Sasaki[1], Saiko Kino[1], Yuji Matsuura[1] (1. Tohoku Univ. (Japan))

4:30 PM - 4:45 PM

[CMP15B-05] A Computational Efficient Temporal Convolutional Network for Heart Rate Monitoring under Strenuous Exercising Condition using a mm-Wave FMCW Radar

[Presentation Style] Online

*Shih-Hsuan Lai[1], Chun-Chia Chen[1], Chun-Yen Chuang[1], Zai-Yuan Han[1], Kyle Cheng[2], Irwin Chen[2], Vincent Wu[2], Jyehong Chen[1] (1. National Yang Ming Chiao Tung University (Taiwan), 2. Wistron Corporation (Taiwan))

4:45 PM - 5:00 PM

4:00 PM - 4:15 PM (Mon. Aug 1, 2022 4:00 PM - 5:00 PM Mid-sized Hall A)

[CMP15B-02] Rapid Three-Dimensional Imaging Using Visible Bessel Beams Eliminating Side Lobe Effects
[Presentation Style] Onsite

*Yuichi Kozawa[1], Yuuki Uesugi[1], Shunichi Sato[1] (1. IMRAM, Tohoku Univ. (Japan))

[Presentation Style] Onsite

Axially resolved, volumetric imaging using a visible Bessel beam with wavefront modulation for fluorescence is proposed. Rapid acquisition of volumetric images without apparent side lobe effects is demonstrated even for the one-photon excitation process.

4:15 PM - 4:30 PM (Mon. Aug 1, 2022 4:00 PM - 5:00 PM Mid-sized Hall A)

[CMP15B-03] Highly Efficient Assembly of Bacteria by Portable Optical Condensation System with Multiple Compact Laser Modules
[Presentation Style] Onsite

*Takuya Iida[1,2], Kota Hayashi[1,2,3], Taichi Suehiro[1,2,3], Yasuyuki Yamamoto[1,2,3], Mamoru Tamura[2,4], Ryota Ishikura[2,3], Kenji Sakurai[2,3], Shiho Tokonami[2,3], Hirohito Washida[5], Tsutomu Yamasaki[5], Hiroki Ishikawa[5] (1. Graduate School of Science, Osaka Prefecture University (Japan), 2. Research Institute for Light-induced Acceleration System (RILACS), Osaka Prefecture University (Japan), 3. Graduate School of Engineering, Osaka Prefecture University (Japan), 4. Graduate School of Engineering Science, Osaka University (Japan), 5. Murata Manufacturing Co., Ltd., (Japan))

[Presentation Style] Onsite

We developed a portable optical condensation system with multiple compact laser modules, and demonstrated highly efficient light-induced assembly. Remarkably, we succeeded in light-induced assembly of bacteria beyond 10^5 cells within a few minutes.

4:30 PM - 4:45 PM (Mon. Aug 1, 2022 4:00 PM - 5:00 PM Mid-sized Hall A)

[CMP15B-04] Biological Tissue Analysis by Mid-infrared Photoacoustic Spectroscopy Using Piezoelectric Transducer
[Presentation Style] Onsite

*Ryota Sasaki[1], Saiko Kino[1], Yuji Matsuura[1] (1. Tohoku Univ. (Japan))

[Presentation Style] Onsite

A piezoelectric photoacoustic spectroscopy system detecting ultrasound induced by irradiation of mid-infrared laser light is developed. A photoacoustic spectrum of human skin was obtained and an investigation to improve the sensitivity is performed.

4:45 PM - 5:00 PM (Mon. Aug 1, 2022 4:00 PM - 5:00 PM Mid-sized Hall A)

[CMP15B-05] A Computational Efficient Temporal Convolutional Network for Heart Rate Monitoring under Strenuous Exercising Condition using a mm-Wave FMCW Radar [Presentation Style] Online

*Shih-Hsuan Lai[1], Chun-Chia Chen[1], Chun-Yen Chuang[1], Zai-Yuan Han[1], Kyle Cheng[2], Irwin Chen[2], Vincent Wu[2], Jyehong Chen[1] （1. National Yang Ming Chiao Tung University (Taiwan), 2. Wistron Corporation (Taiwan)）

[Presentation Style] Online

A mm-Wave FMCW radar system with a low-complexity temporal convolutional network for non-contact exercise heart-rate monitoring is demonstrated. With around 10% of original parameters, we achieve 85% average accuracy on various types of exercise equipment.

Metamaterial Devices

Session Chairs: Takuo Tanaka (RIKEN), Yu-Jung Lu (Academia Sinica)
Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 204 (2F)

[CMP16A-01 (Invited(P))] High Dimensional Optical Meta-devices: Classical to Quantum
[Presentation Style] Online
*Din Ping TSAI[1], Mu Ku Chen[1], Jingcheng Zhang[1], Xiaoyuan Liu[1] (1. City University of Hong Kong (Hong Kong))
1:30 PM - 2:00 PM

[CMP16A-02] High Transmittance Multicolor Metasurface Holograms Made of Silicon Nitride
[Presentation Style] Onsite
*Masakazu Yamaguchi[1], Hiroki Hiroki[1], Naoyuki Yamada[1], Satoshi Ikezawa[1], Kentaro Iwami[1] (1. Tokyo University of Agriculuture and Technology (Japan))
2:00 PM - 2:15 PM

[CMP16A-03] Meta-optic for Intelligent Imaging and Sensing
[Presentation Style] Online
*Xiaoyuan Liu[1], Mu Ku Chen[1], Yubin Fan[1], Jin Yao[1], Yao Liang[1], Jingcheng Zhang[1], Linshan Sun[1], Din Ping Tsai[1] (1. City University of Hong Kong (Hong Kong))
2:15 PM - 2:30 PM

[CMP16A-04] Plasmonic Color Generation by Metal Nanopillar Array
[Presentation Style] Online
*Yosuke Sugimoto[1], Mana Toma[1], Kotaro Kajikawa[1] (1. Tokyo Institute of Technology (Japan))
2:30 PM - 2:45 PM

[CMP16A-05] Metasurface measuring twisted light in turbulence
[Presentation Style] Online
Thomas Dinter[1], Lucca Kühner[2], Chenhao Li[2], Thomas Weber[2], Andreas Tittl[2], Stefan A. Maier[2,3], Judith M. Dawes[1], *Haoran Ren[1] (1. Macquarie University (Australia), 2. Ludwig-Maximilians-University Munich, Munich (Germany), 3. Imperial College London (UK))
2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 204)

[CMP16A-01 (Invited(P))] High Dimensional Optical Meta-devices: Classical to Quantum [Presentation Style] Online

*Din Ping TSAI[1], Mu Ku Chen[1], Jingcheng Zhang[1], Xiaoyuan Liu[1] (1. City University of Hong Kong (Hong Kong))

[Presentation Style] Online

Meta-devices are ultra-thin optical elements with artificial nanoantennas. The applications of the meta-lens array are discussed from classical to quantum optics. The imaging, sensing, edge detecting, and high-dimensional quantum entanglement light source are demonstrated.

2:00 PM - 2:15 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 204)

[CMP16A-02] High Transmittance Multicolor Metasurface Holograms Made of Silicon Nitride [Presentation Style] Onsite

*Masakazu Yamaguchi[1], Hiroki Hiroki[1], Naoyuki Yamada[1], Satoshi Ikezawa[1], Kentaro Iwami[1] (1. Tokyo University of Agriculuture and Technology (Japan))

[Presentation Style] Onsite

High transmittance multicolor metasurface holograms were fabricated using SiN. The hologram showed successful projection of color image with high brightness. The average transmittance was 97%, which was much higher than that of previous studies.

2:15 PM - 2:30 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 204)

[CMP16A-03] Meta-optic for Intelligent Imaging and Sensing [Presentation Style] Online

*Xiaoyuan Liu[1], Mu Ku Chen[1], Yubin Fan[1], Jin Yao[1], Yao Liang[1], Jingcheng Zhang[1], Linshan Sun[1], Din Ping Tsai[1] (1. City University of Hong Kong (Hong Kong))

[Presentation Style] Online

We developed a meta-lens array based light field imaging system for full-color imaging, depth perception, edge detection and intelligent sensing. We reported the design, fabrication, and applications of the intelligent meta-lens.

2:30 PM - 2:45 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 204)

[CMP16A-04] Plasmonic Color Generation by Metal Nanopillar Array [Presentation Style] Online

*Yosuke Sugimoto[1], Mana Toma[1], Kotaro Kajikawa[1] （1. Tokyo Institute of Technology (Japan)）
[Presentation Style] Online
Metal nanopillar arrays were fabricated by metal deposition on manufactured moth-eye film. They showed plasmonic colors varied by the metal thickness. The colors from metal nanopillars arrays can be applied for colorimetric plasmonic biosensors.

2:45 PM - 3:00 PM (Mon. Aug 1, 2022 1:30 PM - 3:00 PM Room 204)

[CMP16A-05] Metasurface measuring twisted light in turbulence

[Presentation Style] Online

Thomas Dinter[1], Lucca Kühner[2], Chenhao Li[2], Thomas Weber[2], Andreas Tittl[2], Stefan A. Maier[2,3], Judith M. Dawes[1], *Haoran Ren[1] （1. Macquarie University (Australia), 2. Ludwig-Maximilians-University Munich, Munich (Germany), 3. Imperial College London (UK)）
[Presentation Style] Online
Practical free-space communication systems suffer from turbulence-induced phase distortions to propagating beams, destroying the orthogonality of orbital angular momentum (OAM) modes used for space-division multiplexing and introducing modal crosstalk. Here we present the design and use of an ultrathin OAM mode-sorting metasurface for investigating the deterioration of OAM orthogonality under different turbulence conditions, offering a compact, fast and efficient way to measure the OAM spectrum.

Fabrication Technologies for Plasmonics and Metamaterials

Session Chair: Wakana Kubo (Tokyo Univ. of Agriculture and Tech.)

Mon. Aug 1, 2022 3:30 PM - 4:45 PM Room 204 (2F)

[CMP16B-01 (Invited)] 3D Laser Nanoprinting: Recent Progress
[Presentation Style] Online

*Martin Wegener[1] （1. Karlsruhe Institute of Technology (KIT) (Germany)）

3:30 PM - 4:00 PM

[CMP16B-02] Resonant laser printing of photonic metasurfaces -structural colors, metalenses and holograms

*Xiaolong Zhu[1] （1. East China Normal University (China)）

4:00 PM - 4:15 PM

[CMP16B-03] Fabrication technology of a low-loss plasmonic waveguide containing both “plasmonic- friendly” and “plasmonic-unfriendly” metals
[Presentation Style] Online

*Vadym Zayets[1], Iryna Serdeha[2], Valerii Grygoruk[2] （1. AIST (Japan), 2. Kyiv Univ. (Ukraine)）

4:15 PM - 4:30 PM

[CMP16B-04] Experimental Demonstration of Deformation Robust Flexible Flat Optics for the Visible
[Presentation Style] Online

*Arturo Burguete Lopez[1], Maksim Makaarenko[1], Fedor Getman[1], Qizhou Wang[1], Andrea Fratalocchi[1] （1. King Abdullah University of Science and Technology (Saudi Arabia)）

4:30 PM - 4:45 PM

3:30 PM - 4:00 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Room 204)

[CMP16B-01 (Invited)] 3D Laser Nanoprinting: Recent Progress
[Presentation Style] Online

*Martin Wegener[1] (1. Karlsruhe Institute of Technology (KIT) (Germany))

[Presentation Style] Online

Two-photon 3D printing has become a mature technology. Here, we review our efforts on using two-step absorption instead of two-photon absorption. The approach works with low-power continuous-wave laser diodes. We present one- and two-color results.

4:00 PM - 4:15 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Room 204)

[CMP16B-02] Resonant laser printing of photonic metasurfaces - structural colors, metalenses and holograms

*Xiaolong Zhu[1] (1. East China Normal University (China))

We introduced a resonant laser printing (RLP) technique as a feasible photo-thermal post-writing technology for mass-customization of photonic metasurfaces for use in structural color, metalens and hologram applications.

4:15 PM - 4:30 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Room 204)

[CMP16B-03] Fabrication technology of a low-loss plasmonic waveguide containing both “plasmonic- friendly” and “plasmonic- unfriendly” metals
[Presentation Style] Online

*Vadym Zayets[1], Iryna Serdeha[2], Valerii Grygoruk[2] (1. AIST (Japan), 2. Kyiv Univ. (Ukraine))

[Presentation Style] Online

Fabrication technology, which allows a substantial decrease of the plasmonic propagation loss for both a “plasmon- friendly” metal like Au, Cu or Al and “plasmon- unfriendly” metal like Co, Fe or Cr, have been developed and experimentally demonstrated. Optimization of the optical confinement is used to reduce the propagation loss below 1 dB per a plasmonic device.

4:30 PM - 4:45 PM (Mon. Aug 1, 2022 3:30 PM - 4:45 PM Room 204)

[CMP16B-04] Experimental Demonstration of Deformation Robust Flexible Flat Optics for the Visible
[Presentation Style] Online

*Arturo Burguete Lopez[1], Maksim Makaarenko[1], Fedor Getman[1], Qizhou Wang[1], Andrea Fratalocchi[1] (1. King Abdullah University of Science and Technology (Saudi Arabia))

[Presentation Style] Online

We present experimentally realized flexible flat optics polarizers for the visible range. We show that upon curving the devices, their polarization efficiency is maintained within 5% with an 85% maximum efficiency.

THz Transmission System

Session Chair: Shota Ishimura (KDDI Research Inc.)

Mon. Aug 1, 2022 1:30 PM - 2:45 PM Room 207 (2F)

[CMP18A-01] Output Power Enhancement in Photonic-Based RF Generation by Optical Pulse Compression: Performance Improvement of 300-GHz band 10-Gbit/s ASK system
[Presentation Style] Onsite

Keita Toichi[1], Yuta Uemura[1], Keita Ogawa[2], Wataru Tada[2], Masayuki Suzuki[2], *Hiroyuki Toda[2], Masayuki Fujita[1], Tadao Nagatsuma[1] (1. Osaka Univ. (Japan), 2. Doshisha Univ. (Japan))

1:30 PM - 1:45 PM

[CMP18A-02] Demonstration of THz wireless transmission using cost-effective directly modulated laser for real-time ultra high definition video streaming service
[Presentation Style] Onsite

*Eon-sang Kim[1], Sang-rok Moon[1], Minkyu Sung[1], Joon Ki Lee[1], Seung-hyun Cho[1] (1. Electronics and Telecommunications Research Inst. (Korea))

1:45 PM - 2:00 PM

[CMP18A-03] Photonic-Wireless Seamless Network to support 6G Radio Access Network in Terahertz Band
[Presentation Style] Online

*Minkyu Sung[1], Eon-Sang Kim[1], Sang-Rok Moon[1], Joon Ki Lee[1], Seung-Hyun Cho[1] (1. Electronics and Telecommunications Research Institute (ETRI) (Korea))

2:00 PM - 2:15 PM

[CMP18A-04 (Invited)] Multi-dimensional Multiplexed Fiber-Wireless Transmission in the THz Band
[Presentation Style] Online

*Xianbin Yu[1,2], Hongqi Zhang[1], Zuomin Yang[1], Zijie Lu[1], Shiwei Wang[1], Xiaodan Pang[3], Lu Zhang[1,2], Xianmin Zhang[1] (1. Zhejiang University (China), 2. Zhejiang Lab (China), 3. KTH Royal Institute of Technology (Sweden))

2:15 PM - 2:45 PM

1:30 PM - 1:45 PM (Mon. Aug 1, 2022 1:30 PM - 2:45 PM Room 207)

[CMP18A-01] Output Power Enhancement in Photonic-Based RF Generation by Optical Pulse Compression: Performance Improvement of 300-GHz band 10-Gbit/s ASK system [Presentation Style] Onsite

Keita Toichi[1], Yuta Uemura[1], Keita Ogawa[2], Wataru Tada[2], Masayuki Suzuki[2], *Hiroyuki Toda[2], Masayuki Fujita[1], Tadao Nagatsuma[1] (1. Osaka Univ. (Japan), 2. Doshisha Univ. (Japan))

[Presentation Style] Onsite

We experimentally demonstrate performance improvement of photonic-based 300-GHz band 10-Gbit/s ASK system by optical pulse compression in a highly nonlinear fiber. The amplitude of the received eye pattern is increased by 8.1 dB.

1:45 PM - 2:00 PM (Mon. Aug 1, 2022 1:30 PM - 2:45 PM Room 207)

[CMP18A-02] Demonstration of THz wireless transmission using cost-effective directly modulated laser for real-time ultra high definition video streaming service [Presentation Style] Onsite

*Eon-sang Kim[1], Sang-rok Moon[1], Minkyu Sung[1], Joon Ki Lee[1], Seung-hyun Cho[1] (1. Electronics and Telecommunications Research Inst. (Korea))

[Presentation Style] Onsite

We demonstrate a seamless UHD video streaming service over a cost-effective directly modulated DFB-LD-based terahertz wireless link with more than 2-m link distance. The uncompressed 4K video signals were successfully transmitted with no black frames.

2:00 PM - 2:15 PM (Mon. Aug 1, 2022 1:30 PM - 2:45 PM Room 207)

[CMP18A-03] Photonic-Wireless Seamless Network to support 6G Radio Access Network in Terahertz Band [Presentation Style] Online

*Minkyu Sung[1], Eon-Sang Kim[1], Sang-Rok Moon[1], Joon Ki Lee[1], Seung-Hyun Cho[1] (1. Electronics and Telecommunications Research Institute (ETRI) (Korea))

[Presentation Style] Online

We experimentally demonstrate the photonic-wireless network for 6G-RAN in 0.3 terahertz. Technical consideration for implementation of photonic-wireless network is discussed through noise contribution analysis.

2:15 PM - 2:45 PM (Mon. Aug 1, 2022 1:30 PM - 2:45 PM Room 207)

[CMP18A-04 (Invited)] Multi-dimensional Multiplexed Fiber-Wireless Transmission in the THz Band

[Presentation Style] Online

*Xianbin Yu[1,2], Hongqi Zhang[1], Zuomin Yang[1], Zijie Lu[1], Shiwei Wang[1], Xiaodan Pang[3], Lu Zhang[1,2], Xianmin Zhang[1] （1. Zhejiang University (China), 2. Zhejiang Lab (China), 3. KTH Royal Institute of Technology (Sweden)）

[Presentation Style] Online

We propose and experimentally demonstrate multi-dimensional multiplexed THz photonic wireless communication systems, achieving wireless net data rates of up to 510 Gbit/s and 1.059 Tbit/s in the 350 GHz band.

Oral Session | CLEO-PR2022 | Devices and Subsystems for Microwave Photonics

Devices and Subsystems for Microwave Photonics

Session Chair: Hiroyuki Toda (Doshisha Univ)

Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 207 (2F)

[CMP18B-01 (Invited)] THz and photonics convergence for future access links
[Presentation Style] Onsite
*Tetsuya Kawanishi Kawanishi[1] (1. Waseda University (Japan))
3:30 PM - 4:00 PM

[CMP18B-02] 5G Wireless-Optical Signal Converter Using Antenna-Coupled Electrode Electro-Optic Modulator and WDM Add/Drop Filters
[Presentation Style] Onsite
Hiroto Miyazaki[1], Hiroto Yokohashi[1], *Hiroshi Murata[1] (1. Mie Univ. (Japan))
4:00 PM - 4:15 PM

[CMP18B-03] Antenna-Coupled Optical Modulators Using Electro-Optic Polymer Waveguides and Non-Coplanar Patch Antennas
[Presentation Style] Onsite
*Takahiro Kaji[1], Isao Morohashi[1], Yukihiro Tominari[1], Toshiki Yamada[1], Akira Otomo[1] (1. NICT (Japan))
4:15 PM - 4:30 PM

[CMP18B-04] Spectrally Efficient THz-wave Multi-carrier Wireless Communication Using THz-domain Fourier Transformation-type Demultiplexer
[Presentation Style] Onsite
*Koichi Takiguchi[1], Nozomu Nishio[1] (1. Ritsumeikan Univ. (Japan))
4:30 PM - 4:45 PM

[CMP18B-05] Dual-comb-based Microwave Photonic Beamforming
[Presentation Style] Online
*Mian Wang[1], XiaoXiao Xue[1], Yunlu Xing[1], Shangyuan Li[1], Xiaoping Zheng[1] (1. Tsinghua Univ. (China))
4:45 PM - 5:00 PM

[CMP18B-06 (Invited)] Actuating stimulated Brillouin scattering in silicon nitride photonic circuits
[Presentation Style] Online
Kaixuan Ye[1], Roel Botter[1], Okky Daulay[1], Yvan Klaver[1], *David Marpaung[1] (1. Univ. of Twente (Netherlands))
5:00 PM - 5:30 PM

3:30 PM - 4:00 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 207)

[CMP18B-01 (Invited)] THz and photonics convergence for future access links

[Presentation Style] Onsite

*Tetsuya Kawanishi Kawanishi[1] (1. Waseda University (Japan))

[Presentation Style] Onsite

We review seamless networks consisting of THz radio and optical fiber links. Transmission distance of THz links is shorter than 1km, but is longer than typical radii of small cells for future mobile networks.

4:00 PM - 4:15 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 207)

[CMP18B-02] 5G Wireless-Optical Signal Converter Using Antenna-Coupled Electrode Electro-Optic Modulator and WDM Add/Drop Filters

[Presentation Style] Onsite

Hiroto Miyazaki[1], Hiroto Yokohashi[1], *Hiroshi Murata[1] (1. Mie Univ. (Japan))

[Presentation Style] Onsite

A 5G wireless-optical signal converter module is fabricated using an antenna-coupled electrode electro-optic modulator and WDM add/drop filters. This is suitable for a passive signal converter for up-link in mobile front-hauls in dense user environment.

4:15 PM - 4:30 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 207)

[CMP18B-03] Antenna-Coupled Optical Modulators Using Electro-Optic Polymer Waveguides and Non-Coplanar Patch Antennas

[Presentation Style] Onsite

*Takahiro Kaji[1], Isao Morohashi[1], Yukihiro Tominari[1], Toshiki Yamada[1], Akira Otomo[1] (1. NICT (Japan))

[Presentation Style] Onsite

We fabricated 150-GHz-band antenna-coupled optical modulators using electro-optic (EO) polymer waveguides and non-coplanar patch antennas using a transfer method of a poled EO polymer film and evaluated the device characteristics.

4:30 PM - 4:45 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 207)

[CMP18B-04] Spectrally Efficient THz-wave Multi-carrier Wireless Communication Using THz-domain Fourier Transformation-type Demultiplexer

[Presentation Style] Onsite

*Koichi Takiguchi[1], Nozomu Nishio[1] （1. Ritsumeikan Univ. (Japan)）

[Presentation Style] Onsite

We report on spectrally efficient multi-carrier wireless communication in the 300 GHz-band with a THz-domain Fourier transformation-based channel demultiplexer. We carried out 4 x 7.0 Gsymbol/s communication with the spectral efficiency of about 0.6 symbol/s/Hz.

4:45 PM - 5:00 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 207)

[CMP18B-05] Dual-comb-based Microwave Photonic Beamforming

[Presentation Style] Online

*Mian Wang[1], XiaoXiao Xue[1], Yunlu Xing[1], Shangyuan Li[1], Xiaoping Zheng[1] （1. Tsinghua Univ. (China)）

[Presentation Style] Online

A novel scheme based on heterodyning of dual optical frequency combs is proposed for wideband phased arrays. True-time-delay beam steering can be achieved without the need for complex delay lines.

5:00 PM - 5:30 PM (Mon. Aug 1, 2022 3:30 PM - 5:30 PM Room 207)

[CMP18B-06 (Invited)] Actuating stimulated Brillouin scattering in silicon nitride photonic circuits

[Presentation Style] Online

Kaixuan Ye[1], Roel Botter[1], Okky Daulay[1], Yvan Klaver[1], *David Marpaung[1] （1. Univ. of Twente (Netherlands)）

[Presentation Style] Online

Stimulated Brillouin scattering (SBS) can enable high-resolution signal processing. Here, we demonstrate advanced control of SBS in multilayer silicon nitride waveguides. We further utilize the SBS gain to demonstrate a high-rejection microwave photonic notch filter.

Oral Session | CLEO-PR2022 | CLEO-PR 2022 Post Deadline

CLEO-PR 2022 Post Deadline

Session Chair: Fumihiko Kannari (Keio Univ.)

Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall (2F)

[CPDP-02] Actively controlled two bit Binary Coding in Graphene assisted Terahertz Metasurface

[Presentation Style] Online

*Dhriti Maurya[1], Gagan Kumar[1] （1. Indian Institute of Technology Guwahati (India)）

6:15 PM - 6:30 PM

[CPDP-03] Low threshold plasmonic lattice laser based on $CsPbBr_3$ quantum dots with directional emission

[Presentation Style] Online

*Di Xing[1], Cheng-Chieh Lin[2,3,4], Ya-Lun Ho [1], Yang-Chun Lee[1], Mu-Hsin Chen[1], Bo-Wei Lin[1], Chun-Wei Chen[2,3,5], Jean-Jacques Delaunay[1] （1. The Univ. of Tokyo (Japan), 2. Int'l. Graduate Program of Molecular Sci. and Tech, National Taiwan Univ. and Academia Sinica, (Taiwan), 3. Department of Materials Sci. and Eng., National Taiwan Univ. (Taiwan), 4. Molecular Sci. and Tech. Program, Taiwan Int'l Graduate Program, Academia Sinica (Taiwan), 5. Center of Atomic Initiative for New Materials, National Taiwan Univ. (Taiwan)）

6:30 PM - 6:45 PM

[CPDP-04] Optical Coupling between a Single Tin-vacancy Center and a Photonic Crystal Nanocavity in Diamond

*Kazuhiro Kuruma[1], Benjamin Pingault[1,2], Cleaven Chia[1], Dylan Renaud[1], Patrick Hoffmann[3], Satoshi Iwamoto[4], Carsten Ronning[3], Marko Lončar[1] （1. Harvard Univ. (United States of America), 2. Delft Univ. of Tech. (Netherlands), 3. Friedrich Schiller Univ. of Jena (Germany), 4. The Univ. of Tokyo (Japan)）

6:45 PM - 7:00 PM

[CPDP-05] A Machine Learning-based Approach to Model Highly-thermally Robust Metasurface Absorber

[Presentation Style] Online

Sumbel Ijaz[1], Sadia Noureen[1], Bacha Rehman[2], Muhammad Zubair[1], Muhammad Qasim Mehmood[1], *Yehia Massoud[3] （1. MicroNano Lab, Electrical Engineering Department, Information Technology University of the Punjab, Lahore 54600, Pakistan (Pakistan), 2. Department of Computer Science, Namal University, Mianwali, Punjab, Pakistan (Pakistan), 3. Innovative Technologies Laboratories (ITL), Electrical and Computer Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal 23955, Saudi Arabia (Saudi Arabia)）

7:00 PM - 7:15 PM

[CPDP-06] On-chip chiral-field-enhanced Raman optical activity for biosensing

[Presentation Style] Onsite

*Tinghui Xiao[1], Zhenyi Luo[1], Kotaro Hiramatsu[1], Akihiro Isozaki[1], Tamitake Itoh[2], Zhenzhou Cheng[3], Masahiro Nomura[1], Satoshi Iwamoto[1], Keisuke Goda[1,4,5] （1. University of Tokyo (Japan), 2. National Institute of Advanced Industrial Science and Technology (Japan), 3. Tianjin University (China), 4. Wuhan University (China), 5. University of California, Los Angeles (United States of America)）

7:15 PM - 7:30 PM

[CPDP-07] Over-one-octave PM hollow-core anti-resonance fiber with ultralow polarization-mode coupling
[Presentation Style] Online

*Zhuozhao Luo[1,2,3], Jiapeng Huang[2,3], Yu Zheng[1,4], Zhiyuan Huang[2], Ruochen Yin[4], Xiaocong Wang[2], Haihu Yu[1], Xin Jiang[1,3,5], Meng Pang[2,3] （1. National Engineering Lab. for Fiber Optic Sensing Tech., Wuhan Univ. of Tech. (China), 2. State Key Lab. of High Field Laser Physics, Shanghai Inst. of Optics and Fine Mechanics (China), 3. Russell Centre for Advanced Lightwave Sci. (RCALS), Hangzhou Inst. of Optics and Fine Mechanics (China), 4. iFiber Optoelectronics Tech. Co., Ltd. (China), 5. Max-Planck-Inst. for the Sci. of Light (Germany)）

7:30 PM - 7:45 PM

[CPDP-08] Detection of PM 2.5 Particulates using a Snap-Shot Hyperspectral Imaging Technology
[Presentation Style] Online

*Arvind Mukundan[1], Hsiang -Chen Wang[1], Nguyen Hong -Thai[1] （1. National Chung Cheng University (Taiwan)）

7:45 PM - 8:00 PM

[CPDP-09] 10 J, 100 Hz, 1 kW conductive-cooled active-mirror laser
[Presentation Style] Onsite

*Jumpei Ogino[1], Koji Tsubakimoto[1], Hidetsugu Yoshida[1], Shinji Motokoshi[2], Noboru Morio[1], Keiko Matsumoto[1], Kana Fujioka[1], Shigeki Tokita[3], Noriaki Miyanaga[1,2], Ken-ichi Ueda[1,4], Ryousuke Kodama[1], Akifumi Yogo[1] （1. ILE, Osaka Univ (Japan), 2. ILT (Japan), 3. ICR, Kyoto Univ. (Japan), 4. ILS/UEC (Japan)）

8:00 PM - 8:15 PM

[CPDP-10] Observation of high-order Laguerre-Gaussian beams from a diamond Raman laser
[Presentation Style] Online

*Hui Chen[1,2], Yu Zhang[1,2], Hongwei Guo[1,2], Jiashuo An[1,2], Zhenxu Bai[1,2] （1. Hebei Univ. of Tech. (China), 2. Hebei Key Lab. of Adv. Laser Tech. and Eq. (China)）

8:15 PM - 8:30 PM

[CPDP-11] Continuously Wavelength-Tunable Coherent EUV and Soft X-ray Light for Dynamic Magnetic Imaging and Metrology
[Presentation Style] Online

Dimitar Popmintchev[2], Aref Imani[2], Roman Joris[2], Siyang Wang[1], Will Brunner[1], Jieyu Yan[1], Paolo Carpeggiani[2], Valentina Shumakova[2], Edgar Kaksis[2], Tobias Flöry[2], Elizaveta Gangrskaia[2], Audrius Pugzlys[2], Andrius Baltuska[2], *Tenio Popmintchev[1,2] （1. University of California San Diego (United States of America), 2. TU Wien (Austria)）

8:30 PM - 8:45 PM

[CPDP-12] Spin-isolated Meta-Holographic Displays at Broadband UV-VIS Regimes
[Presentation Style] Online

Aqsa Asad[1], Hafiz Saad Khaliq[1], Nasir Mahmood[1], Muhammad Qasim Mehmood[1], *Yehia Massoud[1] （1. Innovative Technologies Laboratories (ITL), King Abdullah University of Science and Technology (KAUST), Thuwal 23955, Saudi Arabia (Saudi Arabia)）

8:45 PM - 9:00 PM

6:15 PM - 6:30 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-02] Actively controlled two bit Binary Coding in Graphene assisted Terahertz Metasurface
[Presentation Style] Online

*Dhriti Maurya[1], Gagan Kumar[1] (1. Indian Institute of Technology Guwahati (India))

[Presentation Style] Online

A two bit binary coder based on graphene assisted terahertz (THz) metasurface is demonstrated. By tuning the Fermi energy, four different binary codes are obtained in the transmission which could be useful in THz communication.

6:30 PM - 6:45 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-03] Low threshold plasmonic lattice laser based on $CsPbBr_3$ quantum dots with directional emission
[Presentation Style] Online

*Di Xing[1], Cheng-Chieh Lin[2,3,4], Ya-Lun Ho [1], Yang-Chun Lee[1], Mu-Hsin Chen[1], Bo-Wei Lin[1], Chun-Wei Chen [2,3,5], Jean-Jacques Delaunay[1] (1. The Univ. of Tokyo (Japan), 2. Int'l. Graduate Program of Molecular Sci. and Tech, National Taiwan Univ. and Academia Sinica, (Taiwan), 3. Department of Materials Sci. and Eng., National Taiwan Univ. (Taiwan), 4. Molecular Sci. and Tech. Program, Taiwan Int'l Graduate Program, Academia Sinica (Taiwan), 5. Center of Atomic Initiative for New Materials, National Taiwan Univ. (Taiwan))

[Presentation Style] Online

In this work, we present a pressure-assisted recrystallization process for low-roughness and compact $CsPbBr_3$ quantum dots thin film and demonstrate a $CsPbBr_3$ quantum dots based surface lattice resonance laser with a low lasing threshold.

6:45 PM - 7:00 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-04] Optical Coupling between a Single Tin-vacancy Center and a Photonic Crystal Nanocavity in Diamond

*Kazuhiro Kuruma[1], Benjamin Pingault[1,2], Cleaven Chia[1], Dylan Renaud[1], Patrick Hoffmann[3], Satoshi Iwamoto [4], Carsten Ronning[3], Marko Lončar[1] (1. Harvard Univ. (United States of America), 2. Delft Univ. of Tech. (Netherlands), 3. Friedrich Schiller Univ. of Jena (Germany), 4. The Univ. of Tokyo (Japan))

We demonstrate coupling of a tin-vacancy (SnV) center and a photonic crystal nanobeam cavity in diamond. We observed a 12-hold intensity enhancement of SnV emission and a 16-hold reduction in its lifetime under resonance conditions.

7:00 PM - 7:15 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-05] A Machine Learning-based Approach to Model Highly-

thermally Robust Metasurface Absorber
[Presentation Style] Online

Sumbel Ijaz[1], Sadia Noureen[1], Bacha Rehman[2], Muhammad Zubair[1], Muhammad Qasim Mehmood[1], *Yehia Massoud[3] （1. MicroNano Lab, Electrical Engineering Department, Information Technology University of the Punjab, Lahore 54600, Pakistan (Pakistan), 2. Department of Computer Science, Namal University, Mianwali, Punjab, Pakistan (Pakistan), 3. Innovative Technologies Laboratories (ITL), Electrical and Computer Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal 23955, Saudi Arabia (Saudi Arabia)）

[Presentation Style] Online

For accelerating design procedure of compact and efficient on-chip nano-photonics and to aid computationally expensive, time-exhaustive state-of-the-art iterative simulation schemes, regression-based machine-learning models are demonstrated that predict the optical response and structural parameters of the meta-atoms

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7:15 PM - 7:30 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-06] On-chip chiral-field-enhanced Raman optical activity for biosensing
[Presentation Style] Onsite

*Tinghui Xiao[1], Zhenyi Luo[1], Kotaro Hiramatsu[1], Akihiro Isozaki[1], Tamitake Itoh[2], Zhenzhou Cheng[3], Masahiro Nomura[1], Satoshi Iwamoto[1], Keisuke Goda[1,4,5] （1. University of Tokyo (Japan), 2. National Institute of Advanced Industrial Science and Technology (Japan), 3. Tianjin University (China), 4. Wuhan University (China), 5. University of California, Los Angeles (United States of America)）

[Presentation Style] Onsite

We demonstrate on-chip chiral-field-enhanced Raman optical activity (ROA) by tailoring a dark mode excited in a silicon nanodisk array. We show >100x enhanced chiral light-molecule interaction with negligible artifacts for ROA measurement of biological enantiomers.

7:30 PM - 7:45 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-07] Over-one-octave PM hollow-core anti-resonance fiber with ultralow polarization-mode coupling
[Presentation Style] Online

*Zhuozhao Luo[1,2,3], Jiapeng Huang[2,3], Yu Zheng[1,4], Zhiyuan Huang[2], Ruochen Yin[4], Xiaocong Wang[2], Haihu Yu[1], Xin Jiang[1,3,5], Meng Pang[2,3] （1. National Engineering Lab. for Fiber Optic Sensing Tech., Wuhan Univ. of Tech. (China), 2. State Key Lab. of High Field Laser Physics, Shanghai Inst. of Optics and Fine Mechanics (China), 3. Russell Centre for Advanced Lightwave Sci. (RCALS), Hangzhou Inst. of Optics and Fine Mechanics (China), 4. iFiber Optoelectronics Tech. Co., Ltd. (China), 5. Max-Planck-Inst. for the Sci. of Light (Germany)）

[Presentation Style] Online

A hollow-core anti-resonance fiber, featured with an elliptical-core structure, was fabricated and characterized, exhibiting broad-bandwidth (>900 nm), robust polarization-maintaining performance with ultra-low h-parameter of 10^{-8} m^{-1}.

7:45 PM - 8:00 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-08] Detection of PM 2.5 Particulates using a Snap-Shot Hyperspectral Imaging Technology
[Presentation Style] Online

*Arvind Mukundan[1], Hsiang -Chen Wang[1], Nguyen Hong -Thai[1] （1. National Chung Cheng University (Taiwan)）

[Presentation Style] Online

In this paper, visible light hyperspectral imaging technology combined with VGG-16 to estimate PM2.5 concentration in images captured aerially using three different methods; RGB, Principal component Analysis, and 3D-CAE, and their accuracy is compared.

8:00 PM - 8:15 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-09] 10 J, 100 Hz, 1 kW conductive-cooled active-mirror laser
[Presentation Style] Onsite

*Jumpei Ogino[1], Koji Tsubakimoto[1], Hidetsugu Yoshida[1], Shinji Motokoshi[2], Noboru Morio[1], Keiko Matsumoto[1], Kana Fujioka[1], Shigeki Tokita[3], Noriaki Miyanaga[1,2], Ken-ichi Ueda[1,4], Ryousuke Kodama[1], Akifumi Yogo[1] （1. ILE, Osaka Univ (Japan), 2. ILT (Japan), 3. ICR, Kyoto Univ. (Japan), 4. ILS/UEC (Japan)）

[Presentation Style] Onsite

We report a 1 kW diode-pumped laser with a Yb:YAG conductive-cooled active-mirror chain, delivering 10 J of energetic pulses at 100 Hz.

8:15 PM - 8:30 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-10] Observation of high-order Laguerre-Gaussian beams from a diamond Raman laser
[Presentation Style] Online

*Hui Chen[1,2], Yu Zhang[1,2], Hongwei Guo[1,2], Jiashuo An[1,2], Zhenxu Bai[1,2] （1. Hebei Univ. of Tech. (China), 2. Hebei Key Lab. of Adv. Laser Tech. and Eq. (China)）

[Presentation Style] Online

We report on the direct generation of $LG_{0,m}$ modes Stokes laser with m tunable range of 0-9, for the first time to our knowledge, in an external-cavity diamond Raman laser using Gaussian beam pumping.

8:30 PM - 8:45 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-11] Continuously Wavelength-Tunable Coherent EUV and Soft X-

ray Light for Dynamic Magnetic Imaging and Metrology
[Presentation Style] Online

Dimitar Popmintchev[2], Aref Imani[2], Roman Joris[2], Siyang Wang[1], Will Brunner[1], Jieyu Yan[1], Paolo Carpeggiani[2], Valentina Shumakova[2], Edgar Kaksis[2], Tobias Flöry[2], Elizaveta Gangrskaia[2], Audrius Pugzlys[2], Andrius Baltuska[2], *Tenio Popmintchev[1,2] （1. University of California San Diego (United States of America), 2. TU Wien (Austria)）

[Presentation Style] Online

We demonstrate bright, narrow-bandwidth, high order harmonics driven by VIS lasers, continuously tunable towards higher and lower EUV – X-ray photon energies, ideal for resonant, ultrafast, coherent diffractive imaging at the absorption edges of ferromagnets.

8:45 PM - 9:00 PM (Mon. Aug 1, 2022 6:15 PM - 9:00 PM Small Hall)

[CPDP-12] Spin-isolated Meta-Holographic Displays at Broadband UV-VIS Regimes
[Presentation Style] Online

Aqsa Asad[1], Hafiz Saad Khaliq[1], Nasir Mahmood[1], Muhammad Qasim Mehmood[1], *Yehia Massoud[1] （1. Innovative Technologies Laboratories (ITL), King Abdullah University of Science and Technology (KAUST), Thuwal 23955, Saudi Arabia (Saudi Arabia)）

[Presentation Style] Online

A planar multi-functional meta-surface is designed to reproduce spin-isolated meta-holographic displays at broadband wavelengths covering ultraviolet (UV) and visible (VIS) regimes. The proposed metasurface can have potential application in data-encryption, advertisement industry, sensing etc.

Poster Session | CLEO-PR2022 | Poster Session

C2. Ultrafast and Nonlinear Phenomena

Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CM2-01] Pump Power Optimization of Picosecond Supercontinuum Generation in Silicon-on-insulator Waveguide
[Presentation Style] Online
*Kaibin Lin[1], Qian Li[1] (1. Peking Univ. (China))

[P-CM2-02] A Compact Detector Module for Remote Characterization of Ultrashort Pulses Delivered over Dynamic Fiber-optic Links
[Presentation Style] Onsite
*Lakshmi C G[1], V R Supradeepa[1] (1. Indian Institute of Science (India))

[P-CM2-03] Broadband phase-sensitive CARS spectroscopy by using a combination of edge filters
[Presentation Style] Onsite
*Takayuki Suzuki[1], Akimasa Kubota[1], Kei Tanaka[1] (1. Meiji Univ. (Japan))

[P-CM2-04] The optical nonlinearity evolution of the graphene/Bi_2Te_3 heterostructure and application for pulsed laser therein
[Presentation Style] Onsite
*Mu-Hsuan Tsai[1], Chan-Shan Yang[3], Chun-Hu Chen[1], Cheng-Maw Cheng[2], Jia-Chi Lan[1], Chao-Kuei Lee[1] (1. National Sun Yat-sen Univ. (Taiwan), 2. National Synchrotron Radiation Research Center (Taiwan), 3. National Taiwan Normal Univ. (Taiwan))

[P-CM2-05] Novel approach for distinguishing 2H/1T-1T' molybdenum disulfide(MoS_2) optical nonlinearity
[Presentation Style] Online
*Shih-Po Su[1], Yi-Hsuan Huang[1], Jia-Qi Lan[1], Li-Wei Tu[1], Paritosh V. Wadekar[1], Hsiang-Chen Wang[2], Chao-Kuei Lee[1] (1. National Sun Yat-sen Univ. (Taiwan), 2. National Chung Cheng Univ. (Taiwan))

[P-CM2-06] Quasi-phase-matching properties of MgO:PPSLT in the oo-e, oo-o, and oe-o interactions
[Presentation Style] Onsite
*Nobuhiro Nobuhiro Umemura[1], Junji Hirohashi[2] (1. Chitose Inst. of Sci. and Tech. (Japan), 2. OXIDE Corp. (Japan))

[P-CM2-07] A Theoretical Study on Mid-Infrared Pumped Broadband Frequency Doubling Characteristics of Non-Oxide Crystals
[Presentation Style] Online
*Ilhwan Kim[1], Kwang Jo Lee[1] (1. Kyung Hee Univ. (Korea))

[P-CM2-08] Excited State Dynamics and Nonlinear Optical Responses of Metalated Porphyrin – Napthalimide Based Donor-Acceptor Systems
[Presentation Style] Onsite
*Md Soif Ahmed[1], Chinmoy Biswas[1], Botta Bhavani[2], Lingamallu Giribabu[2], Venugopal Rao Soma[3], Sai Santosh Kumar Raavi[1] (1. Indian Institute of Technology Hyderabad (India), 2. CSIR-Indian Institute of Chemical Technology (India), 3. University of Hyderabad (India))

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM2-01] Pump Power Optimization of Picosecond Supercontinuum Generation in Silicon-on-insulator Waveguide
[Presentation Style] Online

*Kaibin Lin[1], Qian Li[1] (1. Peking Univ. (China))

[Presentation Style] Online

We numerically demonstrate an active control method to optimize the pump power of picosecond pulse pumped supercontinuum generation in the silicon-on-insulator waveguide, which can obtain a broad spectrum at a lower pump power.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM2-02] A Compact Detector Module for Remote Characterization of Ultrashort Pulses Delivered over Dynamic Fiber-optic Links
[Presentation Style] Onsite

*Lakshmi C G[1], V R Supradeepa[1] (1. Indian Institute of Science (India))

[Presentation Style] Onsite

We demonstrate remote characterization and dispersion compensation of ultrashort pulses delivered over dynamic fiber-optic links using a nonlinear crystal, power detectors, and a pulse shaper-based interferometer. Measurements of sub-400fs pulses agree well with conventional measurements.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM2-03] Broadband phase-sensitive CARS spectroscopy by using a combination of edge filters
[Presentation Style] Onsite

*Takayuki Suzuki[1], Akimasa Kubota[1], Kei Tanaka[1] (1. Meiji Univ. (Japan))

[Presentation Style] Onsite

We apply a combination of edge filters instead of an optical bandpass filter for preparing a narrow band probe beam of our CARS spectroscopy. This enables us to broaden Raman spectra with variable frequency resolution.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM2-04] The optical nonlinearity evolution of the graphene/Bi_2Te_3 heterostructure and application for pulsed laser therein
[Presentation Style] Onsite

*Mu-Hsuan Tsai[1], Chan-Shan Yang[3], Chun-Hu Chen[1], Cheng-Maw Cheng[2], Jia-Chi Lan[1], Chao-Kuei Lee[1] (1. National Sun Yat-sen Univ. (Taiwan), 2. National Synchrotron Radiation Research Center (Taiwan), 3. National Taiwan Normal Univ. (Taiwan))
[Presentation Style] Onsite
The intensity-dependent of the optical nonlinearity of a graphene/Bi_2Te_3 heterostructure at 800 nm over 10 orders of magnitude were investigated by z-scan technique. The versatile nonlinear absorption behavior was discussed and applied to interpret the reported evolution of pulsed solid-state laser.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM2-05] Novel approach for distinguishing 2H/1T-1T' molybdenum disulfide(MoS_2) optical nonlinearity

[Presentation Style] Online

*Shih-Po Su[1], Yi-Hsuan Huang[1], Jia-Qi Lan[1], Li-Wei Tu[1], Paritosh V. Wadekar[1], Hsiang-Chen Wang[2], Chao-Kuei Lee[1] (1. National Sun Yat-sen Univ. (Taiwan), 2. National Chung Cheng Univ. (Taiwan))
[Presentation Style] Online
2H/1T-1T' MoS_2 is typical phase existed crystal. In this work, by controlling the atmosphere during CVD preparation, 2H/1T-1T' MoS_2 are separately growth. Additionally, by z-scan technique, the phase dependent optical nonlinearity of MoS_2 was observed.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM2-06] Quasi-phase-matching properties of MgO:PPSLT in the oo-e, oo-o, and oe-o interactions

[Presentation Style] Onsite

*Nobuhiro Nobuhiro Umemura[1], Junji Hirohashi[2] (1. Chitose Inst. of Sci. and Tech. (Japan), 2. OXIDE Corp. (Japan))
[Presentation Style] Onsite
We measured the QPM temperature for SHG at 0.5321 µm with the oo-e, oo-o, and oe-o interactions in MgO:PPSLT. The cross points of the temperature tuning curves of the QPM processes with different interactions exist around 80℃ in this QPM device.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM2-07] A Theoretical Study on Mid-Infrared Pumped Broadband Frequency Doubling Characteristics of Non-Oxide Crystals

[Presentation Style] Online

*Ilhwan Kim[1], Kwang Jo Lee[1] (1. Kyung Hee Univ. (Korea))
[Presentation Style] Online

We present a theoretical and numerical study on the broadband frequency doubling characteristics of non-oxide crystals including uniaxial chalcopyrite semiconductors and defect chalcopyrite as well as biaxial orthorhombic ternary chalcogenides.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM2-08] Excited State Dynamics and Nonlinear Optical Responses of Metalated Porphyrin – Napthalimide Based Donor-Acceptor Systems

[Presentation Style] Onsite

*Md Soif Ahmed[1], Chinmoy Biswas[1], Botta Bhavani[2], Lingamallu Giribabu[2], Venugopal Rao Soma[3], Sai Santosh Kumar Raavi[1] (1. Indian Institute of Technology Hyderabad (India), 2. CSIR-Indian Institute of Chemical Technology (India), 3. University of Hyderabad (India))

[Presentation Style] Onsite

Femtosecond transient absorption spectroscopy (fs-TAS) of two porphyrin-napthalimide molecular systems have been measured to study the excited state properties. Also
the second hyperpolarizability value of ~10-31 esu described their usefulness as a nonlinear material

C3. Infrared and Terahertz Technologies and Applications

Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CM3-01] Imaging identification of pharmaceutical material by using terahertz difference-frequency generation semiconductor source
[Presentation Style] Onsite

*Atsushi Nakanishi[1], Koichiro Akiyama[1], Shohei Hayashi[1], Hiroshi Satozono[1], Kazuue Fujita[1] （1. Hamamatsu Photonics K. K. (Japan)）

[P-CM3-02] "Laser-Printed Emissive Flexible Metasurface"

*Dongkyun Kang[1], Jaeyong Kim[1], Yeongseon Kim[1], Myeongkyu Lee[1] （1. Yonsei Univ. (Korea)）

[P-CM3-03] Phase noise of THz wave generated by a combination of microresonator soliton comb with uni-traveling-carrier photodiode
[Presentation Style] Onsite

*Shota Okada[1], Kenji Nishimoto[1], Yu Tokizane[2], Naoya Kuse[2,3], Takeshi Yasui[2] （1. Grad. Sch. Sci. Tech. Innov., Tokushima Univ. (Japan), 2. pLED, Tokushima Univ. (Japan), 3. JST-PRESTO (Japan)）

[P-CM3-04] Laser Printing of Thermal Emission Pattern in a Phase-Change Thin Film Cavity

*Yeongseon Kim[1], Jaeyong Kim[1], Dongkyun Kang[1], MyeongKyu Lee[1] （1. Yonsei Univ. (Korea)）

[P-CM3-05] Characterization of UV-responsive Properties of DNA:PEDOT Biomaterial by Time-Domain Terahertz Spectroscopy
[Presentation Style] Online

*Chia-hsin Huang[1], Wei-Tsung Chuang[2], Yu-Chueh Hung[1] （1. National Tsing Hua University (Taiwan), 2. National Synchrotron Radiation Research Center (NSRRC) (Taiwan)）

[P-CM3-06] Design, Fabrication, and Properties of a Terahertz Linear Polarizer made of an Organic Single Crystal
[Presentation Style] Onsite

*Takenori Tanno[1], Wataru Sasaki[1], Manabu Yamada[1], Emi Adachi[1], Shinichi Yodokawa[1], Toru Kurabayashi[1] （1. Akita Univ. (Japan)）

[P-CM3-07] Optimal optical feedback conditions for a multimode laser diode with delayed optical feedback in THz time-domain spectroscopy
[Presentation Style] Onsite

*Tokihiro Kitagawa[1], Tetsuya Matsuyama[1], Kenji Wada[1], Fumiyoshi Kuwashima[2], Koichi Okamoto[1] （1. Osaka Metropolitan Univ. (Japan), 2. Fukui Univ. of Technology (Japan)）

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM3-01] Imaging identification of pharmaceutical material by using terahertz difference-frequency generation semiconductor source

[Presentation Style] Onsite

*Atsushi Nakanishi[1], Koichiro Akiyama[1], Shohei Hayashi[1], Hiroshi Satozono[1], Kazuue Fujita[1] (1. Hamamatsu Photonics K. K. (Japan))

[Presentation Style] Onsite

We demonstrated imaging identification of pharmaceutical material using a compact ultra-broadband terahertz semiconductor source. We demonstrated the ability to distinguish the pharmaceutical materials having different crystal forms by using the THz DFG source.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM3-02] "Laser-Printed Emissive Flexible Metasurface"

*Dongkyun Kang[1], Jaeyong Kim[1], Yeongseon Kim[1], Myeongkyu Lee[1] (1. Yonsei Univ. (Korea))

A metasurface consisting of a phase-changing $Ge_2Sb_2Te_5$ layer on a metal mirror is promising as a space-selectively and dynamically control the infrared emission of the surface by a spatially modulated pulsed laser beam.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM3-03] Phase noise of THz wave generated by a combination of microresonator soliton comb with uni-traveling-carrier photodiode

[Presentation Style] Onsite

*Shota Okada[1], Kenji Nishimoto[1], Yu Tokizane[2], Naoya Kuse[2,3], Takeshi Yasui[2] (1. Grad. Sch. Sci. Tech. Innov., Tokushima Univ. (Japan), 2. pLED, Tokushima Univ. (Japan), 3. JST-PRESTO (Japan))

[Presentation Style] Onsite

We evaluated the phase noise of CW-THz wave at 560 GHz generated by optical-to-electric conversion of microresonator soliton comb with uni-traveling-carrier photodiode for wireless carrier wave of beyond 5G.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM3-04] Laser Printing of Thermal Emission Pattern in a Phase-Change Thin Film Cavity

*Yeongseon Kim[1], Jaeyong Kim[1], Dongkyun Kang[1], MyeongKyu Lee[1] (1. Yonsei Univ. (Korea))

Engineering the thermal emission that depends on emissivity(ε) and temperature of a material in the infrared(IR) range is applicable to various fields. The proposed laser-printing and annealing method can tune

the emissivity position-selectively and continuously.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM3-05] Characterization of UV-responsive Properties of DNA:PEDOT Biomaterial by Time-Domain Terahertz Spectroscopy
[Presentation Style] Online

*Chia-hsin Huang[1], Wei-Tsung Chuang[2], Yu-Chueh Hung[1] （1. National Tsing Hua University (Taiwan), 2. National Synchrotron Radiation Research Center (NSRRC) (Taiwan)）

[Presentation Style] Online

We present refractive indices, conductivities, and carrier-related parameters of newly developed DNA:PEDOT biomaterial using time-domain terahertz spectroscopy. Our results reveal UV-responsive electrical properties of the complex, which may be further utilized for biomaterial-based optoelectronic devices.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM3-06] Design, Fabrication, and Properties of a Terahertz Linear Polarizer made of an Organic Single Crystal
[Presentation Style] Onsite

*Takenori Tanno[1], Wataru Sasaki[1], Manabu Yamada[1], Emi Adachi[1], Shinichi Yodokawa[1], Toru Kurabayashi[1] （1. Akita Univ. (Japan)）

[Presentation Style] Onsite

A terahertz polarizer was developed using a single crystal of methyl 4-nitrobenzoate. The molecules are arranged in parallel in the crystal, allowing high anisotropy. A high degree of polarization, 76%, was achieved at 2.74 THz.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM3-07] Optimal optical feedback conditions for a multimode laser diode with delayed optical feedback in THz time-domain spectroscopy
[Presentation Style] Onsite

*Tokihiro Kitagawa[1], Tetsuya Matsuyama[1], Kenji Wada[1], Fumiyoshi Kuwashima[2], Koichi Okamoto[1] （1. Osaka Metropolitan Univ. (Japan), 2. Fukui Univ. of Technology (Japan)）

[Presentation Style] Onsite

Optimal optical feedback conditions for a multimode laser diode with delayed optical feedback in THz time-domain spectroscopy were found in the chaotic intermittent oscillation conditions by numerical simulations using the multimode laser diode rate equations.

Poster Session | CLEO-PR2022 | Poster Session

C9. Optical Communication Systems and Networks

Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CM9-01] Traffic Prediction Model for Optical Network Based on Multi-input Neural Network
[Presentation Style] Online
*Yan Liu[1], Qian Hu[1], Xiaoli Huo[1], Anxu Zhang[1] (1. China Telecom Research Institute (China))

[P-CM9-02] Evaluation of Nonlinear Phase Shift Mitigating Dispersion-Induced Fading in Radio-over-Fiber Link
[Presentation Style] Onsite
*Kento Okunushi[1], Amila Kariyawasam[1], Joji Maeda[1] (1. Tokyo Univ. of Science (Japan))

[P-CM9-03] Optical Wireless HDMI with Uncooled Violet-Blue Laser Diode
[Presentation Style] Onsite
*Chih-Hsien Cheng[2], Yi-Ze Lee[1], Yi-Chien Wu[1], Wei-Chun Wang[1], Huai-Yung Qang[1], Gong-Ru Lin[1] (1. National Taiwan Univ. (Taiwan), 2. Univ. of Tokyo (Japan))

[P-CM9-04] An Experimental Study on the Effect of Modulation Distortion on DDMZM Based OSSB+C Signal Generation
[Presentation Style] Onsite
*Yusuke Suzuki[1], Ryo Okajima[1], Amila Kariyawasam[1], Joji Maeda[1] (1. Tokyo Univ. of Sci. (Japan))

[P-CM9-05] Physical Layer Encryption Based on a Cascading Method of Inter-domain Scrambling and Phase Perturbance in CO-OFDM System
[Presentation Style] Online
Zeyu Xu[1], Tianyu Su[1], Miao Tu[1], Yankai Rong[1], Yifeng Ye[1], Yang Xiao[2], Le Liu[1], *Xianfeng Tang[1] (1. State Key Lab. of Info. Photonics and Optical Communications, Beijing Univ. of Posts and Telecommunications (China), 2. Wuhan Univ. of Science and Technology (China))

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM9-01] Traffic Prediction Model for Optical Network Based on Multi-input Neural Network
[Presentation Style] Online

*Yan Liu[1], Qian Hu[1], Xiaoli Huo[1], Anxu Zhang[1] (1. China Telecom Research Institute (China))

[Presentation Style] Online

A novel traffic prediction model for optical network is proposed based on Multi-input Neural Network. Results indicate that the proposed model shows better performances than other prediction models in this experiment.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM9-02] Evaluation of Nonlinear Phase Shift Mitigating Dispersion-Induced Fading in Radio-over-Fiber Link
[Presentation Style] Onsite

*Kento Okunushi[1], Amila Kariyawasam[1], Joji Maeda[1] (1. Tokyo Univ. of Science (Japan))

[Presentation Style] Onsite

We discuss the nonlinear phase shift induced by self-phase modulation in analogue Radio-over-Fiber link based on a small signal analytical model. The validity of the model is examined by comparing it with experimental results.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM9-03] Optical Wireless HDMI with Uncooled Violet-Blue Laser Diode
[Presentation Style] Onsite

*Chih-Hsien Cheng[2], Yi-Ze Lee[1], Yi-Chien Wu[1], Wei-Chun Wang[1], Huai-Yung Qang[1], Gong-Ru Lin[1] (1. National Taiwan Univ. (Taiwan), 2. Univ. of Tokyo (Japan))

[Presentation Style] Onsite

Optical wireless HDMI transceiver using uncooled 12-mW violet laser diode as Tx with f_{-3dB}=4GHz and p-i-n photodiode as Rx with f_{-3dB}=7GHz is demonstrated to enable 26.4-Gbit/s 64-QAM OFDM data and 2K×1K HDMI (1080P@60fps) video transmission.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM9-04] An Experimental Study on the Effect of Modulation Distortion on DDMZM Based OSSB+C Signal Generation
[Presentation Style] Onsite

*Yusuke Suzuki[1], Ryo Okajima[1], Amila Kariyawasam[1], Joji Maeda[1] （1. Tokyo Univ. of Sci. (Japan)）
[Presentation Style] Onsite
We experimentally demonstrated the impact of fiber dispersion on modulation distortion of dual-drive Mach-Zehnder modulator-based OSSB+C transmission. Unlike in single-drive Mach-Zehnder modulator-based transmitter, fiber dispersion does not compensate modulation distortion in dual-drive Mach-Zehnder modulator-based transmitter.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM9-05] Physical Layer Encryption Based on a Cascading Method of Inter-domain Scrambling and Phase Perturbance in CO-OFDM System
[Presentation Style] Online

Zeyu Xu[1], Tianyu Su[1], Miao Tu[1], Yankai Rong[1], Yifeng Ye[1], Yang Xiao[2], Le Liu[1], *Xianfeng Tang[1] （1. State Key Lab. of Info. Photonics and Optical Communications, Beijing Univ. of Posts and Telecommunications (China), 2. Wuhan Univ. of Science and Technology (China)）
[Presentation Style] Online
A physical layer encryption scheme using Arnold transform and discrete fractional Fourier transform is proposed to realize inter-domain scrambling and phase perturbance. Simulations show that security performance is enhanced with key space of 10^{96}.

Poster Session | CLEO-PR2022 | Poster Session

C11. Semiconductor and Integrated Optical Devices

Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CM11-01] Bandwidth Evaluation of Orthogonal Lattice Waveguide (OLW) for Circular Defect in Photonic Crystal (CirD) Lasers

[Presentation Style] Onsite

*Masaya Morita[1], Shotaro Hirata[1], Takuya Higuchi[1], Kenta Kaichi[1], Rubing Zuo[1], Hanqiao Ye[1], Hirotake Kajii[1], Masato Morifuji[1], Akihiro Maruta[1], Masahiko Kondow[1] (1. Osaka University (Japan))

[P-CM11-02] Advanced Dry Etching of GaAs/AlGaAs Multilayer Wafer for Circular Defect in Photonic Crystal (CirD) Laser

[Presentation Style] Onsite

*Hanqiao Ye[1], Yifan Xiong[1], Rubing Zuo[1], Masaya Morita[1], Kenta Kaichi[1], Akihiro Maruta[1], Hirotake Kajii[1], Masato Morifuji[1], Masahiko Kondow[1] (1. Osaka Univ. (Japan))

[P-CM11-03] A New Method for Measuring $AlGaO_x$ Oxidation Width of Circular Defect in 2D Photonic Crystal (CirD) Laser

[Presentation Style] Onsite

*Rubing Zuo[1], Shunsuke Miyazaki[1], Ryosei Kinoshita[1], Hanqiao Ye[1], Masaya Morita[1], Kenta Kaichi[1], Masato Morifuji[1], Hirotake Kajii[1], Akihiro Maruta[1], Masahiko Kondow[1] (1. Osaka Univ. (Japan))

[P-CM11-04] Operation of microscale-light-emitting diode display using GeTe-based memristor

*Seok Hee Hong[1], Kyung Rock Son[1], Ho Jin Lee[1], Minji yu[1], Jun Young Kim[1], Tae Geun Kim[1] (1. School of Electrical Engineering, Korea Univ. (Korea))

[P-CM11-05] Large wavelength offset for lateral bandgap engineering by using Quantum Well Intermixing

[Presentation Style] Online

Yi-jen Chiu[1], Lu Kuan Du[1], *Yang-Jeng Chen[1] (1. National Sun Yat-sen University (Taiwan))

[P-CM11-06] An Optical Filter Based on Sidewall Long-Period Grating in Lithium Niobate on Insulator

[Presentation Style] Online

*li jun hui[1], wang meng ke [1], chen kai xin[1] (1. University of Electronic Science and Technology of China (China))

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM11-01] Bandwidth Evaluation of Orthogonal Lattice Waveguide (OLW) for Circular Defect in Photonic Crystal (CirD) Lasers [Presentation Style] Onsite

*Masaya Morita[1], Shotaro Hirata[1], Takuya Higuchi[1], Kenta Kaichi[1], Rubing Zuo[1], Hanqiao Ye[1], Hirotake Kajii[1], Masato Morifuji[1], Akihiro Maruta[1], Masahiko Kondow[1] (1. Osaka University (Japan))

[Presentation Style] Onsite

We fabricate CirD lasers with Orthogonal Lattice Waveguides and evaluate them by optical pumping. We have experimentally confirmed that the wavelength range of OLW is 20 nm, which is about double for the conventional W1 waveguide.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM11-02] Advanced Dry Etching of GaAs/AlGaAs Multilayer Wafer for Circular Defect in Photonic Crystal (CirD) Laser [Presentation Style] Onsite

*Hanqiao Ye[1], Yifan Xiong[1], Rubing Zuo[1], Masaya Morita[1], Kenta Kaichi[1], Akihiro Maruta[1], Hirotake Kajii[1], Masato Morifuji[1], Masahiko Kondow[1] (1. Osaka Univ. (Japan))

[Presentation Style] Onsite

We improved dry etching process by introducing 3-steps etching and 3 layers of quantum dots for fabricating the CirD laser that will be used for intra-chip optical communications. Excellent lasing property was consequently obtained.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM11-03] A New Method for Measuring $AlGaO_x$ Oxidation Width of Circular Defect in 2D Photonic Crystal (CirD) Laser [Presentation Style] Onsite

*Rubing Zuo[1], Shunsuke Miyazaki[1], Ryosei Kinoshita[1], Hanqiao Ye[1], Masaya Morita[1], Kenta Kaichi[1], Masato Morifuji[1], Hirotake Kajii[1], Akihiro Maruta[1], Masahiko Kondow[1] (1. Osaka Univ. (Japan))

[Presentation Style] Onsite

To develop the CirD laser, which will be used in intra-chip optical interconnects, we investigate a new method to measure the oxidation width of AlGaOx precisely so that we can obtain the most appropriate Q factor.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM11-04] Operation of microscale-light-emitting diode display using GeTe-based memristor

*Seok Hee Hong[1], Kyung Rock Son[1], Ho Jin Lee[1], Minji yu[1], Jun Young Kim[1], Tae Geun Kim[1] （1. School of Electrical Engineering, Korea Univ. (Korea)）

A new active-matrix driving circuitry for microscale light-emitting diode display, using GeTe-based memristor with multiple resistance states, instead of conventional one-transistor and one-capacitor approach, is proposed and demonstrated.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM11-05] Large wavelength offset for lateral bandgap engineering by using Quantum Well Intermixing

[Presentation Style] Online

Yi-jen Chiu[1], Lu Kuan Du[1], *Yang-Jeng Chen[1] （1. National Sun Yat-sen University (Taiwan)）

[Presentation Style] Online

Patterned SiO_2 and Si_3N_4 thin film on top of InGaAsP-based epi-layer. Quantum well intermixing had use for lateral bandgap engineering. 85nm wavelength difference has been attained in 1550nm quantum well, showing potential for photonic integration.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM11-06] An Optical Filter Based on Sidewall Long-Period Grating in Lithium Niobate on Insulator

[Presentation Style] Online

*li jun hui[1], wang meng ke [1], chen kai xin[1] （1. University of Electronic Science and Technology of China (China)）

[Presentation Style] Online

We propose an optical filter based on sidewall long-period waveguide grating with metal absorption layer in lithium niobite-on-insulator. Our designed filter achieves an extinction ratio >30 dB at 1550 nm wavelength and a 3-dB bandwidth of 78 nm.

Poster Session | CLEO-PR2022 | Poster Session

C15. Biophotonics and Applications

Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CM15-01] Design of dual-wavelength waveplate made of single crystal for coherent anti-Stokes Raman endoscopy
[Presentation Style] Onsite
*Yuuka Kawasaki[1], Mamoru Hashimoto[1] (1. Hokkaido University (Japan))

[P-CM15-02] Label free isomeric metabolism measurement with multiplex coherent anti-Stokes Raman scattering microspectroscopy
[Presentation Style] Onsite
*Soichiro Homma[1], Mamoru Hashimoto[1] (1. Hokkaido university (Japan))

[P-CM15-03] Fabrication of Flexible Artificial Compound Eyes for Real-time Focal Length Tuning
[Presentation Style] Online
*Jihyun Jung[1], Heesang Ahn[1], Hyerin Song[1], Taerim Yoon[1], Seunghun Lee[1], Taeyeon Kim[1], Soojung Kim[1], Kyujung Kim[1] (1. Pusan Nat'l Univ. (Korea))

[P-CM15-04] Measurement of Scattered Fluorescence Light by TIE-based 3D Fluorescence Imaging Technique
[Presentation Style] Onsite
*Marin Shoda[1], Xiangyu Quan[1], Takashi Murata[3], Yasuhiro Awatsuji[2], Osamu Matoba[1] (1. Kobe Univ. (Japan), 2. Kyoto Inst. Tech. (Japan), 3. Kanagawa Inst. Tech. (Japan))

[P-CM15-05] Multi-photon activation of fluorescent proteins using visible wavelength for high-resolution imaging
[Presentation Style] Onsite
*Toshiki Kubo[1], Kenta Temma[1], Kazunori Sugiura[1], Hajime Shinoda[1], Kai Lu[1], Nicholas I. Smith[1], Tomoki Matsuda[1], Takeharu Nagai[1], Katsumasa Fujita[1] (1. Osaka Univ. (Japan))

[P-CM15-06] Development of rigid-endoscope optical coherence tomography system with KTN optical scanner
[Presentation Style] Onsite
*Masato Ohmi[1], Kentaro Wada[1], Shogo Yagi[2] (1. Osaka Univ. (Japan), 2. NTT Advanced Technology Corp. (Japan))

[P-CM15-07] Second-harmonic generation arthroscope with integrated femtosecond Yb fiber laser
[Presentation Style] Onsite
Yoshitada Kashimura[1], Riku Matsuda[1], *Naoki Yamato[1], Mamoru Hashimoto[1] (1. Hokkaido University (Japan))

[P-CM15-08] Assessing role of sensor directivity in the photoacoustic tomography
[Presentation Style] Onsite
*Pankaj Warbal[1], Ratan K Saha[1] (1. Indian Institute of Information Technology Allahabad (India))

[P-CM15-09] Photoacoustic image reconstruction with polynomial based interpolation algorithms
[Presentation Style] Onsite
Avijit Paul[1], *Pankaj Warbal[1], Amrita Mukherjee[1], Subhadip Paul[1], Ratan K Saha[1] (1. Indian

Institute of Information Technology Allahabad (India))

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM15-01] Design of dual-wavelength waveplate made of single crystal for coherent anti-Stokes Raman endoscopy
[Presentation Style] Onsite

*Yuuka Kawasaki[1], Mamoru Hashimoto[1] (1. Hokkaido University (Japan))

[Presentation Style] Onsite

We have determined the quartz crystal thickness for dual-wavelength waveplate to maximize the intensity of coherent anti-Stokes Raman scattering (CARS). The CARS intensity with incident orthogonally polarized beams was 99.0% when excited with parallel polarization.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM15-02] Label free isomeric metabolism measurement with multiplex coherent anti-Stokes Raman scattering microspectroscopy
[Presentation Style] Onsite

*Soichiro Homma[1], Mamoru Hashimoto[1] (1. Hokkaido university (Japan))

[Presentation Style] Onsite

We observed beta-oxidation of *trans*-fatty acid for human hepatocarcinoma cell line HepG2 with multiplex coherent anti-Stokes Raman scattering microspectroscopy under time-series and found the isomerization of unsaturated fatty acid without staining.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM15-03] Fabrication of Flexible Artificial Compound Eyes for Real-time Focal Length Tuning
[Presentation Style] Online

*Jihyun Jung[1], Heesang Ahn[1], Hyerin Song[1], Taerim Yoon[1], Seunghun Lee[1], Taeyeon Kim[1], Soojung Kim[1], Kyujung Kim[1] (1. Pusan Nat'l Univ. (Korea))

[Presentation Style] Online

We present a microlens arrays (MLAs) based artificial compound eye for tuning a focal length. The flexible MLAs-patterned poly (dimetylsiloxane) (PDMS) film was deformed from planar to curved shape with the increase of the fluid injection, acting as a focus-tunable lens. With a designed optical system, we compared focused beam intensity depending on the radius of curvature of the fabricated lens.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM15-04] Measurement of Scattered Fluorescence Light by TIE-

based 3D Fluorescence Imaging Technique
[Presentation Style] Onsite

*Marin Shoda[1], Xiangyu Quan[1], Takashi Murata[3], Yasuhiro Awatsuji[2], Osamu Matoba[1] (1. Kobe Univ. (Japan), 2. Kyoto Inst. Tech. (Japan), 3. Kanagawa Inst. Tech. (Japan))

[Presentation Style] Onsite

Complex amplitude distribution of scattered fluorescence light is measured by TIE-based 3D fluorescence imaging technique. We present a preliminary experiment in tobacco cultured cells expressing GFP with tubulin covered by a diffused medium.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM15-05] Multi-photon activation of fluorescent proteins using visible wavelength for high-resolution imaging
[Presentation Style] Onsite

*Toshiki Kubo[1], Kenta Temma[1], Kazunori Sugiura[1], Hajime Shinoda[1], Kai Lu[1], Nicholas I. Smith[1], Tomoki Matsuda[1], Takeharu Nagai[1], Katsumasa Fujita[1] (1. Osaka Univ. (Japan))

[Presentation Style] Onsite

We experimentally demonstrated the photo-activation of reversibly photo-switchable fluorescent proteins by visible-wavelength two-photon excitation and applied the activation technique in confocal imaging of biological cells. Higher spatial resolution than conventional confocal microscopy was confirmed.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM15-06] Development of rigid-endoscope optical coherence tomography system with KTN optical scanner
[Presentation Style] Onsite

*Masato Ohmi[1], Kentaro Wada[1], Shogo Yagi[2] (1. Osaka Univ. (Japan), 2. NTT Advanced Technology Corp. (Japan))

[Presentation Style] Onsite

We developed novel rigid-endoscope OCT system with KTN optical probe for a diagnosis in the orthopedic surgery fields. The present system demonstrates that biological image was measured by using KTN optical scanner for having degree of freedom in sample arm as OCT. The system was shown to have a resolution 14.2μm for biological tissue in few mm depth. The 3D-OCT image of human fingerprint was obtained using this OCT system.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM15-07] Second-harmonic generation arthroscope with integrated femtosecond Yb fiber laser

[Presentation Style] Onsite

Yoshitada Kashimura[1], Riku Matsuda[1], *Naoki Yamato[1], Mamoru Hashimoto[1] （1. Hokkaido University (Japan)）

[Presentation Style] Onsite

We have developed a second-harmonic generation arthroscope with integrated a femtosecond Yb fiber laser. The head of the arthroscope is covered with a stainless-steel cylinder of 4 mm in diameter and 180 mm in length.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM15-08] Assessing role of sensor directivity in the photoacoustic tomography

[Presentation Style] Onsite

*Pankaj Warbal[1], Ratan K Saha[1] （1. Indian Institute of Information Technology Allahabad (India)）

[Presentation Style] Onsite

Sensor directivity in photoacoustic tomography (PAT) imaging is investigated. The photoacoustic (PA) signals with directivity effect were used to construct the system matrix needed for the Tikhonov regularization. This method provides improved PAT images.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM15-09] Photoacoustic image reconstruction with polynomial based interpolation algorithms

[Presentation Style] Onsite

Avijit Paul[1], *Pankaj Warbal[1], Amrita Mukherjee[1], Subhadip Paul[1], Ratan K Saha[1] （1. Indian Institute of Information Technology Allahabad (India)）

[Presentation Style] Onsite

We employ the polynomial-based interpolation methods for photoacoustic tomography (PAT). The nearest-neighbour, bilinear, bicubic, and biquintic interpolation algorithms were utilized to construct the model matrix. The performance of these interpolation techniques was studied.

Poster Session | CLEO-PR2022 | Poster Session

C16. Plasmonics and Metamaterials

Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CM16-01] Surface scattering in periodic metamaterials
[Presentation Style] Online
*Tieyan Zhang[1], Jiachen Yu[1], Qiqige Wulan[1], Zhe Li[1], Zhijun Liu[1] (1. Univ. of Electronic Sci. and Tech. of China (China))

[P-CM16-02] Performance Estimation of EO-Polymer Plasmonic Optical Phased Array
[Presentation Style] Onsite
*Yuji Kuwamura[1], Kyosuke Hibata[1] (1. Kanazawa Univ. (Japan))

[P-CM16-04] Dynamic refractive index analysis by focused surface plasmon for continuous evaluation of evaporation of saliva
[Presentation Style] Onsite
*Ipsita Chakraborty[1], Akinari Abe[1], Daiki Matsubayashi[1], Hiroshi Kano[1] (1. Muroran Institute of Technology (Japan))

[P-CM16-05] Metal-Insulator-Metal Structured Surface Plasmon Polariton Waveguide with Improved Gain
[Presentation Style] Online
*RISHITEJA CHAPARALA[1], Sreenivasulu Tupakula[1] (1. SRM Univ. (India))

[P-CM16-06] Plasmon resonance wavelength controlled by SiO_2 layer thickness on a silver surface and nanoantenna effect at a center of Bull' s eye pattern
[Presentation Style] Onsite
*Takeha Shinohara[1], Keiko Tawa[1] (1. Kwansei Gakuin Univ. (Japan))

[P-CM16-07] Novel Plasmonic Metamaterials based on Ag Nano-Hemispheres and Metal/Dielectric Multilayer Structures
[Presentation Style] Onsite
*Rei Niguma[1], Sayako Maeda[1], Tetsuya Matsuyama[1], Kenji Wada[1], Koichi Okamoto[1] (1. Osaka Prefecture Univ. (Japan))

[P-CM16-08] Plasmonic colorimetric sensor using Ag-NHoM structures
[Presentation Style] Onsite
*Sayako Maeda[1], Koki Matsuda[1], Rei Niguma[1], Tetsuya Matsuyama[1], Kenji Wada[1], Koichi Okamoto[1] (1. Osaka Metropolitan University (Japan))

[P-CM16-09] New Sensitive Biosensor Platform by Plasmon Field Enhanced Photoreaction and Fluorescence
[Presentation Style] Onsite
*Shohei Horio[1], Koji Mizutani[1], Hirobumi Sunayama[2], Toshihumi Takeuchi[3], Keiko Tawa[1] (1. Kwansei Gakuin University (Japan), 2. Graduate School of Engineering, Kobe Universit (Japan), 3. Innovation Commercialization Division, Kobe University (Japan))

[P-CM16-10] Surface-enhanced Low-frequency Raman Spectroscopy
[Presentation Style] Onsite
*Ryosuke Morisaki[1], Takayuki Umakoshi[1], Prabhat Verma[1] (1. Osaka University (Japan))

[P-CM16-11] Multiple Anapole State in Free-standing Silicon Nanodisk
[Presentation Style] Onsite

Monica Pradhan[1], Shubhanshi Sharma[1], Shivakiran B N Bhaktha[1], *Shailendra Kumar Varshney[1] （1. Indian Institute of Technology, Kharagpur (India)）

[P-CM16-12] Near-field spectral properties and ultrafast dynamics of coupled plasmonic nanostructures
[Presentation Style] Onsite

*Hiroki Takeuchi[1], Junfeng Yue[1], Keisuke Imaeda[2], Kosei Ueno[2] （1. Graduate School of Chemical Sciences and Engineering, Hokkaido University (Japan), 2. Department of Chemistry, Faculty of Science, Hokkaido University (Japan)）

[P-CM16-13] Plasmon-Enhanced Solar-Driven Hydrogen Evolution Using Plasmonic Metasurface Broadband Absorbers
[Presentation Style] Onsite

*Tzu Yu Peng[1,2], Meng-Ju Yu[1], Chih-Li Chang[3], Hao-Yu Lan[1], Zong-Yi Chiao[1,2], Yu-Chia Chen[1], Ho Wai Howard Lee[4], Yia-Chung Chang[1], Shu-Wei Chang[1], Takuo Tanaka[5,6,7], Vincent Tung[8], Ho-Hsiu Chou[4], Yu-Jung Lu[1,2] （1. Research Center for Applied Sciences, Academia Sinica (Taiwan), 2. Department of Physics, National Taiwan University (Taiwan), 3. Department of Chemical Engineering, National Tsing Hua University (Taiwan), 4. Department of Physics and Astronomy, University of California (United States of America), 5. Metamaterials Laboratory, RIKEN Cluster for Pioneering Research (Japan), 6. Innovative Photon Manipulation Research Team, RIKEN Center for Advanced Photonics (Japan), 7. Institute of Post-LED Photonics, Tokushima University (Japan), 8. Physical Science and Engineering (PSE) Division, King Abdullah University of Science and Technology (KAUST) (Saudi Arabia)）

[P-CM16-14] Plasmon-Enhanced Upconversion Luminescence in Two-Dimensional Halide Perovskite Film
[Presentation Style] Onsite

*Yen-Yu Wang[1,2], Tzu-Yu Peng[1,3], Jia-Wern Chen[1], Fang-Zhou Liu[4], Tik-Lun Leung[4], Chih-Wei Chu[1], Aleksandra B. Djurišic[4], Yu-Jung Lu[1] （1. Research Center for Applied Sciences, Academia Sinica (Taiwan), 2. Department of Physics, National Taiwan Univ. (Taiwan), 3. Graduate Institute of Applied Physics, National Taiwan Univ. (Taiwan), 4. Department of Physics, The Univ. of Hong Kong (Hong Kong)）

[P-CM16-16] Fabrication of Wavelength-Selective Visible-Absorbing Filter for 405-nm by Surface Plasmon Resonance
[Presentation Style] Online

*Atsushi Motogaito[1], Seigi Shimizu[1], Karen Akatsuka[1], Kazumasa Hiramatsu[1] （1. Mie Univ. (Japan)）

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-01] Surface scattering in periodic metamaterials
[Presentation Style] Online

*Tieyan Zhang[1], Jiachen Yu[1], Qiqige Wulan[1], Zhe Li[1], Zhijun Liu[1] (1. Univ. of Electronic Sci. and Tech. of China (China))

[Presentation Style] Online

Surface light scattering in periodic metamaterials is characterized. Diffuse reflection is shown to occur at wavelengths less than that of the first order Rayleigh anomaly as dominated by grating diffractions from structural periodicity

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-02] Performance Estimation of EO-Polymer Plasmonic Optical Phased Array
[Presentation Style] Onsite

*Yuji Kuwamura[1], Kyosuke Hibata[1] (1. Kanazawa Univ. (Japan))

[Presentation Style] Onsite

We proposed a new type of plasmonic optical phased array consisting of an array of plasmonic phase modulators based on electro-optic polymers. The proposed device has only one optical peak at a wavelength of 1.55um, and the output light can be deflected and scanned over a range of more than 100 degrees by voltage control, which is confirmed by numerical calculation using the two-dimensional FDTD method. A Small-sized (70*26um^2), low-voltage (Less than 10V), high-speed and low-power optical phased array could be designed.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-04] Dynamic refractive index analysis by focused surface plasmon for continuous evaluation of evaporation of saliva
[Presentation Style] Onsite

*Ipsita Chakraborty[1], Akinari Abe[1], Daiki Matsubayashi[1], Hiroshi Kano[1] (1. Muroran Institute of Technology (Japan))

[Presentation Style] Onsite

Analyzing evaporation of liquid containing multiple substances from liquid state, semi-dried state to completely dried state with focused surface plasmon. Quantitative dynamic refractive index analysis of saliva at various temperatures was performed.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-05] Metal-Insulator-Metal Structured Surface Plasmon

Polariton Waveguide with Improved Gain
[Presentation Style] Online

*RISHITEJA CHAPARALA[1], Sreenivasulu Tupakula[1] （1. SRM Univ. (India)）

[Presentation Style] Online

Design and analysis of spoof surface plasmon polariton waveguide is presented in this work. The novel structure exhibits an improved gain of 6.973dBi with an increment of 0.83dBi compared to the existing designs.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-06] Plasmon resonance wavelength controlled by SiO_2 layer thickness on a silver surface and nanoantenna effect at a center of Bull’ s eye pattern
[Presentation Style] Onsite

*Takeha Shinohara[1], Keiko Tawa[1] （1. Kwansei Gakuin Univ. (Japan)）

[Presentation Style] Onsite

Resonance wavelength was controlled by SiO_2 film thickness deposited on a thin Ag film and the excitation and emission enhancement was individually evaluated by microscope to clarify the cause of the nanoantenna effect.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-07] Novel Plasmonic Metamaterials based on Ag Nano-Hemispheres and Metal/Dielectric Multilayer Structures
[Presentation Style] Onsite

*Rei Niguma[1], Sayako Maeda[1], Tetsuya Matsuyama[1], Kenji Wada[1], Koichi Okamoto[1] （1. Osaka Prefecture Univ. (Japan)）

[Presentation Style] Onsite

We have devised a novel plasmonic metamaterial based on Ag Nano-hemispheres and Ag/SiO_2 multilayer structures. This structure enables the propagation of near-field light and is expected to be observed beyond the diffraction limit.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-08] Plasmonic colorimetric sensor using Ag-NHoM structures
[Presentation Style] Onsite

*Sayako Maeda[1], Koki Matsuda[1], Rei Niguma[1], Tetsuya Matsuyama[1], Kenji Wada[1], Koichi Okamoto[1] （1. Osaka Metropolitan University (Japan)）

[Presentation Style] Onsite
We demonstrated that random structures formed by heat-treatment on mirrored substrates through spacers layer can control the plasmonic color in the visible wavelength range and can be applied to highly sensitive colorimetric sensors.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-09] New Sensitive Biosensor Platform by Plasmon Field Enhanced Photoreaction and Fluorescence [Presentation Style] Onsite

*Shohei Horio[1], Koji Mizutani[1], Hirobumi Sunayama[2], Toshihumi Takeuchi[3], Keiko Tawa[1] (1. Kwansei Gakuin University (Japan), 2. Graduate School of Engineering, Kobe Universit (Japan), 3. Innovation Commercialization Division, Kobe University (Japan))
[Presentation Style] Onsite
We used the plasmon-enhanced electric field not only as an excitation enhancement field for fluorescence but also as a photochemical reaction field, aiming to create a biosensor platform with sensitive detection in the controlled area.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-10] Surface-enhanced Low-frequency Raman Spectroscopy [Presentation Style] Onsite

*Ryosuke Morisaki[1], Takayuki Umakoshi[1], Prabhat Verma[1] (1. Osaka University (Japan))
[Presentation Style] Onsite
In this research, we for the first time demonstrated surface-enhanced low-frequency Raman spectroscopy. Low-frequency Raman scattering from a thin layered MoS_2, which arises from inter-layer interaction, was highly enhanced by silver nanoparticles.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-11] Multiple Anapole State in Free-standing Silicon Nanodisk [Presentation Style] Onsite

Monica Pradhan[1], Shubhanshi Sharma[1], Shivakiran B N Bhaktha[1], *Shailendra Kumar Varshney[1] (1. Indian Institute of Technology, Kharagpur (India))
[Presentation Style] Onsite
Through finite-element 3D simulations, we achieve the multiple anapole states, in a single silicon nanodisk at 522 nm (pseudo-anapole) and 815 nm (higher-order anapole) wavelengths which can be used for multitude applications.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-12] Near-field spectral properties and ultrafast dynamics of coupled plasmonic nanostructures
[Presentation Style] Onsite

*Hiroki Takeuchi[1], Junfeng Yue[1], Keisuke Imaeda[2], Kosei Ueno[2] (1. Graduate School of Chemical Sciences and Engineering, Hokkaido University (Japan), 2. Department of Chemistry, Faculty of Science, Hokkaido University (Japan))

[Presentation Style] Onsite

We have successfully elucidated the near-field spectral properties and phase relaxation dynamics of coupled plasmonic nanostructures as well as the effect of plasmon dephasing dynamics on near-field enhancement.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-13] Plasmon-Enhanced Solar-Driven Hydrogen Evolution Using Plasmonic Metasurface Broadband Absorbers
[Presentation Style] Onsite

*Tzu Yu Peng[1,2], Meng-Ju Yu[1], Chih-Li Chang[3], Hao-Yu Lan[1], Zong-Yi Chiao[1,2], Yu-Chia Chen[1], Ho Wai Howard Lee[4], Yia-Chung Chang[1], Shu-Wei Chang[1], Takuo Tanaka[5,6,7], Vincent Tung[8], Ho-Hsiu Chou[4], Yu-Jung Lu[1,2] (1. Research Center for Applied Sciences, Academia Sinica (Taiwan), 2. Department of Physics, National Taiwan University (Taiwan), 3. Department of Chemical Engineering, National Tsing Hua University (Taiwan), 4. Department of Physics and Astronomy, University of California (United States of America), 5. Metamaterials Laboratory, RIKEN Cluster for Pioneering Research (Japan), 6. Innovative Photon Manipulation Research Team, RIKEN Center for Advanced Photonics (Japan), 7. Institute of Post-LED Photonics, Tokushima University (Japan), 8. Physical Science and Engineering (PSE) Division, King Abdullah University of Science and Technology (KAUST) (Saudi Arabia))

[Presentation Style] Onsite

We report that plasmonic metasurface exhibits broadband absorption with an average absorption of more than 92% over visible range, achieving 300% increase in the hydrogen evolution rate due to the LSPR that enhances the rates of light absorption.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-14] Plasmon-Enhanced Upconversion Luminescence in Two-Dimensional Halide Perovskite Film
[Presentation Style] Onsite

*Yen-Yu Wang[1,2], Tzu-Yu Peng[1,3], Jia-Wern Chen[1], Fang-Zhou Liu[4], Tik-Lun Leung[4], Chih-Wei Chu[1], Aleksandra B. Djurišic[4], Yu-Jung Lu[1] (1. Research Center for Applied Sciences, Academia Sinica (Taiwan), 2. Department of Physics, National Taiwan Univ. (Taiwan), 3. Graduate Institute of Applied Physics, National Taiwan Univ. (Taiwan), 4. Department of Physics, The Univ. of Hong Kong (Hong Kong))

[Presentation Style] Onsite

We achieve Upconversion Luminescence Enhancement on 2D perovskite by using alternative plasmonic material (HfN) bowtie structure.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM16-16] Fabrication of Wavelength-Selective Visible-Absorbing Filter for 405-nm by Surface Plasmon Resonance [Presentation Style] Online

*Atsushi Motogaito[1], Seigi Shimizu[1], Karen Akatsuka[1], Kazumasa Hiramatsu[1] （1. Mie Univ. (Japan)）

[Presentation Style] Online

Herein, the fabrication of the wavelength-selective visible-absorbing filter for 405-nm by surface plasmon resonance was performed. Using the double-layer wire grid structure of Ag and Al, the peak absorptance was observed experimentally.

Poster Session | CLEO-PR2022 | Poster Session

C18. Microwave Photonics

Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CM18-01] Photonic Generation of Multi-Carrier Chirped Waveform using a Dual-Drive Mach Zehnder Modulator

[Presentation Style] Online

*Rajveer Dhawan[1], Reena Parihar[1], Amol Choudhary[1] (1. UFO-CHIP group, Indian Inst. of Tech. (IIT), Delhi (India))

[P-CM18-02] Optical Filter-less Photonic Dechirping of a Frequency-Modulated Continuous-Wave Radar

[Presentation Style] Online

Kartik Moyal[1], *Rajveer Dhawan[1], Amol Choudhary[1] (1. UFO-CHIP group, Indian Inst. of Tech. (IIT), Delhi (India) (India))

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM18-01] Photonic Generation of Multi-Carrier Chirped Waveform using a Dual-Drive Mach Zehnder Modulator [Presentation Style] Online

*Rajveer Dhawan[1], Reena Parihar[1], Amol Choudhary[1] (1. UFO-CHIP group, Indian Inst. of Tech. (IIT), Delhi (India))

[Presentation Style] Online

Frequency multiplication of the RF frequency of linear frequency modulated waveforms by 4X using a dual-drive Mach Zehnder modulator is demonstrated. A chirp bandwidth of 1GHz, time-bandwidth product of 10000, range-resolution of 0.15m is achieved.

(Mon. Aug 1, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CM18-02] Optical Filter-less Photonic Dechirping of a Frequency-Modulated Continuous-Wave Radar [Presentation Style] Online

Kartik Moyal[1], *Rajveer Dhawan[1], Amol Choudhary[1] (1. UFO-CHIP group, Indian Inst. of Tech. (IIT), Delhi (India) (India))

[Presentation Style] Online

Optical filter-less photonic dechirping of signals from a Frequency-Modulated Continuous Wave (FMCW) radar using a dual-drive Mach Zehnder modulator is demonstrated for three different targets at 300m, 450m, and 750m with an error of <1.4m.

Oral Session | CLEO-PR2022 | MIR Lasers

MIR Lasers

Session Chair: Shigeki Tokita (Kyoto Univ.)

Tue. Aug 2, 2022 9:00 AM - 10:30 AM Conference Hall (Oval Room) (1F)

[CTuA1A-01 (Invited)] 3.5 µm fiber lasers

[Presentation Style] Online

*David J. Ottaway[1,2], Ori Henderson Sapir[1,3] (1. Dept. Physics and IPAS, The University of Adelaide (Australia), 2. ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav) (Australia), 3. Mirage Photonics (Australia))

9:00 AM - 9:30 AM

[CTuA1A-02] Frequency-shifted feedback mode-locked and tunable 3.5 μm fiber laser and Bragg grating interrogator

[Presentation Style] Online

Ori Henderson-Sapir[1,2], Nathaniel Bawden[1], Antreas Theodosiou[3,4], Kyriacos Kalli[3], Matthew R. Majewski[5], Stuart D. Jackson[5], *David J. Ottaway[1] (1. Department of Physics and Institute of Photonics and Advanced Sensing (Australia), 2. Mirage Photonics (Australia), 3. Photonics and Optical Sensors Research Laboratory, Cyprus University of Technology (Cyprus), 4. Lumoscribe LTD. (Cyprus), 5. MQ Photonics, School of Engineering, Faculty of Science and Engineering, Macquarie University (Australia))

9:30 AM - 9:45 AM

[CTuA1A-03] Highly-efficient CW Fe:ZnSe Laser Amplifier at ~4 μm

[Presentation Style] Onsite

*Enhao Li[1], Hiyori Uehara[1,2], Shigeki Tokita[3], Fedor Potemkin[4], Ryo Yasuhara[1,2] (1. SOKENDAI (Japan), 2. NIFS (Japan), 3. Osaka Univ. (Japan), 4. Moscow State Univ. (Russia))

9:45 AM - 10:00 AM

[CTuA1A-04] Mode-locked Cr:ZnS laser with multiple spectral peaks at molecular vibrational resonances

[Presentation Style] Onsite

*Daiki Okazaki[1], Wenqing Song[1], Ikki Morichika[1], Satoshi Ashihara[1] (1. IIS, The Univ. of Tokyo (Japan))

10:00 AM - 10:15 AM

[CTuA1A-05] 2 μm Ultrabroadband InAs/InP Quantum Dash Emitter for SWIR Tunable Lasers

*Rafael Jumar Chu[1,2], Yeonhwa Kim[1,2], Hosung Kim[3], Seungwan Woo[1,4], Dae-Hwan Ahn[1], Won Jun Choi[1], Daehwan Jung[1,2] (1. Center for Opto-electronic Materials and Devices, Korea Institute of Science and Technology (Korea), 2. University of Science and Technology (Korea), 3. Electronics and Telecommunications Research Institute (Korea), 4. Korea University (Korea))

10:15 AM - 10:30 AM

9:00 AM - 9:30 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Conference Hall (Oval Room))

[CTuA1A-01 (Invited)] 3.5 µm fiber lasers

[Presentation Style] Online

*David J. Ottaway[1,2], Ori Henderson Sapir[1,3] (1. Dept. Physics and IPAS, The University of Adelaide (Australia), 2. ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav) (Australia), 3. Mirage Photonics (Australia))

[Presentation Style] Online

The introduction of dual wavelength pumping nearly a decade ago has made the 3.5 µm transition in erbium doped fluoride glasses viable. This has enabled a host of new lasers with interesting properties to be developed.

9:30 AM - 9:45 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Conference Hall (Oval Room))

[CTuA1A-02] Frequency-shifted feedback mode-locked and tunable 3.5 m fiber laser and Bragg grating interrogator

[Presentation Style] Online

Ori Henderson-Sapir[1,2], Nathaniel Bawden[1], Antreas Theodosiou[3,4], Kyriacos Kalli[3], Matthew R. Majewski[5], Stuart D. Jackson[5], *David J. Ottaway[1] (1. Department of Physics and Institute of Photonics and Advanced Sensing (Australia), 2. Mirage Photonics (Australia), 3. Photonics and Optical Sensors Research Laboratory, Cyprus University of Technology (Cyprus), 4. Lumoscribe LTD. (Cyprus), 5. MQ Photonics, School of Engineering, Faculty of Science and Engineering, Macquarie University (Australia))

[Presentation Style] Online

A mode-locked, dual-wavelength pumped 3.5 m fiber laser using frequency-shifted feedback is reported. Pulses of 3.8 ps with 8.7 nJ were obtained. An electronically wavelength swept, mid-IR interrogator is built to characterize a mid-IR fiber Bragg grating.

9:45 AM - 10:00 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Conference Hall (Oval Room))

[CTuA1A-03] Highly-efficient CW Fe:ZnSe Laser Amplifier at ~4 μ m

[Presentation Style] Onsite

*Enhao Li[1], Hiyori Uehara[1,2], Shigeki Tokita[3], Fedor Potemkin[4], Ryo Yasuhara[1,2] (1. SOKENDAI (Japan), 2. NIFS (Japan), 3. Osaka Univ. (Japan), 4. Moscow State Univ. (Russia))

[Presentation Style] Onsite

We present a high-efficiency CW Fe:ZnSe laser amplifier seeded by a 4-μm quantum cascade laser. The amplifier obtained a more than fourfold single-pass gain and a maximum extraction efficiency of over 30%.

10:00 AM - 10:15 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Conference Hall (Oval Room))

[CTuA1A-04] Mode-locked Cr:ZnS laser with multiple spectral peaks at molecular vibrational resonances

[Presentation Style] Onsite

*Daiki Okazaki[1], Wenqing Song[1], Ikki Morichika[1], Satoshi Ashihara[1] （1. IIS, The Univ. of Tokyo (Japan)）

[Presentation Style] Onsite

We demonstrate mode-locked oscillation accompanied by multiple spectral peaks at absorption lines of gaseous molecules. Numerical simulations reveal that the modulated spectrum represents peak structure while it evolves in a self-consistent manner inside the cavity.

10:15 AM - 10:30 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Conference Hall (Oval Room))

[CTuA1A-05] 2 μ m Ultrabroadband InAs/InP Quantum Dash Emitter for SWIR Tunable Lasers

*Rafael Jumar Chu[1,2], Yeonhwa Kim[1,2], Hosung Kim[3], Seungwan Woo[1,4], Dae-Hwan Ahn[1], Won Jun Choi[1], Daehwan Jung[1,2] （1. Center for Opto-electronic Materials and Devices, Korea Institute of Science and Technology (Korea), 2. University of Science and Technology (Korea), 3. Electronics and Telecommunications Research Institute (Korea), 4. Korea University (Korea)）

We present a 2 μm ultrabroadband InAs quantum dash laser grown epitaxially with a 531 nm spontaneous emission bandwidth under continuous wave mode, and a lasing threshold current of 3.5 kA/cm^2 under pulsed mode.

Oral Session | CLEO-PR2022 | Soliton Fiber Lasers

Soliton Fiber Lasers

Session Chairs: Jungwon Kim (KAIST), Shigeki Tokita (Kyoto Univ.)

Tue. Aug 2, 2022 11:00 AM - 12:00 PM Conference Hall (Oval Room) (1F)

[CTuA1B-01 (Invited)] Temporal Solitons in Coherently driven Active Fiber Resonators

[Presentation Style] Online

*Francois Leo[1] (1. Universite libre de Bruxelles (Belgium))

11:00 AM - 11:30 AM

[CTuA1B-02] Numerical Analysis on the Effects of Spectral Ripple for Saturable Absorber Based Mode-Locking

[Presentation Style] Onsite

*Bowen Liu[1], Shinji Yamashita[1], Sze Yun Set[1] (1. The University of Tokyo (Japan))

11:30 AM - 11:45 AM

[CTuA1B-03] Characteristics of Spectral Peaking in Ultrashort Pulse Fiber Lasers with Molecular Gas Cell

[Presentation Style] Onsite

*Norihiko Nishizawa[1], Shotaro Kitajima[1], Youichi Sakakibara[2] (1. Nagoya University (Japan), 2. AIST (Japan))

11:45 AM - 12:00 PM

11:00 AM - 11:30 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Conference Hall (Oval Room))

[CTuA1B-01 (Invited)] Temporal Solitons in Coherently driven Active Fiber Resonators
[Presentation Style] Online

*Francois Leo[1] (1. Universite libre de Bruxelles (Belgium))

[Presentation Style] Online

In this talk I will discuss our recent results about active cavity solitons. We show how coherent and incoherent gain mechanisms can both be harnessed for stable soliton generation

11:30 AM - 11:45 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Conference Hall (Oval Room))

[CTuA1B-02] Numerical Analysis on the Effects of Spectral Ripple for Saturable Absorber Based Mode-Locking
[Presentation Style] Onsite

*Bowen Liu[1], Shinji Yamashita[1], Sze Yun Set[1] (1. The University of Tokyo (Japan))

[Presentation Style] Onsite

We report numerical study on spectral ripple effects in a mode-locked fiber laser towards steady single-pulse states. Maps of nonlinear saturable absorption threshold required for stable mode-locking generation are explored. Ripple cancellation is also demonstrated.

11:45 AM - 12:00 PM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Conference Hall (Oval Room))

[CTuA1B-03] Characteristics of Spectral Peaking in Ultrashort Pulse Fiber Lasers with Molecular Gas Cell
[Presentation Style] Onsite

*Norihiko Nishizawa[1], Shotaro Kitajima[1], Youichi Sakakibara[2] (1. Nagoya University (Japan), 2. AIST (Japan))

[Presentation Style] Onsite

Characteristics of spectral peaking in fiber laser were investigated both experimentally and numerically. Ultrashort soliton pulse with multiple sharp spectral peaks were generated stably. The peak intensity was increased exponentially for the magnitude of absorption.

Ultrafast Spectroscopy and Coherent Control I

Session Chairs: Kazutaka Nakamura (Tokyo Institute of Technology), Tadashi Togashi (JASRI)

Tue. Aug 2, 2022 10:00 AM - 10:30 AM Room 204 (2F)

[CTuA2C-01] Coherent quench of superconducting state using optical vortex pulses

[Presentation Style] Onsite

*Yasunori Toda[1], Satoshi Tsuchiya[1], Keisaku Yamane[1], Ryuji Morita[1], Migaku Oda[1], Tomaz Mertelj[2], Dragan Mihailovic[2] （1. Hokkaido University (Japan), 2. Jozef Stefan Institute (Slovenia)）

10:00 AM - 10:15 AM

[CTuA2C-02] Ultrafast, all-optical, and highly efficient imaging of molecular chirality via low-order nonlinear processes

[Presentation Style] Online

Josh Vogwell[1], Olga Smirnova[2,3], *David Ayuso[1,2] （1. Imperial College London (UK), 2. Max-Born-Institut Berlin (Germany), 3. Technische Universitat Berlin (Germany)）

10:15 AM - 10:30 AM

10:00 AM - 10:15 AM (Tue. Aug 2, 2022 10:00 AM - 10:30 AM Room 204)

[CTuA2C-01] Coherent quench of superconducting state using optical vortex pulses

[Presentation Style] Onsite

*Yasunori Toda[1], Satoshi Tsuchiya[1], Keisaku Yamane[1], Ryuji Morita[1], Migaku Oda[1], Tomaz Mertelj[2], Dragan Mihailovic[2] (1. Hokkaido University (Japan), 2. Jozef Stefan Institute (Slovenia))

[Presentation Style] Onsite

Spatially modulated superconducting states are generated using superconducting coherent quenches induced by ultrashort optical vortex pulses. The proof-of-principle of super-resolution of the SC response using the technique is also demonstrated.

10:15 AM - 10:30 AM (Tue. Aug 2, 2022 10:00 AM - 10:30 AM Room 204)

[CTuA2C-02] Ultrafast, all-optical, and highly efficient imaging of molecular chirality via low-order nonlinear processes

[Presentation Style] Online

Josh Vogwell[1], Olga Smirnova[2,3], *David Ayuso[1,2] (1. Imperial College London (UK), 2. Max-Born-Institut Berlin (Germany), 3. Technische Universitat Berlin (Germany))

[Presentation Style] Online

We introduce an ultrafast chiro-optical method based on sum-frequency generation. In contrast to traditional implementations, the medium's chirality is encoded in the *intensity* of the nonlinear response, rather than in its *phase*, with extreme efficiency.

Ultrafast Spectroscopy and Coherent Control II

Session Chairs: Takao Fuji (Toyota Technological Institute), Ryuji Morita (Hokkaido Univ.)

Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 204 (2F)

[CTuA2D-01] Ultrafast quantum-path interferometry to study decoherence time of electron-phonon coupled states in GaAs using polarized femtosecond pulses

[Presentation Style] Onsite

*Itsuki Takagi[1,2], Masaki Suda[1,2], Yosuke Kayanuma[1,3], Kazutaka G. Nakamura[1,2] (1. MSL Tokyo Tech (Japan), 2. Materials. Eng. Tokyo Tech (Japan), 3. Osaka Prefecture Univ. (Japan))

11:00 AM - 11:15 AM

[CTuA2D-02] Population Manipulation with Chirped Pulses in InAs Quantum Dots with Resonators

[Presentation Style] Onsite

*Kotaro Miyauchi[1], Yutaro Kinoshita[1], Kouichi Akahane[2], Junko Ishi-Hayase[1] (1. Keio Univ. (Japan), 2. NICT (Japan))

11:15 AM - 11:30 AM

[CTuA2D-03] Photoinduced Non-thermal Topological Phase Transition in Bi_2Se_3 Driven by Coherent Interlayer Vibrations

[Presentation Style] Onsite

*Tae Gwan Park Park[1], Junho Park Park[1], Eon Taek Oh[1], Hong Ryeol Na[2], Seung-Hyun Chun[2], Sunghun Lee[2], Fabian Rotermund[1] (1. KAIST (Korea), 2. Sejong Univ. (Korea))

11:30 AM - 11:45 AM

[CTuA2D-04] Ultrafast All-Optical Switching with High-Quality Graphene and its Polarization Effect

[Presentation Style] Onsite

*Tomoki Kusaka[1], Akihiro Furube[1], Tetsuro Katayama[1], Hiroki Kishikawa[1], Yasuhide Ohno[1], Masao Nagase[1], Junichi Fujikata[1] (1. Tokushima Univ. (Japan))

11:45 AM - 12:00 PM

11:00 AM - 11:15 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 204)

[CTuA2D-01] Ultrafast quantum-path interferometry to study decoherence time of electron-phonon coupled states in GaAs using polarized femtosecond pulses [Presentation Style] Onsite

*Itsuki Takagi[1,2], Masaki Suda[1,2], Yosuke Kayanuma[1,3], Kazutaka G. Nakamura[1,2] (1. MSL Tokyo Tech (Japan), 2. Materials. Eng. Tokyo Tech (Japan), 3. Osaka Prefecture Univ. (Japan))

[Presentation Style] Onsite

Decoherence time of the electron-phonon coupled states in n-GaAs has been studied with ultrafast quantum-path interferometry using a pair of polarized 60-fs pulses with relative phase locking and quantum model calculations.

11:15 AM - 11:30 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 204)

[CTuA2D-02] Population Manipulation with Chirped Pulses in InAs Quantum Dots with Resonators [Presentation Style] Onsite

*Kotaro Miyauchi[1], Yutaro Kinoshita[1], Kouichi Akahane[2], Junko Ishi-Hayase[1] (1. Keio Univ. (Japan), 2. NICT (Japan))

[Presentation Style] Onsite

We demonstrate the robust population inversion of excitons with a large inhomogeneous broadening using chirped pulses in self-assembled InAs quantum dots embedded in optical resonator.

11:30 AM - 11:45 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 204)

[CTuA2D-03] Photoinduced Non-thermal Topological Phase Transition in Bi_2Se_3 Driven by Coherent Interlayer Vibrations [Presentation Style] Onsite

*Tae Gwan Park Park[1], Junho Park Park[1], Eon Taek Oh[1], Hong Ryeol Na[2], Seung-Hyun Chun[2], Sunghun Lee[2], Fabian Rotermund[1] (1. KAIST (Korea), 2. Sejong Univ. (Korea))

[Presentation Style] Onsite

We present the non-thermal route of photoinduced topological phase transition driven by interlayer vibrations.

11:45 AM - 12:00 PM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 204)

[CTuA2D-04] Ultrafast All-Optical Switching with High-Quality Graphene and its Polarization Effect

[Presentation Style] Onsite

*Tomoki Kusaka[1], Akihiro Furube[1], Tetsuro Katayama[1], Hiroki Kishikawa[1], Yasuhide Ohno[1], Masao Nagase[1], Junichi Fujikata[1] （1. Tokushima Univ. (Japan)）

[Presentation Style] Onsite

All-optical switching operation with spatial incidence and its polarization effect was investigated using the saturable absorption property of the graphene on SiC. 120fs ultrafast optical switching operation and about 8% absorption change could be achieved.

Single Photon Sources

Session Chairs: Kai-Hong Luo (Paderborn Univ.), Hiroki Takesue (NTT Corp.)
Tue. Aug 2, 2022 9:00 AM - 10:30 AM Mid-sized Hall A (1F)

[CTuA7A-01 (Tutorial)] Quantum advantage with photons
[Presentation Style] Online
*Chao-Yang Lu[1] （1. University of Science and Technology of China (China)）
9:00 AM - 10:00 AM

[CTuA7A-02] Scalable Quantum Dot Single-photon Sources Based on Dual-mode Waveguides
[Presentation Style] Online
Leonardo Midolo[1], *Camille Papon[1], Xiaoyan Zhou[1], Ravitej Uppu[1], Ying Wang[1], Sven Scholz[2], Andreas D. Wieck[2], Arne Ludwig[2], Peter Lodahl[1] （1. University of Copenhagen (Denmark), 2. Ruhr-Universität Bochum (Germany)）
10:00 AM - 10:15 AM

[CTuA7A-03] Low-Temperature Spectroscopy of Single-Photon Emitters in Irradiation-Engineered Hexagonal Boron Nitride
[Presentation Style] Onsite
*Moritz Fischer[1], Ali Sajid[1], Alexander Hötger[2], Kristian Sommer Thygesen[1], Sanshui Xiao[1], Martijn Wubs[1], Alexander Holleitner[2], Nicolas Stenger[1] （1. Technical Univ. of Denmark (DTU) (Denmark), 2. Technical Univ. of Munich (Germany)）
10:15 AM - 10:30 AM

9:00 AM - 10:00 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Mid-sized Hall A)

[CTuA7A-01 (Tutorial)] Quantum advantage with photons
[Presentation Style] Online

*Chao-Yang Lu[1] (1. University of Science and Technology of China (China))

[Presentation Style] Online

We have implemented boson sampling, an intermediate quantum computer model for demonstrating quantum computational advantage and refuting. Extended Church Turing Thesis, with up to 113 photon clicks after a 144-mode ultralow-loss interferometer.

10:00 AM - 10:15 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Mid-sized Hall A)

[CTuA7A-02] Scalable Quantum Dot Single-photon Sources Based on Dual-mode Waveguides
[Presentation Style] Online

Leonardo Midolo[1], *Camille Papon[1], Xiaoyan Zhou[1], Ravitej Uppu[1], Ying Wang[1], Sven Scholz[2], Andreas D. Wieck[2], Arne Ludwig[2], Peter Lodahl[1] (1. University of Copenhagen (Denmark), 2. Ruhr-Universität Bochum (Germany))

[Presentation Style] Online

We present a photonic integrated circuit for the simultaneous resonant excitation of two distinct InAs quantum dots and for the generation of coherent streams of single photons, towards on-chip quantum information and computing.

10:15 AM - 10:30 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Mid-sized Hall A)

[CTuA7A-03] Low-Temperature Spectroscopy of Single-Photon Emitters in Irradiation-Engineered Hexagonal Boron Nitride
[Presentation Style] Onsite

*Moritz Fischer[1], Ali Sajid[1], Alexander Hötger[2], Kristian Sommer Thygesen[1], Sanshui Xiao[1], Martijn Wubs[1], Alexander Holleitner[2], Nicolas Stenger[1] (1. Technical Univ. of Denmark (DTU) (Denmark), 2. Technical Univ. of Munich (Germany))

[Presentation Style] Onsite

To identify the microscopic origin of single-photon emitters in hexagonal boron nitride, we perform low-temperature spectroscopy. We observe strong photoluminescence at two different excitation lasers that hint at a phonon-assisted excitation scheme

Electrical Nonlinear Equalization

Session Chair: Fukutaro Hamaoka (NTT Corp.)

Tue. Aug 2, 2022 9:30 AM - 10:30 AM Room 207 (2F)

[CTuA9C-01] Nonlinear Eye Skew Equalizers for Directly-Modulated Laser based 400G-LR Transmission Systems

[Presentation Style] Onsite

*Jyh-Kae Lin[1], Chun-Yen Chuang[1], Kuan-Hao Liu[1], Jyehong Chen[1], Chin-Shih Huang[2], Hao-Chun Hsieh[2], Hung-Chun Pan[2], Tsung-Han Lee[2], Chia-Wei Kao[2] （1. National Yang Ming Chiao Tung Univ. (Taiwan), 2. Wistron Corp. (Taiwan)）

9:30 AM - 9:45 AM

[CTuA9C-02] 10 dB Sensitivity Improvement by Employing Volterra Equalization for 400G-ZR 80 km Pluggable Coherent Transceiver

[Presentation Style] Onsite

*Yu Cheng Su[1], Chun-Yen Chuang[1], Yen-Hsiang Tseng[1], Nick Fan[2], Louis Lin[2], Jack Cheng[2], Jyehong Chen[1] （1. National Yang Ming Chiao Tung Univ. (Taiwan), 2. Optoway Tech. Inc. (Taiwan)）

9:45 AM - 10:00 AM

[CTuA9C-03] Simplified Pre-Distortion Technique for PAM4 Modulation based on a Micro-Ring Modulator

[Presentation Style] Online

Kai-Wen Chang[1], *Yu-Cheng Yu[1], Chia-Chien Wei[1], Chin Shih Huang[2], Hao Chun Hsieh[2], Hung Chun Pan[2], Wei-Jo Ting[2], Heng Li[2] （1. National Sun Yat-sen University (Taiwan), 2. Wistron Corporation (Taiwan)）

10:00 AM - 10:15 AM

[CTuA9C-04] Elimination of Nonlinear Distortion in DML-based OFDM Transmission Using Novel Pre-distortion

[Presentation Style] Online

Szu-Chi Huang[1], *Yu-Cheng Yu[1], Chia-Chien Wei[1], Chin Shih Huang[2], Hao Chun Hsieh[2], Hung Chun Pan[2], Wei-Jo Ting[2], Heng Li[2] （1. National Sun Yat-sen University (Taiwan), 2. Wistron Corporation (Taiwan)）

10:15 AM - 10:30 AM

9:30 AM - 9:45 AM (Tue. Aug 2, 2022 9:30 AM - 10:30 AM Room 207)

[CTuA9C-01] Nonlinear Eye Skew Equalizers for Directly-Modulated Laser based 400G-LR Transmission Systems
[Presentation Style] Onsite

*Jyh-Kae Lin[1], Chun-Yen Chuang[1], Kuan-Hao Liu[1], Jyehong Chen[1], Chin-Shih Huang[2], Hao-Chun Hsieh[2], Hung-Chun Pan[2], Tsung-Han Lee[2], Chia-Wei Kao[2] （1. National Yang Ming Chiao Tung Univ. (Taiwan), 2. Wistron Corp. (Taiwan)）

[Presentation Style] Onsite

We propose two nonlinear eye-skew equalizers for 400G-LR4 transceivers using DMLs. After equalizers, the eye-skew is effectively reduced, and the system shows a 3.2 dB power budget improvement and more than 10^7 BER floor reduction.

9:45 AM - 10:00 AM (Tue. Aug 2, 2022 9:30 AM - 10:30 AM Room 207)

[CTuA9C-02] 10 dB Sensitivity Improvement by Employing Volterra Equalization for 400G-ZR 80 km Pluggable Coherent Transceiver
[Presentation Style] Onsite

*Yu Cheng Su[1], Chun-Yen Chuang[1], Yen-Hsiang Tseng[1], Nick Fan[2], Louis Lin[2], Jack Cheng[2], Jyehong Chen[1] （1. National Yang Ming Chiao Tung Univ. (Taiwan), 2. Optoway Tech. Inc. (Taiwan)）

[Presentation Style] Onsite

We have successfully demonstrated a -22 dBm receiver sensitivity 400G-ZR coherent transmission system over 80km. The extra 10 dB link budget has potential to extend the distance to 120 km for next generation 400G-ZR+ applications.

10:00 AM - 10:15 AM (Tue. Aug 2, 2022 9:30 AM - 10:30 AM Room 207)

[CTuA9C-03] Simplified Pre-Distortion Technique for PAM4 Modulation based on a Micro-Ring Modulator
[Presentation Style] Online

Kai-Wen Chang[1], *Yu-Cheng Yu[1], Chia-Chien Wei[1], Chin Shih Huang[2], Hao Chun Hsieh[2], Hung Chun Pan[2], Wei-Jo Ting[2], Heng Li[2] （1. National Sun Yat-sen University (Taiwan), 2. Wistron Corporation (Taiwan)）

[Presentation Style] Online

This study analyzes the performance of digital pre-distortion (DPD) for micro-ring-modulator-based PAM4 modulation. With limited taps for practicality, the optimal design of the DPD was shown to depend on the operating conditions of the modulator.

10:15 AM - 10:30 AM (Tue. Aug 2, 2022 9:30 AM - 10:30 AM Room 207)

[CTuA9C-04] Elimination of Nonlinear Distortion in DML-based OFDM Transmission Using Novel Pre-distortion [Presentation Style] Online

Szu-Chi Huang[1], *Yu-Cheng Yu[1], Chia-Chien Wei[1], Chin Shih Huang[2], Hao Chun Hsieh[2], Hung Chun Pan[2], Wei-Jo Ting[2], Heng Li[2] （1. National Sun Yat-sen University (Taiwan), 2. Wistron Corporation (Taiwan)）

[Presentation Style] Online

Based on Volterra filtering, a novel pre-distortion method without significantly altering the transmitted spectra was proposed to eliminate nonlinear distortion in DML-based OFDM transmission. The scheme experimentally increased the capacity by >60% after 150-km transmission.

Oral Session | CLEO-PR2022 | Space Division Multiplexing

Space Division Multiplexing

Session Chair: Manabu Arikawa (NEC Corp.)

Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 207 (2F)

[CTuA9D-01 (Invited)] Generalized Stokes-space analysis of modal dispersion in fibers for space-division multiplexing with mode-dependent loss

[Presentation Style] Online

*Cristian Antonelli[1], Antonio Mecozzi[1], Mark Shtaif[2], Nicolas Keith Fontaine[3], Haoshuo Chen[3], Mikael Mazur[3], Roland Ryf[3], （1. University of L'Aquila (Italy), 2. University of Tel Aviv (Israel), 3. Nokia Bell Labs (United States of America)）

11:00 AM - 11:30 AM

[CTuA9D-02 (Invited(P))] Cumulative Dynamic Inter-Core Skew Measurements in Spooled Uncoupled Core Multicore Fibers

[Presentation Style] Onsite

*Ruben Luis[1], Benjamin J. Puttnam[1], Georg Rademacher[1], Yoshinari Awaji[1], Hideaki Furukawa[1] （1. NICT (Japan)）

11:30 AM - 12:00 PM

11:00 AM - 11:30 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 207)

[CTuA9D-01 (Invited)] Generalized Stokes-space analysis of modal dispersion in fibers for space-division multiplexing with mode-dependent loss
[Presentation Style] Online

*Cristian Antonelli[1], Antonio Mecozzi[1], Mark Shtaif[2], Nicolas Keith Fontaine[3], Haoshuo Chen[3], Mikael Mazur[3], Roland Ryf[3], （1. University of L'Aquila (Italy), 2. University of Tel Aviv (Israel), 3. Nokia Bell Labs (United States of America)))

[Presentation Style] Online

We present a unified model for modal dispersion and mode-dependent loss in fibers for space-division multiplexed transmission. The proposed model, based on a generalized Stokes-space representation of multi-modal fields, is validated by comparison with experimental data.

11:30 AM - 12:00 PM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 207)

[CTuA9D-02 (Invited(P))] Cumulative Dynamic Inter-Core Skew Measurements in Spooled Uncoupled Core Multicore Fibers
[Presentation Style] Onsite

*Ruben Luis[1], Benjamin J. Puttnam[1], Georg Rademacher[1], Yoshinari Awaji[1], Hideaki Furukawa[1] （1. NICT (Japan))

[Presentation Style] Onsite

We measured the propagation delay fluctuations and dynamic inter-core skew of 125 um cladding, 4-core fibers with 15.7, 29.5, and 50 km lengths. The measurements provide insight on the skew dependence on transmission distance.

Thin-film LN and AlN Devices

Session Chair: Toshimasa Umezawa (NICT)

Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 104&105 (1F)

[CTuA11C-01 (Invited)] Integrated lithium niobate photonics: when performance meets scalability
[Presentation Style] Online

*Mian Zhang[1] (1. HyperLight (United States of America))

9:00 AM - 9:30 AM

[CTuA11C-02] Efficient Lithium Niobate on Insulator Phase Modulator Using Light Recirculation
[Presentation Style] Onsite

*Haijin Huang[1], Xu Han[2], Armandas Balčytis[1], Aditya Dubey[1], Andreas Boes[1], Thach Nguyen[1], Guanghui Ren[1], Mengxi Tan[1], Yonghui Tian[2], Arnan Mitchell[1] (1. Integrated Photonics and Applications Centre, School of Engineering, RMIT University (Australia), 2. Key Laboratory for Magnetism and Magnetic Materials of MOE, School of Physical Science and Technology, Lanzhou University (China))

9:30 AM - 9:45 AM

[CTuA11C-03] Integrated spatiotemporal circulator on thin-film lithium niobate platform
[Presentation Style] Onsite

*Rebecca A Russell[1,2] (1. RMIT University (Australia), 2. InPAC (Australia))

9:45 AM - 10:00 AM

[CTuA11C-04] Low-loss Adiabatic Couplers on Thin-Film Lithium Niobate with Benzocyclobutene (BCB) Waveguide
[Presentation Style] Online

*Hao Liu[1], Xuecheng Liu[1], Bing Xiong[1], Changzheng Sun[1], Zhibiao Hao[1], Lai Wang[1], Jian Wang[1], Yanjun Han[1], Hongtao Li[1], Yi Luo[1] (1. Tsinghua Univ. (China))

10:00 AM - 10:15 AM

[CTuA11C-05] High-Efficiency Overlay Grating Fiber-Chip Couplers for Aluminum nitride-on-Sapphire Waveguide Platform
[Presentation Style] Onsite

*Shreelakshmi KP[1], Srinivasan Raghavan [1], Shankar Kumar Selvaraja[1] (1. Indian Institute of Science (India))

10:15 AM - 10:30 AM

9:00 AM - 9:30 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 104&105)

[CTuA11C-01 (Invited)] Integrated lithium niobate photonics: when performance meets scalability

[Presentation Style] Online

*Mian Zhang[1] (1. HyperLight (United States of America))

[Presentation Style] Online

Thin film lithium niobate photonics can provide high performance and scalable solution for optical communication applications. We discuss the advantage, challenge and future promises of this platform.

9:30 AM - 9:45 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 104&105)

[CTuA11C-02] Efficient Lithium Niobate on Insulator Phase Modulator Using Light Recirculation

[Presentation Style] Onsite

*Haijin Huang[1], Xu Han[2], Armandas Balčytis[1], Aditya Dubey[1], Andreas Boes[1], Thach Nguyen[1], Guanghui Ren[1], Mengxi Tan[1], Yonghui Tian[2], Arnan Mitchell[1] (1. Integrated Photonics and Applications Centre, School of Engineering, RMIT University (Australia), 2. Key Laboratory for Magnetism and Magnetic Materials of MOE, School of Physical Science and Technology, Lanzhou University (China))

[Presentation Style] Onsite

We describe an advanced integrated optical phase modulator design that harnesses a light recycling approach to exhibit an up to 8 times enhanced modulation response for an equivalent optical and electrical input power.

9:45 AM - 10:00 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 104&105)

[CTuA11C-03] Integrated spatiotemporal circulator on thin-film lithium niobate platform

[Presentation Style] Onsite

*Rebecca A Russell[1,2] (1. RMIT University (Australia), 2. InPAC (Australia))

[Presentation Style] Onsite

We report the simulation and experimental demonstration of an integrated electro-optic modulator based isolator/circulator on the lithium niobate on insulator optical waveguide platform, achieving 20dB theoretical and 9dB experimental isolation.

10:00 AM - 10:15 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 104&105)

[CTuA11C-04] Low-loss Adiabatic Couplers on Thin-Film Lithium Niobate with Benzocyclobutene (BCB) Waveguide

[Presentation Style] Online

*Hao Liu[1], Xuecheng Liu[1], Bing Xiong[1], Changzheng Sun[1], Zhibiao Hao[1], Lai Wang[1], Jian Wang[1], Yanjun Han[1], Hongtao Li[1], Yi Luo[1] （1. Tsinghua Univ. (China)）

[Presentation Style] Online

Adiabatic fiber-to-chip edge coupler based on BCB guiding waveguide and bilayer thin-film lithium niobate (TFLN) taper is proposed, and ultra-low coupling loss of 0.9 dB/facet between 3.5-μm mode-field-diameter (MFD) fiber and TFLN waveguide is recorded.

10:15 AM - 10:30 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 104&105)

[CTuA11C-05] High-Efficiency Overlay Grating Fiber-Chip Couplers for Aluminum nitride-on-Sapphire Waveguide Platform

[Presentation Style] Onsite

*Shreelakshmi KP[1], Srinivasan Raghavan [1], Shankar Kumar Selvaraja[1] （1. Indian Institute of Science (India)）

[Presentation Style] Onsite

Fiber-chip grating couplers in AlN-on-Sapphire platform with a coupling efficiency of -5.5 dB/coupler is demonstrated, best reported so far. This enables the development of possible strategies to harness nonlinear photonics with the AlN platform.

Oral Session | CLEO-PR2022 | Silicon Photonics

Silicon Photonics

Session Chair: Takuo Tanemura (Univ. of Tokyo)

Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 104&105 (1F)

[CTuA11D-01 (Invited)] Silicon Photonics Integrated Circuit for Co-Packaged Optical-IO

[Presentation Style] Online

*Yuliya Akulova[1], Saeed Fathololoumi[1], Kimchau Nguyen[1], Hari Mahalingam[1], Pegah Seddighian[1], Reece Defrees[1], Christian Malouin[1], Kadhair Al-hemyari[1], Daniel Zhu[1], Ling Liao[1], Thomas Liljeberg[1] (1. Intel Corporation (United States of America))

11:00 AM - 11:30 AM

[CTuA11D-02] Optimized Design of Inductive-peaking Si Microring Modulator for Operating Bandwidth over 65 GHz.

[Presentation Style] Online

*Hsiang-Chih Kao[1,2], Ming-Wei Lin[2], Ming-Chang Lee[1,3] (1. Institute of Photonics Technologies,National Tsinghua Univ. (Taiwan), 2. Taiwan Semiconductor Research Institute (Taiwan), 3. Department of Electrical Engineering, National Tsing Hua Univ. (Taiwan))

11:30 AM - 11:45 AM

[CTuA11D-03] Highly efficient power splitter with arbitrary ratios based on inverse shape optimization

[Presentation Style] Online

*Junpeng Liao[1], Ye Tian[1], Zirong Yang[1], Zhe Kang[2], Qinghui Jin[1], Xiaowei Zhang[1] (1. Ningbo Univ. (China), 2. Zhejiang Univ. (China))

11:45 AM - 12:00 PM

11:00 AM - 11:30 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 104&105)

[CTuA11D-01 (Invited)] Silicon Photonics Integrated Circuit for Co-Packaged Optical-IO
[Presentation Style] Online

*Yuliya Akulova[1], Saeed Fathololoumi[1], Kimchau Nguyen[1], Hari Mahalingam[1], Pegah Seddighian[1], Reece Defrees[1], Christian Malouin[1], Kadhair Al-hemyari[1], Daniel Zhu[1], Ling Liao[1], Thomas Liljeberg[1] (1. Intel Corporation (United States of America))

[Presentation Style] Online

Explosive growth of intra-datacenter traffic and scaling of compute fabric drive rapid evolution of the optical I/O architectures. We review advancements in silicon photonics manufacturing platform towards multi-Tb/s optical interconnects.

11:30 AM - 11:45 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 104&105)

[CTuA11D-02] Optimized Design of Inductive-peaking Si Microring Modulator for Operating Bandwidth over 65 GHz.
[Presentation Style] Online

*Hsiang-Chih Kao[1,2], Ming-Wei Lin[2], Ming-Chang Lee[1,3] (1. Institute of Photonics Technologies,National Tsinghua Univ. (Taiwan), 2. Taiwan Semiconductor Research Institute (Taiwan), 3. Department of Electrical Engineering, National Tsing Hua Univ. (Taiwan))

[Presentation Style] Online

We design a high-speed inductive-peaking Si microring modulator integrated with an on-chip spiral inductor to extend the 3dB operating bandwidth beyond 65GHz and increase the conversion gain by 5 dB. A 64Gb/s transmission is demonstrated.

11:45 AM - 12:00 PM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 104&105)

[CTuA11D-03] Highly efficient power splitter with arbitrary ratios based on inverse shape optimization
[Presentation Style] Online

*Junpeng Liao[1], Ye Tian[1], Zirong Yang[1], Zhe Kang[2], Qinghui Jin[1], Xiaowei Zhang[1] (1. Ningbo Univ. (China), 2. Zhejiang Univ. (China))

[Presentation Style] Online

Adjoint shape optimization method is implemented to design SOI-based power splitters with arbitrary ratios. Splitters with ratios of 1:2, 1:4 and 1:8 are demonstrated with loss below 0.28 dB over a bandwidth of 100 nm.

2D and Nanocarbon Materials III

Session Chairs: Kazunari Matsuda (Kyoto Univ.), Yuhei Miyauchi (Kyoto Univ.)
Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 206 (2F)

[CTuA14C-01 (Invited)] Ultrastrong Light-Matter and Matter-Matter Coupling
[Presentation Style] Onsite
*Junichiro Kono[1] (1. Rice University (United States of America))
9:00 AM - 9:30 AM

[CTuA14C-02 (Invited)] Controlling Emission Wavelength and Chirality of Quantum Emitters in 2D Heterostructures
[Presentation Style] Onsite
*Han Htoon[1] (1. Los Alamos National Laboratory (United States of America))
9:30 AM - 10:00 AM

[CTuA14C-03] Gate tunable moiré excitonic states in twisted $WSe_2/MoSe_2$ heterobilayers
[Presentation Style] Onsite
*Duanfei Dong[1], Wenjin Zhang[1], Kenji Watanabe[2], Takashi Taniguchi[3], Keisuke Shinokita[1], Kazunari Matsuda[1] (1. Inst. of Advanced Energy, Kyoto Univ. (Japan), 2. Res. Center for Functional Materials, National Inst. for Materials Sci. (Japan), 3. Int'l Center for Materials Nanoarchitectonics, National Inst. for Materials Sci. (Japan))
10:00 AM - 10:15 AM

[CTuA14C-04] Correlation Between Optical Absorption and Twisted Angle of Bilayer Graphene Observed by High-Resolution Reflectance Confocal Laser Microscopy
[Presentation Style] Online
*Wei-Shiuan Tseng[1], Ming-Che Chan[1], Yen-Chun Chen[2], Bai-Heng Shiue[1], Tzi-I Tsai[1], Chii-Dong Chen[2] (1. Natioanl Yang-Ming Chiao-Tung University (Taiwan), 2. Institute of Physics, Academia Sinica (Taiwan))
10:15 AM - 10:30 AM

9:00 AM - 9:30 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 206)

[CTuA14C-01 (Invited)] Ultrastrong Light-Matter and Matter-Matter Coupling
[Presentation Style] Onsite

*Junichiro Kono[1] （1. Rice University (United States of America)）

[Presentation Style] Onsite

This talk will describe our recent studies of light-matter and matter-matter coupling phenomena in condensed matter in the ultrastrong coupling regime.

9:30 AM - 10:00 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 206)

[CTuA14C-02 (Invited)] Controlling Emission Wavelength and Chirality of Quantum Emitters in 2D Heterostructures
[Presentation Style] Onsite

*Han Htoon[1] （1. Los Alamos National Laboratory (United States of America)）

[Presentation Style] Onsite

Quantum emitters capable of operating in previously in assessable telecommunication wavelength range were realized in $MoTe_2$ multilayers. Proximity induced chiral quantum light generation is also achieved via strain-engineering of $WSe_2/NiPS_3$ heterostructures.

10:00 AM - 10:15 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 206)

[CTuA14C-03] Gate tunable moiré excitonic states in twisted $WSe_2/MoSe_2$ heterobilayers
[Presentation Style] Onsite

*Duanfei Dong[1], Wenjin Zhang[1], Kenji Watanabe[2], Takashi Taniguchi[3], Keisuke Shinokita[1], Kazunari Matsuda[1] （1. Inst. of Advanced Energy, Kyoto Univ. (Japan), 2. Res. Center for Functional Materials, National Inst. for Materials Sci. (Japan), 3. Int'l Center for Materials Nanoarchitectonics, National Inst. for Materials Sci. (Japan)）

[Presentation Style] Onsite

We revealed the impact of charging effects on heterobilayers. The additional peaks in photoluminescence spectra under the gate voltage originate from the moiré-trapped trions. The temperature-dependent result clarified the thermal activation of the moiré trions.

10:15 AM - 10:30 AM (Tue. Aug 2, 2022 9:00 AM - 10:30 AM Room 206)

[CTuA14C-04] Correlation Between Optical Absorption and Twisted Angle of Bilayer Graphene Observed by High-Resolution

Reflectance Confocal Laser Microscopy [Presentation Style] Online

*Wei-Shiuan Tseng[1], Ming-Che Chan[1], Yen-Chun Chen[2], Bai-Heng Shiue[1], Tzi-I Tsai[1], Chii-Dong Chen[2] （1. Natioanl Yang-Ming Chiao-Tung University (Taiwan), 2. Institute of Physics, Academia Sinica (Taiwan)）

[Presentation Style] Online

We report a systematic study of the optical absorption of twisted bilayer graphene across a broad range of twist angles from 0˚ to 30˚ firstly using a home-made, high-resolution reflectance confocal laser microscopy system.

Photothermal and Optical Force

Session Chair: Miya Ishihara (National Defense Medical Collage)
Tue. Aug 2, 2022 9:00 AM - 10:15 AM Room 201&202 (2F)

[CTuA15C-01 (Invited(P))] High-speed Live-cell Vibrational Imaging with a Mid-infrared Photothermal Quantitative Phase Microscope
[Presentation Style] Onsite
*Genki Ishigane[1], Keiichiro Toda[1], Miu Tamamitsu[1], Hiroyuki Shimada[2], Takuro Ideguchi[1,2] (1. Department of Physics, The University of Tokyo (Japan), 2. Institute for Photon Science and Technology, The University of Tokyo (Japan))
9:00 AM - 9:30 AM

[CTuA15C-02] Heat-mediated optical manipulation of Janus particle energized by photonic nanojet
[Presentation Style] Online
*Yuxuan Ren[1], Huade Mao[2], Cihang Kong[1], Bo Li[1], Kenneth K. Y. Wong[2] (1. Fudan University (China), 2. Hong Kong University (Hong Kong))
9:30 AM - 9:45 AM

[CTuA15C-03] Single-Neuron Stimulation with a Focused Femtosecond Laser
[Presentation Style] Onsite
*Yumi Segawa[1], Wataru Minoshima[1], Kyoko Masui[1], Chie Hosokawa[1] (1. Osaka City Univ. (Japan))
9:45 AM - 10:00 AM

[CTuA15C-04] Sensitive Detection of Biological Nanoparticles by Controlled Optical Force in Microflow
[Presentation Style] Onsite
*Kana Fujiwara[1,2,3], Yumiko Takagi[1,2], Mamoru Tamura[2,4], Ikuhiko Nakase[1,2], Shiho Tokonami[2,3], Takuya Iida[1,2] (1. Grad. Sch. Sci., Osaka Pref. Univ. (Japan), 2. Res. Inst. for Light-induced Acceleration System (RILACS), Osaka Pref. Univ. (Japan), 3. Grad. Sch. Eng., Osaka Pref. Univ. (Japan), 4. Grad. Sch. Eng. Sci., Osaka Univ. (Japan))
10:00 AM - 10:15 AM

9:00 AM - 9:30 AM (Tue. Aug 2, 2022 9:00 AM - 10:15 AM Room 201&202)

[CTuA15C-01 (Invited(P))] High-speed Live-cell Vibrational Imaging with a Mid-infrared Photothermal Quantitative Phase Microscope

[Presentation Style] Onsite

*Genki Ishigane[1], Keiichiro Toda[1], Miu Tamamitsu[1], Hiroyuki Shimada[2], Takuro Ideguchi[1,2] (1. Department of Physics, The University of Tokyo (Japan), 2. Institute for Photon Science and Technology, The University of Tokyo (Japan))

[Presentation Style] Onsite

We demonstrate high-speed live-cell imaging at 50 frames/s with a mid-infrared photothermal quantitative phase microscope by implementing nanosecond pulsed lasers and a high-full-well-capacity image sensor.

9:30 AM - 9:45 AM (Tue. Aug 2, 2022 9:00 AM - 10:15 AM Room 201&202)

[CTuA15C-02] Heat-mediated optical manipulation of Janus particle energized by photonic nanojet

[Presentation Style] Online

*Yuxuan Ren[1], Huade Mao[2], Cihang Kong[1], Bo Li[1], Kenneth K. Y. Wong[2] (1. Fudan University (China), 2. Hong Kong University (Hong Kong))

[Presentation Style] Online

We report on the generation of wavelength-dependent photonic nanojet (PNJ) with plasmonic Janus particle. Such PNJ would produce heat and mediate the backaction force on the Janus particle for biophotonic applications.

9:45 AM - 10:00 AM (Tue. Aug 2, 2022 9:00 AM - 10:15 AM Room 201&202)

[CTuA15C-03] Single-Neuron Stimulation with a Focused Femtosecond Laser

[Presentation Style] Onsite

*Yumi Segawa[1], Wataru Minoshima[1], Kyoko Masui[1], Chie Hosokawa[1] (1. Osaka City Univ. (Japan))

[Presentation Style] Onsite

The less invasive stimulation of neurons at the single-cell level was demonstrated with a focused femtosecond laser. The evoked neuronal activity by the laser irradiation was evaluated by simultaneous fluorescent Ca^{2+} imaging and electrophysiological recordings.

10:00 AM - 10:15 AM (Tue. Aug 2, 2022 9:00 AM - 10:15 AM Room 201&202)

[CTuA15C-04] Sensitive Detection of Biological Nanoparticles by

Controlled Optical Force in Microflow

[Presentation Style] Onsite

*Kana Fujiwara[1,2,3], Yumiko Takagi[1,2], Mamoru Tamura[2,4], Ikuhiko Nakase[1,2], Shiho Tokonami[2,3], Takuya Iida[1,2]
（1. Grad. Sch. Sci., Osaka Pref. Univ. (Japan), 2. Res. Inst. for Light-induced Acceleration System (RILACS), Osaka Pref. Univ. (Japan), 3. Grad. Sch. Eng., Osaka Pref. Univ. (Japan), 4. Grad. Sch. Eng. Sci., Osaka Univ. (Japan)）

[Presentation Style] Onsite

We succeeded in sensitive detection of biological nanoparticles by optical condensation in microflow system. Furthermore, we revealed that the detection range of biological nanoparticles can be controlled by changing the action range of optical force.

Scattering and Diffuse Reflectance

Session Chair: Masato Ohmi (Osaka Univ.)

Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 201&202 (2F)

[CTuA15D-01 (Invited)] Transcutaneous monitoring of hemoglobin derivatives using camera-based diffuse reflectance spectroscopy
[Presentation Style] Onsite

*Izumi Nishidate[1] （1. Tokyo University of Agriculture and Technology (Japan)）

11:00 AM - 11:30 AM

[CTuA15D-02] Cancer detection with depth resolution using scattering of circularly polarized light
[Presentation Style] Onsite

*Nozomi Nishizawa[1], Bassam Al- Qadi[2], Takahiro Kuchimaru[3] （1. Tokyo Inst. of Tech. (Japan), 2. Palestine Tech.l Univ. (Palestine), 3. Jiichi Med. Univ. (Japan)）

11:30 AM - 11:45 AM

[CTuA15D-03] Widefield Heterodyne Optical Coherence Microscopy for Volumetric Vibration Imaging
[Presentation Style] Online

*Samuel Choi[1,4], Kaito Yoshimizu[1], Takeru Ota[2], Fumiaki Nin[3], Hibino Hiroshi[2,4], Shogo Muramatsu[1], Takamasa Suzuki[1] （1. Niigata Univ. (Japan), 2. Osaka Univ. (Japan), 3. Gifu Univ. (Japan), 4. AMED-CREST, AMED (Japan)）

11:45 AM - 12:00 PM

11:00 AM - 11:30 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 201&202)

[CTuA15D-01 (Invited)] Transcutaneous monitoring of hemoglobin derivatives using camera-based diffuse reflectance spectroscopy [Presentation Style] Onsite

*Izumi Nishidate[1] (1. Tokyo University of Agriculture and Technology (Japan))

[Presentation Style] Onsite

This paper describes a simple and affordable imaging technique to evaluate transcutaneously hemoglobin derivatives including methemoglobin and multiple physiological parameters such as heart rate, respiratory rate, and hemoglobin oxygen saturation using a digital red-green-blue camera.

11:30 AM - 11:45 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 201&202)

[CTuA15D-02] Cancer detection with depth resolution using scattering of circularly polarized light [Presentation Style] Onsite

*Nozomi Nishizawa[1], Bassam Al- Qadi[2], Takahiro Kuchimaru[3] (1. Tokyo Inst. of Tech. (Japan), 2. Palestine Tech.l Univ. (Palestine), 3. Jiichi Med. Univ. (Japan))

[Presentation Style] Onsite

Depolarization of circularly polarized light scattered from biological tissues provides valuable information for detecting cancer. We have studied the CPL scattering technique from both aspects of experimental and computational studies.

11:45 AM - 12:00 PM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Room 201&202)

[CTuA15D-03] Widefield Heterodyne Optical Coherence Microscopy for Volumetric Vibration Imaging [Presentation Style] Online

*Samuel Choi[1,4], Kaito Yoshimizu[1], Takeru Ota[2], Fumiaki Nin[3], Hibino Hiroshi[2,4], Shogo Muramatsu[1], Takamasa Suzuki[1] (1. Niigata Univ. (Japan), 2. Osaka Univ. (Japan), 3. Gifu Univ. (Japan), 4. AMED-CREST, AMED (Japan))

[Presentation Style] Online

A simultaneous tomographic vibration visualization technique of an entire volume using a scanning low-coherence interferometric microscope was proposed. This technique demonstrated to be valuable for rapid vibration localization and characterization of in-vivo biological tomography.

Plasmonics and Metamaterials for Sensing Applications

Session Chair: Takuo Tanaka (RIKEN)

Tue. Aug 2, 2022 9:30 AM - 10:30 AM Small Hall (2F)

[CTuA16C-02] Polymer-Stabilized Silver Nanoparticles for Plasmonic Fluorescence Biosensing

[Presentation Style] Onsite

*Ryo Kato[1,2], Mitsuhiro Uesugi[3], Yoshie Komatsu[3], Fusatoshi Okamoto[3], Takuo Tanaka[2,1], Fumihisa Kitawaki[3], Taka-aki Yano[1,2] (1. Tokushima University (Japan), 2. RIKEN (Japan), 3. PHC Corporation (Japan))

9:30 AM - 9:45 AM

[CTuA16C-03] Ultrasensitive Gas Refractive Index Measurement with Plasmonic Phase Spectroscopy using Frequency Comb

[Presentation Style] Onsite

*Anh Duy Nguyen[1], GeonHo Lee[1], DongChel Shin[1], SeungWoo Kim[1], YoungJin Kim[1] (1. Korea Advanced Institute of Science and Technology (KAIST) (Korea))

9:45 AM - 10:00 AM

[CTuA16C-04] Plasmon Nanofocusing in Broadband Frequency

[Presentation Style] Onsite

*Takayuki Umakoshi[1], Koki Taguchi[1], Prabhat Verma[1] (1. Osaka Univ. (Japan))

10:00 AM - 10:15 AM

[CTuA16C-05] Quantitative Evaluation of Raman Scattering Intensity Enhanced by Propagating Surface Plasmon Resonance

[Presentation Style] Onsite

*Koichi Honda[1,2], Hidekazu Ishitobi[1,2], Yasushi Inouye[1,2] (1. Osaka Univ. (Japan), 2. AIST PhotoBIO-OIL (Japan))

10:15 AM - 10:30 AM

9:30 AM - 9:45 AM (Tue. Aug 2, 2022 9:30 AM - 10:30 AM Small Hall)

[CTuA16C-02] Polymer-Stabilized Silver Nanoparticles for Plasmonic Fluorescence Biosensing [Presentation Style] Onsite

*Ryo Kato[1,2], Mitsuhiro Uesugi[3], Yoshie Komatsu[3], Fusatoshi Okamoto[3], Takuo Tanaka[2,1], Fumihisa Kitawaki[3], Taka-aki Yano[1,2] (1. Tokushima University (Japan), 2. RIKEN (Japan), 3. PHC Corporation (Japan))

[Presentation Style] Onsite

We developed novel polymer layers to facilely coat plasmonic metal nanoparticles to obtain strong net fluorescence intensity and employed the polymer-coated silver nanoparticles for highly sensitive biosensing based on plasmon-enhanced fluorescence.

9:45 AM - 10:00 AM (Tue. Aug 2, 2022 9:30 AM - 10:30 AM Small Hall)

[CTuA16C-03] Ultrasensitive Gas Refractive Index Measurement with Plasmonic Phase Spectroscopy using Frequency Comb [Presentation Style] Onsite

*Anh Duy Nguyen[1], GeonHo Lee[1], DongChel Shin[1], SeungWoo Kim[1], YoungJin Kim[1] (1. Korea Advanced Institute of Science and Technology (KAIST) (Korea))

[Presentation Style] Onsite

Phase-sensitivity plasmonic sensor has not been much explored because of the lack of a stable light source. Here, we demonstrate that frequency-comb-referenced plasmonic phase spectroscopy can be used for ultrasensitive gas refractive index measurement

10:00 AM - 10:15 AM (Tue. Aug 2, 2022 9:30 AM - 10:30 AM Small Hall)

[CTuA16C-04] Plasmon Nanofocusing in Broadband Frequency [Presentation Style] Onsite

*Takayuki Umakoshi[1], Koki Taguchi[1], Prabhat Verma[1] (1. Osaka Univ. (Japan))

[Presentation Style] Onsite

In this study, we have shown that plasmon nanofocusing technique enables to generate a nanolight source that spans over extremely wide frequency range from the whole visible to near-infrared regions.

10:15 AM - 10:30 AM (Tue. Aug 2, 2022 9:30 AM - 10:30 AM Small Hall)

[CTuA16C-05] Quantitative Evaluation of Raman Scattering Intensity Enhanced by Propagating Surface Plasmon Resonance [Presentation Style] Onsite

*Koichi Honda[1,2], Hidekazu Ishitobi[1,2], Yasushi Inouye[1,2] （1. Osaka Univ. (Japan), 2. AIST PhotoBIO-OIL (Japan)）

[Presentation Style] Onsite

The incident angle dependence of Raman scattering intensity of Rhodamine 6G enhanced by propagating surface plasmon resonance was quantitatively evaluated, and the dependence was found to be in good agreement with electromagnetic field analysis.

Optical Trapping and Photon Manipulation

Session Chair: Kosei Ueno (Hokkaido Univ.)

Tue. Aug 2, 2022 11:00 AM - 12:00 PM Small Hall (2F)

[CTuA16D-01] Light powered nanomotors and control of light momentum via engineering localized plasmon resonances

[Presentation Style] Online

*Yoshito Y. Tanaka[1], Tsutomu Shimura[1] (1. Institute of Industrial Science, The University of Tokyo (Japan))

11:00 AM - 11:15 AM

[CTuA16D-02] Analysis of angular momentum transfer from photon to multimer nanoantenna

[Presentation Style] Onsite

*Yuji Sunaba[1], Keiji Sasaki[1] (1. Hokkaido Univ. (Japan))

11:15 AM - 11:30 AM

[CTuA16D-03] Trapping of poly (N-isopropylacrylamide) by optical tweezers using silver plasmon

[Presentation Style] Onsite

*Maho Nishiguchi[1], Maho Kubota[1], Ken-ichi Yuyama[1], Yoshiki Nakata[2], Yasuyuki Tsuboi[1] (1. Osaka City University (Japan), 2. Osaka University (Japan))

11:30 AM - 11:45 AM

[CTuA16D-04] Development of Three-dimensional Arbitrary Optical Condensation Method with Fiber-based Module

[Presentation Style] Onsite

*Kota Hayashi[1,2,3], Mamoru Tamura[2,4], Masazumi Fujiwara[2,5], Shiho Tokonami[2,3], Takuya Iida[1,2] (1. Grad. Sch. Sci. in Osaka Pref. Uni. (Japan), 2. RILACS in Osaka Pref. Univ. (Japan), 3. Grad. Sch. Eng. in Osaka Pref. Univ. (Japan), 4. Grad. Sch. Eng. Sci. in Osaka Univ. (Japan), 5. Grad. Sch. Nat. Sci. Tech. in Okayama Univ. (Japan))

11:45 AM - 12:00 PM

11:00 AM - 11:15 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Small Hall)

[CTuA16D-01] Light powered nanomotors and control of light momentum via engineering localized plasmon resonances
[Presentation Style] Online

*Yoshito Y. Tanaka[1], Tsutomu Shimura[1] (1. Institute of Industrial Science, The University of Tokyo (Japan))

[Presentation Style] Online

We demonstrate a linear nanomotor using lateral optical force due to directional side scattering by a plasmonic nanoparticle. We also propose the nanomotors with different functions, direction-controllable nanomotor and nonlinear optical nanomotor.

11:15 AM - 11:30 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Small Hall)

[CTuA16D-02] Analysis of angular momentum transfer from photon to multimer nanoantenna
[Presentation Style] Onsite

*Yuji Sunaba[1], Keiji Sasaki[1] (1. Hokkaido Univ. (Japan))

[Presentation Style] Onsite

We numerically analyzed the localized plasmonic field. In this paper, we show the mechanism of angular momentum transfer from photon to the plasmonic nanoantenna in terms of nano scale energy flux and electric field distribution.

11:30 AM - 11:45 AM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Small Hall)

[CTuA16D-03] Trapping of poly (N-isopropylacrylamide) by optical tweezers using silver plasmon
[Presentation Style] Onsite

*Maho Nishiguchi[1], Maho Kubota[1], Ken-ichi Yuyama[1], Yoshiki Nakata[2], Yasuyuki Tsuboi[1] (1. Osaka City University (Japan), 2. Osaka University (Japan))

[Presentation Style] Onsite

We trapped a water-soluble chain polymer by silver plasmonic optical tweezers. Three types of silver plasmonic nanostructures were examined as substrate that silver plasmonic optical tweezers are a powerful tool for manipulation of nanomaterials.

11:45 AM - 12:00 PM (Tue. Aug 2, 2022 11:00 AM - 12:00 PM Small Hall)

[CTuA16D-04] Development of Three-dimensional Arbitrary Optical Condensation Method with Fiber-based Module

[Presentation Style] Onsite

*Kota Hayashi[1,2,3], Mamoru Tamura[2,4], Masazumi Fujiwara[2,5], Shiho Tokonami[2,3], Takuya Iida[1,2] (1. Grad. Sch. Sci. in Osaka Pref. Uni. (Japan), 2. RILACS in Osaka Pref. Univ. (Japan), 3. Grad. Sch. Eng. in Osaka Pref. Univ. (Japan), 4. Grad. Sch. Eng. Sci. in Osaka Univ. (Japan), 5. Grad. Sch. Nat. Sci. Tech. in Okayama Univ. (Japan))

[Presentation Style] Onsite

We developed photothermal fiber-based module coated with metallic nanofilm to demonstrate optical condensation at Three-dimensionally arbitrary positions. By using this module, the assembly efficiency was improved about twenty times in comparison with the conventional method.

Microwave Signal Generation

Session Chairs: Joonyoung Kim (Sangmyung Univ.), Atsushi Kanno (NICT)

Tue. Aug 2, 2022 11:00 AM - 11:45 AM Mid-sized Hall B (1F)

[CTuA18C-01 (Invited(P))] Injection-Locked Optoelectronic Oscillator for Phase Noise Purification in 100-GHz Bands

[Presentation Style] Onsite

*Atsushi Kanno[1], Pham Tien Dat[1] （1. National Institute of Information and Communications Technology (Japan)）

11:00 AM - 11:30 AM

[CTuA18C-02] High-frequency microwave generation using period-one dynamics of two mutually coupled semiconductor lasers

[Presentation Style] Online

*Chin-Hao Tseng[1], Bin-Kai Liao[1], Sheng-Kwang Hwang[1,2] （1. Department of Photonics, National Cheng Kung University (Taiwan), 2. Advanced Optoelectronic Technology Center, National Cheng Kung University (Taiwan)）

11:30 AM - 11:45 AM

11:00 AM - 11:30 AM (Tue. Aug 2, 2022 11:00 AM - 11:45 AM Mid-sized Hall B)

[CTuA18C-01 (Invited(P))] Injection-Locked Optoelectronic Oscillator for Phase Noise Purification in 100-GHz Bands [Presentation Style] Onsite

*Atsushi Kanno[1], Pham Tien Dat[1] (1. National Institute of Information and Communications Technology (Japan))

[Presentation Style] Onsite

Injection-locked optoelectronic oscillator operated in the 100-GHz band is configured and evaluated. High-speed modulator and photodiode realize W-band fundamental oscillation, and resultant phase noise is improved 10 dB at an offset frequency of 10 kHz.

11:30 AM - 11:45 AM (Tue. Aug 2, 2022 11:00 AM - 11:45 AM Mid-sized Hall B)

[CTuA18C-02] High-frequency microwave generation using period-one dynamics of two mutually coupled semiconductor lasers [Presentation Style] Online

*Chin-Hao Tseng[1], Bin-Kai Liao[1], Sheng-Kwang Hwang[1,2] (1. Department of Photonics, National Cheng Kung University (Taiwan), 2. Advanced Optoelectronic Technology Center, National Cheng Kung University (Taiwan))

[Presentation Style] Online

We propose a novel photonic approach for microwave generation based on two mutually coupled semiconductor lasers. A 55-GHz microwave with a 3-dB linewidth below 3.6 kHz and a side-peak-suppression ratio of 45 dB is achieved.

Oral Session | CLEO-PR2022 | High Power Fiber Amplifier

High Power Fiber Amplifier

Session Chairs: Wei Shi (Tianjin Univ.), Akira Shirakawa (UEC)

Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall B (1F)

[CTuP1C-01 (Invited(P))] Flexible Wavelength Shifting of Ultrafast Lasers at High Power Levels

[Presentation Style] Onsite

*Henrik Tuennermann[1], Prannay Balla[1,2,3], Sarper H Salman[1,2,3], Mingqi Fan[1,2,3], Mindaugas Mecejus[1], Ingmar Hartl[1], Christoph M. Heyl[1,2,3] (1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. Helmholtz-Institute Jena (Germany), 3. GSI Helmholtzzentrum fur Schwerionenforschnung GmbH (Germany))

1:30 PM - 2:00 PM

[CTuP1C-02] Suppression of stimulated Brillouin scattering in multimode fiber via adjusting the input wavefront

[Presentation Style] Onsite

*Linh Viet Nguyen[1], Stephen Warren-Smith[1], Ori Henderson-Sapir[2], Heike Ebendorff-Heidepriem[2], David Ottoway[2], Erik Schartner[2], Chun-Wei Chen[3], Kabish Wisal[3], Douglas A. Stone[3] (1. University of South Australia (Australia), 2. The University of Adelaide (Australia), 3. Yale University (United States of America))

2:00 PM - 2:15 PM

[CTuP1C-03] Pre-chirper Free Nonlinear Fiber Amplifier Generating Tunable Picosecond Pulses For Coherent Anti-Stokes Raman Imaging

[Presentation Style] Online

Jiaying Li[1], Jiamei Wu[1], *Kangwen Yang[1], Qiang Hao[1], Minbiao Ji[2], Ming Yan[3,4], Kun Huang[3,4], Heping Zeng[1,3,4,5] (1. University of Shanghai for Science and Technology (China), 2. Fudan University (China), 3. East China Normal University (China), 4. Chongqing Institute of East China Normal University (China), 5. Jinan Institute of Quantum Technology (China))

2:15 PM - 2:30 PM

[CTuP1C-04] High Power Mode Instability in Fiber Amplifiers Employing Double-side Spiral Coiling Configuration

[Presentation Style] Online

*Rumao Tao[1] (1. Laser Fusion Research Center (China))

2:30 PM - 2:45 PM

[CTuP1C-05] Phase Modulated Frequency Comb Seed Source for High Power Spectral Beam Combining

[Presentation Style] Onsite

*Shilpi Arora[1], Lakshmi C.G.[1], B.S. Vikram[1], V.R. Supradeepa[1] (1. Indian Institute of Science (India))

2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CTuP1C-01 (Invited(P))] Flexible Wavelength Shifting of Ultrafast Lasers at High Power Levels
[Presentation Style] Onsite

*Henrik Tuennermann[1], Prannay Balla[1,2,3], Sarper H Salman[1,2,3], Mingqi Fan[1,2,3], Mindaugas Mecejus[1], Ingmar Hartl[1], Christoph M. Heyl[1,2,3] (1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. Helmholtz-Institute Jena (Germany), 3. GSI Helmholtzzentrum fur Schwerionenforschnung GmbH (Germany))

[Presentation Style] Onsite

We present a wavelength shifting method suitable for high power lasers. We demonstrate our concept via simulations and experimentally shift an 80 W, 200 fs laser at 1030 nm by ±30 nm.

2:00 PM - 2:15 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CTuP1C-02] Suppression of stimulated Brillouin scattering in multimode fiber via adjusting the input wavefront
[Presentation Style] Onsite

*Linh Viet Nguyen[1], Stephen Warren-Smith[1], Ori Henderson-Sapir[2], Heike Ebendorff-Heidepriem[2], David Ottoway[2], Erik Schartner[2], Chun-Wei Chen[3], Kabish Wisal[3], Douglas A. Stone[3] (1. University of South Australia (Australia), 2. The University of Adelaide (Australia), 3. Yale University (United States of America))

[Presentation Style] Onsite

Stimulated Brillouin scattering (SBS) induced by narrow-linewidth high power pulses in a multimode fiber (MMF) is suppressed via controlling the input wavefront, presenting a new route to scaling power in high power fiber amplifiers.

2:15 PM - 2:30 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CTuP1C-03] Pre-chirper Free Nonlinear Fiber Amplifier Generating Tunable Picosecond Pulses For Coherent Anti-Stokes Raman Imaging
[Presentation Style] Online

Jiaying Li[1], Jiamei Wu[1], *Kangwen Yang[1], Qiang Hao[1], Minbiao Ji[2], Ming Yan[3,4], Kun Huang[3,4], Heping Zeng[1,3,4,5] (1. University of Shanghai for Science and Technology (China), 2. Fudan University (China), 3. East China Normal University (China), 4. Chongqing Institute of East China Normal University (China), 5. Jinan Institute of Quantum Technology (China))

[Presentation Style] Online

A pre-chirper free, core-pumped nonlinear fiber amplifier was demonstrated to generate parabolic pulse with spectral bandwidth of 53 nm, these pulses were filtered and passively synchronized for conducting coherent anti-Stokes Raman imaging.

2:30 PM - 2:45 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CTuP1C-04] High Power Mode Instability in Fiber Amplifiers Employing Double-side Spiral Coiling Configuration
[Presentation Style] Online

*Rumao Tao[1] (1. Laser Fusion Research Center (China))

[Presentation Style] Online

Mode instability of fiber amplifiers employing double-side spiral coiling configurations has been analyzed numerically for the first time, which reveals that, compared with those employing traditional spiral coiling configurations, fiber amplifiers with double-side spiral coiling configurations have much higher mode instability threshold.

2:45 PM - 3:00 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CTuP1C-05] Phase Modulated Frequency Comb Seed Source for High Power Spectral Beam Combining
[Presentation Style] Onsite

*Shilpi Arora[1], Lakshmi C.G.[1], B.S. Vikram[1], V.R. Supradeepa[1] (1. Indian Institute of Science (India))

[Presentation Style] Onsite

We have demonstrated a seed laser architecture that can be used for spectral beam combining to generate high output powers from a single laser. The proposed method reduces stimulated Brillouin scattering through line shape control.

Oral Session | CLEO-PR2022 | Fiber Lasers

Fiber Lasers

Session Chairs: Sze Yun Set (Univ. of Tokyo), Norihiko Nishizawa (Nagoya Univ.)

Tue. Aug 2, 2022 3:30 PM - 5:15 PM Mid-sized Hall B (1F)

[CTuP1D-01] Single-polarization Single-frequency Brillouin Fiber Laser Emits Near 5-W Power at 1 μ m

[Presentation Style] Online

*Yue Tao[1], Man Jiang[1], Liu Liu[1], Can Li[1], Pu Zhou[1], Zongfu Jiang[1] (1. National University of Defense Technology (China))

3:30 PM - 3:45 PM

[CTuP1D-02] Pulsed Cascaded Raman Fiber Laser with Wide Wavelength Tunability

[Presentation Style] Onsite

*Abhigyan Goswami[1], Sarthak Dash[1], Rashmita Deheri[1], S. Arun[1], V.R. Supradeepa[1] (1. Indian Institute of Science (India))

3:45 PM - 4:00 PM

[CTuP1D-03] Cascaded Raman fiber lasers pumped with narrow linewidth, low intensity noise sources

[Presentation Style] Onsite

*RASHMITA DEHERI[1], Sarthak Dash[1], V.R. Supradeepa[1], V. Balaswamy[1] (1. Indian Institute of Science, Bengaluru (India))

4:00 PM - 4:15 PM

[CTuP1D-04] 2.1 μ m Fiber Gas Raman Laser Source based on Deuterium-filled Hollow-core Photonic Crystal Fibers

[Presentation Style] Online

*Ziyan Li[1], Wenxi Pei[1], Hao Li[1], Wei Huang[1], Meng Wang[1], Zefeng Wang[1] (1. The National University of Defense Technology (China))

4:15 PM - 4:30 PM

[CTuP1D-05] Achieving high pulse purity in spectrally-sliced supercontinuum pumped by ultrafast fiber lasers

[Presentation Style] Online

Shiyu Zhu[1], Jiahe Li[1], Ruihong Dai[1], *Fengqiu Wang[1] (1. Nanjing University (China))

4:30 PM - 4:45 PM

[CTuP1D-06] Mode-locking of an Erbium-doped fiber laser using a Ti_2AlN based saturable absorber

[Presentation Style] Online

*Suh-young Kwon[1], Jinho Lee[1], Ju Han Lee[1] (1. Univ. of Seoul (Korea))

4:45 PM - 5:00 PM

[CTuP1D-07] Fiber Microcavity Lasers with Complex Lasing

*jinchuan zhang[1], hongyang zhu[1], mingzhu she[1], weili zhang[1] (1. university of electronic science and technology of China (China))

5:00 PM - 5:15 PM

3:30 PM - 3:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Mid-sized Hall B)

[CTuP1D-01] Single-polarization Single-frequency Brillouin Fiber Laser Emits Near 5-W Power at 1 μm

[Presentation Style] Online

*Yue Tao[1], Man Jiang[1], Liu Liu[1], Can Li[1], Pu Zhou[1], Zongfu Jiang[1] (1. National University of Defense Technology (China))

[Presentation Style] Online

A 4.9 W single-polarization single-frequency 1064 nm Brillouin fiber laser that constructed with 20/400 polarization-maintaining germanium-doped fiber is demonstrated, which is the highest power that outputs from a single-frequency fiber laser.

3:45 PM - 4:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Mid-sized Hall B)

[CTuP1D-02] Pulsed Cascaded Raman Fiber Laser with Wide Wavelength Tunability

[Presentation Style] Onsite

*Abhigyan Goswami[1], Sarthak Dash[1], Rashmita Deheri[1], S. Arun[1], V.R. Supradeepa[1] (1. Indian Institute of Science (India))

[Presentation Style] Onsite

Tunable self Q-switched Ytterbium pump and spectral filtering of Raman stokes is used to generate pulsed output at wavelengths spanning 1100nm-1600nm having pulse width ~150ns with ~40kHz repetition rate and peak powers greater than ~20W.

4:00 PM - 4:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Mid-sized Hall B)

[CTuP1D-03] Cascaded Raman fiber lasers pumped with narrow linewidth, low intensity noise sources

[Presentation Style] Onsite

*RASHMITA DEHERI[1], Sarthak Dash[1], V.R. Supradeepa[1], V. Balaswamy[1] (1. Indian Institute of Science, Bengaluru (India))

[Presentation Style] Onsite

We demonstrate a cascaded Raman fiber laser with low intensity noise (<-104dBc/Hz, from 9kHz to 10GHz) and ~99% spectral purity tunable over 6 Stokes orders, by using very low intensity noise, narrow linewidth pump source.

4:15 PM - 4:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Mid-sized Hall B)

[CTuP1D-04] 2.1 μm Fiber Gas Raman Laser Source based on Deuterium-filled Hollow-core Photonic Crystal Fibers

[Presentation Style] Online

*Ziyan Li[1], Wenxi Pei[1], Hao Li[1], Wei Huang[1], Meng Wang[1], Zefeng Wang[1] （1. The National University of Defense Technology (China)）

[Presentation Style] Online

We report a watt-level fiber gas Raman laser source at 2.1 μm based on deuterium-filled hollow-core photonic crystal fibers (HC-PCFs). The maximum Raman power of 1.1 W is obtained; the corresponding conversion efficiency is 25.3%.

4:30 PM - 4:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Mid-sized Hall B)

[CTuP1D-05] Achieving high pulse purity in spectrally-sliced supercontinuum pumped by ultrafast fiber lasers

[Presentation Style] Online

Shiyu Zhu[1], Jiahe Li[1], Ruihong Dai[1], *Fengqiu Wang[1] （1. Nanjing University (China)）

[Presentation Style] Online

We compare the temporal purity of pulses from filter-sliced supercontinuum and found pulses generated by a picosecond pump exhibit appreciably better quality than a femtosecond pump, yielding new insights for designing practical ultrafast wavelength-tunable supercontinuum.

4:45 PM - 5:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Mid-sized Hall B)

[CTuP1D-06] Mode-locking of an Erbium-doped fiber laser using a Ti_2AlN based saturable absorber

[Presentation Style] Online

*Suh-young Kwon[1], Jinho Lee[1], Ju Han Lee[1] （1. Univ. of Seoul (Korea)）

[Presentation Style] Online

The feasibility of using MAX phase Ti_2AlN for fiber laser mode-locking at 1.5-μm wavelengths was investigated. Our Ti_2AlN-based saturable absorber with a ~7% modulation depth was successfully used for generation of ~4.62-ps pulses.

5:00 PM - 5:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Mid-sized Hall B)

[CTuP1D-07] Fiber Microcavity Lasers with Complex Lasing

*jinchuan zhang[1], hongyang zhu[1], mingzhu she[1], weili zhang[1] （1. university of electronic science and technology of China (China)）

A fiber microcavity laser with multi-mechanism emission is proposed. Due to boundary effect of cavity and scattering of the gain medium, different mechanisms of lasing can be obtained by changing cavity length and pump position.

Oral Session | CLEO-PR2022 | THz Spectroscopy

THz Spectroscopy

Session Chair: Hiroaki Minamide (RIKEN)

Tue. Aug 2, 2022 1:30 PM - 2:45 PM Room 201&202 (2F)

[CTuP3C-01] Terahertz Time-Domain Spectroscopy using Chirped-Pulse Up-Conversion with Dispersion Compensation

[Presentation Style] Onsite

*Ryo Tamaki[1,2], Masashi Suzuki[2], Jun Takeda[2], Ikufumi Katayama[2] （1. KISTEC (Japan), 2. Yokohama Natl. Univ. (Japan)）

1:30 PM - 1:45 PM

[CTuP3C-02] Development of Terahertz Time-Domain Rotating-Analyzer Ellipsometry

[Presentation Style] Onsite

Verdad Agulto[1], Toshiyuki Iwamoto[2], Valynn Mag-usara[1], *MAKOTO NAKAJIMA[1] （1. Osaka University (Japan), 2. Nippo Precision (Japan)）

1:45 PM - 2:00 PM

[CTuP3C-03] Interlayer Phonon Modes of $MoSe_2$ and WSe_2 Observed by THz Emission Spectroscopy

[Presentation Style] Online

*Jessica C. Afalla[1], Joselito E. Muldera[2], Semmi Takamizawa[1], Takumi Fukuda[1], Keiji Ueno[3], Masahiko Tani[2], Muneaki Hase[1] （1. Univ. Tsukuba (Japan), 2. Univ. Fukui (Japan), 3. Saitama Univ. (Japan)）

2:00 PM - 2:15 PM

[CTuP3C-04] Ultrabroadband infrared coherent spectroscopy using solids as nonlinear media

*Eiichi Matsubara[1,2], Masaaki Ashida[2] （1. National Inst. of Tech., Asahikawa College (Japan), 2. Osaka Univ. (Japan)）

2:15 PM - 2:30 PM

[CTuP3C-05] Discussion on optical parameters of quartz crystal in the terahertz frequency

[Presentation Style] Onsite

*Kei Takeya[1,2], Hideki Ishizuki[1,2], Takunori Taira[1,2] （1. Institute for Molecular Science (Japan), 2. RIKEN (Japan)）

2:30 PM - 2:45 PM

1:30 PM - 1:45 PM (Tue. Aug 2, 2022 1:30 PM - 2:45 PM Room 201&202)

[CTuP3C-01] Terahertz Time-Domain Spectroscopy using Chirped-Pulse Up-Conversion with Dispersion Compensation

[Presentation Style] Onsite

*Ryo Tamaki[1,2], Masashi Suzuki[2], Jun Takeda[2], Ikufumi Katayama[2] (1. KISTEC (Japan), 2. Yokohama Natl. Univ. (Japan))

[Presentation Style] Onsite

Chirped-pulse up-conversion was applied to detect an accurate terahertz waveform. The waveform distortion was suppressed by using dispersion compensation via the chirped-pulse up-conversion, providing a scheme for terahertz time-domain spectroscopy on a single-shot basis.

1:45 PM - 2:00 PM (Tue. Aug 2, 2022 1:30 PM - 2:45 PM Room 201&202)

[CTuP3C-02] Development of Terahertz Time-Domain Rotating-Analyzer Ellipsometry

[Presentation Style] Onsite

Verdad Agulto[1], Toshiyuki Iwamoto[2], Valynn Mag-usara[1], *MAKOTO NAKAJIMA[1] (1. Osaka University (Japan), 2. Nippo Precision (Japan))

[Presentation Style] Onsite

High-precision terahertz (THz) time-domain ellipsometry is developed. The rotating-analyzer technique is newly applied through phase component correction based on the analysis of the THz field amplitude as a function of analyzer angle.

2:00 PM - 2:15 PM (Tue. Aug 2, 2022 1:30 PM - 2:45 PM Room 201&202)

[CTuP3C-03] Interlayer Phonon Modes of $MoSe_2$ and WSe_2 Observed by THz Emission Spectroscopy

[Presentation Style] Online

*Jessica C. Afalla[1], Joselito E. Muldera[2], Semmi Takamizawa[1], Takumi Fukuda[1], Keiji Ueno[3], Masahiko Tani[2], Muneaki Hase[1] (1. Univ. Tsukuba (Japan), 2. Univ. Fukui (Japan), 3. Saitama Univ. (Japan))

[Presentation Style] Online

Terahertz time domain emission spectroscopy was performed on bulk $MoSe_2$ and WSe_2. Results show THz signals comprising of a single cycle transient current-driven signal and oscillatory signals from coherent phonons attributed to interlayer vibrational modes.

2:15 PM - 2:30 PM (Tue. Aug 2, 2022 1:30 PM - 2:45 PM Room 201&202)

[CTuP3C-04] Ultrabroadband infrared coherent spectroscopy using solids as nonlinear media

*Eiichi Matsubara[1,2], Masaaki Ashida[2] (1. National Inst. of Tech., Asahikawa College (Japan), 2. Osaka Univ. (Japan))

The use of multiple thin fused-silica plates for pulse compression and that of a single crystal of diamond for detection have been found to contribute to the efficient and stable ultrabroadband infrared coherent spectroscopy.

2:30 PM - 2:45 PM (Tue. Aug 2, 2022 1:30 PM - 2:45 PM Room 201&202)

[CTuP3C-05] Discussion on optical parameters of quartz crystal in the terahertz frequency

[Presentation Style] Onsite

*Kei Takeya[1,2], Hideki Ishizuki[1,2], Takunori Taira[1,2] (1. Institute for Molecular Science (Japan), 2. RIKEN (Japan))

[Presentation Style] Onsite

Quartz crystals with different geometries and impurity concentrations were analyzed by terahertz time-domain spectroscopy in order to discuss the optical parameters of quartz crystals in detail.

Oral Session | CLEO-PR2022 | THz Detection, Sensing, and Manipulation

THz Detection, Sensing, and Manipulation

Session Chair: Takeshi Yasui (Tokushima Univ.)

Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 201&202 (2F)

[CTuP3D-01 (Invited)] Recent Progress in Terahertz Quantum Sensing
[Presentation Style] Online

Mirco Kutas[1,2], Björn E Haase[1,2], Felix Riexinger[1,2], Joshua Hennig[1,2], Tobias Pfeiffer[1,2], Daniel Molter[1,2], *Georg von Freymann[1,2] (1. Fraunhofer Institute for Industrial Mathematics ITWM (Germany), 2. Technische Univ. Kaiserslautern (Germany))

3:30 PM - 4:00 PM

[CTuP3D-02] Single-shot Detection of Terahertz Radiation Waveform Emitted from Femtosecond Laser Ablation
[Presentation Style] Onsite

Ryo Tamaki[1,2], Tatsuki Kasai[1], Gaku Asai[3], Daiki Hata[3], Hajime Kubo[3], Yuichi Takigawa[3], Jun Takeda[1], *Ikufumi Katayama[1] (1. Yokohama Natl. Univ. (Japan), 2. KISTEC (Japan), 3. Nikon Corp. (Japan))

4:00 PM - 4:15 PM

[CTuP3D-03] Alignment-Insensitive THz-OAM Wave Generator Based on Square Lattice Photonic Crystal
[Presentation Style] Onsite

*Remma Hata[1], Hiroki Kishikawa[1], Junichi Fujikata[1] (1. Tokushima Univ. (Japan))

4:15 PM - 4:30 PM

[CTuP3D-04] Profile control of silicon moth-eye structures for terahertz antireflection fabricated by femtosecond laser processing
[Presentation Style] Onsite

*Xi Yu[1], Yuki Yasunaga[2], Kazusa Goto[2], Dejun Liu[3], Makoto Kuwahara[1,4], Shingo Ono[2] (1. IMaSS, Nagoya Univ. (Japan), 2. Dept. Phys. Sci. and Eng., Nitech (Japan), 3. Dept. Phys., Shanghai Normal Univ. (China), 4. Grad. Sch. Eng., Nagoya Univ. (Japan))

4:30 PM - 4:45 PM

[CTuP3D-05] Hybrid moth-eye structure fabricated by laser processing and heat press coating for terahertz antireflection
[Presentation Style] Onsite

*Xi Yu[1], Kazusa Goto[2], Yuki Yasunaga[2], Junshi Soeda[3], Makoto Kuwahara[4], Shingo Ono[2] (1. IMaSS, Nagoya Univ. (Japan), 2. Dept. Phys. Sci. and Eng., Nitech (Japan), 3. Teijin Ltd. (Japan), 4. Grad. Sch. Eng., Nagoya Univ. (Japan))

4:45 PM - 5:00 PM

[CTuP3D-06] Characteristics of Terahertz Notch Filter using Two Monolayer Guided-Mode Resonance Filters
[Presentation Style] Onsite

Hyeon Sang Bark[1], Gyeong-Ryul Kim[2,3], Mun-Won Park[2,3], Kyu-Ha Jang[1], Kitae Lee[1], Young Uk Jeong[1], *Tae-In Jeon[2,3] (1. Radiation Center for Ultrafast

Science, KAER Inst. (Korea), 2. Electrical and Electronics Engineering, KMO Univ. (Korea), 3. Interdisciplinary Major of Maritime AI Convergence, KMO Univ. (Korea))

5:00 PM - 5:15 PM

3:30 PM - 4:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 201&202)

[CTuP3D-01 (Invited)] Recent Progress in Terahertz Quantum Sensing
[Presentation Style] Online

Mirco Kutas[1,2], Björn E Haase[1,2], Felix Riexinger[1,2], Joshua Hennig[1,2], Tobias Pfeiffer[1,2], Daniel Molter[1,2], *Georg von Freymann[1,2] (1. Fraunhofer Institute for Industrial Mathematics ITWM (Germany), 2. Technische Univ. Kaiserslautern (Germany))

[Presentation Style] Online

Terahertz quantum sensing using nonlinear interferometers allows for measuring terahertz spectral properties of samples while only detecting visible light, which never interacted with the sample. We discuss possibilities for terahertz applications in spectroscopy and imaging.

4:00 PM - 4:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 201&202)

[CTuP3D-02] Single-shot Detection of Terahertz Radiation Waveform Emitted from Femtosecond Laser Ablation
[Presentation Style] Onsite

Ryo Tamaki[1,2], Tatsuki Kasai[1], Gaku Asai[3], Daiki Hata[3], Hajime Kubo[3], Yuichi Takigawa[3], Jun Takeda[1], *Ikufumi Katayama[1] (1. Yokohama Natl. Univ. (Japan), 2. KISTEC (Japan), 3. Nikon Corp. (Japan))

[Presentation Style] Onsite

Initial charge emission dynamics during femtosecond laser ablation was visualized by detecting the terahertz radiation waveform using a highly sensitive single-shot terahertz spectrometer. Pulse-to-pulse changes of the terahertz waveforms were clearly observed.

4:15 PM - 4:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 201&202)

[CTuP3D-03] Alignment-Insensitive THz-OAM Wave Generator Based on Square Lattice Photonic Crystal
[Presentation Style] Onsite

*Remma Hata[1], Hiroki Kishikawa[1], Junichi Fujikata[1] (1. Tokushima Univ. (Japan))

[Presentation Style] Onsite

For orbital angular momentum (OAM) wave generation, high-accuracy beam alignment is usually required. A photonic crystal (PhC)-based OAM wave generator is proposed and analyzed numerically. Very small alignment-dependence can be achieved with high efficiency.

4:30 PM - 4:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 201&202)

[CTuP3D-04] Profile control of silicon moth-eye structures for terahertz antireflection fabricated by femtosecond laser processing
[Presentation Style] Onsite

*Xi Yu[1], Yuki Yasunaga[2], Kazusa Goto[2], Dejun Liu[3], Makoto Kuwahara[1,4], Shingo Ono[2] （1. IMaSS, Nagoya Univ. (Japan), 2. Dept. Phys. Sci. and Eng., Nitech (Japan), 3. Dept. Phys., Shanghai Normal Univ. (China), 4. Grad. Sch. Eng., Nagoya Univ. (Japan)）

[Presentation Style] Onsite

Micro tapers with different profiles were fabricated by using femtosecond laser processing, and these tapers were employed to constitute moth-eye structures for terahertz frequencies. The relationship between profiles and antireflective performance is quantitatively analyzed.

4:45 PM - 5:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 201&202)

[CTuP3D-05] Hybrid moth-eye structure fabricated by laser processing and heat press coating for terahertz antireflection [Presentation Style] Onsite

*Xi Yu[1], Kazusa Goto[2], Yuki Yasunaga[2], Junshi Soeda[3], Makoto Kuwahara[4], Shingo Ono[2] （1. IMaSS, Nagoya Univ. (Japan), 2. Dept. Phys. Sci. and Eng., Nitech (Japan), 3. Teijin Ltd. (Japan), 4. Grad. Sch. Eng., Nagoya Univ. (Japan)）

[Presentation Style] Onsite

A hybrid antireflective structure was fabricated by attaching a polymer-based two-layer coating onto a silicon moth-eye structure, whose power reflectance can remain below 6% in a broad range from 0.6 to 2.5 THz.

5:00 PM - 5:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:15 PM Room 201&202)

[CTuP3D-06] Characteristics of Terahertz Notch Filter using Two Monolayer Guided-Mode Resonance Filters [Presentation Style] Onsite

Hyeon Sang Bark[1], Gyeong-Ryul Kim[2,3], Mun-Won Park[2,3], Kyu-Ha Jang[1], Kitae Lee[1], Young Uk Jeong[1], *Tae-In Jeon[2,3] （1. Radiation Center for Ultrafast Science, KAER Inst. (Korea), 2. Electrical and Electronics Engineering, KMO Univ. (Korea), 3. Interdisciplinary Major of Maritime AI Convergence, KMO Univ. (Korea)）

[Presentation Style] Onsite

We present the THz transmission characteristics of a guided-mode resonance (GMR) notch filter made of all-dielectric material. When the polarization angle for the ideal 1-D GMR filter changes from 0˚ to 180˚, the transmittance variation changes from 0 to 1 as a function of $\cos^2(\Phi)$, where Φ is polarization angle. However, if the second filter is installed at a rotation angle between 0˚ and 90˚ compared to the first filter, then the transmittance ranges for the polarization angles change from 0 to any value less than 1.

Oral Session | CLEO-PR2022 | Beam Manipulation and Applications

Beam Manipulation and Applications

Session Chair: Aiko Narazaki (AIST)

Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 206 (2F)

[CTuP5A-01 (Invited)] High depth of field and high speed variable focus for advanced laser processing applications
[Presentation Style] Online

Xiaohan Du[1], Camilo Florian[1], *Craig Arnold[1] (1. Princeton University (United States of America))

1:30 PM - 2:00 PM

[CTuP5A-02] Two-dimensional array of multiple-armed chiral surface reliefs in azo-polymers with rotating petal beams
[Presentation Style] Onsite

*Arata Tomita[1], Adam Vallés[2], Katsuhiko Miyamoto[1], Takashige Omatsu[1] (1. Chiba Univ. (Japan), 2. Institut de Ciencies Fotoniques (Spain))

2:00 PM - 2:15 PM

[CTuP5A-03] Direct print of well-aligned close-packed gold microdots with optical vortex irradiation
[Presentation Style] Onsite

*Kanta Takahashi[1], Haruki Kawaguchi[1], Rong Wei[1], Keisaku Yamane[2], Ken-ichi Yuyama[3], Satoyuki Kawano[4], Ryuji Morita[2], Nobuyuki Aoki[1], Katsuhiko Miyamoto[1], Takashige Omatsu[1] (1. Chiba Univ. (Japan), 2. Hokkaido Univ. (Japan), 3. Osaka City Univ. (Japan), 4. Osaka Univ. (Japan))

2:15 PM - 2:30 PM

[CTuP5A-04] Creation of a Spring-Shaped Microfiber with Optical Vortex
[Presentation Style] Onsite

*Yuto Horiuchi[1], Masataka Shinada[1], Haruki Kawaguchi[1], Katsuhiko Miyamoto[1,2], Yoshihiko Arita[2,3], Takashige Omatsu[1,2] (1. Graduate School of Engineering, Chiba univ. (Japan), 2. MCRC, Chiba univ. (Japan), 3. SUPA, School of Physics and Astronomy, St Andrews univ. (UK))

2:30 PM - 2:45 PM

[CTuP5A-05] A compact optical set-up to create high-order vectorial structured light beams
[Presentation Style] Online

*Praveen Kumar[1], Naveen K. Nishchal[2], Takashige Omatsu[1], A Srinivasa Rao[1] (1. Chiba University (Japan), 2. Indian Institute of Technology Patna (India))

2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 206)

[CTuP5A-01 (Invited)] High depth of field and high speed variable focus for advanced laser processing applications [Presentation Style] Online

Xiaohan Du[1], Camilo Florian[1], *Craig Arnold[1] (1. Princeton University (United States of America))

[Presentation Style] Online

We use an ultrafast varifocal lens to achieve quasi-simultaneous multi-focal laser marking and scribing of transparent materials. Multiple lines located at different depths in the substrate are produced with a single laser pass.

2:00 PM - 2:15 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 206)

[CTuP5A-02] Two-dimensional array of multiple-armed chiral surface reliefs in azo-polymers with rotating petal beams [Presentation Style] Onsite

*Arata Tomita[1], Adam Vallés[2], Katsuhiko Miyamoto[1], Takashige Omatsu[1] (1. Chiba Univ. (Japan), 2. Institut de Ciencies Fotoniques (Spain))

[Presentation Style] Onsite

We report on the formation of two-dimensional array of two-/four-armed chiral surface reliefs of azo-polymers by irradiation of a rotating petal-shaped beam with zero orbital angular momentum. Such chiral surface relief array will pave the way towards advanced rewritable ultrahigh-density optical data storages.

2:15 PM - 2:30 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 206)

[CTuP5A-03] Direct print of well-aligned close-packed gold microdots with optical vortex irradiation [Presentation Style] Onsite

*Kanta Takahashi[1], Haruki Kawaguchi[1], Rong Wei[1], Keisaku Yamane[2], Ken-ichi Yuyama[3], Satoyuki Kawano[4], Ryuji Morita[2], Nobuyuki Aoki[1], Katsuhiko Miyamoto[1], Takashige Omatsu[1] (1. Chiba Univ. (Japan), 2. Hokkaido Univ. (Japan), 3. Osaka City Univ. (Japan), 4. Osaka Univ. (Japan))

[Presentation Style] Onsite

We demonstrate the direct print of well-aligned gold microdots formed of close-packed gold nanoparticles at high spatial resolution by employing an optical vortex laser-induced forward transfer technique.

2:30 PM - 2:45 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 206)

[CTuP5A-04] Creation of a Spring-Shaped Microfiber with Optical Vortex [Presentation Style] Onsite

*Yuto Horiuchi[1], Masataka Shinada[1], Haruki Kawaguchi[1], Katsuhiko Miyamoto[1,2], Yoshihiko Arita[2,3], Takashige Omatsu[1,2] （1. Graduate School of Engineering, Chiba univ. (Japan), 2. MCRC, Chiba univ. (Japan), 3. SUPA, School of Physics and Astronomy, St Andrews univ. (UK)）

[Presentation Style] Onsite

We demonstrate, for the first time, the creation of a spring-shaped microfiber with optical vortex via two-photon absorption. The fiber exhibits a diameter of ~5 µm and a length of ~400 µm, respectively.

2:45 PM - 3:00 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 206)

[CTuP5A-05] A compact optical set-up to create high-order vectorial structured light beams

[Presentation Style] Online

*Praveen Kumar[1], Naveen K. Nishchal[2], Takashige Omatsu[1], A Srinivasa Rao[1] （1. Chiba University (Japan), 2. Indian Institute of Technology Patna (India)）

[Presentation Style] Online

This paper describes a method to generate vectorial structured beams using a compact and flexible experimental set-up. A single SLM with calibrated phase response has been used for phase modulation through on-axis configuration.

3D and Volume Processing

Session Chair: Koji Sugioka (RIKEN)

Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 206 (2F)

[CTuP5B-01 (Invited)] Processing the bulk of silicon using IR ultrashort laser pulses – from waveguides to welding

[Presentation Style] Online

*Stefan Nolte[1,2], Namig Alasgarzade[1], Alessandro Alberucci[1], Markus Blothe[1], Chandroth P. Jisha[1], Qingfeng Li[1], Gabor Matthäus[1], Maxime Chambonneau[1]
（1. Friedrich Schiller Univ. Jena (Germany), 2. Fraunhofer IOF (Germany)）

3:30 PM - 4:00 PM

[CTuP5B-02] Micro Raman tomographic imaging on laser internal damage into sapphire for laser cleaving process

[Presentation Style] Onsite

*Teppei Onuki[1], Junnosuke Kuroda[1], Kazuki Kaneko[1], Hirotaka Ojima[1], Jun Shimizu[1], Libo Zhou[1] （1. Ibaraki Univ. (Japan)）

4:00 PM - 4:15 PM

[CTuP5B-03] Microfabrication using Laser-Induced Bubble (microFLIB) of thermoset polymer and its potential techniques

[Presentation Style] Onsite

*Yasutaka Hanada[1] （1. Hirosaki University (Japan)）

4:15 PM - 4:30 PM

[CTuP5B-04] Multiphoton Photoreduction for Biomimetic Applications of Hydrogels

[Presentation Style] Onsite

Yo Nagano[1], Kaneto Tsunemitsu[1], Hiroaki Onoe[1], *Mitsuhiro Terakawa[1] （1. Keio Univ. (Japan)）

4:30 PM - 4:45 PM

[CTuP5B-05] Multi-Material Two-Photon Lithography Using Liquid Bridges Driven by a Permanent Magnet

[Presentation Style] Onsite

*Daiki Ishikawa[1], Taichi Furukawa[1], Masaru Mukai[1], Shoji Maruo[1] （1. Yokohama National University (Japan)）

4:45 PM - 5:00 PM

3:30 PM - 4:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 206)

[CTuP5B-01 (Invited)] Processing the bulk of silicon using IR ultrashort laser pulses – from waveguides to welding [Presentation Style] Online

*Stefan Nolte[1,2], Namig Alasgarzade[1], Alessandro Alberucci[1], Markus Blothe[1], Chandroth P. Jisha[1], Qingfeng Li[1], Gabor Matthäus[1], Maxime Chambonneau[1] (1. Friedrich Schiller Univ. Jena (Germany), 2. Fraunhofer IOF (Germany))

[Presentation Style] Online

We report on processing the bulk of silicon with infrared ultrashort laser pulses. The localized energy deposition and resulting material modifications enable various applications, from the inscription of waveguides to dicing and semiconductor–metal welding.

4:00 PM - 4:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 206)

[CTuP5B-02] Micro Raman tomographic imaging on laser internal damage into sapphire for laser cleaving process [Presentation Style] Onsite

*Teppei Onuki[1], Junnosuke Kuroda[1], Kazuki Kaneko[1], Hirotaka Ojima[1], Jun Shimizu[1], Libo Zhou[1] (1. Ibaraki Univ. (Japan))

[Presentation Style] Onsite

We attempt micro Raman Tomographic magingl technique to the evaluation of the location, size, and the severity of laser induced damage on sapphire toward the laser cleaving process

4:15 PM - 4:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 206)

[CTuP5B-03] Microfabrication using Laser-Induced Bubble (microFLIB) of thermoset polymer and its potential techniques [Presentation Style] Onsite

*Yasutaka Hanada[1] (1. Hirosaki University (Japan))

[Presentation Style] Onsite

We present microFabrication using Laser-Induced Bubble (microFLIB) of thermoset polymer PDMS. The fundamental characteristics of microFLIB reveals some advantages over the conventional laser direct writing techniques. We also discuss potential techniques of the microFLIB.

4:30 PM - 4:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 206)

[CTuP5B-04] Multiphoton Photoreduction for Biomimetic Applications of Hydrogels

[Presentation Style] Onsite

Yo Nagano[1], Kaneto Tsunemitsu[1], Hiroaki Onoe[1], *Mitsuhiro Terakawa[1] （1. Keio Univ. (Japan)）

[Presentation Style] Onsite

Light-driven control of the flow velocity inside a hydrogel microchannel is demonstrated by fabricating metal microstructures by multiphoton photoreduction. A technique to evaluate the local strain and compression of the hydrogel will also be described.

4:45 PM - 5:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 206)

[CTuP5B-05] Multi-Material Two-Photon Lithography Using Liquid Bridges Driven by a Permanent Magnet

[Presentation Style] Onsite

*Daiki Ishikawa[1], Taichi Furukawa[1], Masaru Mukai[1], Shoji Maruo[1] （1. Yokohama National University (Japan)）

[Presentation Style] Onsite

We propose a multi-material two-photon lithography technique using multiple liquid bridges driven by an external magnetic field. Using this method, multi-material 2D and 3D microstructures such as a multicolor overlapping cylinder model were fabricated.

Chip-Scale Comb Sources

Session Chair: Kaoru Minoshima (UEC)

Tue. Aug 2, 2022 1:45 PM - 3:00 PM Room 204 (2F)

[CTuP6A-01 (Invited)] Diode-Laser Frequency-Combs
[Presentation Style] Online

*Steven T Cundiff[1], Matthew Day[1], Mark Dong[1], Herbert Winful[1] (1. Univ. Michigan (United States of America))

1:45 PM - 2:15 PM

[CTuP6A-02] Strong Phase-Noise Suppression of a Kerr Comb via Synchronization to an Optical Parametric Oscillator
[Presentation Style] Onsite

Jae K. Jang[1], Yun Zhao[1], Yoshi Okawachi[1], Xingchen Ji[1], Michal Lipson[1], *Alexander Gaeta[1] (1. Columbia University (United States of America))

2:15 PM - 2:30 PM

[CTuP6A-03] Dark-Bright Soliton Pairs in a Microresonator
[Presentation Style] Onsite

*Shuangyou Zhang[1], Toby Bi[1,2], George N Ghalanos[1,3], Niall P Moroney[1,3], Leonardo Del Bino[1], Pascal Del'Haye[1,2] (1. Max Planck Institute for the Science of Light (Germany), 2. Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany), 3. Imperial College London (UK))

2:30 PM - 2:45 PM

[CTuP6A-04] Enhancement of supercontinuum generation with multi-mode excitation in silicon-nitride waveguide
[Presentation Style] Onsite

*Kouki Yoshida[1,2], Atsushi Ishizawa[1], Rai Kou[3], Xuejun Xu[1], Tai Tsuchizawa[4], Takuma Aihara[4], Yugo Kikkawa[1,2], Tadashi Nishikawa[2], Kenichi Hitach[1], Guangwei Cong[3], Noritsugu Yamamoto[3], Koji Yamada[3], Katsuya Oguri[1] (1. NTT BRL (Japan), 2. Tokyo Denki Univ. (Japan), 3. AIST (Japan), 4. NTT DTL (Japan))

2:45 PM - 3:00 PM

1:45 PM - 2:15 PM (Tue. Aug 2, 2022 1:45 PM - 3:00 PM Room 204)

[CTuP6A-01 (Invited)] Diode-Laser Frequency-Combs
[Presentation Style] Online

*Steven T Cundiff[1], Matthew Day[1], Mark Dong[1], Herbert Winful[1] (1. Univ. Michigan (United States of America))

[Presentation Style] Online

We demonstrate coherent comb generation by diode-lasers. These simple, electrically pumped, and inexpensive devices are readily manufactured. We measure the underlying frequency dynamics responsible for the comb spectrum, and conduct dual comb molecular spectroscopy.

2:15 PM - 2:30 PM (Tue. Aug 2, 2022 1:45 PM - 3:00 PM Room 204)

[CTuP6A-02] Strong Phase-Noise Suppression of a Kerr Comb via Synchronization to an Optical Parametric Oscillator
[Presentation Style] Onsite

Jae K. Jang[1], Yun Zhao[1], Yoshi Okawachi[1], Xingchen Ji[1], Michal Lipson[1], *Alexander Gaeta[1] (1. Columbia University (United States of America))

[Presentation Style] Onsite

We demonstrate near-complete suppression of phase noise associated with thermo-refractive noise in microresonator Kerr soliton comb via all-optical synchronization of the comb to an optical parametric oscillator all on a single silicon-nitride chip.

2:30 PM - 2:45 PM (Tue. Aug 2, 2022 1:45 PM - 3:00 PM Room 204)

[CTuP6A-03] Dark-Bright Soliton Pairs in a Microresonator
[Presentation Style] Onsite

*Shuangyou Zhang[1], Toby Bi[1,2], George N Ghalanos[1,3], Niall P Moroney[1,3], Leonardo Del Bino[1], Pascal Del'Haye[1,2] (1. Max Planck Institute for the Science of Light (Germany), 2. Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany), 3. Imperial College London (UK))

[Presentation Style] Onsite

Mutually trapped dark-bright soliton pairs are demonstrated in a microresonator by seeding modes in different dispersion regimes with similar group velocity. Dark-bright-soliton pairs enable frequency combs with nearly constant power in time domain.

2:45 PM - 3:00 PM (Tue. Aug 2, 2022 1:45 PM - 3:00 PM Room 204)

[CTuP6A-04] Enhancement of supercontinuum generation with multi-mode excitation in silicon-nitride waveguide
[Presentation Style] Onsite

*Kouki Yoshida[1,2], Atsushi Ishizawa[1], Rai Kou[3], Xuejun Xu[1], Tai Tsuchizawa[4], Takuma Aihara[4], Yugo Kikkawa[1,2], Tadashi Nishikawa[2], Kenichi Hitach[1], Guangwei Cong[3], Noritsugu Yamamoto[3], Koji Yamada[3], Katsuya Oguri[1]
（1. NTT BRL (Japan), 2. Tokyo Denki Univ. (Japan), 3. AIST (Japan), 4. NTT DTL (Japan)）

[Presentation Style] Onsite

We demonstrated the enhancement of supercontinuum generation by 18 dB at a wavelength of 0.6 μm with multimode excitation in a dispersion-controlled silicon-nitride waveguides. The enhancement was observed in the spectral range of 0.4 to 1.0 μm.

Oral Session | CLEO-PR2022 | MIR and THz Comb

MIR and THz Comb

Session Chairs: Minglie Hu (Tianjin Univ.), Haochen Tian (Univ. of Electro-Communications)
Tue. Aug 2, 2022 3:30 PM - 5:30 PM Room 204 (2F)

[CTuP6B-01 (Invited)] Wide-field mid-infrared imaging based on adiabatic frequency upconversion
[Presentation Style] Online
*Jianan Fang[1], Kun Huang[1], Ming Yan[1], E Wu[1], Heping Zeng[1] (1. East China Normal Univ. (China))
3:30 PM - 4:00 PM

[CTuP6B-02] Quantum Cascade Laser Frequency Comb for Comb-Calibrated Spectroscopy in the Long-Wave Infrared
[Presentation Style] Onsite
*Kenichi N. Komagata[1], Michele Gianella[2], Pierre Jouy[3], Filippos Kapsalidis[4], Mehran Shahmohammadi[4], Mattias Beck[4], Renaud Matthey[1], Valentin J. Wittwer[1], Andreas Hugi[3], Jérôme Faist[4], Lukas Emmenegger[2], Thomas Südmeyer[1], Stéphane Schilt[1] (1. Lab. Temps-Fréquence, Univ. de Neuchâtel (Switzerland), 2. Lab. for Air Pollution / Environmental Tech., Empa (Switzerland), 3. IRsweep AG (Switzerland), 4. Inst. for Quantum Electronics, ETH Zurich (Switzerland))
4:00 PM - 4:15 PM

[CTuP6B-03] Fast and Accurate Dual-Comb Spectroscopy with Mid-Infrared Quantum Cascade Laser Frequency Combs
[Presentation Style] Onsite
*Kenichi N. Komagata[1], Simon Vogel[2], Valentin J. Wittwer[1], Mathieu Bertrand[3], Stéphane Schilt[1], Jérôme Faist[3], Thomas Südmeyer[1], Lukas Emmenegger[2], Michele Gianella[2] (1. Lab. Temps-Fréquence, Univ. de Neuchâtel (Switzerland), 2. Lab. for Air Pollution / Environmental Tech., Empa (Switzerland), 3. Inst. for Quantum Electronics, ETH Zurich (Switzerland))
4:15 PM - 4:30 PM

[CTuP6B-04] Coherent optical-to-terahertz down-conversion via photomixing of comb-rooted optical frequencies
[Presentation Style] Onsite
Dong-Chel Shin[1], *Guseon Kang[1], Byung Soo Kim[1], Young-Jin Kim[1], Seung-Woo Kim[1] (1. KAIST (Korea))
4:30 PM - 4:45 PM

[CTuP6B-05] Fourier-transform spectroscopy with a mid-infrared frequency comb for line-shape study of CO-Ar
[Presentation Style] Onsite
*Akiko Nishiyama[1,2], Grzegorz Kowzan[1], Dominik Charczun[1], Piotr Masłowski[1] (1. Nicolaus Copernicus University in Torun (Poland), 2. National Institute of Advanced Industrial Science and Technology (AIST) (Japan))
4:45 PM - 5:00 PM

[CTuP6B-06] Generation of a mW-class broadband mid-infrared comb using a waveguide-type PPLN crystal and its application to

dual-comb spectroscopy
[Presentation Style] Onsite

*Kazumichi Yoshii[1], Naoya Kuse[1,2], Kazuki Inoue[2], Ryo Mitsumoto[2], Yoshiaki Nakajima[3], Takeshi Yasui[1,2], Kaoru Minoshima[1,3] （1. Inst. of Post-LED Photonics, Tokushima Univ. (Japan), 2. Tokushima Univ. (Japan), 3. Univ. of Electro-Commun. (Japan)）

5:00 PM - 5:15 PM

[CTuP6B-07] Mid-infrared Dual-comb Spectroscopy using Bidirectional Dual-comb Fiber Laser for Greenhouse N2O Gas Detection
[Presentation Style] Onsite

*Jiajie Li[1], Akifumi Asahara[1], Haochen Tian[1,2], Kazumichi Yoshii[3], Takashi Kato[1], Yoshiaki Nakajima[1,4], Kaoru Minoshima[1,3] （1. The University of Electro-Communications (Japan), 2. Research Fellow of the Japan Society for the Promotion of Science (JSPS) (Japan), 3. pLED Tokushima University pLED (Japan), 4. Toho University (Japan)）

5:15 PM - 5:30 PM

3:30 PM - 4:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Room 204)

[CTuP6B-01 (Invited)] Wide-field mid-infrared imaging based on adiabatic frequency upconversion [Presentation Style] Online

*Jianan Fang[1], Kun Huang[1], Ming Yan[1], E Wu[1], Heping Zeng[1] (1. East China Normal Univ. (China))

[Presentation Style] Online

Adiabatic frequency upconversion based on a chirped-poling nonlinear crystal was used to realize a large-field-of-view mid-infrared imaging, which further facilitated unprecedented performances with single-photon sensitivity and a MHz-level frame rate.

4:00 PM - 4:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Room 204)

[CTuP6B-02] Quantum Cascade Laser Frequency Comb for Comb-Calibrated Spectroscopy in the Long-Wave Infrared [Presentation Style] Onsite

*Kenichi N. Komagata[1], Michele Gianella[2], Pierre Jouy[3], Filippos Kapsalidis[4], Mehran Shahmohammadi[4], Mattias Beck[4], Renaud Matthey[1], Valentin J. Wittwer[1], Andreas Hugi[3], Jérôme Faist[4], Lukas Emmenegger[2], Thomas Südmeyer[1], Stéphane Schilt[1] (1. Lab. Temps-Fréquence, Univ. de Neuchâtel (Switzerland), 2. Lab. for Air Pollution / Environmental Tech., Empa (Switzerland), 3. IRsweep AG (Switzerland), 4. Inst. for Quantum Electronics, ETH Zurich (Switzerland))

[Presentation Style] Onsite

We demonstrate the suitability of mid-infrared quantum cascade laser frequency combs as highly-accurate frequency references. We exploit a fully-stabilized quantum cascade laser frequency comb to perform spectroscopy with 100-kHz frequency accuracy at 7.7 μm.

4:15 PM - 4:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Room 204)

[CTuP6B-03] Fast and Accurate Dual-Comb Spectroscopy with Mid-Infrared Quantum Cascade Laser Frequency Combs [Presentation Style] Onsite

*Kenichi N. Komagata[1], Simon Vogel[2], Valentin J. Wittwer[1], Mathieu Bertrand[3], Stéphane Schilt[1], Jérôme Faist[3], Thomas Südmeyer[1], Lukas Emmenegger[2], Michele Gianella[2] (1. Lab. Temps-Fréquence, Univ. de Neuchâtel (Switzerland), 2. Lab. for Air Pollution / Environmental Tech., Empa (Switzerland), 3. Inst. for Quantum Electronics, ETH Zurich (Switzerland))

[Presentation Style] Onsite

We present a dual-comb spectrometer combining absolute frequency accuracy (600-kHz), fast acquisition (54-ms), and broadband mid-infrared coverage (40-cm-1) near 1300 cm-1. These unique characteristics are realized by chip-based quantum cascade laser frequency combs.

4:30 PM - 4:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Room 204)

[CTuP6B-04] Coherent optical-to-terahertz down-conversion via photomixing of comb-rooted optical frequencies [Presentation Style] Onsite

Dong-Chel Shin[1], *Guseon Kang[1], Byung Soo Kim[1], Young-Jin Kim[1], Seung-Woo Kim[1] (1. KAIST (Korea))

[Presentation Style] Onsite

Coherent down-conversion of an optical reference for the terahertz domain is demonstrated, yielding a residual instability of $3x10^{-15}$ at 1-s and a residual phase noise of −53.2 dBc/Hz at 1 Hz offset.

4:45 PM - 5:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Room 204)

[CTuP6B-05] Fourier-transform spectroscopy with a mid-infrared frequency comb for line-shape study of CO-Ar [Presentation Style] Onsite

*Akiko Nishiyama[1,2], Grzegorz Kowzan[1], Dominik Charczun[1], Piotr Masłowski[1] (1. Nicolaus Copernicus University in Torun (Poland), 2. National Institute of Advanced Industrial Science and Technology (AIST) (Japan))

[Presentation Style] Onsite

We developed a mid-infrared optical frequency comb-based Fourier-transform spectroscopy system and applied for line-shape study of fundamental vibrational band of CO. The technique allows to determine line-shape parameters precisely in wide range of mid-infrared region.

5:00 PM - 5:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Room 204)

[CTuP6B-06] Generation of a mW-class broadband mid-infrared comb using a waveguide-type PPLN crystal and its application to dual-comb spectroscopy [Presentation Style] Onsite

*Kazumichi Yoshii[1], Naoya Kuse[1,2], Kazuki Inoue[2], Ryo Mitsumoto[2], Yoshiaki Nakajima[3], Takeshi Yasui[1,2], Kaoru Minoshima[1,3] (1. Inst. of Post-LED Photonics, Tokushima Univ. (Japan), 2. Tokushima Univ. (Japan), 3. Univ. of Electro-Commun. (Japan))

[Presentation Style] Onsite

We generated a broadband mid-infrared comb of 2.7-4.6 μm with an output of 2.7 mW based on an Er:fiber comb as a fundamental light using a waveguide-type PPLN crystal. A dual-comb spectrometer using these combs was developed.

5:15 PM - 5:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Room 204)

[CTuP6B-07] Mid-infrared Dual-comb Spectroscopy using Bidirectional Dual-comb Fiber Laser for Greenhouse N2O Gas Detection [Presentation Style] Onsite

*Jiajie Li[1], Akifumi Asahara[1], Haochen Tian[1,2], Kazumichi Yoshii[3], Takashi Kato[1], Yoshiaki Nakajima[1,4], Kaoru Minoshima[1,3] （1. The University of Electro-Communications (Japan), 2. Research Fellow of the Japan Society for the Promotion of Science (JSPS) (Japan), 3. pLED Tokushima University pLED (Japan), 4. Toho University (Japan)）

[Presentation Style] Onsite

We demonstrate mid-infrared dual-comb gas spectroscopy using a bidirectional dual-comb fiber laser. Without complex tight-locking, we detect N2O absorption lines consistent with HITRAN database. The developed scheme is useful for practical greenhouse gas detection.

Novel Quantum Systems

Session Chair: Shuntaro Takeda (Univ. of Tokyo)

Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall A (1F)

[CTuP7B-01 (Invited)] Silicon photonics for quantum information and communication

[Presentation Style] Onsite

*Nobuyuki Matsuda[1] (1. Tohoku Univ. (Japan))

1:30 PM - 2:00 PM

[CTuP7B-02] Topologically Protected Entanglement Emitters

[Presentation Style] Online

*Tianxiang Dai[1], Yutian Ao[1], Jueming Bao[1], Jun Mao[1], Yulin Chi[1], Zhaorong Fu[1], Yilong You[1], Xiaojing Chen[1], Chonghao Zhai[1], Bo Tang[2], Yan Yang[2], Zhihua Li[2], Luqi Yuan[3], Fei Gao[4], Xiao Lin[4], Mark G. Thompson[5], Jeremy L. O'Brien[6], Yan Li[1], Xiaoyong Hu[1], Qihuang Gong[1], Jianwei Wang[1] (1. Peking Univ. (China), 2. Chinese Academy of Scis. (China), 3. Shanghai Jiao Tong Univ. (China), 4. Zhejiang Univ. (China), 5. Univ. of Bristol (UK), 6. The Univ.of Western Australia (Australia))

2:00 PM - 2:15 PM

[CTuP7B-03] Femtosecond Laser Direct Writing of Path Encoded Two-qubit and Multiqubit Photonic Quantum Gate Chips

[Presentation Style] Online

*Meng Li[1], Chu Li[1], Yang Chen[2], Lan-Tian Feng[2], Xi-Feng Ren[2], Qihuang Gong[1,3,4,5], Yan Li[1,3,4,5] (1. State Key Lab. for Artificial Microstructure and Mesoscopic Phys., School of Phys., Peking Univ., Beijing (China), 2. CAS Key Lab. of Quantum Info., Univ.of Sci. and Tech. of China, Hefei (China), 3. Frontiers Sci. Center for Nano-Optoelectronics, Peking Univ., Beijing (China), 4. Collaborative Innovation Center of Extreme Optics, Shanxi Univ., Taiyuan, Shanxi (China), 5. Peking Univ. Yangtze Delta Inst. of Optoelectronics, Nantong (China))

2:15 PM - 2:30 PM

[CTuP7B-04] Single- and Multi-Phonon Subtraction to a Mechanical Thermal State via Optomechanics

[Presentation Style] Onsite

*Andreas Svela[1,2], Georg Enzian[2,3], Lars Freisem[1,2], John J. Price[1,2], Jack Clarke[1], Biveen Shajilal[4], Jiri Janousek[4], Ben Buchler[4], Ping K. Lam[4], Michael Vanner[1,2] (1. Blackett Lab., Imperial College London (UK), 2. Clarendon Lab., Univ. of Oxford (UK), 3. Niels Bohr Inst., Univ. of Copenhagen (Denmark), 4. Res. School of Physics and Eng., Australian National Univ. (Australia))

2:30 PM - 2:45 PM

[CTuP7B-05] Quantum Engineering the Effective Optomechanical Coupling in Diamond Resonators

*Mikolaj K. Schmidt[1], Christopher G. Poulton[2], Michael J. Steel[1] (1. Macquarie Univ. (Australia), 2. Univ. of Tech. Sydney (Australia))

2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CTuP7B-01 (Invited)] Silicon photonics for quantum information and communication

[Presentation Style] Onsite

*Nobuyuki Matsuda[1] (1. Tohoku Univ. (Japan))

[Presentation Style] Onsite

Silicon photonics is a versatile platform for information science and technology using light. This talk reviews our silicon photonics-based devices for quantum information processing and large-capacity optical communication systems.

2:00 PM - 2:15 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CTuP7B-02] Topologically Protected Entanglement Emitters

[Presentation Style] Online

*Tianxiang Dai[1], Yutian Ao[1], Jueming Bao[1], Jun Mao[1], Yulin Chi[1], Zhaorong Fu[1], Yilong You[1], Xiaojing Chen[1], Chonghao Zhai[1], Bo Tang[2], Yan Yang[2], Zhihua Li[2], Luqi Yuan[3], Fei Gao[4], Xiao Lin[4], Mark G. Thompson[5], Jeremy L. O'Brien[6], Yan Li[1], Xiaoyong Hu[1], Qihuang Gong[1], Jianwei Wang[1] (1. Peking Univ. (China), 2. Chinese Academy of Scis. (China), 3. Shanghai Jiao Tong Univ. (China), 4. Zhejiang Univ. (China), 5. Univ. of Bristol (UK), 6. The Univ.of Western Australia (Australia))

[Presentation Style] Online

We report topologically-protected entanglement emitters, that emit topological Einstein-Podolsky-Rosen state and multiphoton entangled state from a plug-and-play silicon-photonic chip emulating a photonic anomalous Floquet insulator in ambient conditions.

2:15 PM - 2:30 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CTuP7B-03] Femtosecond Laser Direct Writing of Path Encoded Two-qubit and Multiqubit Photonic Quantum Gate Chips

[Presentation Style] Online

*Meng Li[1], Chu Li[1], Yang Chen[2], Lan-Tian Feng[2], Xi-Feng Ren[2], Qihuang Gong[1,3,4,5], Yan Li[1,3,4,5] (1. State Key Lab. for Artificial Microstructure and Mesoscopic Phys., School of Phys., Peking Univ., Beijing (China), 2. CAS Key Lab. of Quantum Info., Univ.of Sci. and Tech. of China, Hefei (China), 3. Frontiers Sci. Center for Nano-Optoelectronics, Peking Univ., Beijing (China), 4. Collaborative Innovation Center of Extreme Optics, Shanxi Univ., Taiyuan, Shanxi (China), 5. Peking Univ. Yangtze Delta Inst. of Optoelectronics, Nantong (China))

[Presentation Style] Online

We demonstrate the first realization of path encoded two-qubit photonic quantum gate chip for generating Bell states, three-qubit Toffoli gate and four-qubit Controlled-Controlled-Controlled NOT gate via combining logic gates together by femtosecond laser direct writing.

2:30 PM - 2:45 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CTuP7B-04] Single- and Multi-Phonon Subtraction to a Mechanical Thermal State via Optomechanics

[Presentation Style] Onsite

*Andreas Svela[1,2], Georg Enzian[2,3], Lars Freisem[1,2], John J. Price[1,2], Jack Clarke[1], Biveen Shajilal[4], Jiri Janousek[4], Ben Buchler[4], Ping K. Lam[4], Michael Vanner[1,2] (1. Blackett Lab., Imperial College London (UK), 2. Clarendon Lab., Univ. of Oxford (UK), 3. Niels Bohr Inst., Univ. of Copenhagen (Denmark), 4. Res. School of Physics and Eng., Australian National Univ. (Australia))

[Presentation Style] Onsite

By heralding events of single- and multi-phonon subtraction to a mechanical thermal state in a Brillouin optomechanical system and using heterodyne tomography, we observe non-Gaussianity in the *s*-parameterised Wigner phase-space distribution.

2:45 PM - 3:00 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CTuP7B-05] Quantum Engineering the Effective Optomechanical Coupling in Diamond Resonators

*Mikolaj K. Schmidt[1], Christopher G. Poulton[2], Michael J. Steel[1] (1. Macquarie Univ. (Australia), 2. Univ. of Tech. Sydney (Australia))

We show how the optomechanical coupling between optical and acoustic modes of a diamond microresonator can be mediated by an ensemble of nitrogen vacancies, and that this quantum-engineered response becomes the dominant in realistic systems.

Quantum Optics with Atoms

Session Chair: Haruka Tanji (UEC)

Tue. Aug 2, 2022 3:30 PM - 5:30 PM Mid-sized Hall A (1F)

[CTuP7C-01] Cold Atomic Demonstration of Datta-Das Transistor

[Presentation Style] Onsite

Chetan Sriram Madasu[1,2], Mehedi Hasan[1,2], Ketan Rathod[3], *Chang Chi Kwong[1,2], David Wilkowski[1,2,3] (1. School of Physical and Mathematical Sciences, Nanyang Technological Univ. (Singapore), 2. Majulab, International Research Laboratory, IRL 3654, CNRS, Université Côte d'Azur, Sorbonne Université, National University of Singapore, Nanyang Technological University (Singapore), 3. Centre for Quantum Technologies, National Univ. of Singapore (Singapore))

3:30 PM - 3:45 PM

[CTuP7C-02] Strontium-88 cold atomic source with double color Zeeman slower

[Presentation Style] Onsite

*Jianing Li[1], Swarup Das[1], Chang Chi Kwong[1], Thomas Zanon[1], Shau-Yu Lan[1], David Wilkowski[1] (1. Nanyang Technological University (Singapore))

3:45 PM - 4:00 PM

[CTuP7C-03] 400-m-Long Polarization-Maintaining Fibers for Magneto-Optical Trapping of Francium Atoms

[Presentation Style] Online

*Keisuke Nakamura[1], Shintaro Nagase[2], Teruhito Nakashita[3], Tomohiro Hayamizu[4], Takatoshi Aoki[3], Hiroki Nagahama[1], Naoya Ozawa[2], Motoki Sato[3,4], Kazeki Yamane[3], Mirai Fukase[2], Daisuke Uehara[2], Aiko Takamine[4], Yasuhiro Sakemi[1] (1. Center for Nuclear Study, The University of Tokyo (Japan), 2. Department of Physics, the University of Tokyo (Japan), 3. Graduate School of Arts and Sciences, the University of Tokyo (Japan), 4. Nishina Center for Accelerator-Based Science, RIKEN (Japan))

4:00 PM - 4:15 PM

[CTuP7C-04] Super-resolution spectrometer enabled by a quantum-memory-based time-frequency processor

[Presentation Style] Online

*Mateusz Mazelanik[1], Adam Leszczynski[1], Michal Parniak[1], Wojciech Wasilewski[1] (1. University of Warsaw (Poland))

4:15 PM - 4:30 PM

[CTuP7C-05] Multiplexed quantum memory with many functions: entanglement generation and interferometric processing

[Presentation Style] Online

*Michal Parniak[1,2], Mateusz Mazelanik[1], Adam Leszczynski[1], Michal Lipka[1], Wojciech Wasilewski[1] (1. Univ. of Warsaw (Poland), 2. Univ. of Copenhagen (Denmark))

4:30 PM - 4:45 PM

[CTuP7C-06] Spectral Hologram of a Single Photon

[Presentation Style] Online

*Michal Lipka[1], Michal Parniak[1,2] (1. University of Warsaw (Poland), 2. University of Copenhagen (Denmark))

4:45 PM - 5:00 PM

[CTuP7C-08] Tunable coupling of a single quantum emitter to a composite nanofiber cavity

[Presentation Style] Online

*Ramachandrarao Yalla[1], K. Muhammed Shafi[2], Kali P Nayak[3], Kohzo Hakuta[3] （1. University of Hyderabad (India), 2. Indian Institute of Science (India), 3. University of Electro-Communications (Japan)）

5:15 PM - 5:30 PM

3:30 PM - 3:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Mid-sized Hall A)

[CTuP7C-01] Cold Atomic Demonstration of Datta-Das Transistor [Presentation Style] Onsite

Chetan Sriram Madasu[1,2], Mehedi Hasan[1,2], Ketan Rathod[3], *Chang Chi Kwong[1,2], David Wilkowski[1,2,3] (1. School of Physical and Mathematical Sciences, Nanyang Technological Univ. (Singapore), 2. Majulab, International Research Laboratory, IRL 3654, CNRS, Université Côte d'Azur, Sorbonne Université, National University of Singapore, Nanyang Technological University (Singapore), 3. Centre for Quantum Technologies, National Univ. of Singapore (Singapore))

[Presentation Style] Onsite

We experimentally demonstrate an atomtronic analog of the Datta-Das transistor using ultracold atoms, where a sensitive control of the spin rotation in the gate region is achieved using three gaussian beams.

3:45 PM - 4:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Mid-sized Hall A)

[CTuP7C-02] Strontium-88 cold atomic source with double color Zeeman slower [Presentation Style] Onsite

*Jianing Li[1], Swarup Das[1], Chang Chi Kwong[1], Thomas Zanon[1], Shau-Yu Lan[1], David Wilkowski[1] (1. Nanyang Technological University (Singapore))

[Presentation Style] Onsite

We design and build up a compact Strontium atomic source based on a new scheme of double-frequency and cross polarization Zeeman slower. With the atomic flux of $2.3x10^{9}$ atom/s, we aim to demonstrate inertial quantum sensing using clock transition of bosonic strontium-88 atoms.

4:00 PM - 4:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Mid-sized Hall A)

[CTuP7C-03] 400-m-Long Polarization-Maintaining Fibers for Magneto-Optical Trapping of Francium Atoms [Presentation Style] Online

*Keisuke Nakamura[1], Shintaro Nagase[2], Teruhito Nakashita[3], Tomohiro Hayamizu[4], Takatoshi Aoki[3], Hiroki Nagahama[1], Naoya Ozawa[2], Motoki Sato[3,4], Kazeki Yamane[3], Mirai Fukase[2], Daisuke Uehara[2], Aiko Takamine[4], Yasuhiro Sakemi[1] (1. Center for Nuclear Study, The University of Tokyo (Japan), 2. Department of Physics, the University of Tokyo (Japan), 3. Graduate School of Arts and Sciences, the University of Tokyo (Japan), 4. Nishina Center for Accelerator-Based Science, RIKEN (Japan))

[Presentation Style] Online

We installed a 400-m-long polarization-maintaining fiber link for magneto-optical trapping of Francium atoms. Fiber polarization stability of ~9×10^{-4} was achieved with an averaging time of 10 seconds, which even allows fluorescence observation at 20 atoms.

4:15 PM - 4:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Mid-sized Hall A)

[CTuP7C-04] Super-resolution spectrometer enabled by a quantum-memory-based time-frequency processor
[Presentation Style] Online

*Mateusz Mazelanik[1], Adam Leszczynski[1], Michal Parniak[1], Wojciech Wasilewski[1] (1. University of Warsaw (Poland))

[Presentation Style] Online

We employ an optical quantum memory with build-in processing capabilities to demonstrate a quantum-optimal measurement of frequency separation between two narrow spectral lines.

4:30 PM - 4:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Mid-sized Hall A)

[CTuP7C-05] Multiplexed quantum memory with many functions: entanglement generation and interferometric processing
[Presentation Style] Online

*Michal Parniak[1,2], Mateusz Mazelanik[1], Adam Leszczynski[1], Michal Lipka[1], Wojciech Wasilewski[1] (1. Univ. of Warsaw (Poland), 2. Univ. of Copenhagen (Denmark))

[Presentation Style] Online

We present an optical quantum memory based on cold rubidium atoms that can generate and process quantum states of light. The multimode capacity of the memory enables enhanced implementation of protocols.

4:45 PM - 5:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Mid-sized Hall A)

[CTuP7C-06] Spectral Hologram of a Single Photon
[Presentation Style] Online

*Michal Lipka[1], Michal Parniak[1,2] (1. University of Warsaw (Poland), 2. University of Copenhagen (Denmark))

[Presentation Style] Online

Spectrally-resolved two-photon interference experimentally unveils a spectral-phase footprint of a bandwidth-mismatched interaction between an ultrafast single photon and slowly-relaxing resonant atomic vapor, promising applications in non-invasive sensing of ultrafast transient processes and bringing new fundamental insights.

5:15 PM - 5:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Mid-sized Hall A)

[CTuP7C-08] Tunable coupling of a single quantum emitter to a composite nanofiber cavity
[Presentation Style] Online

*Ramachandrarao Yalla[1], K. Muhammed Shafi[2], Kali P Nayak[3], Kohzo Hakuta[3] （1. University of Hyderabad (India), 2. Indian Institute of Science (India), 3. University of Electro-Communications (Japan)）
[Presentation Style] Online
We demonstrate cavity-enhanced spontaneous emission over a broad wavelength range for a single quantum emitter using a composite nanofiber cavity. We also discuss how the longitudinal polarization of the light appears in the composite cavity.

Emission from Atoms, Quantum Wells, and Quantum Dots

Session Chair: Takasumi Tanabe (Keio Univ.)

Tue. Aug 2, 2022 1:30 PM - 2:45 PM Conference Hall (Oval Room) (1F)

[CTuP8A-01] Erbium-doped Rare-Earth Oxide Thin Film Waveguides for Integrated Quantum Photonic Devices

[Presentation Style] Onsite

*Xuejun Xu[1], Masaya Hiraishi[1,2], Tomohiro Inaba[1], Tai Tsuchizawa[3], Atsushi Ishizawa[1], Haruki Sanada[1], Takehiko Tawara[4], Jevon Longdell[2], Katsuya Oguri[1], Hideki Gotoh[1] （1. NTT Basic Research Laboratories (Japan), 2. University of Otago (New Zealand), 3. NTT Device Technology Laboratories (Japan), 4. Nihon University (Japan)）

1:30 PM - 1:45 PM

[CTuP8A-02] Compression of the Inhomogeneous Broadening of Ensemble Rare-earth Ions Using a Mechanical Resonance

[Presentation Style] Onsite

*Ryuichi Ohta[1], Takuya Hatomura[1,2], Masaya Hiraishi[1], Victor M. Bastidas[1,2], Xuejun Xu[1], Katsuya Oguri[1], William J. Munro[1,2,3], Hajime Okamoto[1] （1. NTT Basic Res. Lab. (Japan), 2. NTT Res. for Theoretical Quantum Physics (Japan), 3. National Institute of Informatics (Japan)）

1:45 PM - 2:00 PM

[CTuP8A-03] Electron beam excited non-bridging oxygen hole centers in silica as nanophotonic probes

[Presentation Style] Onsite

*Mark Sadgrove[1], Masaru Irita[1], Yoshinori Uemura[1], Sogo Ito[1], Yuta Osawa[1], Sho Kikuchi, Yoshikazu Homma[1] （1. Tokyo University of Science (Japan)）

2:00 PM - 2:15 PM

[CTuP8A-04] Polarization-independent Light Emission from Air-bridge Bull's-eye Cavities Containing a GaAs Quantum Well

[Presentation Style] Onsite

*Sangmin Ji[1], Takeyoshi Tajiri[2], Xiao-Fei Liu[3], Haruki Kiyama[3], Akira Oiwa[3], Julian Ritzmann[4], Arne Ludwig[4], Andreas Dirk Wieck[4], Satoshi Iwamoto[1] （1. The Univ. of Tokyo (Japan), 2. Univ. of Electro-Communications (Japan), 3. Osaka Univ. (Japan), 4. Ruhr-Universität Bochum (Germany)）

2:15 PM - 2:30 PM

[CTuP8A-05] Expanding ultrahigh-Q r/a range of L3 nanocavity by large-scale automated optimization

[Presentation Style] Onsite

*Eiichi Kuramochi[1], Shota Kita[1], Akihiko Shinya[1], Masaya Notomi[1,2] （1. NTT Corp. (Japan), 2. Tokyo Tech. (Japan)）

2:30 PM - 2:45 PM

1:30 PM - 1:45 PM (Tue. Aug 2, 2022 1:30 PM - 2:45 PM Conference Hall (Oval Room))

[CTuP8A-01] Erbium-doped Rare-Earth Oxide Thin Film Waveguides for Integrated Quantum Photonic Devices
[Presentation Style] Onsite

*Xuejun Xu[1], Masaya Hiraishi[1,2], Tomohiro Inaba[1], Tai Tsuchizawa[3], Atsushi Ishizawa[1], Haruki Sanada[1], Takehiko Tawara[4], Jevon Longdell[2], Katsuya Oguri[1], Hideki Gotoh[1] （1. NTT Basic Research Laboratories (Japan), 2. University of Otago (New Zealand), 3. NTT Device Technology Laboratories (Japan), 4. Nihon University (Japan)）

[Presentation Style] Onsite

We have developed a low-loss waveguide platform for erbium-doped rare-earth oxide thin films grown on silicon substrate and investigated optical properties of erbium ions in waveguides at cryogenic temperature, aiming for integrated quantum photonic devices.

1:45 PM - 2:00 PM (Tue. Aug 2, 2022 1:30 PM - 2:45 PM Conference Hall (Oval Room))

[CTuP8A-02] Compression of the Inhomogeneous Broadening of Ensemble Rare-earth Ions Using a Mechanical Resonance
[Presentation Style] Onsite

*Ryuichi Ohta[1], Takuya Hatomura[1,2], Masaya Hiraishi[1], Victor M. Bastidas[1,2], Xuejun Xu[1], Katsuya Oguri[1], William J. Munro[1,2,3], Hajime Okamoto[1] （1. NTT Basic Res. Lab. (Japan), 2. NTT Res. for Theoretical Quantum Physics (Japan), 3. National Institute of Informatics (Japan)）

[Presentation Style] Onsite

We propose a scheme to create the collective mode of ensemble rare-earth ions with a mechanical resonance, which significantly reduces the inhomogeneity of the ions and improves their photon emission and absorption efficiencies.

2:00 PM - 2:15 PM (Tue. Aug 2, 2022 1:30 PM - 2:45 PM Conference Hall (Oval Room))

[CTuP8A-03] Electron beam excited non-bridging oxygen hole centers in silica as nanophotonic probes
[Presentation Style] Onsite

*Mark Sadgrove[1], Masaru Irita[1], Yoshinori Uemura[1], Sogo Ito[1], Yuta Osawa[1], Sho Kikuchi, Yoshikazu Homma[1] （1. Tokyo University of Science (Japan)）

[Presentation Style] Onsite

We demonstrate the excitation of small numbers of non-bridging oxygen hole centers (NBOHCs) in a silica nanofiber. By collecting fluorescence directly through the fiber, we probe the structure's non-radiative local density of states.

2:15 PM - 2:30 PM (Tue. Aug 2, 2022 1:30 PM - 2:45 PM Conference Hall (Oval Room))

[CTuP8A-04] Polarization-independent Light Emission from Air-bridge Bull's-eye Cavities Containing a GaAs Quantum Well
[Presentation Style] Onsite

*Sangmin Ji[1], Takeyoshi Tajiri[2], Xiao-Fei Liu[3], Haruki Kiyama[3], Akira Oiwa[3], Julian Ritzmann[4], Arne Ludwig[4], Andreas Dirk Wieck[4], Satoshi Iwamoto[1] （1. The Univ. of Tokyo (Japan), 2. Univ. of Electro-Communications (Japan), 3. Osaka Univ. (Japan), 4. Ruhr-Universität Bochum (Germany)）

[Presentation Style] Onsite

We demonstrate bull’s-eye cavities containing a single quantum well showing almost polarization-independent emission originating from well-degenerated orthogonally polarized cavity modes. The polarization-independent properties will allow the application of the cavity structure to a photon–spin interface.

2:30 PM - 2:45 PM (Tue. Aug 2, 2022 1:30 PM - 2:45 PM Conference Hall (Oval Room))

[CTuP8A-05] Expanding ultrahigh-Q r/a range of L3 nanocavity by large-scale automated optimization
[Presentation Style] Onsite

*Eiichi Kuramochi[1], Shota Kita[1], Akihiko Shinya[1], Masaya Notomi[1,2] （1. NTT Corp. (Japan), 2. Tokyo Tech. (Japan)）

[Presentation Style] Onsite

We reveal that highly-optimized L3 nanocavity (theoretical $Q>10^7$) are highly sensitive to design parameters. By optimizing the cavity in terms of design parameters, we demonstrated ultrahigh-Q L3 nanocavities at r/a far below/above 0.25.

2D Materials in Nanophotonics and Non-Hermitian Nanophotonics

Session Chair: Ryuichi Ohta (NTT Basic Research Laboratories)

Tue. Aug 2, 2022 3:30 PM - 5:30 PM Conference Hall (Oval Room) (1F)

[CTuP8B-01 (Invited)] Quantum Nanophotonics Hexagonal Boron Nitride
[Presentation Style] Online

*Igor Aharonovich[1] （1. University of Technology Sydney (Australia)）

3:30 PM - 4:00 PM

[CTuP8B-02] Efficient graphene-based photodetector with an asymmetric hybrid plasmonic waveguide
[Presentation Style] Onsite

*Masaaki Ono[1,2], Katsumasa Yoshioka[2], Kengo Nozaki[1,2], Akihiko Shinya[1,2], Masaya Notomi[1,2,3] （1. NTT Nanophotonics Center (Japan), 2. NTT Basic Research Labs. (Japan), 3. Tokyo Institute of Technology (Japan)）

4:00 PM - 4:15 PM

[CTuP8B-03] Multi-level anti-counterfeiting based on covert structural features embedded in a fs-laser-treated gold/graphene layer
[Presentation Style] Onsite

*Shiru Jiang[1,2], Su-Han Kim[2], Chul-Soon Park[2], Woo-Bin Lee[1,2], Sang-Shin Lee[1,2] （1. Department of Electronic Engineering, Kwangwoon University (Korea), 2. Nano Device Application Center, Kwangwoon University (Korea)）

4:15 PM - 4:30 PM

[CTuP8B-04 (Invited)] Non-Hermitian nanophotonics with photonic crystal cavities
[Presentation Style] Onsite

*Kenta Takata[1,2], Kengo Nozaki[1,2], Eiichi Kuramochi[1,2], Shinji Matsuo[1,3], Koji Takeda[1,3], Takuro Fujii[1,3], Shota Kita[1,2], Nathan Roberts[2], Akihiko Shinya[1,2], Masaya Notomi[1,2,4] （1. NTT Nanophotonics Center (Japan), 2. NTT Basic Research Labs. (Japan), 3. NTT Device Tech. Labs. (Japan), 4. Tokyo Inst. Tech. (Japan)）

4:30 PM - 5:00 PM

[CTuP8B-05] Chiral response observed at exceptional points in graphene-loaded photonic crystals
[Presentation Style] Online

Syutaro Otsuka[1], *Yuto Moritake[1], Taiki Yoda[2,3], Takahiro Uemura[1], Masaaki Ono[2,3], Eiichi Kuramochi[2,3], Masaya Notomi[1,2,3] （1. Tokyo Inst. of Tech. (Japan), 2. NTT Basic Res. Lab. (Japan), 3. NTT Nanophotonics Center (Japan)）

5:00 PM - 5:15 PM

[CTuP8B-06] Optical non-Hermitian skin effect in continuous media
[Presentation Style] Onsite

*Taiki Yoda[1], Yuto Moritake[2,3], Kazuki Yokomizo[4], Shuichi Murakami[2,5], Masaya Notomi[1,2,6] （1. NTT Basic Research Laboratories (Japan), 2. Tokyo Tech (Japan), 3. JST Presto (Japan), 4. RIKEN (Japan), 5. TIES (Japan), 6. NTT Nanophotonics center (Japan)）

5:15 PM - 5:30 PM

3:30 PM - 4:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Conference Hall (Oval Room))

[CTuP8B-01 (Invited)] Quantum Nanophotonics Hexagonal Boron Nitride
[Presentation Style] Online

*Igor Aharonovich[1] (1. University of Technology Sydney (Australia))

[Presentation Style] Online

I will discuss emerging trends with HBN quantum photonics

4:00 PM - 4:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Conference Hall (Oval Room))

[CTuP8B-02] Efficient graphene-based photodetector with an asymmetric hybrid plasmonic waveguide
[Presentation Style] Onsite

*Masaaki Ono[1,2], Katsumasa Yoshioka[2], Kengo Nozaki[1,2], Akihiko Shinya[1,2], Masaya Notomi[1,2,3] (1. NTT Nanophotonics Center (Japan), 2. NTT Basic Research Labs. (Japan), 3. Tokyo Institute of Technology (Japan))

[Presentation Style] Onsite

We designed a compact photodetector with a graphene-loaded hybrid plasmonic waveguide that enhances light absorption to 32.1% for a 5-μm length. The asymmetric structure generates photovoltage by the photothermoelectric effect without dark current.

4:15 PM - 4:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Conference Hall (Oval Room))

[CTuP8B-03] Multi-level anti-counterfeiting based on covert structural features embedded in a fs-laser-treated gold/graphene layer
[Presentation Style] Onsite

*Shiru Jiang[1,2], Su-Han Kim[2], Chul-Soon Park[2], Woo-Bin Lee[1,2], Sang-Shin Lee[1,2] (1. Department of Electronic Engineering, Kwangwoon University (Korea), 2. Nano Device Application Center, Kwangwoon University (Korea))

[Presentation Style] Onsite

A gold/graphene hybrid layer works as triple-level anti-counterfeiting after femtosecond laser irradiation. The presence of graphene enables key structural information related to anti-counterfeiting signatures to be covert thoroughly under the surface of the hybrid layer.

4:30 PM - 5:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Conference Hall (Oval Room))

[CTuP8B-04 (Invited)] Non-Hermitian nanophotonics with photonic

crystal cavities
[Presentation Style] Onsite

*Kenta Takata[1,2], Kengo Nozaki[1,2], Eiichi Kuramochi[1,2], Shinji Matsuo[1,3], Koji Takeda[1,3], Takuro Fujii[1,3], Shota Kita[1,2], Nathan Roberts[2], Akihiko Shinya[1,2], Masaya Notomi[1,2,4] (1. NTT Nanophotonics Center (Japan), 2. NTT Basic Research Labs. (Japan), 3. NTT Device Tech. Labs. (Japan), 4. Tokyo Inst. Tech. (Japan))

[Presentation Style] Onsite

We review recent research of exceptional point degeneracies in on-chip coupled cavities, including our experimental demonstration with electrically pumped photonic crystal lasers and extended coupled-mode theory. We also discuss extra properties of such non-Hermitian systems.

5:00 PM - 5:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Conference Hall (Oval Room))

[CTuP8B-05] Chiral response observed at exceptional points in graphene-loaded photonic crystals
[Presentation Style] Online

Syutaro Otsuka[1], *Yuto Moritake[1], Taiki Yoda[2,3], Takahiro Uemura[1], Masaaki Ono[2,3], Eiichi Kuramochi[2,3], Masaya Notomi[1,2,3] (1. Tokyo Inst. of Tech. (Japan), 2. NTT Basic Res. Lab. (Japan), 3. NTT Nanophotonics Center (Japan))

[Presentation Style] Online

By using non-Hermitian photonic crystals loaded with graphene, we investigate unique chiral properties of exceptional points in the polarization space. We experimentally observe PT phase transition and chiral asymmetric transmission originating from exceptional points.

5:15 PM - 5:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:30 PM Conference Hall (Oval Room))

[CTuP8B-06] Optical non-Hermitian skin effect in continuous media
[Presentation Style] Onsite

*Taiki Yoda[1], Yuto Moritake[2,3], Kazuki Yokomizo[4], Shuichi Murakami[2,5], Masaya Notomi[1,2,6] (1. NTT Basic Research Laboratories (Japan), 2. Tokyo Tech (Japan), 3. JST Presto (Japan), 4. RIKEN (Japan), 5. TIES (Japan), 6. NTT Nanophotonics center (Japan))

[Presentation Style] Onsite

Although non-Hermitian skin effect has been discussed in periodic media having band structures, we show that continuous media can exhibit similar non-Hermitian skin effects when appropriate loss and anisotropy are incorporated.

High Capacity Optical Transport II

Session Chair: Sugang Xu (NICT)

Tue. Aug 2, 2022 2:00 PM - 3:00 PM Room 207 (2F)

[CTuP9E-01 (Invited)] Towards >100 Tb/s Ultra-Wideband Transmission Systems [Presentation Style] Online

Jeremie Renaudier[1], *Cosimo Calo[2], Amirhossein Ghazisaeidi[1] (1. Nokia Bell Labs (France), 2. III-V Lab (France))

2:00 PM - 2:30 PM

[CTuP9E-02] Real-time 80 × 200-Gb/s DWDM Transmission over 3600-km G.652.D Fiber with 6-THz Bandwidth C-Band Amplifiers [Presentation Style] Online

*Lipeng Feng[1], Anxu Zhang[1], Rong Zhang[2], Yingqing Ma[2], Kai Lv[1], Kai Kang[1], Xiaowei Lou[1], Xiaoli Huo[1], Junjie Li[1] (1. China Telecom Res. Inst. (China), 2. China Telecom Global Ltd. (China))

2:30 PM - 2:45 PM

[CTuP9E-03] 3-Dimensional Constellation Shaping in High Spectral Efficiency Multidimensional Optical Transmission [Presentation Style] Onsite

*Jinwoo Park[1], Joung-Moon Lee[1], Inho Ha[1], Sang-Kook Han[1] (1. Yonsei University (Korea))

2:45 PM - 3:00 PM

2:00 PM - 2:30 PM (Tue. Aug 2, 2022 2:00 PM - 3:00 PM Room 207)

[CTuP9E-01 (Invited)] Towards >100 Tb/s Ultra-Wideband Transmission Systems
[Presentation Style] Online

Jeremie Renaudier[1], *Cosimo Calo[2], Amirhossein Ghazisaeidi[1] (1. Nokia Bell Labs (France), 2. III-V Lab (France))

[Presentation Style] Online

We report on the use of semiconductor optical amplifiers to enlarge optical bandwidth of next generation WDM systems. We review recent advances and achievements paving the way for >100 Tb/s fiber communications systems.

2:30 PM - 2:45 PM (Tue. Aug 2, 2022 2:00 PM - 3:00 PM Room 207)

[CTuP9E-02] Real-time 80 × 200-Gb/s DWDM Transmission over 3600-km G.652.D Fiber with 6-THz Bandwidth C-Band Amplifiers
[Presentation Style] Online

*Lipeng Feng[1], Anxu Zhang[1], Rong Zhang[2], Yingqing Ma[2], Kai Lv[1], Kai Kang[1], Xiaowei Lou[1], Xiaoli Huo[1], Junjie Li[1] (1. China Telecom Res. Inst. (China), 2. China Telecom Global Ltd. (China))

[Presentation Style] Online

We successfully demonstrate a record real-time transmission over 3600-km common G.652.D fiber with at least 7.9-dB OSNR margins using a commercially available 200-Gb/s PDM-QPSK transponder, which reserves more than 3-dB engineering link budget for each 100-km span.

2:45 PM - 3:00 PM (Tue. Aug 2, 2022 2:00 PM - 3:00 PM Room 207)

[CTuP9E-03] 3-Dimensional Constellation Shaping in High Spectral Efficiency Multidimensional Optical Transmission
[Presentation Style] Onsite

*Jinwoo Park[1], Joung-Moon Lee[1], Inho Ha[1], Sang-Kook Han[1] (1. Yonsei University (Korea))

[Presentation Style] Onsite

Multidimensional optical modulation is critical in next-generation optical communication to achieve high spectral efficiency. 3-Dimensional geometric and Probabilistic constellation shaping technique is proposed in multidimensional optical modulation and performance is verified with transmission simulation.

Novel Concepts and Fundamentals

Session Chair: Joji Maeda (Tokyo Univ. of Sci.)

Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 207 (2F)

[CTuP9F-01] Compact Nyquist Transmitter based on Silicon Carrier Injection Ring Modulator

[Presentation Style] Online

*Mohamed I.Hosni[1], Karanveer Singh[1], Younus Mandalawi[1], Arijit Misra[1], Stefan Preussler[1], Ayman Mohammed Mokhtar[2], Thomas Schneider[1] （1. TU Braunschweig (Germany), 2. MTC (Egypt)）

3:30 PM - 3:45 PM

[CTuP9F-02] Generalized Carrier Assisted Differential Detection Receiver with Simplest Structure

[Presentation Style] Online

*Yixiao Zhu[1], Weisheng Hu[1] （1. Shanghai Jiao Tong University (China)）

3:45 PM - 4:00 PM

[CTuP9F-03] Modulation Format Conversion From Three BPSK to One 8QAM Based on Coherent Interference and XPM

[Presentation Style] Onsite

*Taiga Ishida[1], Hiroki Kishikawa[1], Junichi Fujikata[1] （1. Tokushima University (Japan)）

4:00 PM - 4:15 PM

[CTuP9F-04] Performance Enhancement of 4-D QAM-MDPSK Optical Transmission Using Set-Partitioning

[Presentation Style] Onsite

*Joungmoon Lee[1], Inho Ha[1], Jinwoo Park[1], Sang-Kook Han[1] （1. Yonsei University (Korea)）

4:15 PM - 4:30 PM

[CTuP9F-05] Quantum-Noise-Limited Performance of BPSK Transmission with EDFAs, PSAs, or Raman Amplifiers

[Presentation Style] Onsite

*kyo Inoue[1] （1. Osaka University (Japan)）

4:30 PM - 4:45 PM

[CTuP9F-06] A Low-Latency DWBA Scheme for TWDM-PON Based Fronthaul Network with Non-Zero Laser Tuning Time

[Presentation Style] Online

*Yuansen CHENG[1], Chun-Kit CHAN[1] （1. CUHK (Hong Kong)）

4:45 PM - 5:00 PM

3:30 PM - 3:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 207)

[CTuP9F-01] Compact Nyquist Transmitter based on Silicon Carrier Injection Ring Modulator
[Presentation Style] Online

*Mohamed I.Hosni[1], Karanveer Singh[1], Younus Mandalawi[1], Arijit Misra[1], Stefan Preussler[1], Ayman Mohammed Mokhtar[2], Thomas Schneider[1] (1. TU Braunschweig (Germany), 2. MTC (Egypt))

[Presentation Style] Online

We demonstrate simulation results for a very compact Nyquist signal transmission system based on integrated silicon ring modulators.

3:45 PM - 4:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 207)

[CTuP9F-02] Generalized Carrier Assisted Differential Detection Receiver with Simplest Structure
[Presentation Style] Online

*Yixiao Zhu[1], Weisheng Hu[1] (1. Shanghai Jiao Tong University (China))

[Presentation Style] Online

We propose a generalized carrier assisted differential detection receiver featuring simplest structure of 2×2 optical coupler and 2 single-ended photodiodes. The performance of the designed receiver is comprehensively evaluated through numerical simulation.

4:00 PM - 4:15 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 207)

[CTuP9F-03] Modulation Format Conversion From Three BPSK to One 8QAM Based on Coherent Interference and XPM
[Presentation Style] Onsite

*Taiga Ishida[1], Hiroki Kishikawa[1], Junichi Fujikata[1] (1. Tokushima University (Japan))

[Presentation Style] Onsite

Modulation format conversion from three BPSK to one 8QAM based on coherent interference and cross phase modulation is proposed. Calculated BER performance and constellation diagram show that error-free conversion can be achieved.

4:15 PM - 4:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 207)

[CTuP9F-04] Performance Enhancement of 4-D QAM-MDPSK Optical Transmission Using Set-Partitioning
[Presentation Style] Onsite

*Joungmoon Lee[1], Inho Ha[1], Jinwoo Park[1], Sang-Kook Han[1] （1. Yonsei University (Korea)）
[Presentation Style] Onsite
In multidimensional optical modulation combining both optical intensity and phase signals, inter-dimensional interference (IDI) occurs which degrades the error performances. We propose 4-D set partitioning QAM-MDPSK optical transmissions which lowers the error floor effectively.

4:30 PM - 4:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 207)

[CTuP9F-05] Quantum-Noise-Limited Performance of BPSK Transmission with EDFAs, PSAs, or Raman Amplifiers [Presentation Style] Onsite

*kyo Inoue[1] （1. Osaka University (Japan)）
[Presentation Style] Onsite
This study investigates the quantum-noise-limited performance of BPSK transmission using EDFAs, PSAs, or Raman amplifiers as repeaters. Calculations based on quantum-mechanical analysis qualitatively show that bidirectionally pumped Raman systems achieve considerably long transmission distances.

4:45 PM - 5:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 207)

[CTuP9F-06] A Low-Latency DWBA Scheme for TWDM-PON Based Fronthaul Network with Non-Zero Laser Tuning Time [Presentation Style] Online

*Yuansen CHENG[1], Chun-Kit CHAN[1] （1. CUHK (Hong Kong)）
[Presentation Style] Online
The influence of laser tuning delay is investigated for the TWDM-PON based fronthaul transmission and proposed a WT-DWBA scheme to improve the bandwidth efficiency. We realize a superior performance in wavelength reduction up to 47%.

Novel Light-emitting and Detection Devices

Session Chairs: Judy Rorison (Univ. of Bristol), Takuo Tanemura (Univ. of Tokyo)
Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 104&105 (1F)

[CTuP11E-01 (Invited(P))] Control of Vector Beam Polarization Mode by Spatially Modulated Photonic-crystal Lasers
[Presentation Style] Onsite
*Kyoko Kitamura[1,2], Seira Kotera[1], Masako Yone[1], Kazuaki Yoshida[1], Susumu Noda[2] (1. Kyoto Inst. of Tech. (Japan), 2. Kyoto Univ. (Japan))
1:30 PM - 2:00 PM

[CTuP11E-02] Ultrafast and high-power green micro-LED for visible light communications
[Presentation Style] Online
*Junfei Wang[1], Chicheng Ma[1], Dong Li[1], Junhui Hu[1], Shulan Yi[1], Shanshan Wang[1], Yuqi Hou[1], Yingnan Ma[1], Jianyang Shi[1,2,3], Junwen Zhang[1,2,3,4], Ziwei Li[1,2,3,4], Nan Chi[1,2,3,4], Chao Shen[1,2,3,4] (1. Fudan University (China), 2. Shanghai Engineering Research Center of Low-Earth-Orbit Satellite Communication and Applications (China), 3. Shanghai Collaborative Innovation Center of Low-Earth-Orbit Satellite Communication Technology (China), 4. Peng Cheng Laboratory (China))
2:00 PM - 2:15 PM

[CTuP11E-03] Direct printing of organic micro-disk cavity lasers on waveguides in optical integrated circuits
[Presentation Style] Onsite
*Kota Hiramoto[1], Nasim Obata[1], Alexander Eich[2,3,4], Yuya Mikami[1], Abdul Nasir[1], Naoya Tate[1], Yuji Oki[1], Carsten Schuck[2,3,4], Hiroaki Yoshioka[1] (1. Graduate School and Faculty of Information Science and Electrical Engineering, Kyushu Univ. (Japan), 2. Institute of Physics, Univ. of Münster (Germany), 3. Center for Nanotechnology (Germany), 4. Center for Soft Nanoscience (Germany))
2:15 PM - 2:30 PM

[CTuP11E-04] Simulations of two-well THz-QCL structures with non-equilibrium Green’ s function method
[Presentation Style] Onsite
*Hiroaki Yasuda[1], Norihiko Sekine[1], Iwao Hosako[1] (1. NICT (Japan))
2:30 PM - 2:45 PM

[CTuP11E-05] Ultra-broadband photodetector module toward 200 GHz using UTC-PD and frequency compensation technique
[Presentation Style] Onsite
*Toshimasa Umezawa[1], Atsushi Matsumoto[1], Kouichi Akahane[1], Atsushi Kanno[1], Naokatsu Yamamoto[1] (1. National Institute of Information and Communications Technology (NICT) (Japan))
2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 104&105)

[CTuP11E-01 (Invited(P))] Control of Vector Beam Polarization Mode by Spatially Modulated Photonic-crystal Lasers [Presentation Style] Onsite

*Kyoko Kitamura[1,2], Seira Kotera[1], Masako Yone[1], Kazuaki Yoshida[1], Susumu Noda[2] (1. Kyoto Inst. of Tech. (Japan), 2. Kyoto Univ. (Japan))

[Presentation Style] Onsite

We demonstrate a single-chip vector beam generator by designing spatial modulation of modulated photonic-crystal lasers. The polarization modes of the output beam are controlled by mode selection of the laser.

2:00 PM - 2:15 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 104&105)

[CTuP11E-02] Ultrafast and high-power green micro-LED for visible light communications [Presentation Style] Online

*Junfei Wang[1], Chicheng Ma[1], Dong Li[1], Junhui Hu[1], Shulan Yi[1], Shanshan Wang[1], Yuqi Hou[1], Yingnan Ma[1], Jianyang Shi[1,2,3], Junwen Zhang[1,2,3,4], Ziwei Li[1,2,3,4], Nan Chi[1,2,3,4], Chao Shen[1,2,3,4] (1. Fudan University (China), 2. Shanghai Engineering Research Center of Low-Earth-Orbit Satellite Communication and Applications (China), 3. Shanghai Collaborative Innovation Center of Low-Earth-Orbit Satellite Communication Technology (China), 4. Peng Cheng Laboratory (China))

[Presentation Style] Online

High power green micro-LED is essential for extending the range of free-space and underwater visible light communication systems. We demonstrate a ~520nm micro-LED with 11.5mW output power, achieving a data rate of 3.77Gbps.

2:15 PM - 2:30 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 104&105)

[CTuP11E-03] Direct printing of organic micro-disk cavity lasers on waveguides in optical integrated circuits [Presentation Style] Onsite

*Kota Hiramoto[1], Nasim Obata[1], Alexander Eich[2,3,4], Yuya Mikami[1], Abdul Nasir[1], Naoya Tate[1], Yuji Oki[1], Carsten Schuck[2,3,4], Hiroaki Yoshioka[1] (1. Graduate School and Faculty of Information Science and Electrical Engineering, Kyushu Univ. (Japan), 2. Institute of Physics, Univ. of Münster (Germany), 3. Center for Nanotechnology (Germany), 4. Center for Soft Nanoscience (Germany))

[Presentation Style] Onsite

We have used inkjet printing for integrating organic microcavity lasers vertically on top of optical waveguides embedded into photonic integrated circuits. This achievement will enable three-dimensional circuits and exploiting novel heterogeneous material combinations.

2:30 PM - 2:45 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 104&105)

[CTuP11E-04] Simulations of two-well THz-QCL structures with non-equilibrium Green’ s function method

[Presentation Style] Onsite

*Hiroaki Yasuda[1], Norihiko Sekine[1], Iwao Hosako[1] （1. NICT (Japan)）

[Presentation Style] Onsite

We designed a two-well terahertz quantum cascade laser that has the highest gain in the positive differential conductance region and confirmed better THz-QCL performance by using the non-equilibrium Green’s function method.

2:45 PM - 3:00 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Room 104&105)

[CTuP11E-05] Ultra-broadband photodetector module toward 200 GHz using UTC-PD and frequency compensation technique

[Presentation Style] Onsite

*Toshimasa Umezawa[1], Atsushi Matsumoto[1], Kouichi Akahane[1], Atsushi Kanno[1], Naokatsu Yamamoto[1] （1. National Institute of Information and Communications Technology (NICT) (Japan)）

[Presentation Style] Onsite

We presented an ultra-broadband photodetector module toward 200-GHz using a UTC-PD chip and a frequency compensation technique. The fabricated PD module exhibited high 3-dB bandwidth over 110-GHz, and the improvement using frequency compensation was discussed.

Novel Semiconductor Lasers

Session Chair: Tatsuro Hiraki (NTT Corp.)

Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 104&105 (1F)

[CTuP11F-01 (Tutorial)] Semiconductor Nanolasers: Progress and Perspective
[Presentation Style] Online

*Cun-Zheng Ning[1,2] (1. Shenzhen Technology University (China), 2. Tsinghua University (China))

3:30 PM - 4:30 PM

[CTuP11F-02] Strain-compensated type-II $GaAs_{1-x}Bi_x/GaN_yAs_{1-y}$ "W" quantum wells for GaAs-based telecom lasers
[Presentation Style] Online

*Zoe C M Davidson[1], Judy M Rorison[1], Stephen J Sweeney[2], Christopher A Broderick[3,4] (1. University of Bristol (UK), 2. University of Surrey (UK), 3. Tyndall National Institute (Ireland), 4. University College Cork (Ireland))

4:30 PM - 4:45 PM

[CTuP11F-03] Theory of highly-strained InAs quantum well lasers grown on InP for optical communications at 2 μm
[Presentation Style] Online

*Zoe C M Davidson[1], Judy M Rorison[1], Christopher A Broderick[2,3] (1. University of Bristol (UK), 2. Tyndall National Institute (Ireland), 3. University College Cork (Ireland))

4:45 PM - 5:00 PM

3:30 PM - 4:30 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 104&105)

[CTuP11F-01 (Tutorial)] Semiconductor Nanolasers: Progress and Perspective
[Presentation Style] Online

*Cun-Zheng Ning[1,2] (1. Shenzhen Technology University (China), 2. Tsinghua University (China))

[Presentation Style] Online

This is a tutorial review of the progress made over the last 15 years on semiconductor plasmonic nanolasers and the related development. Motivations, key results, remaining challenges, and potential on-chip applications will be discussed.

4:30 PM - 4:45 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 104&105)

[CTuP11F-02] Strain-compensated type-II $GaAs_{1-x}Bi_x/GaN_yAs_{1-y}$ "W" quantum wells for GaAs-based telecom lasers
[Presentation Style] Online

*Zoe C M Davidson[1], Judy M Rorison[1], Stephen J Sweeney[2], Christopher A Broderick[3,4] (1. University of Bristol (UK), 2. University of Surrey (UK), 3. Tyndall National Institute (Ireland), 4. University College Cork (Ireland))

[Presentation Style] Online

We theoretically analyse strain-compensated $GaAs_{1-x}Bi_x/GaN_yAs_{1-y}$ "W-type" quantum wells, demonstrating a viable approach to achieve efficient GaAs-based 1.3 and 1.55 µm lasers in which non-radiative Auger recombination is expected to be mitigated by type-II band offsets.

4:45 PM - 5:00 PM (Tue. Aug 2, 2022 3:30 PM - 5:00 PM Room 104&105)

[CTuP11F-03] Theory of highly-strained InAs quantum well lasers grown on InP for optical communications at 2 μ m
[Presentation Style] Online

*Zoe C M Davidson[1], Judy M Rorison[1], Christopher A Broderick[2,3] (1. University of Bristol (UK), 2. Tyndall National Institute (Ireland), 3. University College Cork (Ireland))

[Presentation Style] Online

We present a theoretical analysis of highly-strained InAs quantum well lasers grown on InP for use in next-generation hollow-core fibre optical communications close to 2 μm, and validate our calculations against recent experimental data.

Metamaterial Absorber and Thermal Devices

Session Chair: Ryo Kato (Tokushima Univ.)

Tue. Aug 2, 2022 1:30 PM - 3:00 PM Small Hall (2F)

[CTuP16E-01 (Invited)] Mutual Control of Heat-Light by Si Metasurface
[Presentation Style] Onsite

*Junichi Takahara[1], Rongyang Xu[1] (1. Osaka University (Japan))

1:30 PM - 2:00 PM

[CTuP16E-02] Metamaterial Thermoelectric Generation under Uniform Temperature Environment
[Presentation Style] Onsite

*Wakana Kubo[1] (1. Tokyo Univ. of Agri. and Technol. (Japan))

2:00 PM - 2:15 PM

[CTuP16E-03] Assembly of All-Dielectric Broadband Perfect Absorbers Based on Degenerate Critical Coupling
[Presentation Style] Onsite

*Rongyang Xu[1], Junichi Takahara[1] (1. Osaka University (Japan))

2:15 PM - 2:30 PM

[CTuP16E-04] Detection of Biological Nanoparticles by Photothermal Convection with Plasmonic Nano-bowl Substrate
[Presentation Style] Onsite

*Masatoshi Kanoda[1,2,3], Hayashi Kota[1,2,3], Mamoru Tamura[2,4], Shiho Tokonami[2,3], Takuya Iida[1,2] (1. Graduate School of Sci., Osaka Prefecture Univ. (Japan), 2. Res. Inst. for Light-induced Acceleration System (RILACS), Osaka Prefecture Univ. (Japan), 3. Graduate School of Eng,, Osaka Prefecture Univ. (Japan), 4. Graduate School of Eng. Sci., Osaka Univ. (Japan))

2:30 PM - 2:45 PM

[CTuP16E-05] Laser-induced microbubble fusion of liposomes and formation of ultralong tubes
[Presentation Style] Onsite

*Akemi Noguchi[1], Chiaki Kojima[1], Ken-ichi Yuyama[1], Tatsuya Shoji[2], Yasuyuki Tsuboi[1] (1. Osaka City Univ. (Japan), 2. Kanagawa Univ. (Japan))

2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Small Hall)

[CTuP16E-01 (Invited)] Mutual Control of Heat-Light by Si Metasurface
[Presentation Style] Onsite

*Junichi Takahara[1], Rongyang Xu[1] (1. Osaka University (Japan))

[Presentation Style] Onsite

We describe single crystalline silicon perfect absorbers in visible and near-infrared region based on degenerate critical coupling. We show that not only dipoles, but also quadrupoles play an important role to realize PAs with higher Q-factor.

2:00 PM - 2:15 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Small Hall)

[CTuP16E-02] Metamaterial Thermoelectric Generation under Uniform Temperature Environment
[Presentation Style] Onsite

*Wakana Kubo[1] (1. Tokyo Univ. of Agri. and Technol. (Japan))

[Presentation Style] Onsite

We propose a thermoelectric device that can produce a thermal gradient even in a uniform-temperature environment.

2:15 PM - 2:30 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Small Hall)

[CTuP16E-03] Assembly of All-Dielectric Broadband Perfect Absorbers Based on Degenerate Critical Coupling
[Presentation Style] Onsite

*Rongyang Xu[1], Junichi Takahara[1] (1. Osaka University (Japan))

[Presentation Style] Onsite

Previous studies about perfect absorbers based on degenerate critical coupling only achieved narrowband absorption. We propose perfect absorbers that can be assembled as building blocks to achieve broadband absorption in the visible and near-infrared ranges.

2:30 PM - 2:45 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Small Hall)

[CTuP16E-04] Detection of Biological Nanoparticles by Photothermal Convection with Plasmonic Nano-bowl Substrate
[Presentation Style] Onsite

*Masatoshi Kanoda[1,2,3], Hayashi Kota[1,2,3], Mamoru Tamura[2,4], Shiho Tokonami[2,3], Takuya Iida[1,2] (1. Graduate School of Sci., Osaka Prefecture Univ. (Japan), 2. Res. Inst. for Light-induced Acceleration System (RILACS), Osaka Prefecture Univ. (Japan), 3. Graduate School of Eng,, Osaka Prefecture Univ. (Japan), 4. Graduate School of Eng. Sci., Osaka Univ. (Japan))

[Presentation Style] Onsite

We developed a plasmonic nano-bowl substrate exhibiting sensitive optical properties due to localized surface plasmons, and demonstrated the optical condensation detection of nanoparticles. Quantitative analysis of nanoparticles was performed by fluorescence imaging and reflectance spectra.

2:45 PM - 3:00 PM (Tue. Aug 2, 2022 1:30 PM - 3:00 PM Small Hall)

[CTuP16E-05] Laser-induced microbubble fusion of liposomes and formation of ultralong tubes [Presentation Style] Onsite

*Akemi Noguchi[1], Chiaki Kojima[1], Ken-ichi Yuyama[1], Tatsuya Shoji[2], Yasuyuki Tsuboi[1] (1. Osaka City Univ. (Japan), 2. Kanagawa Univ. (Japan))

[Presentation Style] Onsite

We discovered a phenomenon of the formation of giant tubular liposomes by small spherical liposomes, those are trapped under a laser-induced bubble on an Au film. In this study, we investigated this phenomenon in detail to elucidate its mechanism.

Oral Session | CLEO-PR2022 | THz Technologies

THz Technologies

Session Chair: Nobuyuki Takeyasu (Okayama Univ.)

Tue. Aug 2, 2022 3:30 PM - 4:00 PM Small Hall (2F)

[CTuP16F-01] A switchable THz filter by integrating an H-shaped metamaterial and ultra-small MEMS switches

[Presentation Style] Onsite

*Ying Huang[1], Taiyu Okatani[1], Yoshiaki Kanamori[1] （1. Tohoku University (Japan)）

3:30 PM - 3:45 PM

[CTuP16F-02] Minimizing radiative losses via interaction of Dark states in terahertz metamaterials

[Presentation Style] Online

*Sukhvinder Kaur[1], Subhajit Karmakar[1], Arun Jana[2], Ravendra K. Varshney[1], Dibakar Roy Chowdhury[2] （1. Indian Institute of Technology, Delhi (India), 2. Mahindra university, Hydrabad (India)）

3:45 PM - 4:00 PM

3:30 PM - 3:45 PM (Tue. Aug 2, 2022 3:30 PM - 4:00 PM Small Hall)

[CTuP16F-01] A switchable THz filter by integrating an H-shaped metamaterial and ultra-small MEMS switches [Presentation Style] Onsite

*Ying Huang[1], Taiyu Okatani[1], Yoshiaki Kanamori[1] (1. Tohoku University (Japan))

[Presentation Style] Onsite

We proposed ultra-fast switchable terahertz (THz) filters consisting of a metamaterial with ultra-small MEMS switches and fabricated static on- and off-state-filters offering a 55%-transmittance-difference at 0.61 THz. A 0.9 MHz-tuning-speed is expected.

3:45 PM - 4:00 PM (Tue. Aug 2, 2022 3:30 PM - 4:00 PM Small Hall)

[CTuP16F-02] Minimizing radiative losses via interaction of Dark states in terahertz metamaterials [Presentation Style] Online

*Sukhvinder Kaur[1], Subhajit Karmakar[1], Arun Jana[2], Ravendra K. Varshney[1], Dibakar Roy Chowdhury[2] (1. Indian Institute of Technology, Delhi (India), 2. Mahindra university, Hydrabad (India))

[Presentation Style] Online

We have demonstrated the coupling of dark resonant states in metamaterial array consisting of two mirrored asymmetric dual gap split-ring resonators (ASRRs). Coupling of these dark states results in hybridized states with high-quality factors.

1. Photonics in the fight against COVID-19

Session Chair: Eiichi Tamiya (AIST and Osaka Univ.)

Tue. Aug 2, 2022 6:00 PM - 8:00 PM Small Hall (2F)

[CTuW1-01] Overview of COVID-19

[Presentation Style] Onsite

*Eiichi Tamiya[1] （1. AIST/Osaka University (Japan)）

6:00 PM - 6:30 PM

[CTuW1-02] Sensitive Detection of Marker Proteins by the Enhanced Fluorescence Technique with a Plasmonic Chip

[Presentation Style] Onsite

*Keiko Tawa[1] （1. Kwansei Gakuin Univ. (Japan)）

6:30 PM - 7:00 PM

[CTuW1-03] Virus inactivation using ultraviolet LEDs

[Presentation Style] Onsite

*Kentaro Nagamatsu[1] （1. Tokushima Univ. (Japan)）

7:00 PM - 7:30 PM

[CTuW1-04] Non-Contact Aerial Interfaces

[Presentation Style] Onsite

*Hirotsugu Yamamoto[1] （1. Utsunomiya Univ. (Japan)）

7:30 PM - 8:00 PM

6:00 PM - 6:30 PM (Tue. Aug 2, 2022 6:00 PM - 8:00 PM Small Hall)

[CTuW1-01] Overview of COVID-19

[Presentation Style] Onsite

*Eiichi Tamiya[1] (1. AIST/Osaka University (Japan))

[Presentation Style] Onsite

The pandemic caused by the new coronavirus began in 2019 and was named COVID-19; unlike the pandemic of 100 years ago, humans have been able to rapidly identify this virus, establish diagnostic methods from infection to disease onset, and try to prevent the spread of infection. Photonics has been contributed extremely much to them. An overview for basic understanding of COVID-19 was presented here.

6:30 PM - 7:00 PM (Tue. Aug 2, 2022 6:00 PM - 8:00 PM Small Hall)

[CTuW1-02] Sensitive Detection of Marker Proteins by the Enhanced Fluorescence Technique with a Plasmonic Chip

[Presentation Style] Onsite

*Keiko Tawa[1] (1. Kwansei Gakuin Univ. (Japan))

[Presentation Style] Onsite

A plasmonic chip with a wavelength-size periodic pattern coated with silver film can provide the enhanced electric field under the resonance condition and it can be applied to the sensitive fluorescence detection.

7:00 PM - 7:30 PM (Tue. Aug 2, 2022 6:00 PM - 8:00 PM Small Hall)

[CTuW1-03] Virus inactivation using ultraviolet LEDs

[Presentation Style] Onsite

*Kentaro Nagamatsu[1] (1. Tokushima Univ. (Japan))

[Presentation Style] Onsite

Virus inactivation technology is attracting much attention to realize mitigation of the spread of COVID-19. There are many approaches for virus inactivation. One of the effective methods well known is directly damaging their RNAs by ultraviolet (UV) light emitting diodes (LED). However, the quantum efficiency in the UV-LED is much lower than that of the visible LEDs. So, a large cooling system is required owing to maintain irradiation because LED generates heat. In this report, the present situation of UV-LED characteristic such as the wavelength, quantum efficiency, and lifetime in LED are shown. Moreover, the virus inactivation effect by the UV-LED with including COVID-19 is explained. Finally, we introduce the recent study in UV-LEDs becoming the common in virus inactivation.

7:30 PM - 8:00 PM (Tue. Aug 2, 2022 6:00 PM - 8:00 PM Small Hall)

[CTuW1-04] Non-Contact Aerial Interfaces

[Presentation Style] Onsite

*Hirotsugu Yamamoto[1] （1. Utsunomiya Univ. (Japan)）

[Presentation Style] Onsite

Non-contact interfaces are expected to be immune to infectious diseases. Aerial display with 3D sensing enables us directly to handle information without physical touch. This paper reviews recent developments and future prospects of aerial display.

3. State-of-the-Art to Next-Era LiDAR Technologies

Session Chairs: Toshihiko Baba (Yokohama National Univ.), Nobuhiko Nishiyama (Tokyo Tech)
Tue. Aug 2, 2022 6:00 PM - 8:45 PM Conference Hall (Oval Room) (1F)

[OP(W2)] Opening Remark
6:00 PM - 6:05 PM

[CTuW2-01] Optical Semiconductor Devices for LiDAR
[Presentation Style] Onsite
*Kazuaki Maekita[1], Mitsuhito Mase[1] (1. Hamamatsu Photonics K. K. (Japan))
6:05 PM - 6:30 PM

[CTuW2-02] Solid State VCSEL Beam Scanners for 3D Sensing
[Presentation Style] Online
*Fumio Koyama[1] (1. Tokyo Institute of Technology (Japan))
6:30 PM - 6:55 PM

[CTuW2-03] Progress of photonic-crystal surface-emitting lasers for LiDAR applications
[Presentation Style] Online
*Susumu Noda[1], Menaka De Zoysa[1], Masahiro Yoshida[1], Kenji Ishizaki[1], Takuya Inoue[1], Ryoichi Sakata[1] (1. Kyoto University (Japan))
6:55 PM - 7:20 PM

[CTuW2-04] FMCW LiDAR Chip with SLG Beam Scanner
[Presentation Style] Onsite
*Toshihiko Baba[1], Takemasa Tamanuki[1], Hiroyuki Ito[1], Mikiya Kamata[1], Ryo Tetsuya[1], Saneyuki Suyama[1], Hiroshi Abe[1], Ryo Kurahashi[1] (1. Yokohama National University (Japan))
7:20 PM - 7:45 PM

[CTuW2-05] Photonic Integrated Circuits for LiDAR: Solid-State 2D Beamsteering
[Presentation Style] Onsite
*Marcus S. Dahlem[1], Mathias Prost[1], Sarvagya Dwivedi[1], Jon Ø. Kjellman[1], Bruno Figeys[1], Tangla D. Kongnyuy[1], Aleksandrs Marinins[1], Sandeep S. Saseendran[1], Philippe Soussan[1], Xavier Rottenberg[1], Roelof Jansen[1], Wim Bogaerts[2] (1. IMEC (Belgium), 2. Ghent Univ. - IMEC (Belgium))
7:45 PM - 8:15 PM

[CTuW2-06] Silicon Photonic LiDAR Based on MEMS Focal Plane Switch Array
[Presentation Style] Online
*Ming C. Wu[1] (1. UC Berkeley (United States of America))
8:15 PM - 8:45 PM

6:00 PM - 6:05 PM (Tue. Aug 2, 2022 6:00 PM - 8:45 PM Conference Hall (Oval Room))

[OP(W2)] Opening Remark

6:05 PM - 6:30 PM (Tue. Aug 2, 2022 6:00 PM - 8:45 PM Conference Hall (Oval Room))

[CTuW2-01] Optical Semiconductor Devices for LiDAR [Presentation Style] Onsite

*Kazuaki Maekita[1], Mitsuhito Mase[1] (1. Hamamatsu Photonics K. K. (Japan))

[Presentation Style] Onsite

We have been offering many types of optical semiconductor devices for LiDAR. In this presentation, our products required in the various LiDAR application are explained.

6:30 PM - 6:55 PM (Tue. Aug 2, 2022 6:00 PM - 8:45 PM Conference Hall (Oval Room))

[CTuW2-02] Solid State VCSEL Beam Scanners for 3D Sensing [Presentation Style] Online

*Fumio Koyama[1] (1. Tokyo Institute of Technology (Japan))

[Presentation Style] Online

We review our recent activities on solid-state 1D and 2D VCSEL beam scanners for 3D sensing, exhibiting high resolutions of 1,400 and 33,000, respectively. We show the time-of-flight 3D real-time sensing over 60m distance.

6:55 PM - 7:20 PM (Tue. Aug 2, 2022 6:00 PM - 8:45 PM Conference Hall (Oval Room))

[CTuW2-03] Progress of photonic-crystal surface-emitting lasers for LiDAR applications [Presentation Style] Online

*Susumu Noda[1], Menaka De Zoysa[1], Masahiro Yoshida[1], Kenji Ishizaki[1], Takuya Inoue[1], Ryoichi Sakata[1] (1. Kyoto University (Japan))

[Presentation Style] Online

Recent progresses of photonic-crystal surface-emitting lasers (PCSELs) are described, particularly based on recently developed photonic crystals, so called “double lattice photonic crystals” and “dually modulated photonic crystals”. Their applications to LiDAR systems are also discussed.

7:20 PM - 7:45 PM (Tue. Aug 2, 2022 6:00 PM - 8:45 PM Conference Hall (Oval Room))

[CTuW2-04] FMCW LiDAR Chip with SLG Beam Scanner

[Presentation Style] Onsite

*Toshihiko Baba[1], Takemasa Tamanuki[1], Hiroyuki Ito[1], Mikiya Kamata[1], Ryo Tetsuya[1], Saneyuki Suyama[1], Hiroshi Abe[1], Ryo Kurahashi[1] （1. Yokohama National University (Japan)）

[Presentation Style] Onsite

Si photonics slow-light grating based on photonic crystal waveguides allows electrically driven completely nonmechanical beam scanning. We have incorporated it in a fully integrated FMCW LiDAR chip and obtained its real time operation.

7:45 PM - 8:15 PM (Tue. Aug 2, 2022 6:00 PM - 8:45 PM Conference Hall (Oval Room))

[CTuW2-05] Photonic Integrated Circuits for LiDAR: Solid-State 2D Beamsteering

[Presentation Style] Onsite

*Marcus S. Dahlem[1], Mathias Prost[1], Sarvagya Dwivedi[1], Jon Ø. Kjellman[1], Bruno Figeys[1], Tangla D. Kongnyuy[1], Aleksandrs Marinins[1], Sandeep S. Saseendran[1], Philippe Soussan[1], Xavier Rottenberg[1], Roelof Jansen[1], Wim Bogaerts[2] （1. IMEC (Belgium), 2. Ghent Univ. - IMEC (Belgium)）

[Presentation Style] Onsite

In this work, we summarize our recent advances in 2D beamsteering using optical phased arrays operating in NIR and SWIR wavelengths, covering different architectures and steering techniques based on active phase shifting and wavelength tuning.

8:15 PM - 8:45 PM (Tue. Aug 2, 2022 6:00 PM - 8:45 PM Conference Hall (Oval Room))

[CTuW2-06] Silicon Photonic LiDAR Based on MEMS Focal Plane Switch Array

[Presentation Style] Online

*Ming C. Wu[1] （1. UC Berkeley (United States of America)）

[Presentation Style] Online

Solid-state LiDARs with no mechanical moving parts and fully integrable on a chip have received a great deal of attention. This talk will discuss silicon photonic LiDARs with focal plane MEMS switch array.

Poster Session | CLEO-PR2022 | Poster Session

C4. High Power, High Energy Lasers

Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTu4-01] Investigation on power scalability of Yb:KREW thin-disk lasers by anisotropic thermo-mechanical analysis
[Presentation Style] Onsite

*Shotaro Kitajima[1], Norihiko Nishizawa[1] (1. Nagoya University (Japan))

[P-CTu4-02] All-Fiber High-Power Chirped Pulse Amplification System at 1.03 μm
[Presentation Style] Online

*Tao Wang[1], Can Li[1], Bo Ren[1], Kun Guo[1], Pu Zhou[1] (1. National University of Defense Technology (China))

[P-CTu4-03] Narrow Linewidth Cr:forsterite Master-Oscillator Power-Amplifier Laser System with Output Energy >45 mJ

*Lyubomir I. Stoychev[1], Marco Baruzzo[2,3], Jose J. Suárez-Vargas[2,3], Humberto Cabrera[2,4], Ivaylo P. Nikolov[5], Alexander A. Demidovich[5], Miltcho B. Danailov[5], Andrea Vacchi[2,3] (1. ISSP, BAS (Bulgaria), 2. INFN Triest (Italy), 3. Univ. Udine (Italy), 4. ICTP, Triest (Italy), 5. Elettra-Sincotrone (Italy))

[P-CTu4-04] Superachromatic Reflective Phase Retarder for the Polarization Conversion of Attosecond Pulses
[Presentation Style] Onsite

*Keisuke Sakata[1], Taro Sekikawa[1], Kengo Ito[1] (1. Hokkaido Univ. (Japan))

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu4-01] Investigation on power scalability of Yb:KREW thin-disk lasers by anisotropic thermo-mechanical analysis

[Presentation Style] Onsite

*Shotaro Kitajima[1], Norihiko Nishizawa[1] （1. Nagoya University (Japan)）

[Presentation Style] Onsite

Thermally induced OPD of the thin-disk laser with anisotropic Yb:KRE$(WO_4)_2$ crystal, which is promising broadband gain media, was calculated. The results show that the OPD is sufficiently small even at 9.6 kW/cm^2 pumping.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu4-02] All-Fiber High-Power Chirped Pulse Amplification System at 1.03 μ m

[Presentation Style] Online

*Tao Wang[1], Can Li[1], Bo Ren[1], Kun Guo[1], Pu Zhou[1] （1. National University of Defense Technology (China)）

[Presentation Style] Online

A high-power all-fiber chirped pulse amplification system is experimentally demonstrated. The average power is scaled up to 536.3 W. The pulse duration is compressed to 781 fs at the output power of 154 W.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu4-03] Narrow Linewidth Cr:forsterite Master-Oscillator Power-Amplifier Laser System with Output Energy >45 mJ

*Lyubomir I. Stoychev[1], Marco Baruzzo[2,3], Jose J. Suárez-Vargas[2,3], Humberto Cabrera[2,4], Ivaylo P. Nikolov[5], Alexander A. Demidovich[5], Miltcho B. Danailov[5], Andrea Vacchi[2,3] （1. ISSP, BAS (Bulgaria), 2. INFN Triest (Italy), 3. Univ. Udine (Italy), 4. ICTP, Triest (Italy), 5. Elettra-Sincotrone (Italy)）

A master-oscillator power-amplifier Cr:forsterite laser is presented with narrow linewidth of only 0.5 pm (95 MHz), beam quality factor Mx2=1.94, My2=1.70, an output energy of 45 mJ and quantum efficiency of 10.5%.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu4-04] Superachromatic Reflective Phase Retarder for the Polarization Conversion of Attosecond Pulses

[Presentation Style] Onsite

*Keisuke Sakata[1], Taro Sekikawa[1], Kengo Ito[1] （1. Hokkaido Univ. (Japan)）

[Presentation Style] Onsite

A reflective superachromatic phase retarder for extreme ultraviolet attosecond pulses was developed using SiC mirrors. The phase retardation at 28.0 eV is 90˚ with a deviation less than $\pm\lambda/50$ for a bandwidth of 3.1 eV.

Poster Session | CLEO-PR2022 | Poster Session

C8. Micro and Nanophotonics, and Light Localization Effects

Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTu8-01] Dark-pulse Microcombs in Integrated Chalcogenide Microresonators
[Presentation Style] Online
*Di Xia[1], Jiayue Wu[1], Zifu Wang[1], Yufei Li[1], Jiaxin Zhao[1], Liyang Luo[1], Dong Liu[1], Shuixian Yang[1], Bin Zhang[1], Zhaohui Li[1] (1. Sun Yat-sen university (China))

[P-CTu8-02] Milliwatt-threshold widely-tunable optical parametric oscillation in integrated chalcogenide microresonators
[Presentation Style] Online
*Zifu Wang[1], Jiaxin Zhao[1], Di Xia[1], Yufei Li[1], Liyang luo[1], Dong Liu[1], Bin Zhang[1], Zhaohui Li[1] (1. Sun Yat-sen Univ. (China))

[P-CTu8-03] Photonic Crystal-Based Higher Order Mode Pass Filter
[Presentation Style] Online
*Omnia Nawwar[1], Naoya Kuse[1,2] (1. Tokushima Univ. (Japan), 2. PRESTO (Japan))

[P-CTu8-04] Silicon photonic crystal slow-light waveguide in a lattice-shifted perturbed kagome lattice
[Presentation Style] Onsite
*Deji Li[1], Kiyoto Takahata[1] (1. Waseda Univ. (Japan))

[P-CTu8-05] Enhance Photoluminescence of MoS_2 by SiN_x Photonic Crystal Resonators
[Presentation Style] Online
*Tsan-Wen Lu[1], Huan-Yueh Chu[1], Shih-Yen Lin[2], Po-Tsung Lee[1] (1. National Yang Ming Chiao Tung University (Taiwan), 2. Academia Sinica (Taiwan))

[P-CTu8-06] Polarization Characteristics of Polaritonic BCS in $CsPbBr_3$ Microcavity
[Presentation Style] Onsite
*Yuta Moriyama[1], Yusuke Ueda[1], Tsukasa Hirao[1], Tomoya Tagami[1], Shun Takahashi[1], Kenichi Yamashita[1] (1. Kyoto Inst. of Tech. (Japan))

[P-CTu8-07] Plasmonic Ring Resonator Glucose Sensor with Reduced Full width at Half Maximum
[Presentation Style] Online
*Soumya Kumari[1], Yogesh Kumar Verma[1], Saurabh Mani Tripathi[1] (1. Indian Institute of Technology Kanpur (India))

[P-CTu8-08] Highly sensitive microdisk-laser sensor with meta-air-hole patterns
[Presentation Style] Onsite
*Haerin Jeong[1], Myung-Ki Kim[1] (1. Korea University (Korea))

[P-CTu8-09] MXene (Ti3C2TX) Surface Plasmon Resonance (SPR) in the Short-Wave Infrared (SWIR) wavelength
[Presentation Style] Online
*Han-na Kim[1], Da In Song[1], Young-Ho Jin[1], Changhoon Park[1], Chong Min Koo[2], Myung-Ki Kim[1] (1. Korea University (Korea), 2. KIST (Korea))

[P-CTu8-10] Microbubbles photothermally induced on sub-wavelength $FeSi_2$ discs
[Presentation Style] Onsite
*Kyoko Namura[1], Ayaka Hara[1], Motofumi Suzuki[1] (1. Kyoto Univ. (Japan))

[P-CTu8-11] Single Droplet Formation in the Ionic Liquid/Water Mixture by Optical Tweezers
[Presentation Style] Onsite
*Maho Tanaka[1], Yasuyuki Tsuboi[1], Ken-ichi Yuyama[1] （1. Osaka City University (Japan)）

[P-CTu8-12] Optical manipulation of nanoparticles in tapered capillaries: application to the optical sorting of nanodiamonds
[Presentation Style] Onsite
*Christophe Pin[1], O Suzuki[1], Keiji Sasaki[1] （1. Hokkaido Univ. (Japan)）

[P-CTu8-13] "Sensing Kinetics of Ice Recrystallization through Plasmonic Nanoantennas"
[Presentation Style] Onsite
*Nu-Ri Park[1], Yedam Lee[2], Han-Na Kim[1], Sang Yup Lee[1], Dong June Ahn[1,2], Myung-Ki Kim[1] （1. KU-KIST Graduate School of Converging Sci. and Tech., Korea Univ. (Korea), 2. Department of Chemical and Biological Eng., Korea Univ. (Korea)）

[P-CTu8-14] Quest for chiral nanogap structures using topology optimization
[Presentation Style] Onsite
*Yamato Fukui[1], Atsushi Taguchi[1], Keiji Sasaki[1] （1. Hokkaido Univ. (Japan)）

[P-CTu8-15] Multifunctional Reflective Metalens in Broadband Visible Light Band
[Presentation Style] Online
*Aran Yu[1], Da In Song[1], Moohyuk Kim[1], Myung-Ki Kim[1] （1. Korea University (Korea)）

[P-CTu8-16] Simple &precisely printed metasurface on fiber apex
[Presentation Style] Onsite
*Moohyuk Kim[1], Nu-Ri Park[1], Aran Yu[1], Myung-Ki Kim[1] （1. Korea Univ. (Korea)）

[P-CTu8-17] Design and Optimization of Epsilon-Near-Zero Multilayer Structures with Broadband Absorption Performance
[Presentation Style] Online
*Yuqing Wang[1], Jiaye Wu[1], Chenxingyu Huang[1], Ze Tao Xie[1], H. Y. Fu[2], Qian Li[1] （1. Peking Univ. (China), 2. Tsinghua Univ. (China)）

[P-CTu8-18] Organic VCSEL Lattice Fabricated by Nanoimprint Lithography
[Presentation Style] Onsite
*Yuji Adachi[1], Tsukasa Hirao[1], Takuya Enna[1], Takaya Inukai[1], Shun Takahashi[1], Kenichi Yamashita[1] （1. Kyoto Inst. of Tech. (Japan)）

[P-CTu8-19] Fabrication of Lead-Halide Perovskite Film with Two-Dimensional Photonic Lattice
[Presentation Style] Onsite
*Junki Morishita[1], Yuji Adachi[1], Takuya Enna[1], Shun Takahashi[1], Yohei Yamamoto[2], Kenichi Yamashita[1] （1. Kyoto Inst. of Tech. (Japan), 2. Univ. of Tsukuba (Japan)）

[P-CTu8-20] Surface-doped ZnO/Ag/ZnO mesh electrodes for flexible OLEDs with superb efficiency
*Ho Jin Lee[1], Wanqi Ren[1], Na Hyun Kim[1], Hwi Geun Kim[1], Kang Ting[1], Tae Geun Kim[1] （1. Korea University (Korea)）

[P-CTu8-21] III-V gain-block implanted continuous-wave hybrid silicon nanolaser with enhanced heat dissipation
[Presentation Style] Onsite
*Byoung Jun Park[1], Min-Woo Kim[2], Kyoung-Tae Park[2], You-Shin No[1,2], Myung-Ki Kim[1] （1.

Korea Univ. (Korea), 2. Konkuk Univ (Korea))

[P-CTu8-22] Design of a quantum-dot single-photon source on a silicon nitride waveguide for efficient and indistinguishable photon generation
[Presentation Style] Onsite

*Natthajuks Pholsen[1,2], Yasutomo Ota[3,4], Ryota Katsumi[1,2], Yasuhiko Arakawa[4], Satoshi Iwamoto[1,2,4] (1. Res. Center for Advanced Sci. and Tech., The Univ. of Tokyo (Japan), 2. Inst. of Indus. Sci., The Univ. of Tokyo (Japan), 3. Department of Applied Physics and Physio-Informatics, Keio Univ. (Japan), 4. Inst. for Nano Quantum Info. Electronics, The Univ. of Tokyo (Japan))

[P-CTu8-23] Electromagnetic Shielding of Electrically-Insulating Ionic Solution
[Presentation Style] Onsite

*Jisung Kwon[1], Junpyo Hong[2], Aamir Iqubal[2], Chong Min Koo[2], Myung-Ki Kim [1] (1. Korea Univ. (Korea), 2. Korea Inst. of Sci. and Tech. (Korea))

[P-CTu8-24] Sidelobe-Suppressed Bessel Beam using Hologram
[Presentation Style] Onsite

*Jerin Geogy George[1], Yerragadda Guruvaiah[1], Shanti Bhattacharya[1] (1. IIT Madras (India))

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-01] Dark-pulse Microcombs in Integrated Chalcogenide Microresonators
[Presentation Style] Online

*Di Xia[1], Jiayue Wu[1], Zifu Wang[1], Yufei Li[1], Jiaxin Zhao[1], Liyang Luo[1], Dong Liu[1], Shuixian Yang[1], Bin Zhang[1], Zhaohui Li[1] (1. Sun Yat-sen university (China))

[Presentation Style] Online

We demonstrate dark-pulse microcombs generated in an integrated GeSbS microresonator with low pumping power of the ten-milliwatt level. Benefiting from both the high Q-factor and nonlinearity of the microresonator, high-efficiency microcombs are achieved.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-02] Milliwatt-threshold widely-tunable optical parametric oscillation in integrated chalcogenide microresonators
[Presentation Style] Online

*Zifu Wang[1], Jiaxin Zhao[1], Di Xia[1], Yufei Li[1], Liyang luo[1], Dong Liu[1], Bin Zhang[1], Zhaohui Li[1] (1. Sun Yat-sen Univ. (China))

[Presentation Style] Online

We demonstrate a widely-tunable optical parametric oscillation ranging from 1254 nm to 2088 nm in integrated chalcogenide microresonators with 1.2 milliwatt pump power threshold.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-03] Photonic Crystal-Based Higher Order Mode Pass Filter
[Presentation Style] Online

*Omnia Nawwar[1], Naoya Kuse[1,2] (1. Tokushima Univ. (Japan), 2. PRESTO (Japan))

[Presentation Style] Online

We propose a higher-order-mode pass filter with the simulated insertion loss of <1 dB and extinction ratio of >25 dB, which consists of a 1D photonic crystal with periodic elliptical holes.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-04] Silicon photonic crystal slow-light waveguide in a lattice-shifted perturbed kagome lattice
[Presentation Style] Onsite

*Deji Li[1], Kiyoto Takahata[1] (1. Waseda Univ. (Japan))

[Presentation Style] Onsite

Si photonic crystal slow-light waveguide with lattice-shifted structure in the perturbed kagome lattice is proposed. A group index of 60 with low-dispersion bandwidth of 5.5 nm is achieved with numerical calculation.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-05] Enhance Photoluminescence of MoS_2 by SiN_x Photonic Crystal Resonators

[Presentation Style] Online

*Tsan-Wen Lu[1], Huan-Yueh Chu[1], Shih-Yen Lin[2], Po-Tsung Lee[1] (1. National Yang Ming Chiao Tung University (Taiwan), 2. Academia Sinica (Taiwan))

[Presentation Style] Online

We study and realize different integrations between monolayer MoS_2 and SiN_x photonic crystal resonators. These integrations can produce the narrow and broadband photo-luminescence enhancements of MoS_2 by the band-edge and high *Q* cavity mode inside.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-06] Polarization Characteristics of Polaritonic BCS in $CsPbBr_3$ Microcavity

[Presentation Style] Onsite

*Yuta Moriyama[1], Yusuke Ueda[1], Tsukasa Hirao[1], Tomoya Tagami[1], Shun Takahashi[1], Kenichi Yamashita[1] (1. Kyoto Inst. of Tech. (Japan))

[Presentation Style] Onsite

We investigate the polarization state of BCS polariton condensates of a CsPbBr3 microcavity prepared by solution process. At the above-threshold excitation density, we observed condensation switching phenomenon between the two polarized polariton modes.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-07] Plasmonic Ring Resonator Glucose Sensor with Reduced Full width at Half Maximum

[Presentation Style] Online

*Soumya Kumari[1], Yogesh Kumar Verma[1], Saurabh Mani Tripathi[1] (1. Indian Institute of Technology Kanpur (India))

[Presentation Style] Online

A metal-insulator-metal ring resonator is reported for glucose sensing. Introduction of Si dielectric material in input bus-waveguide decreased FWHM to ~27 nm. Simulated average glucose sensitivity and figure-of-merit are 0.17 nm.L/g and 0.0063 L/g, respectively.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-08] Highly sensitive microdisk-laser sensor with meta-air-hole patterns

[Presentation Style] Onsite

*Haerin Jeong[1], Myung-Ki Kim[1] (1. Korea University (Korea))

[Presentation Style] Onsite

We demonstrate a microdisk-laser sensor with meta-air-hole patterns that improves the sensitivity by a factor of two to the external refractive-index compared to the unpatterned microdisk-laser when the volume ratio of meta-air-holes is 8%.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-09] MXene (Ti3C2TX) Surface Plasmon Resonance (SPR) in the Short-Wave Infrared (SWIR) wavelength

[Presentation Style] Online

*Han-na Kim[1], Da In Song[1], Young-Ho Jin[1], Changhoon Park[1], Chong Min Koo[2], Myung-Ki Kim[1] (1. Korea University (Korea), 2. KIST (Korea))

[Presentation Style] Online

MXene SPR, which is more sensitive than the conventional gold SPR at SWIR regime, is advantageous for measuring the refractive index of thin materials, was theoretically and experimentally confirmed.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-10] Microbubbles photothermally induced on sub-wavelength $FeSi_2$ discs

[Presentation Style] Onsite

*Kyoko Namura[1], Ayaka Hara[1], Motofumi Suzuki[1] (1. Kyoto Univ. (Japan))

[Presentation Style] Onsite

Photothermal conversion properties of $FeSi_2$ discs were used to generate water vapor microbubbles. The bubble size depended on the total heat generation because the disc size and the thermal diffusion length were comparable.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-11] Single Droplet Formation in the Ionic Liquid/Water Mixture by Optical Tweezers

[Presentation Style] Onsite

*Maho Tanaka[1], Yasuyuki Tsuboi[1], Ken-ichi Yuyama[1] （1. Osaka City University (Japan)）

[Presentation Style] Onsite

We demonstrate the formation of a single core-shell droplet by focusing a near-infrared laser beam into a ionic liquid/water mixture. The droplet was characterized by means of fluorescence imaging and Raman spectroscopic analysis.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-12] Optical manipulation of nanoparticles in tapered capillaries: application to the optical sorting of nanodiamonds

[Presentation Style] Onsite

*Christophe Pin[1], O Suzuki[1], Keiji Sasaki[1] （1. Hokkaido Univ. (Japan)）

[Presentation Style] Onsite

Liquid-filled tapered glass capillaries with few square-micrometer-large cross-sections are fabricated and used to enhance light-matter interactions between a guided laser beam and dispersed nanoparticles. Optical manipulation and sorting of nanodiamonds is demonstrated.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-13] "Sensing Kinetics of Ice Recrystallization through Plasmonic Nanoantennas"

[Presentation Style] Onsite

*Nu-Ri Park[1], Yedam Lee[2], Han-Na Kim[1], Sang Yup Lee[1], Dong June Ahn[1,2], Myung-Ki Kim[1] （1. KU-KIST Graduate School of Converging Sci. and Tech., Korea Univ. (Korea), 2. Department of Chemical and Biological Eng., Korea Univ. (Korea)）

[Presentation Style] Onsite

We directly observed the ice recrystallization in real-time within a space of tens of nanometers using plasmonic nanoantennas. At the same time, we were able to elucidate the mechanism of inhibition of ice recrystallization.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-14] Quest for chiral nanogap structures using topology optimization

[Presentation Style] Onsite

*Yamato Fukui[1], Atsushi Taguchi[1], Keiji Sasaki[1] (1. Hokkaido Univ. (Japan))
[Presentation Style] Onsite
Nanogap structures, widely used in the field of nanophotonics, are usually achiral, which have mirror image symmetry. We designed chiral nano-gap structures having selectivity against the handedness of circularly polarized light.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-15] Multifunctional Reflective Metalens in Broadband Visible Light Band
[Presentation Style] Online

*Aran Yu[1], Da In Song[1], Moohyuk Kim[1], Myung-Ki Kim[1] (1. Korea University (Korea))
[Presentation Style] Online
We demonstrate reflective metalens using silver and PMMA patterned nanoholes and experimentally confirmed that broadband metalenses efficiently focus with each focal length in the RGB wavelength. We expect compact-optics and meta-filter by combining those.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-16] Simple &precisely printed metasurface on fiber apex
[Presentation Style] Onsite

*Moohyuk Kim[1], Nu-Ri Park[1], Aran Yu[1], Myung-Ki Kim[1] (1. Korea Univ. (Korea))
[Presentation Style] Onsite
We demonstrate a simple yet efficient fabrication technique for integration of metasurface and optical fiber using nanohole patterned PMMA metasurface. We experimentally confirmed that the metasurface-integrated optical fiber can effectively control the wavefront.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-17] Design and Optimization of Epsilon-Near-Zero Multilayer Structures with Broadband Absorption Performance
[Presentation Style] Online

*Yuqing Wang[1], Jiaye Wu[1], Chenxingyu Huang[1], Ze Tao Xie[1], H. Y. Fu[2], Qian Li[1] (1. Peking Univ. (China), 2. Tsinghua Univ. (China))
[Presentation Style] Online
The absorption bandwidth of the AZO-TiO_2 structure is optimized from 483 nm to 628 nm by a modified genetic algorithm. This optimization is appropriate for both normally incident plane waves and obliquely incident polarized waves.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-18] Organic VCSEL Lattice Fabricated by Nanoimprint Lithography

[Presentation Style] Onsite

*Yuji Adachi[1], Tsukasa Hirao[1], Takuya Enna[1], Takaya Inukai[1], Shun Takahashi[1], Kenichi Yamashita[1] (1. Kyoto Inst. of Tech. (Japan))

[Presentation Style] Onsite

We examined a UV-nanoimprint technique as an accessible method to fabricate polariton lattices, and evaluated their luminescence properties. We observed the mode dispersion curves implying the polariton modes localized in the polariton lattice trap.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-19] Fabrication of Lead-Halide Perovskite Film with Two-Dimensional Photonic Lattice

[Presentation Style] Onsite

*Junki Morishita[1], Yuji Adachi[1], Takuya Enna[1], Shun Takahashi[1], Yohei Yamamoto[2], Kenichi Yamashita[1] (1. Kyoto Inst. of Tech. (Japan), 2. Univ. of Tsukuba (Japan))

[Presentation Style] Onsite

We aimed to fabricate lead-halogen perovskite microcavities with two-dimensional photonic lattices using simple UV nanoimprinting technique. Consequently, we can confirm that the perovskite crystals were fabricated periodically, and the two-dimensional lattice structure was successfully fabricated.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-20] Surface-doped ZnO/Ag/ZnO mesh electrodes for flexible OLEDs with superb efficiency

*Ho Jin Lee[1], Wanqi Ren[1], Na Hyun Kim[1], Hwi Geun Kim[1], Kang Ting[1], Tae Geun Kim[1] (1. Korea University (Korea))

Despite great progress in flexible and transparent electrodes, the efficiency of organic light-emitting diodes (OLEDs) is still low under mechanical deformation. Herein, high-efficiency TADF-based blue flexible OLEDs are demonstrated using surface-doped ZnO/Ag/ZnO mesh electrodes.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-21] III-V gain-block implanted continuous-wave hybrid silicon nanolaser with enhanced heat dissipation

[Presentation Style] Onsite

*Byoung Jun Park[1], Min-Woo Kim[2], Kyoung-Tae Park[2], You-Shin No[1,2], Myung-Ki Kim[1] (1. Korea Univ. (Korea), 2. Konkuk Univ (Korea))
[Presentation Style] Onsite
We demonstrate a silicon nanolaser operated as a continuous-wave at room temperature with very low threshold power through direct and efficient integration of a silicon photonic crystal nanocavity and a judiciously designed III-V gain block.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-22] Design of a quantum-dot single-photon source on a silicon nitride waveguide for efficient and indistinguishable photon generation
[Presentation Style] Onsite

*Natthajuks Pholsen[1,2], Yasutomo Ota[3,4], Ryota Katsumi[1,2], Yasuhiko Arakawa[4], Satoshi Iwamoto[1,2,4] (1. Res. Center for Advanced Sci. and Tech., The Univ. of Tokyo (Japan), 2. Inst. of Indus. Sci., The Univ. of Tokyo (Japan), 3. Department of Applied Physics and Physio-Informatics, Keio Univ. (Japan), 4. Inst. for Nano Quantum Info. Electronics, The Univ. of Tokyo (Japan))
[Presentation Style] Onsite
We design quantum-dot single-photon sources based on a defect-based photonic crystal cavity on a SiN waveguide with >90% efficiency. The defect region secures distance between etched airholes and quantum dots, expected to improve photon indistinguishability.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-23] Electromagnetic Shielding of Electrically-Insulating Ionic Solution
[Presentation Style] Onsite

*Jisung Kwon[1], Junpyo Hong[2], Aamir Iqubal[2], Chong Min Koo[2], Myung-Ki Kim[1] (1. Korea Univ. (Korea), 2. Korea Inst. of Sci. and Tech. (Korea))
[Presentation Style] Onsite
Electrically-insulative ionic solutions of KBr, NaCl, and $CaCl_2$ salts are employed as effective electromagnetic interference (EMI) shielding materials. Debye-Drude theoretical models is applied for illuminating the EMI shielding mechanism of ionic solution.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu8-24] Sidelobe-Suppressed Bessel Beam using Hologram
[Presentation Style] Onsite

*Jerin Geogy George[1], Yerragadda Guruvaiah[1], Shanti Bhattacharya[1] （1. IIT Madras (India)）
[Presentation Style] Onsite
We present the generation of a sidelobe suppressed Bessel beam (SBB) using a holographic technique. The peak intensity of the sidelobes of the generated SBB is about 70% less compared to a standard Bessel beam.

Poster Session | CLEO-PR2022 | Poster Session

C10. Optical Fiber and Waveguide Technologies

Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTu10-01] Development of yellow (575 nm) laser by single-mode double-clad structured Dy^{3+} -doped waterproof fluoro-aluminate glass fiber
[Presentation Style] Onsite

*Ayaka Koganei[1], Kenta Takahashi[1], Natsuho Nashimoto[1], Osamu Ishii[2], Masaaki Yamazaki[2], Yasushi Fujimoto[1] (1. Chiba Institute of Technology Univ. (Japan), 2. Sumita Optical Glass Inc. (Japan))

[P-CTu10-02] A Multimode Interference method for power combining and coupling tunable optical power in a single mode fiber
[Presentation Style] Onsite

*Kritarth Srivastava[1], Nitin Bhatia[1] (1. Indian Institute of Technology, Jodhpur (India))

[P-CTu10-03] Mode-Division (De)Multiplexing Combining Stark-Chirped Rapid-Adiabatic-Passage and Supersymmetry
[Presentation Style] Online

*David Viedma[1], Jordi Mompart[1], Verònica Ahufinger[1] (1. Universitat Autònoma de Barcelona (Spain))

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu10-01] Development of yellow (575 nm) laser by single-mode double-clad structured Dy^{3+} -doped waterproof fluoro-aluminate glass fiber
[Presentation Style] Onsite

*Ayaka Koganei[1], Kenta Takahashi[1], Natsuho Nashimoto[1], Osamu Ishii[2], Masaaki Yamazaki[2], Yasushi Fujimoto[1] (1. Chiba Institute of Technology Univ. (Japan), 2. Sumita Optical Glass Inc. (Japan))

[Presentation Style] Onsite

We have been developing a high-power, high-efficiency yellow laser using single-mode double-clad structured Dy^{3+}-doped waterproof fluoro-aluminate glass fiber. This technique will provide a solid-state yellow laser with compact and easy maintenance.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu10-02] A Multimode Interference method for power combining and coupling tunable optical power in a single mode fiber
[Presentation Style] Onsite

*Kritarth Srivastava[1], Nitin Bhatia[1] (1. Indian Institute of Technology, Jodhpur (India))

[Presentation Style] Onsite

We show that the input power of multiple launch fields in a square core multimode fiber can be combined, and continuously tuned to 0-6 dB of the input power by the phase control of inputs.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu10-03] Mode-Division (De)Multiplexing Combining Stark-Chirped Rapid-Adiabatic-Passage and Supersymmetry
[Presentation Style] Online

*David Viedma[1], Jordi Mompart[1], Verònica Ahufinger[1] (1. Universitat Autònoma de Barcelona (Spain))

[Presentation Style] Online

We achieve efficient (de)multiplexing for two multimode waveguides by combining Stark-Chirped Rapid-Adiabatic-Passage and Supersymmetry. The method allows to pump the excited modes of waveguides and can be extended to higher order systems.

Poster Session | CLEO-PR2022 | Poster Session

C12. Silicon Photonics

Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTu12-01] A Silicon Thermo-optic Switch With Sub-10 mW Switching Power And Sub-10 μ s Switching Time
[Presentation Style] Online

*Dongdong Lin[1], Binfeng Yun[1] (1. Southeast University (China))

[P-CTu12-02] High-Density Non-Hermitian Photonic Integrated Circuits
[Presentation Style] Online

*Yanxian Wei[1], Hailong Zhou[1], Yunhong Ding[2,3], Jianji Dong[1], Xinliang Zhang[1] (1. Huazhong university of science and technology (China), 2. Department of Photonics Engineering, Technical University of Denmark (Denmark), 3. SiPhotonIC ApS (Denmark))

[P-CTu12-03] A silicon micro-ring resonator with a curved directional coupler for wavelength-independent operation
[Presentation Style] Online

*Cheng-Hsuan Wu[1], Chih-Hsin Chen[1], Chin-Shih Huang[2], Hao-Chun Hsieh[2], Hung-Chun Pan[2], Yu-Fu Wu[2], Tai-Chi Yang[2], Yung-Jr Hung[1] (1. National Sun Yat-sen Univ. (Taiwan), 2. Wistron Corp. (Taiwan))

[P-CTu12-04] New Image Recognition Approach by Using Image Senser and Machine-Learning for Grating Coupler Alignment
[Presentation Style] Onsite

*Hongli Yu[1], Naoto Yoshimoto[1] (1. Chitose Institute of Science and Technology (Japan))

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu12-01] A Silicon Thermo-optic Switch With Sub-10 mW Switching Power And Sub-10 μ s Switching Time

[Presentation Style] Online

*Dongdong Lin[1], Binfeng Yun[1] (1. Southeast University (China))

[Presentation Style] Online

We demonstrated a spiral silicon waveguide optical switch with optimized pulse driving. The switching power and the switching time are 8.73 mW and 5 μs separately.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu12-02] High-Density Non-Hermitian Photonic Integrated Circuits

[Presentation Style] Online

*Yanxian Wei[1], Hailong Zhou[1], Yunhong Ding[2,3], Jianji Dong[1], Xinliang Zhang[1] (1. Huazhong university of science and technology (China), 2. Department of Photonics Engineering, Technical University of Denmark (Denmark), 3. SiPhotonIC ApS (Denmark))

[Presentation Style] Online

In this paper, we make use of the non-Hermitian system to construct high density integrated waveguide array. An extinct ratio of 15 dB is observed at a gap spacing of 400 nm.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu12-03] A silicon micro-ring resonator with a curved directional coupler for wavelength-independent operation

[Presentation Style] Online

*Cheng-Hsuan Wu[1], Chih-Hsin Chen[1], Chin-Shih Huang[2], Hao-Chun Hsieh[2], Hung-Chun Pan[2], Yu-Fu Wu[2], Tai-Chi Yang[2], Yung-Jr Hung[1] (1. National Sun Yat-sen Univ. (Taiwan), 2. Wistron Corp. (Taiwan))

[Presentation Style] Online

A asymmetric curved directional coupler (CDC) is designed to provide wavelength-independent response and arbitrary optical coupling ratio. The CDC-equipped micro-ring resonator enables an extinction ratio of 14±2 dB over the entire o-band wavelengths.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu12-04] New Image Recognition Approach by Using Image Senser and Machine-Learning for Grating Coupler Alignment

[Presentation Style] Onsite

*Hongli Yu[1], Naoto Yoshimoto[1] （1. Chitose Institute of Science and Technology (Japan)）
[Presentation Style] Onsite
New approach for grating coupler alignment. Hidden grating coupler is successfully visualized and alignment position prediction by using visible light, image sensor and machine learning. The accuracy of prediction is about 85% after machine learning.

C14. Advanced 2D and Nanocarbon Materials for Photonics and Energy

Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTu14-01] Graphene Thermal Emitters Directly Grown on Chips by Etching-Precipitation Method

[Presentation Style] Onsite

*YUI SHIMURA[1], Shinichiro Matano[1], Kenta Nakagawa[1], Suguru Noda[2], Hideyuki Maki[1,3]

(1. Keio Univ. (Japan), 2. Waseda Univ. (Japan), 3. Center for Spintronics Res. Network, Keio Univ. (Japan))

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu14-01] Graphene Thermal Emitters Directly Grown on Chips by Etching-Precipitation Method

[Presentation Style] Onsite

*YUI SHIMURA[1], Shinichiro Matano[1], Kenta Nakagawa[1], Suguru Noda[2], Hideyuki Maki[1,3] (1. Keio Univ. (Japan), 2. Waseda Univ. (Japan), 3. Center for Spintronics Res. Network, Keio Univ. (Japan))

[Presentation Style] Onsite

We have demonstrated a blackbody micro-emitter using etching-precipitation graphene that requires no transfer process. Long-lifetime and bright emission are achieved by using a bow-tie-shaped graphene. This graphene-based micro-emitter is expected to be applied to integrated photonics and optoelectronics.

Poster Session | CLEO-PR2022 | Poster Session

C17. Optical Sensors and Systems

Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTu17-01] Study of Displacement Measurement using Self-coupling Signal of Quantum Dot Laser

[Presentation Style] Onsite

*shunnnosuke Imai[1], Daiki Sato[1], Ryoya Iwamoto[1], Norio Tsuda[1], Jun Yamada[1] (1. Aichi Institute of Technology (Japan))

[P-CTu17-02] Mid-IR Fiber Optic Sensing System Based on Fluoride Fiber Waveguide

[Presentation Style] Onsite

*Kenji Goya[1], Yoshiaki Nishijima[2], Shigeki Tokita[3], Ryo Yasuhara[4], Hiyori Uehara[4] (1. Akita Prefectural Univ. (Japan), 2. Yokohama National Univ. (Japan), 3. Osaka Univ. (Japan), 4. National Inst. for Fusion Science (Japan))

[P-CTu17-03] Noise Reduction by Differential Detection for Mid-infrared Laser Spectroscopy

[Presentation Style] Onsite

*Kyosuke Nagasaka[1], Atsushi Sugiyama[1], Naota Akikusa[1], Tadataka Edamura[1] (1. Hamamatsu Photonics K.K. (Japan))

[P-CTu17-04] Compact active hyperspectral imager for short wave infrared wavelengths

*Teemu Kaariainen[1], Timo Donsberg[1] (1. VTT Technical Research Centre of Finland Ltd (Finland))

[P-CTu17-05] Temperature-insensitive measurement of refractive index using a no-core fiber-based modal interferometer

[Presentation Style] Online

*tae yoon Kim[1], Junha Jung[1], Geun Weon Lim[1], Ju Han Lee[1] (1. University Of Seoul (Korea))

[P-CTu17-07] Dual Evanescent Waves in a Single Resonance: Innovative Applications for Fano Resonance Biosensors

[Presentation Style] Onsite

*Shu-Cheng LO[1,2], Sheng-Hann Wang[1], Ting-Wei Chang[1], Kuang-Li Lee[1], Ruey-Lin Chern[2], Pei-Kuen Wei[1] (1. Research Center for Applied Sciences, Academia Sinica (Taiwan), 2. Institute of Applied Mechanics, National Taiwan University (Taiwan))

[P-CTu17-09] Near-infrared Phase-detection Auto-focusing with Plasmonic Nanostructures

[Presentation Style] Online

*God Eun Seok[1], Yunkyung Kim[1] (1. Dong-A Univ. (Korea))

[P-CTu17-10] A Terahertz Metasurface based Refractive Index Sensor

[Presentation Style] Online

*Aruna Gandhi M S[1], NAGARAJAN NALLUSAMY[2], Rahul Singhal[2], Qian Li[1] (1. School of Electronic and Computer Engineering, Peking Univ. (China), 2. Optical Communication Lab, Department of Electrical and Electronics Engineering, BITS Pilani (India))

[P-CTu17-11] Study on improving the real-time performance of Self-Coupled Distance and Velocity Sensor
[Presentation Style] Onsite
*Daiki Sato[1], Yuto Higuchi[1], Norio Tsuda[1], Jun Yamada[1] （1. Aichi Institute of Technology (Japan)）

[P-CTu17-12] Visualizing the dynamic damping phenomenon in the thermal lensing of crystals by a nanoscale optical ruler
[Presentation Style] Online
Shou-Tai Lin[1], Guan-Yu Zhuo[2,3], Hsien-Yi Wang[4], *Ming-Che Chan[5] （1. Department of Photonics, Feng Chia University (Taiwan), 2. Institute of New Drug Development, China Medical University (Taiwan), 3. Integrative Stem Cell Center, China Medical University Hospital (Taiwan), 4. Medical Research Center, Chimei Hospital (Taiwan), 5. College of Photonics, national Yang-Ming Chiao-Tung University (Taiwan)）

[P-CTu17-13] Reflected-Phase Measurement of Azimuth-Rotated Guided-Mode Resonance Device Using Pohl Interferometer
[Presentation Style] Online
Cheng-Tsung Chang[1], *Jaturon Tongpakpanang[1], Wen-Kai Kuo[1] （1. National Formosa University (Taiwan)）

[P-CTu17-14] Near-infrared Sensing with a Stacked Photodiode
[Presentation Style] Onsite
*Hyunjoon Sung[1], Yunkyung Kim[1] （1. Dong-A Univ. (Korea)）

[P-CTu17-15] Forming Aerial Grid Points with AIRR by Use of Faced Half Mirrors
[Presentation Style] Onsite
*Kohei Kishinami[1], Kazunari Chiba[1], Kengo Fujii[1], Masaki Yasugi[1], Shiro Suyama[1], Hirotsugu Yamamoto[1] （1. Utsunomiya Univ. (Japan)）

[P-CTu17-16] High Sensitive Pixel with Covered Microlens for Quad Color Filter Array
[Presentation Style] Onsite
*Jae-Hyeok Hwang[1], Yunkyung Kim[1] （1. Dong-A Univ. (Korea)）

[P-CTu17-17] A Study on Pulse Measurement of Self-Coupled Laser Terminal Voltage Type Sensor Using Suction Modulation Method
[Presentation Style] Onsite
*Yusuke Iwata[1], Daiki Sato[1], Yuto Higuchi[1], Norio Tsuda[1], Jun Yamada[1] （1. Aichi Institute of Technology (Japan)）

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-01] Study of Displacement Measurement using Self-coupling Signal of Quantum Dot Laser
[Presentation Style] Onsite

*shunnnosuke Imai[1], Daiki Sato[1], Ryoya Iwamoto[1], Norio Tsuda[1], Jun Yamada[1] (1. Aichi Institute of Technology (Japan))

[Presentation Style] Onsite

We conducted research on signal processing of displacement sensors using the self-coupling effect of quantum-dot lasers.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-02] Mid-IR Fiber Optic Sensing System Based on Fluoride Fiber Waveguide
[Presentation Style] Onsite

*Kenji Goya[1], Yoshiaki Nishijima[2], Shigeki Tokita[3], Ryo Yasuhara[4], Hiyori Uehara[4] (1. Akita Prefectural Univ. (Japan), 2. Yokohama National Univ. (Japan), 3. Osaka Univ. (Japan), 4. National Inst. for Fusion Science (Japan))

[Presentation Style] Onsite

A side-polished sensor structures were embedded in a fluoride glass fiber for mid-infrared (IR) fiber evanescent wave spectroscopy, produced by means of a mechanical polishing process. Spectroscopic analyses of liquid and gas samples were successfully performed.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-03] Noise Reduction by Differential Detection for Mid-infrared Laser Spectroscopy
[Presentation Style] Onsite

*Kyosuke Nagasaka[1], Atsushi Sugiyama[1], Naota Akikusa[1], Tadataka Edamura[1] (1. Hamamatsu Photonics K.K. (Japan))

[Presentation Style] Onsite

Differential detection technique was applied to mid-infrared laser spectroscopy with use of developed wavelength swept/tunable quantum cascade laser. It was found that the noise reduction effect was 3.8 times higher than the method without differential detection.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-04] Compact active hyperspectral imager for short wave infrared wavelengths

*Teemu Kaariainen[1], Timo Donsberg[1] (1. VTT Technical Research Centre of Finland Ltd (Finland))
A compact active hyperspectral imager is presented. The imager uses a tunable short wave infrared supercontinuum light source and an imaging sensor for acquisition of hyperspectral images. The imager is demonstrated for material classification.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-05] Temperature-insensitive measurement of refractive index using a no-core fiber-based modal interferometer [Presentation Style] Online

*tae yoon Kim[1], Junha Jung[1], Geun Weon Lim[1], Ju Han Lee[1] (1. University Of Seoul (Korea))
[Presentation Style] Online
We demonstrate a temperature-insensitive refractive index (RI) sensor based on an SMF-NCF-SMF structure-based modal interferometer with a wave configuration. The RI measurement sensitivity of our proposed refractometer was ~-53.24nm/RIU with no temperature sensitivity (0 pm/˚C).

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-07] Dual Evanescent Waves in a Single Resonance: Innovative Applications for Fano Resonance Biosensors [Presentation Style] Onsite

*Shu-Cheng LO[1,2], Sheng-Hann Wang[1], Ting-Wei Chang[1], Kuang-Li Lee[1], Ruey-Lin Chern[2], Pei-Kuen Wei[1] (1. Research Center for Applied Sciences, Academia Sinica (Taiwan), 2. Institute of Applied Mechanics, National Taiwan University (Taiwan))
[Presentation Style] Onsite
Surface plasmon resonance (SPR) sensors take advantages of label-free, real-time and surface-sensitive detection. The SPR technology is widely used for studying binding kinetics of various biomolecules. However, the typical SPR only has an evanescent depth. In this work, we discover a new phenomenon in aluminum capped nanoslit array which possesses two distant evanescent depths in a single Fano mode. This dual-mode in a single resonance property makes the Fano resonance useful for some innovative biosensing applications, such as self-referencing SPR sensors which applied in measuring the bio-reaction.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-09] Near-infrared Phase-detection Auto-focusing with Plasmonic Nanostructures [Presentation Style] Online

*God Eun Seok[1], Yunkyung Kim[1] (1. Dong-A Univ. (Korea))
[Presentation Style] Online

For near-infrared phase-detection autofocusing, a plasmonic structure having metal-insulator-metal (MIM) stack arrays is suggested. The wavelength selectivity and dependency of incident angle of the MIM stack arrays is used for the auto-focusing performance and confirmed.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-10] A Terahertz Metasurface based Refractive Index Sensor [Presentation Style] Online

*Aruna Gandhi M S[1], NAGARAJAN NALLUSAMY[2], Rahul Singhal[2], Qian Li[1] (1. School of Electronic and Computer Engineering, Peking Univ. (China), 2. Optical Communication Lab, Department of Electrical and Electronics Engineering, BITS Pilani (India))

[Presentation Style] Online

The proposed dual-layer highly coupled patch metasurface terahertz sensor achieves a maximum sensitivity of 0.65 THz/RIU, figure-of-merit of 1.828 RIU^{-1} in the sample refractive-index from 1.6-1.7, with quality factor of 6.3 for the bio-chemical applications.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-11] Study on improving the real-time performance of Self-Coupled Distance and Velocity Sensor [Presentation Style] Onsite

*Daiki Sato[1], Yuto Higuchi[1], Norio Tsuda[1], Jun Yamada[1] (1. Aichi Institute of Technology (Japan))

[Presentation Style] Onsite

To improve the real-time performance of the self-coupled distance-velocity sensor, we realized a measurement using only one pulse within a single pulse.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-12] Visualizing the dynamic damping phenomenon in the thermal lensing of crystals by a nanoscale optical ruler [Presentation Style] Online

Shou-Tai Lin[1], Guan-Yu Zhuo[2,3], Hsien-Yi Wang[4], *Ming-Che Chan[5] (1. Department of Photonics, Feng Chia University (Taiwan), 2. Institute of New Drug Development, China Medical University (Taiwan), 3. Integrative Stem Cell Center, China Medical University Hospital (Taiwan), 4. Medical Research Center, Chimei Hospital (Taiwan), 5. College of Photonics, national Yang-Ming Chiao-Tung University (Taiwan))

[Presentation Style] Online

Dynamic thermal lensing of laser crystals has been observed under different conditions. The dynamic information can help to study the balance between driving force (pumping and thermal stress) and damping loss (cooling and lasing).

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-13] Reflected-Phase Measurement of Azimuth-Rotated Guided-Mode Resonance Device Using Pohl Interferometer
[Presentation Style] Online

Cheng-Tsung Chang[1], *Jaturon Tongpakpanang[1], Wen-Kai Kuo[1] (1. National Formosa University (Taiwan))

[Presentation Style] Online

In this paper, we report the reflected-phase measurement results of the GMR device using the Pohl interferometer. Fringe shifts of the interferogram caused by the abrupt phase change of the resonantly reflected beam were observed by rotating the azimuth angle of the GMR device and without altering the reflected interference beam position, and the fringe shift can be captured and calculated by a fixed position camera.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-14] Near-infrared Sensing with a Stacked Photodiode
[Presentation Style] Onsite

*Hyunjoon Sung[1], Yunkyung Kim[1] (1. Dong-A Univ. (Korea))

[Presentation Style] Onsite

For near-infrared sensing of CMOS image sensor, a pixel structure having stacked photodiode is suggested. The optical simulation confirms the suggested structure is useful for both visible and near-infrared imaging without thickening silicon.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-15] Forming Aerial Grid Points with AIRR by Use of Faced Half Mirrors
[Presentation Style] Onsite

*Kohei Kishinami[1], Kazunari Chiba[1], Kengo Fujii[1], Masaki Yasugi[1], Shiro Suyama[1], Hirotsugu Yamamoto[1] (1. Utsunomiya Univ. (Japan))

[Presentation Style] Onsite

We propose a novel optical system to form aerial images of grid points, by introducing faced mirrors to aerial imaging by retro-reflection. We have confirmed possibility of forming 2D multiple aerial imaging by ray-tracing simulations.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-16] High Sensitive Pixel with Covered Microlens for Quad Color Filter Array

[Presentation Style] Onsite

*Jae-Hyeok Hwang[1], Yunkyung Kim[1] （1. Dong-A Univ. (Korea)）

[Presentation Style] Onsite

A covered microlens structure is suggested for high sensitivity of CMOS image sensor with quad color filter (CF) array. We confirmed that the sensitivity of the suggested structure was increased by an optical simulation.

(Tue. Aug 2, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTu17-17] A Study on Pulse Measurement of Self-Coupled Laser Terminal Voltage Type Sensor Using Suction Modulation Method

[Presentation Style] Onsite

*Yusuke Iwata[1], Daiki Sato[1], Yuto Higuchi[1], Norio Tsuda[1], Jun Yamada[1] （1. Aichi Institute of Technology (Japan)）

[Presentation Style] Onsite

Distance measurement using the self-coupled effect of semiconductor lasers requires a linear change in oscillation wavelength.We proposed a novel modulation method for semiconductor lasers and performed measurements with a single pulse.

Plenary Session 2 (CLEO-PR2022/ODF'22)

Session Chairs: Hibiki Tatsuno (Ricoh Co., Ltd.), Takashige Omatsu (Chiba Univ.)

Wed. Aug 3, 2022 9:00 AM - 11:30 AM Main Hall (2/3) (1F)

[OP] Opening Remark

9:00 AM - 9:15 AM

[Plenary2-C1] All in a spin: rotational levitated optomechanics

[Presentation Style] Onsite

*Kishan Dholakia[1] （1. University of St Andrews (UK)）

9:15 AM - 10:00 AM

[Plenary2-C2] Fluctuation for Nanophotonics

[Presentation Style] Onsite

*Satoshi Kawata[1] （1. Osaka University and RIKEN (Japan)）

10:00 AM - 10:45 AM

[Plenary2-O3] Lens design for parallel super cameras

[Presentation Style] Onsite

*David J Brady[1], Jose Sasian[1] （1. University of Arizona (United States of America)）

10:45 AM - 11:30 AM

9:00 AM - 9:15 AM (Wed. Aug 3, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

[OP] Opening Remark

9:15 AM - 10:00 AM (Wed. Aug 3, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

[Plenary2-C1] All in a spin: rotational levitated optomechanics

[Presentation Style] Onsite

*Kishan Dholakia[1] (1. University of St Andrews (UK))

[Presentation Style] Onsite

Optically levitated micro and nanoparticles in vacuum offer new approaches for precision measurement and fundamental physics. We will discuss the use of rotational degree of freedom for achieving high Q values and studying limit cycles.

10:00 AM - 10:45 AM (Wed. Aug 3, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

[Plenary2-C2] Fluctuation for Nanophotonics

[Presentation Style] Onsite

*Satoshi Kawata[1] (1. Osaka University and RIKEN (Japan))

[Presentation Style] Onsite

In the field of nanophotonics, suppression of fluctuations in detectors, light sources, and the environment is an important issue because they cause fatal errors in results. In this talk, I would like to discuss the positive use of fluctuations rather as a signal source, using micro- and nano-Raman imaging and 3D-nanofabrication as examples.

10:45 AM - 11:30 AM (Wed. Aug 3, 2022 9:00 AM - 11:30 AM Main Hall (2/3))

[Plenary2-O3] Lens design for parallel super cameras

[Presentation Style] Onsite

*David J Brady[1], Jose Sasian[1] (1. University of Arizona (United States of America))

[Presentation Style] Onsite

For compact gigapixel-scale cameras, multiscale lens designs are needed, but recent array camera designs utilize discrete heterogeneous arrays. This presentation reviews heterogenous array designs and discusses the motivation for this design choice.

Ultrashort Pulse Generation and Nonlinear Propagation I

Session Chairs: Nobuhisa Ishii (QST), Jiro Itatani (Univ. of Tokyo)

Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall A (1F)

[CWP2E-01] Continuous Synthesis of Arbitrary Optical Waveforms on a Sub-Femtosecond Timescale

[Presentation Style] Onsite

*Akihiro Tomura[1], Chiaki Ohae[2], Ken-ichi Nakagawa[3], Kaoru Minoshima[1,2], Masayuki Katsuragawa[1,2] （1. Graduate School of Informatics and Engineering, University of Electro-Communications (Japan), 2. Institute for Advanced Science, University of Electro-Communications (Japan), 3. Institute for Laser Science, University of Electro-Communications (Japan)）

1:30 PM - 1:45 PM

[CWP2E-02] High-Quality Compression of Ultrafast UV Light in Gas-Filled Hollow-Core Photonic Crystal Fibers

[Presentation Style] Online

*David Novoa[1,2,3], Jie Luan[1], Philip St.J. Russell[1] （1. Max Planck Institute for the Science of Light (Germany), 2. University of the Basque Country (UPV/EHU) (Spain), 3. Ikerbasque, Basque Foundation for Science (Spain)）

1:45 PM - 2:00 PM

[CWP2E-03] High-energy, sub-8 fs green pulse generation

[Presentation Style] Online

Chia-Lun Tsai[1], An-Yuan Liang[1], Liang-Xian Xie[1], Shih-Cheng Liu[1], Po-Wei Lai[1], Ming-Shiang Tsai[1], *Ming-Wei Lin[1], Ming-Chang Chen[1] （1. National Tsing Hua Univ. (Taiwan)）

2:00 PM - 2:15 PM

[CWP2E-04] Energy-Scaling of Multi-Pass Cell Post-Compression: The Bow Tie MPC Scheme

[Presentation Style] Onsite

*Arthur Schoenberg[1], Markus Seidel[1], Esmerando Escoto[1], Stefanos Carlström[4,5], Gunnar Arisholm[6], Tino Lang[1], Ingmar Hartl[1], Christoph M. Heyl[1,2,3] （1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. Helmholtz-Institut Jena (Germany), 3. GSI Helmholtzzentrum für Schwerionenforschung GmbH (Germany), 4. Department of Physics, Lund University (Sweden), 5. Max-Born-Institut (Germany), 6. FFI (Norwegian Defence Research Establishment) (Norway)）

2:15 PM - 2:30 PM

[CWP2E-05] A series of phase-matched spectral peaks generated in gas-filled antiresonant hollow core fiber

[Presentation Style] Onsite

*TRIVIKRAMARAO GAVARA[1], WONKEUN CHANG[1] （1. Nanyang Technological University (Singapore)）

2:30 PM - 2:45 PM

[CWP2E-06] Enhancing optical nonlinear effects with spectrally periodic solitons

[Presentation Style] Online

Joshua P. Lourdesamy[1], *Antoine F. J. Runge[1], Tristram J. Alexander[1], Darren D. Hudson[2],

Andrea Blanco-Redondo[3], C. Martijn de Sterke[1] （1. University of Sydney (Australia), 2. CACI Photonics (United States of America), 3. Nokia Bell labs (United States of America)）

2:45 PM - 3:00 PM

1:30 PM - 1:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CWP2E-01] Continuous Synthesis of Arbitrary Optical Waveforms on a Sub-Femtosecond Timescale
[Presentation Style] Onsite

*Akihiro Tomura[1], Chiaki Ohae[2], Ken-ichi Nakagawa[3], Kaoru Minoshima[1,2], Masayuki Katsuragawa[1,2] (1. Graduate School of Informatics and Engineering, University of Electro-Communications (Japan), 2. Institute for Advanced Science, University of Electro-Communications (Japan), 3. Institute for Laser Science, University of Electro-Communications (Japan))

[Presentation Style] Onsite

We report a technology for synthesizing electric fields of light of arbitrary waveforms on a sub-femtosecond timescale. Five discrete harmonics are arbitrarily manipulated to generate a train of ultrashort waveforms with 890-attosecond temporal duration.

1:45 PM - 2:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CWP2E-02] High-Quality Compression of Ultrafast UV Light in Gas-Filled Hollow-Core Photonic Crystal Fibers
[Presentation Style] Online

*David Novoa[1,2,3], Jie Luan[1], Philip St.J. Russell[1] (1. Max Planck Institute for the Science of Light (Germany), 2. University of the Basque Country (UPV/EHU) (Spain), 3. Ikerbasque, Basque Foundation for Science (Spain))

[Presentation Style] Online

Nonlinear self-compression in gas-filled hollow-core fibers generates ~8.5 fs UV pulses with ~98% of the pulse energy within a single temporal lobe. The approach may find applications in time-resolved spectroscopy and chemistry

2:00 PM - 2:15 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CWP2E-03] High-energy, sub-8 fs green pulse generation
[Presentation Style] Online

Chia-Lun Tsai[1], An-Yuan Liang[1], Liang-Xian Xie[1], Shih-Cheng Liu[1], Po-Wei Lai[1], Ming-Shiang Tsai[1], *Ming-Wei Lin[1], Ming-Chang Chen[1] (1. National Tsing Hua Univ. (Taiwan))

[Presentation Style] Online

We propose a new method of pulse post-compression, named CAScaded foCusing AnD comprEssing (CASCADE) to nonlinearly compress 0.6-mJ, 515-nm pulses from 148 fs to 7.8 fs with an output energy of 0.28 mJ.

2:15 PM - 2:30 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CWP2E-04] Energy-Scaling of Multi-Pass Cell Post-Compression: The Bow Tie MPC Scheme
[Presentation Style] Onsite

*Arthur Schoenberg[1], Markus Seidel[1], Esmerando Escoto[1], Stefanos Carlström[4,5], Gunnar Arisholm[6], Tino Lang[1], Ingmar Hartl[1], Christoph M. Heyl[1,2,3] (1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. Helmholtz-Institut Jena (Germany), 3. GSI Helmholtzzentrum für Schwerionenforschung GmbH (Germany), 4. Department of Physics, Lund University (Sweden), 5. Max-Born-Institut (Germany), 6. FFI (Norwegian Defence Research Establishment) (Norway))

[Presentation Style] Onsite

We introduce the bow tie multi-pass cell as a new scheme for post-compression of high-energy laser pulses, overcoming current limits of Herriott-type multi-pass cell-based post-compression imposed mainly by mirror damage threshold limitations.

2:30 PM - 2:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CWP2E-05] A series of phase-matched spectral peaks generated in gas-filled antiresonant hollow core fiber
[Presentation Style] Onsite

*TRIVIKRAMARAO GAVARA[1], WONKEUN CHANG[1] (1. Nanyang Technological University (Singapore))

[Presentation Style] Onsite

We report the generation of a series of phased-matched spectral peaks in a gas-filled antiresonant hollow core fiber. They appear due to rapid changes in the dispersion profile near the structural resonances in the fiber.

2:45 PM - 3:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CWP2E-06] Enhancing optical nonlinear effects with spectrally periodic solitons
[Presentation Style] Online

Joshua P. Lourdesamy[1], *Antoine F. J. Runge[1], Tristram J. Alexander[1], Darren D. Hudson[2], Andrea Blanco-Redondo[3], C. Martijn de Sterke[1] (1. University of Sydney (Australia), 2. CACI Photonics (United States of America), 3. Nokia Bell labs (United States of America))

[Presentation Style] Online

We report the generation of high-intensity pulses consisting of equally spaced spectral components through linear dispersion engineering. Their interference leads to an enhanced effective nonlinearity that monotonically increases with the number of frequency components.

Ultrashort Pulse Generation and Nonlinear Propagation II

Session Chairs: Masayuki Katsuragawa (Univ. of Electro-Communications), Takayuki Kurihara (Univ. of Tokyo)
Wed. Aug 3, 2022 3:30 PM - 5:15 PM Mid-sized Hall A (1F)

[CWP2F-01 (Tutorial)] Few-Cycle Optical Pulses
[Presentation Style] Online
*Andy Kung[1,2] （1. Academia Sinica (Taiwan), 2. National Tsing Hua Univ. (Taiwan)）
3:30 PM - 4:30 PM

[CWP2F-02] Influence of Resonant Bands on UV Generation in Gas-filled Antiresonant Hollow-core Fiber
[Presentation Style] Onsite
*DAIQI XIONG[1], Yuxi Wang[1], Wonkeun Chang[1] （1. Nanyang Technological Univerisity (Singapore)）
4:30 PM - 4:45 PM

[CWP2F-03] Soft Time Stretch: Boosting the Stretch Factor by Deep Learning
[Presentation Style] Onsite
Yiming Zhou[1], Tingyi Zhou[1], *Bahram Jalali[1] （1. Univ. of California, Los Angeles (United States of America)）
4:45 PM - 5:00 PM

[CWP2F-04] Efficient Simulation of Supercontinua from Cubic, Quadratic and Cascaded Nonlinearities
[Presentation Style] Online
*Thibault Voumard[1], Markus Ludwig[1], Thibault Wildi[1], Tobias Herr[1,2] （1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. UHH Univ. (Germany)）
5:00 PM - 5:15 PM

3:30 PM - 4:30 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Mid-sized Hall A)

[CWP2F-01 (Tutorial)] Few-Cycle Optical Pulses
[Presentation Style] Online

*Andy Kung[1,2] (1. Academia Sinica (Taiwan), 2. National Tsing Hua Univ. (Taiwan))

[Presentation Style] Online

This is an overview and a brief step-by-step guide to the process of converting a femtosecond laser pulse to a pulse of a few optical cycles.

4:30 PM - 4:45 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Mid-sized Hall A)

[CWP2F-02] Influence of Resonant Bands on UV Generation in Gas-filled Antiresonant Hollow-core Fiber
[Presentation Style] Onsite

*DAIQI XIONG[1], Yuxi Wang[1], Wonkeun Chang[1] (1. Nanyang Technological Univerisity (Singapore))

[Presentation Style] Onsite

We investigate the influence of resonant bands in ultraviolet generation in gas-filled antiresonant hollow-core fibers. Their presence in the vicinity of the phase-matching point substantially degrades the efficiency and quality of the frequency up-conversion process.

4:45 PM - 5:00 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Mid-sized Hall A)

[CWP2F-03] Soft Time Stretch: Boosting the Stretch Factor by Deep Learning
[Presentation Style] Onsite

Yiming Zhou[1], Tingyi Zhou[1], *Bahram Jalali[1] (1. Univ. of California, Los Angeles (United States of America))

[Presentation Style] Onsite

We propose the concept of Soft Time Stretch, a technique that boosts the stretch factor of classic time-stretch systems by exploiting deep learning and nonlinear optics.

5:00 PM - 5:15 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Mid-sized Hall A)

[CWP2F-04] Efficient Simulation of Supercontinua from Cubic, Quadratic and Cascaded Nonlinearities
[Presentation Style] Online

*Thibault Voumard[1], Markus Ludwig[1], Thibault Wildi[1], Tobias Herr[1,2] (1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. UHH Univ. (Germany))

[Presentation Style] Online

Chip-integrated nonlinear waveguides with quadratic and cubic optical nonlinearities can give rise to multi-octave spanning supercontinua. An efficient implementation for numerically simulating such ultra-broadband

spectra is presented.

Oral Session | CLEO-PR2022 | High Power, High Energy Lasers III

High Power, High Energy Lasers III

Session Chairs: Martin Smrz (HiLASE Centre), Shigeki Tokita (Kyoto Univ.)

Wed. Aug 3, 2022 2:00 PM - 3:00 PM Room 204 (2F)

[CWP4C-02] Lasing performance of Yb:YAG thin-disk with crystalline coatings directly bonded onto silicon carbide heatsink

[Presentation Style] Onsite

*Martin Cimrman[1,2], Jan Cvrček[1,2], David Vojna[1,2], Denisa Štěpánková[1,2], Ondřej Foršt[1,2], Martin Smrž[1], Ondřej Novák[1], Ondřej Slezák[1], Michal Chyla[1], Michal Jelínek[2], Jiří Mužík[1], Tomáš Mocek[1] （1. HiLASE Centre, Institute of Physics AS CR (Czech Republic), 2. Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering (Czech Republic)）

2:00 PM - 2:15 PM

[CWP4C-03] 19 kW Output Power of Tandem Pumped APS Fiber Amplifier with Higher Ytterbium Concentration

[Presentation Style] Online

*Changle Shen[1], Fengyun Li[1], Jiangyun Dai[1], Nian Liu[1], Honglei He[1], Fang Li[1], Lihua Zhang[1], Jiakun Lv[1], Lei Jiang[1], Honghuan Lin[1], Jianjun Wang[1], Feng Jing[1], Cong Gao[1] （1. Laser Fusion Research Center, China Academy of Engineering Physics (China)）

2:15 PM - 2:30 PM

[CWP4C-04] Picosecond CPA Fiber Laser with 0.4 mJ Pulse Energy and 423 W Average Power Based on XLMA Triple-clad Fiber

[Presentation Style] Online

*bei bei Wang[1], zhigang Peng[1], yan Xu[1], zhaocheng Cheng[1], pu Wang[1] （1. Beijing Univ of Tech (China)）

2:30 PM - 2:45 PM

[CWP4C-05] Parametric Amplification of Passively Phase Locked Intense Mid-Infrared Pulses with 100 kHz repetition

[Presentation Style] Onsite

*Takayuki KURIHARA KURIHARA[1], Tianqi Yang[1], Tomoya Mizuno[1], Teruto Kanai[1], Jiro Itatani[1] （1. The University of Tokyo (Japan)）

2:45 PM - 3:00 PM

2:00 PM - 2:15 PM (Wed. Aug 3, 2022 2:00 PM - 3:00 PM Room 204)

[CWP4C-02] Lasing performance of Yb:YAG thin-disk with crystalline coatings directly bonded onto silicon carbide heatsink [Presentation Style] Onsite

*Martin Cimrman[1,2], Jan Cvrček[1,2], David Vojna[1,2], Denisa Štěpánková[1,2], Ondřej Foršt[1,2], Martin Smrž[1], Ondřej Novák[1], Ondřej Slezák[1], Michal Chyla[1], Michal Jelínek[2], Jiří Mužík[1], Tomáš Mocek[1] （1. HiLASE Centre, Institute of Physics AS CR (Czech Republic), 2. Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering (Czech Republic)）

[Presentation Style] Onsite

The lasing properties of a crystalline-coated Yb:YAG thin disk bonded onto a SiC heatsink in a multi-mode cavity are investigated, including disk temperature, output power, and dioptric power. The coatings show improvement over conventional ones.

2:15 PM - 2:30 PM (Wed. Aug 3, 2022 2:00 PM - 3:00 PM Room 204)

[CWP4C-03] 19 kW Output Power of Tandem Pumped APS Fiber Amplifier with Higher Ytterbium Concentration [Presentation Style] Online

*Changle Shen[1], Fengyun Li[1], Jiangyun Dai[1], Nian Liu[1], Honglei He[1], Fang Li[1], Lihua Zhang[1], Jiakun Lv[1], Lei Jiang[1], Honghuan Lin[1], Jianjun Wang[1], Feng Jing[1], Cong Gao[1] （1. Laser Fusion Research Center, China Academy of Engineering Physics (China)）

[Presentation Style] Online

We report our recent work on power scaling of tandem pumped fiber laser up to 19 kW by increasing the doping concentration of ytterbium up to 0.3(mol)% and using larger core/clad ratio of 60/400.

2:30 PM - 2:45 PM (Wed. Aug 3, 2022 2:00 PM - 3:00 PM Room 204)

[CWP4C-04] Picosecond CPA Fiber Laser with 0.4 mJ Pulse Energy and 423 W Average Power Based on XLMA Triple-clad Fiber [Presentation Style] Online

*bei bei Wang[1], zhigang Peng[1], yan Xu[1], zhaocheng Cheng[1], pu Wang[1] （1. Beijing Univ of Tech (China)）

[Presentation Style] Online

We demonstrate a chirped pulse amplification (CPA) system which delivers an average power of 423 W, pulse energy of 0.4 mJ, pulse duration of 7.6 ps based on an 100/400/480 μm Triple Clad Fiber.

2:45 PM - 3:00 PM (Wed. Aug 3, 2022 2:00 PM - 3:00 PM Room 204)

[CWP4C-05] Parametric Amplification of Passively Phase Locked Intense Mid-Infrared Pulses with 100 kHz repetition

[Presentation Style] Onsite

*Takayuki KURIHARA KURIHARA[1], Tianqi Yang[1], Tomoya Mizuno[1], Teruto Kanai[1], Jiro Itatani[1] （1. The University of Tokyo (Japan)）

[Presentation Style] Onsite

Few-cycle femtosecond optical parametric amplifier in the 1.8-2.5 um region is developed based on Yb;KGW source, exhibiting passively stabilized carrier-envelope phase, pulse energy of tens of uJ and tunable repetition rates up to 100 kHz.

Oral Session | CLEO-PR2022 | Fiber Lasers and Amplifier Devices

Fiber Lasers and Amplifier Devices

Session Chair: Takashi Matsui (NTT Corp.)

Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 206 (2F)

[CWP10A-01 (Invited(P))] Mode-locking state switchable Er-doped fiber laser based on a hybrid scheme of graphene oxide and nonlinear polarization rotation

[Presentation Style] Onsite

*Wei Cai[1], Chih-Hsien Cheng[1], Guanyu Ye[1], Lei Jin[1], Li Li[2], Sze Yun Set[1], Shinji Yamashita[1] (1. Univ. of tokyo (Japan), 2. Harbin Engineering Univ. (China))

1:30 PM - 2:00 PM

[CWP10A-02] Distributed spectral measurement of supercontinuum generation along an optical nanofiber

[Presentation Style] Onsite

*Yosri Haddad[1], Jean-Charles Beugnot[1], Samuel Margueron[1], Gil Fanjoux[1] (1. Institut FEMTO-ST, UMR 6174 CNRS / Université Bourgogne Franche-Comté (France))

2:00 PM - 2:15 PM

[CWP10A-03] High-Q fiber Fabry-Pé rot resonator of sub-centimeter length for stimulated Brillouin scattering laser

[Presentation Style] Onsite

*Shinya Kato[1,2], Takao Aoki[2] (1. Waseda Institute for Advanced Study, Waseda Univ. (Japan), 2. Department of Applied Physics, Waseda Univ. (Japan))

2:15 PM - 2:30 PM

[CWP10A-04] A High-Gain Cladded Erbium-Doped LNOI Waveguide Amplifier Fabricated by PLACE

[Presentation Style] Online

*Youting Liang[1], Junxia Zhou[1], Zhaoxiang Liu[1], Haisu Zhang[1], Zhiwei Fang[1], Yuan Zhou[2], Difeng Yin[2], Jintian Lin[2], Jianping Yu[2], Rongbo Wu[2], Min Wang[1], Ya Cheng[1,2,3,4,5] (1. East China Normal Univ. (China), 2. Shanghai Institute of Optics and Fine Mechanics (China), 3. Shanghai Research Center for Quantum Sciences (China), 4. Shanxi Univ. (China), 5. Shandong Univ. (China))

2:30 PM - 2:45 PM

[CWP10A-05] Angle-tuned bremsstrahlung light sources in an electron microscope

[Presentation Style] Online

*Luo-Hao Peng[1], Long Ho[1], Alexey Kopeykin[1], Yen-Chieh Huang[1] (1. National Tsing Hua Univ. (Taiwan))

2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 206)

[CWP10A-01 (Invited(P))] Mode-locking state switchable Er-doped fiber laser based on a hybrid scheme of graphene oxide and nonlinear polarization rotation [Presentation Style] Onsite

*Wei Cai[1], Chih-Hsien Cheng[1], Guanyu Ye[1], Lei Jin[1], Li Li[2], Sze Yun Set[1], Shinji Yamashita[1] (1. Univ. of tokyo (Japan), 2. Harbin Engineering Univ. (China))

[Presentation Style] Onsite

We demonstrated a mode-locking state switchable Er-doped fiber laser based on the hybrid mode-locking scheme composed by nonlinear polarization rotation and graphene oxide coated side-polished fiber. Four stable switchable mode-locking states were confirmed

2:00 PM - 2:15 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 206)

[CWP10A-02] Distributed spectral measurement of supercontinuum generation along an optical nanofiber [Presentation Style] Onsite

*Yosri Haddad[1], Jean-Charles Beugnot[1], Samuel Margueron[1], Gil Fanjoux[1] (1. Institut FEMTO-ST, UMR 6174 CNRS / Université Bourgogne Franche-Comté (France))

[Presentation Style] Onsite

This work presents preliminary experimental results concerning distributed measurements along an optical nanofiber of the generation of a supercontinuum in the visible range, for a spatial and spectral dynamics analysis.

2:15 PM - 2:30 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 206)

[CWP10A-03] High-Q fiber Fabry-Pé rot resonator of sub-centimeter length for stimulated Brillouin scattering laser [Presentation Style] Onsite

*Shinya Kato[1,2], Takao Aoki[2] (1. Waseda Institute for Advanced Study, Waseda Univ. (Japan), 2. Department of Applied Physics, Waseda Univ. (Japan))

[Presentation Style] Onsite

We demonstrate a stimulated Brillouin scattering (SBS) laser using a high-Q optical fiber Fabry-Pérot resonator. The free spectral range coincides with the SBS shift and the resonator length is about 5 mm.

2:30 PM - 2:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 206)

[CWP10A-04] A High-Gain Cladded Erbium-Doped LNOI Waveguide

Amplifier Fabricated by PLACE
[Presentation Style] Online

*Youting Liang[1], Junxia Zhou[1], Zhaoxiang Liu[1], Haisu Zhang[1], Zhiwei Fang[1], Yuan Zhou[2], Difeng Yin[2], Jintian Lin[2], Jianping Yu[2], Rongbo Wu[2], Min Wang[1], Ya Cheng[1,2,3,4,5] (1. East China Normal Univ. (China), 2. Shanghai Institute of Optics and Fine Mechanics (China), 3. Shanghai Research Center for Quantum Sciences (China), 4. Shanxi Univ. (China), 5. Shandong Univ. (China))

[Presentation Style] Online

Erbium doped thin film lithium niobate waveguide amplifier is fabricated using photolithography assisted chemo-mechanical etching technique. A thin cladding layer of tantalum pentoxide is deposited to boost the optical gain exceeding 20 dB.

2:45 PM - 3:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 206)

[CWP10A-05] Angle-tuned bremsstrahlung light sources in an electron microscope
[Presentation Style] Online

*Luo-Hao Peng[1], Long Ho[1], Alexey Kopeykin[1], Yen-Chieh Huang[1] (1. National Tsing Hua Univ. (Taiwan))

[Presentation Style] Online

By using a 100-keV electron beam, we report bremsstrahlung induced blue fluorescence from silica and demonstrate angle-tuned light emission between 450-500 nm from a thin-film coated glass substrate.

Passive and Active Waveguide Devices

Session Chair: Keisuke Kojima (Mitsubishi Electric Research Laboratories)
Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206 (2F)

[CWP10B-01 (Invited)] Optical Waveguides in Crystals Fabricated by Femtosecond Laser Writing: Recent Advances and Perspectives
[Presentation Style] Online
*Feng Chen[1] (1. Shandong University (China))
3:30 PM - 4:00 PM

[CWP10B-02] Cascaded multi-stage directional coupler on silicon-on-insulator
[Presentation Style] Online
*Cheng Tse Tang[1], Chewn Pu Jou[1], Lan Chou Cho[1], Fong Wei Kuo[1], Ming Yang Chung[1], Tai Chun Huang[1], Yung Jr Hung[2] (1. TSMC Manufac. (Taiwan), 2. NSYSU Univ. (Taiwan))
4:00 PM - 4:15 PM

[CWP10B-03] Poling Free Second-Order Nonlinear Waveguides in LNOI using Bound State in the Continuum
[Presentation Style] Onsite
*Jackson Jacob Chakkoria[1,2], Andreas Boes[1], Shankar Kumar Selvaraja[2], Arnan Mitchell[1] (1. School of Engineering, RMIT University, Melbourne (Australia), 2. Centre for Nano Science and Engineering, Indian Institute of Science (India))
4:15 PM - 4:30 PM

[CWP10B-04] Experimental Demonstration of High Extinction TE-Pass Polarizers in Thin Film Lithium Niobate on Insulator
[Presentation Style] Onsite
*Aditya Dubey[1], Andreas Boes [1], Andreas Frigg[1,2], Guanghui Ren[1], Thach G. Nguyen[1], Sumeet Walia [1], Arnan Mitchell[1] (1. School of Engineering, RMIT Univ. (Australia), 2. Ligentec SA (Switzerland))
4:30 PM - 4:45 PM

[CWP10B-05] Cascaded Wavefront-Matching-Method Designed 6-Mode-Exchangers for MDL Management in MDM Transmission
[Presentation Style] Onsite
Yuichi Asama[1], *Takeshi FUJISAWA[1], Takanori Sato[1], Takayoshi Mori[2], Taiji Sakamoto[2], Ryota Imada[2], Yoko Yamashita[2], Kazuhide Nakajima[2], Kunimasa Saitoh[1] (1. Hokkaido University (Japan), 2. NTT Access Network Service System Laboratories (Japan))
4:45 PM - 5:00 PM

[CWP10B-06 (Invited)] Time reversed optical waves by arbitrary vector spatiotemporal field generation
[Presentation Style] Online
*Joel Carpenter[1], Mickael Mounaix[1], Nicolas Fontaine[2], David T Neilson[2], Roland Ryf[2], Haoshuo Chen[2], Juan Carlos Alvarado-Zacarias[2] (1. University of Queensland (Australia), 2. Nokia Bell Labs (United States of America))

5:00 PM - 5:30 PM

3:30 PM - 4:00 PM (Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206)

[CWP10B-01 (Invited)] Optical Waveguides in Crystals Fabricated by Femtosecond Laser Writing: Recent Advances and Perspectives
[Presentation Style] Online

*Feng Chen[1] (1. Shandong University (China))

[Presentation Style] Online

Femtosecond-laser-direct writing (FsLDW) allows rapid prototyping of on-demand waveguide geometries buried in crystals. This presentation summarizes the recent advances of FsLDW fabrication of waveguides and provides perspectives for potential future directions on this topic.

4:00 PM - 4:15 PM (Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206)

[CWP10B-02] Cascaded multi-stage directional coupler on silicon-on-insulator
[Presentation Style] Online

*Cheng Tse Tang[1], Chewn Pu Jou[1], Lan Chou Cho[1], Fong Wei Kuo[1], Ming Yang Chung[1], Tai Chun Huang[1], Yung Jr Hung[2] (1. TSMC Manufac. (Taiwan), 2. NSYSU Univ. (Taiwan))

[Presentation Style] Online

We demonstrate the feasibility of a width-engineered cascaded multi-stage directional coupler on silicon-on-insulator for broadband (within 5% power variation over 100 nm wavelength range) and fabrication tolerant operation (1 standard deviation= 2.5% across 12-inch wafer).

4:15 PM - 4:30 PM (Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206)

[CWP10B-03] Poling Free Second-Order Nonlinear Waveguides in LNOI using Bound State in the Continuum
[Presentation Style] Onsite

*Jackson Jacob Chakkoria[1,2], Andreas Boes[1], Shankar Kumar Selvaraja[2], Arnan Mitchell[1] (1. School of Engineering, RMIT University, Melbourne (Australia), 2. Centre for Nano Science and Engineering, Indian Institute of Science (India))

[Presentation Style] Onsite

We report a theoretical analysis of second-order nonlinear conversion by combining modal phase matching and bound state in the continuum in SiN strip loaded lithium niobate on insulator waveguides predicting an efficiency of 400% W^{-1} cm^{-2}

4:30 PM - 4:45 PM (Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206)

[CWP10B-04] Experimental Demonstration of High Extinction TE-Pass Polarizers in Thin Film Lithium Niobate on Insulator
[Presentation Style] Onsite

*Aditya Dubey[1], Andreas Boes [1], Andreas Frigg[1,2], Guanghui Ren[1], Thach G. Nguyen[1], Sumeet Walia [1], Arnan Mitchell[1] （1. School of Engineering, RMIT Univ. (Australia), 2. Ligentec SA (Switzerland)）

[Presentation Style] Onsite

In this contribution, we present an experimental demonstration of high extinction TE-pass polarizers by using lateral leakage in the thin film lithium niobate on insulator waveguides, achieving a TM mode polarization suppression of 262 dB/cm.

4:45 PM - 5:00 PM (Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206)

[CWP10B-05] Cascaded Wavefront-Matching-Method Designed 6-Mode-Exchangers for MDL Management in MDM Transmission
[Presentation Style] Onsite

Yuichi Asama[1], *Takeshi FUJISAWA[1], Takanori Sato[1], Takayoshi Mori[2], Taiji Sakamoto[2], Ryota Imada[2], Yoko Yamashita[2], Kazuhide Nakajima[2], Kunimasa Saitoh[1] （1. Hokkaido University (Japan), 2. NTT Access Network Service System Laboratories (Japan)）

[Presentation Style] Onsite

6-mode-exchangers composed of side- and top-grating-like waveguides designed with an optimization algorithm is proposed for mode-division-multiplexing system. By cascading these devices, an efficient reduction of mode-dependent-loss is possible with only one-time mode exchanging operation.

5:00 PM - 5:30 PM (Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206)

[CWP10B-06 (Invited)] Time reversed optical waves by arbitrary vector spatiotemporal field generation
[Presentation Style] Online

*Joel Carpenter[1], Mickael Mounaix[1], Nicolas Fontaine[2], David T Neilson[2], Roland Ryf[2], Haoshuo Chen[2], Juan Carlos Alvarado-Zacarias[2] （1. University of Queensland (Australia), 2. Nokia Bell Labs (United States of America)）

[Presentation Style] Online

We discuss a device for the generation of arbitrary spatiotemporal vector fields in optics. A type of spectral pulse shaper that can also control spatial/polarisation wavefront in a temporally resolved fashion.

Oral Session | CLEO-PR2022 | Silicon Photonics Devices for Communications

Silicon Photonics Devices for Communications

Session Chairs: Dawn Tan (Singapore Univ. of Tech. and Design), Kazuhiro Ikeda (AIST)
Wed. Aug 3, 2022 1:30 PM - 2:45 PM Room 104&105 (1F)

[CWP12A-01] 110 Gbaud PAM-4 Silicon Microring Modulator operating in the C-band

[Presentation Style] Online

*David Weng U Chan[1], Xiong Wu[2], Zunyue Zhang[1], Chao Lu[2], Alan Pak To Lau[2], Hon Ki Tsang[1] （1. The Chinese Univ. of Hong Kong (Hong Kong), 2. The Hong Kong Polytechnic Univ. (Hong Kong)）

1:30 PM - 1:45 PM

[CWP12A-02] High Performance Si and InP/EO Polymer Hybrid Optical Modulators for Data Communication and Computing

[Presentation Style] Onsite

*Tomoki Sakuma[1], Shiyoshi Yokoyama[2], Junichi Fujikata[1] （1. Tokushima University (Japan), 2. Kyushu University (Japan)）

1:45 PM - 2:00 PM

[CWP12A-03] Free-Space Optical Transmission using Si Photonics Slow Light Grating Beam Switching Device

[Presentation Style] Onsite

*Ryo Tetsuya[1], Naoya Kodama[1], Mikiya Kamata[1], Takemasa Tamanuki[1], Toshihiko Baba[1] （1. Yokohama Nat'l Univ. (Japan)）

2:00 PM - 2:15 PM

[CWP12A-04] A low crosstalk optical wavelength filter consisting of a Si arrayed-waveguide grating and Bragg grating tunable filters

[Presentation Style] Onsite

*Yuta Yagi[1], Hiroyuki Tsuda[1] （1. Keio Univ. (Japan)）

2:15 PM - 2:30 PM

[CWP12A-05] Imaging of Electromagnetic-Waves using RoF System Based on Si Photonics Microring Modulator Array

[Presentation Style] Onsite

*Liucun Li[1], Hiroyuki Arai[1], Toshihiko Baba[1] （1. Yokohama National Univ. (Japan)）

2:30 PM - 2:45 PM

1:30 PM - 1:45 PM (Wed. Aug 3, 2022 1:30 PM - 2:45 PM Room 104&105)

[CWP12A-01] 110 Gbaud PAM-4 Silicon Microring Modulator operating in the C-band

[Presentation Style] Online

*David Weng U Chan[1], Xiong Wu[2], Zunyue Zhang[1], Chao Lu[2], Alan Pak To Lau[2], Hon Ki Tsang[1] (1. The Chinese Univ. of Hong Kong (Hong Kong), 2. The Hong Kong Polytechnic Univ. (Hong Kong))

[Presentation Style] Online

We present a compact silicon microring modulator (MRM) which has over 67GHz bandwidth and support over 100 Gbaud PAM-4 transmission. We measured 110 Gbaud PAM-4 transmission (220 Gb/s) with bit error rates below 3.8 E-3.

1:45 PM - 2:00 PM (Wed. Aug 3, 2022 1:30 PM - 2:45 PM Room 104&105)

[CWP12A-02] High Performance Si and InP/EO Polymer Hybrid Optical Modulators for Data Communication and Computing

[Presentation Style] Onsite

*Tomoki Sakuma[1], Shiyoshi Yokoyama[2], Junichi Fujikata[1] (1. Tokushima University (Japan), 2. Kyushu University (Japan))

[Presentation Style] Onsite

High performance Si and InP/EO polymer hybrid optical modulators (HMOD) are studied. We demonstrated 112Gbps-PAM4 high-speed modulation and high-efficiency. We also propose efficient optical neural network with slow light effect by InP/EO polymer HMOD.

2:00 PM - 2:15 PM (Wed. Aug 3, 2022 1:30 PM - 2:45 PM Room 104&105)

[CWP12A-03] Free-Space Optical Transmission using Si Photonics Slow Light Grating Beam Switching Device

[Presentation Style] Onsite

*Ryo Tetsuya[1], Naoya Kodama[1], Mikiya Kamata[1], Takemasa Tamanuki[1], Toshihiko Baba[1] (1. Yokohama Nat'l Univ. (Japan))

[Presentation Style] Onsite

We demonstrate free-space optical transmission using silicon photonics slow-light grating beam switching device based on slow light grating. 20 Gbps transmission was observed with a switching time of approximately 10 ms between two reception points.

2:15 PM - 2:30 PM (Wed. Aug 3, 2022 1:30 PM - 2:45 PM Room 104&105)

[CWP12A-04] A low crosstalk optical wavelength filter consisting of a Si arrayed-waveguide grating and Bragg grating tunable

filters

[Presentation Style] Onsite

*Yuta Yagi[1], Hiroyuki Tsuda[1] （1. Keio Univ. (Japan)）

[Presentation Style] Onsite

A low crosstalk optical wavelength filter consisting of a Si arrayed-waveguide grating and Bragg grating tunable filters was designed and fabricated. The simulation results indicated the crosstalk of the optical wavelength filter was dramatically improved.

2:30 PM - 2:45 PM (Wed. Aug 3, 2022 1:30 PM - 2:45 PM Room 104&105)

[CWP12A-05] Imaging of Electromagnetic-Waves using RoF System Based on Si Photonics Microring Modulator Array

[Presentation Style] Onsite

*Liucun Li[1], Hiroyuki Arai[1], Toshihiko Baba[1] （1. Yokohama National Univ. (Japan)）

[Presentation Style] Onsite

We propose an electromagnetic wave imaging RoF system consisting of RF sensor and Si microring modulator arrays. It was demonstrated in a POC experiment at 3.5 GHz, for which we confirmed the agreement with simulations.

Hybrid Material Integration for Silicon Photonics I

Session Chair: Kazuhiro Ikeda (AIST)

Wed. Aug 3, 2022 4:00 PM - 5:00 PM Room 104&105 (1F)

[CWP12B-02] Annealing sequence dependence of directly bonded InP/Si substrate for GaInAsP LDs on silicon platform

[Presentation Style] Online

*Liang Zhao[1], Motonari Sato[1], Kota Shibukawa[1], Shingo Ito[1], Koji Agata[1], Kazuhiko Shimomura[1] (1. Sophia University (Japan))

4:00 PM - 4:15 PM

[CWP12B-03] Heterostructure vertical p-i-n GeSn Light-Emitting Diodes on Silicon-on-Insulator for 2µm Wavelength Band.

[Presentation Style] Onsite

*Radhika Bansal[1], Guo En Chang[1] (1. National Chung Cheng University (Taiwan))

4:15 PM - 4:30 PM

[CWP12B-04] Single and Multi-photon Absorption Induced Resonance Tuning in Gallium Selenide Integrated Silicon Nitride Ring Resonators

[Presentation Style] Onsite

*Asish Prosad[1], Rabindra Biswas[1], Lal Krishna A.S.[1], Srinivas Talabattula[1], Varun Raghunathan[1] (1. Indian Institute of Science, Bangalore (India))

4:30 PM - 4:45 PM

[CWP12B-05] Photothermal nonlinearity in a graphene oxide covered silicon micro-ring resonator

[Presentation Style] Online

*Chih-Hsien Chen[1], Chang-Yi Wu[1], Nai-Wen Cheng[1], Tzu-Hsiang Yen[1], Chia-Wei Huang[1], Chin-Shih Huang[2], Hao-Chun Hsieh[2], Hung-Chun Pan[2], Yu-Fu Wu[2], Tai-Chi Yang[2], Yung-Jr Hung[1] (1. National Sun Yat-sen Univ. (Taiwan), 2. Wistron Corp. (Taiwan))

4:45 PM - 5:00 PM

4:00 PM - 4:15 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Room 104&105)

[CWP12B-02] Annealing sequence dependence of directly bonded InP/Si substrate for GaInAsP LDs on silicon platform [Presentation Style] Online

*Liang Zhao[1], Motonari Sato[1], Kota Shibukawa[1], Shingo Ito[1], Koji Agata[1], Kazuhiko Shimomura[1] （1. Sophia University (Japan)）

[Presentation Style] Online

We demonstrated the bonding of thin film InP and Si using wafer direct bonding technique, described the heating process of the InP-Si directly attached substrate. The evaluation of the prepared InP-Si substrate by observing the surface state with Nomarski-mode images is better than previous annealing sequence. We have successfully obtained lasing characteristics of GaInAsP MQW LD using this substrate.

4:15 PM - 4:30 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Room 104&105)

[CWP12B-03] Heterostructure vertical p-i-n GeSn Light-Emitting Diodes on Silicon-on-Insulator for 2µm Wavelength Band. [Presentation Style] Onsite

*Radhika Bansal[1], Guo En Chang[1] （1. National Chung Cheng University (Taiwan)）

[Presentation Style] Onsite

We report on GeSn vertical p-i-n heterostructure light-emitting diode grown on silicon-on-insulator platform. Room-temperature electroluminescence spectra were demonstrated. These results pave the pathway for efficient on-chip light sources for integrated photonics in 2µm wavelength band.

4:30 PM - 4:45 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Room 104&105)

[CWP12B-04] Single and Multi-photon Absorption Induced Resonance Tuning in Gallium Selenide Integrated Silicon Nitride Ring Resonators [Presentation Style] Onsite

*Asish Prosad[1], Rabindra Biswas[1], Lal Krishna A.S.[1], Srinivas Talabattula[1], Varun Raghunathan[1] （1. Indian Institute of Science, Bangalore (India)）

[Presentation Style] Onsite

We study resonance tuning in Gallium Selenide integrated Silicon Nitride ring resonators in the 700-800 nm wavelength range using single- and multi-photon absorption processes. Blue-shift observed in the resonances is attributed to free-carrier refraction effects.

4:45 PM - 5:00 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Room 104&105)

[CWP12B-05] Photothermal nonlinearity in a graphene oxide covered silicon micro-ring resonator
[Presentation Style] Online

*Chih-Hsien Chen[1], Chang-Yi Wu[1], Nai-Wen Cheng[1], Tzu-Hsiang Yen[1], Chia-Wei Huang[1], Chin-Shih Huang[2], Hao-Chun Hsieh[2], Hung-Chun Pan[2], Yu-Fu Wu[2], Tai-Chi Yang[2], Yung-Jr Hung[1] （1. National Sun Yat-sen Univ. (Taiwan), 2. Wistron Corp. (Taiwan)）

[Presentation Style] Online

We fabricated highly-oxidized graphene oxide (GO) thin film to provide enhanced photothermal nonlinearity in GO-covered silicon micro-ring resonators. We observed 2~3 times increases in wavelength shifts of ring resonators under a fixed pumping power.

Oral Session | CLEO-PR2022 | Optical Signal Processing for FSO and Sensing

Optical Signal Processing for FSO and Sensing

Session Chair: Amol Choudhary (IIT Delhi)

Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207 (2F)

[CWP13A-01] Robust High-Order Free-Space Mode Sorting Enabled by a Software Defined Photonic Mesh
[Presentation Style] Online

*Aleksandr Boldin[1], Rakan Edrees Alsaigh[1], Maziyar Milanizadeh[2], Charalambos Klitis[1], Fabio Toso[2], Nicolas Fontaine[3], Andrea Melloni[2], Giorgio Ferrari[2], Marc Sorel[1], David A. B. Miller[4], Francesco Morichetti[2], Martin P. J. Lavery[1] (1. James Watt School of Engineering, University of Glasgow (UK), 2. Department of electronics, information and bioengineering (DEIB), Politecnico di Milano (Italy), 3. Nokia Bell Labs (United States of America), 4. Ginzton Laboratory, Stanford University (United States of America))

1:30 PM - 1:45 PM

[CWP13A-02] Entropy of Mode Mixers for Optical Unitary Converter based on Multi-Plane Light Conversion
[Presentation Style] Onsite

*Ryota Tanomura[1], Yoshitaka Taguchi[1], Rui Tang[1], Takuo Tanemura[1], Yoshiaki Nakano[1] (1. The Univ. Tokyo (Japan))

1:45 PM - 2:00 PM

[CWP13A-03 (Invited)] Integrated Microwave Photonics for Radar Applications
[Presentation Style] Online

Giovanni Serafino[1,3], Salvatore Maresca[2], *Manuel Reza[1], Claudio Porzi[1], Antonio Malacarne[3], Filippo Scotti[3], Paolo Ghelfi[3], Antonella Bogoni[1,3] (1. Sant'Anna School of Advanced Studies (Italy), 2. Consiglio Nazionale delle Ricerche (Italy), 3. Consorzio Nazionale Interuniversitario per le Telecomunicazioni (Italy))

2:00 PM - 2:30 PM

[CWP13A-04] Demonstration of highly efficient EO polymer modulator in visible light
[Presentation Style] Onsite

*Shun Kamada[1], Rieko Ueda[1], Chiyumi Yamada[1], Kouichi Tanaka[1], Toshiki Yamada[1], Akira Otomo[1] (1. National Inst. of Info. and Communications Tech. (Japan))

2:30 PM - 2:45 PM

[CWP13A-05] Improvement of Visualization of Sound Wave Propagation by Optical Microphone based on Digital Holography
[Presentation Style] Onsite

Kohei Itaya[1], Xiangyu Quan[1], Yasuhiro Awatsuji[2], *Osamu Matoba[1] (1. Kobe Univ. (Japan), 2. Kyoto Inst. Tech. (Japan))

2:45 PM - 3:00 PM

1:30 PM - 1:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207)

[CWP13A-01] Robust High-Order Free-Space Mode Sorting Enabled by a Software Defined Photonic Mesh

[Presentation Style] Online

*Aleksandr Boldin[1], Rakan Edrees Alsaigh[1], Maziyar Milanizadeh[2], Charalambos Klitis[1], Fabio Toso[2], Nicolas Fontaine[3], Andrea Melloni[2], Giorgio Ferrari[2], Marc Sorel[1], David A. B. Miller[4], Francesco Morichetti[2], Martin P. J. Lavery[1] （1. James Watt School of Engineering, University of Glasgow (UK), 2. Department of electronics, information and bioengineering (DEIB), Politecnico di Milano (Italy), 3. Nokia Bell Labs (United States of America), 4. Ginzton Laboratory, Stanford University (United States of America)）

[Presentation Style] Online

We propose a new free-space mode-sorter that can distinguish 15 spatial-modes with high efficiency, high fill factor and low crosstalk in non-perfect optical systems through the integrations of custom mode filter coupled with software-controllable photonic-mesh.

1:45 PM - 2:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207)

[CWP13A-02] Entropy of Mode Mixers for Optical Unitary Converter based on Multi-Plane Light Conversion

[Presentation Style] Onsite

*Ryota Tanomura[1], Yoshitaka Taguchi[1], Rui Tang[1], Takuo Tanemura[1], Yoshiaki Nakano[1] （1. The Univ. Tokyo (Japan)）

[Presentation Style] Onsite

Requirement of mode mixers in optical unitary converters based on multi-plane light conversion is examined. The “entropy” of each mixer, which describes the degree of mixing, is revealed to be crucial in determining the performance.

2:00 PM - 2:30 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207)

[CWP13A-03 (Invited)] Integrated Microwave Photonics for Radar Applications

[Presentation Style] Online

Giovanni Serafino[1,3], Salvatore Maresca[2], *Manuel Reza[1], Claudio Porzi[1], Antonio Malacarne[3], Filippo Scotti[3], Paolo Ghelfi[3], Antonella Bogoni[1,3] （1. Sant'Anna School of Advanced Studies (Italy), 2. Consiglio Nazionale delle Ricerche (Italy), 3. Consorzio Nazionale Interuniversitario per le Telecomunicazioni (Italy)）

[Presentation Style] Online

Integrated microwave photonics enables high-performance, compact, and rugged radar systems for applications in diverse domains. This paper provides a brief overview of promising photonic integrated solutions for maritime surveillance and Earth observation.

2:30 PM - 2:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207)

[CWP13A-04] Demonstration of highly efficient EO polymer modulator in visible light

[Presentation Style] Onsite

*Shun Kamada[1], Rieko Ueda[1], Chiyumi Yamada[1], Kouichi Tanaka[1], Toshiki Yamada[1], Akira Otomo[1] (1. National Inst. of Info. and Communications Tech. (Japan))

[Presentation Style] Onsite

We demonstrated the optical modulator using electro-optic polymers at visible wavelength. Modulation properties was evaluated using a Mach-Zehnder interferometer. The modulator was driven at wavelength 640 nm and successfully operated at a low voltage-length product.

2:45 PM - 3:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207)

[CWP13A-05] Improvement of Visualization of Sound Wave Propagation by Optical Microphone based on Digital Holography

[Presentation Style] Onsite

Kohei Itaya[1], Xiangyu Quan[1], Yasuhiro Awatsuji[2], *Osamu Matoba[1] (1. Kobe Univ. (Japan), 2. Kyoto Inst. Tech. (Japan))

[Presentation Style] Onsite

In the optical microphone based on digital holography, the noise reduction method of phase images of sound fields is applied and then it is verified that the propagation of sound waves is more clearly observed.

Oral Session | CLEO-PR2022 | Theory and Fundamentals

Theory and Fundamentals

Session Chairs: Yu-Jung Lu (Academia Sinica), Takuo Tanaka (RIKEN)
Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall B (1F)

[CWP16G-01] Resonant Coupling between Image Dipoles of Gold Nanoparticles and Fano Resonance of Capped Gold Nanoslits for Enhanced Oligonucleotide Detection

[Presentation Style] Onsite

*Sheng Hann Wang[1], Chia-Wen Kuo[1,2], Shu Cheng Lo[1,3], Wei-Han Yong[4], Ya-Lun Ho[2], Jean-Jacques Delaunay[2], Wan-Shao Tsai[4], Pei-Kuen Wei[1] （1. Academia Sinica (Taiwan), 2. The University of Tokyo (Japan), 3. National Taiwan University (Taiwan), 4. National Chung Hsing University (Taiwan)）

1:30 PM - 1:45 PM

[CWP16G-02] Metasurfaces for molecular emitter

[Presentation Style] Onsite

*Yoshiaki Nishijima[1] （1. Yokohama National University (Japan)）

1:45 PM - 2:00 PM

[CWP16G-03] Topological surface states at C4 rotational symmetry photonic crystals bounded by air

[Presentation Style] Online

*Anna TASOLAMPROU TASOLAMPROU[1], Maria Kafesaki[1], Costas Soukoulis[1], Eleftherios Economou[1], Thomas KOschny[2] （1. Institute of Electronic Structure and Laser, Foundation for Research and Technology Hellas (Greece), 2. Ames Laboratory and Department of Physics and Astronomy, Iowa State University (United States of America)）

2:00 PM - 2:15 PM

[CWP16G-04] Phase calculation scheme for designing highly customizable metalens-based devices

[Presentation Style] Onsite

*Hongliang Li[1], Changyi Zhou[1], Woo-Bin Lee[1], Duk-Yong Choi[2], Sang-Shin Lee[1] （1. Department of Electronic Engineering, Kwangwoon University (Korea), 2. Department of Quantum Science and Technology, Research School of Physics, Australian National University (Australia)）

2:15 PM - 2:30 PM

[CWP16G-05] Nonlocality-enabled Topological Engineering Towards New Applications of Anisotropic Metamaterials

[Presentation Style] Online

*Bartosz Janaszek[1], Marcin Kieliszczyk[1], Anna Tyszka-Zawadzka[1], Paweł Szczepański[1,2], Xiaowei Li[3], Lingling Huang[4], Zhaoxian Su[4], Yandong Gong[5] （1. Institute of Microelectronics and Optoelectronics, Warsaw University of Technology (Poland), 2. National Institute of Telecommunications (Poland), 3. Laser Micro/Nano-Fabrication Laboratory, School of Mechanical Engineering, Beijing Institute of Technology (China), 4. Beijing Engineering Research Center of Mixed Reality and Advanced Display, School of Optics and Photonics, Beijing Institute of Technology (China), 5. School of Instrument Science and Optoelectronics Engineering, Beijing Information Science and Technology

University (China))

2:30 PM - 2:45 PM

[CWP16G-06] Expanded Optical Waveguide Theory with Magneto-Optical Effect and Magnetoelectrical Effect

[Presentation Style] Onsite

*Yoshihiro Honda[1], Eri Igarashi[1], Tomohiro Amemiya[2] (1. Sony Group Corp. (Japan), 2. Tokyo Institute of Technology (Japan))

2:45 PM - 3:00 PM

1:30 PM - 1:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CWP16G-01] Resonant Coupling between Image Dipoles of Gold Nanoparticles and Fano Resonance of Capped Gold Nanoslits for Enhanced Oligonucleotide Detection [Presentation Style] Onsite

*Sheng Hann Wang[1], Chia-Wen Kuo[1,2], Shu Cheng Lo[1,3], Wei-Han Yong[4], Ya-Lun Ho[2], Jean-Jacques Delaunay[2], Wan-Shao Tsai[4], Pei-Kuen Wei[1] （1. Academia Sinica (Taiwan), 2. The University of Tokyo (Japan), 3. National Taiwan University (Taiwan), 4. National Chung Hsing University (Taiwan)）

[Presentation Style] Onsite

The progressing Bloch wave surface plasmon polaritons depressed by the image dipole of AuNPs on the capped gold nanoslit results in dramatic Fano peak drops and significantly enhance the oligonucleotide detection to 100 fM level.

1:45 PM - 2:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CWP16G-02] Metasurfaces for molecular emitter [Presentation Style] Onsite

*Yoshiaki Nishijima[1] （1. Yokohama National University (Japan)）

[Presentation Style] Onsite

We demonstrate extraordinarily spectrally selective narrowband mid-infrared radiation absorbance and thermal emittance with the strong surface enhancement of molecular infrared absorption (SEIRA) using mid-midinfrared metasurfaces.

2:00 PM - 2:15 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CWP16G-03] Topological surface states at C4 rotational symmetry photonic crystals bounded by air [Presentation Style] Online

*Anna TASOLAMPROU TASOLAMPROU[1], Maria Kafesaki[1], Costas Soukoulis[1], Eleftherios Economou[1], Thomas KOschny[2] （1. Institute of Electronic Structure and Laser, Foundation for Research and Technology Hellas (Greece), 2. Ames Laboratory and Department of Physics and Astronomy, Iowa State University (United States of America)）

[Presentation Style] Online

We present an approach for manipulating topological states sustained at free space interfaces. Eigenvalue analysis corroborated by direct scattering simulations demonstrate the topological invariant jump, the mode's unidirectionalilty and immunity to defects and back-scattering.

2:15 PM - 2:30 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CWP16G-04] Phase calculation scheme for designing highly customizable metalens-based devices [Presentation Style] Onsite

*Hongliang Li[1], Changyi Zhou[1], Woo-Bin Lee[1], Duk-Yong Choi[2], Sang-Shin Lee[1] (1. Department of Electronic Engineering, Kwangwoon University (Korea), 2. Department of Quantum Science and Technology, Research School of Physics, Australian National University (Australia))

[Presentation Style] Onsite

A phase calculation scheme, which gives required phase profiles extracted from pre-designed geometric lenses, was proposed and demonstrated for designing highly customizable metalens-based devices expanding the related research and practical applications.

2:30 PM - 2:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CWP16G-05] Nonlocality-enabled Topological Engineering Towards New Applications of Anisotropic Metamaterials [Presentation Style] Online

*Bartosz Janaszek[1], Marcin Kieliszczyk[1], Anna Tyszka-Zawadzka[1], Paweł Szczepański[1,2], Xiaowei Li[3], Lingling Huang[4], Zhaoxian Su[4], Yandong Gong[5] (1. Institute of Microelectronics and Optoelectronics, Warsaw University of Technology (Poland), 2. National Institute of Telecommunications (Poland), 3. Laser Micro/Nano-Fabrication Laboratory, School of Mechanical Engineering, Beijing Institute of Technology (China), 4. Beijing Engineering Research Center of Mixed Reality and Advanced Display, School of Optics and Photonics, Beijing Institute of Technology (China), 5. School of Instrument Science and Optoelectronics Engineering, Beijing Information Science and Technology University (China))

[Presentation Style] Online

We investigate topological phase transitions of iso-frequency of dispersion of anisotropic metamaterials via use of nonlocality engineering, which may lead to optical isolation or simultaneous generation of orthogonally polarized beams at different frequencies.

2:45 PM - 3:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CWP16G-06] Expanded Optical Waveguide Theory with Magneto-Optical Effect and Magnetoelectrical Effect [Presentation Style] Onsite

*Yoshihiro Honda[1], Eri Igarashi[1], Tomohiro Amemiya[2] (1. Sony Group Corp. (Japan), 2. Tokyo Institute of Technology (Japan))

[Presentation Style] Onsite

We proposed a comprehensive optical waveguide theory including magneto-optical (MO) effect and magnetoelectrical (ME) effect. This expanded theory revealed the interaction between MO effect and ME effect greatly enhanced the nonreciprocity of the propagating light.

Oral Session | CLEO-PR2022 | Photon Emission Devices and Related Technologies

Photon Emission Devices and Related Technologies

Session Chair: Koichi Okamoto (Osaka Metropolitan Univ.)

Wed. Aug 3, 2022 4:00 PM - 5:00 PM Mid-sized Hall B (1F)

[CWP16H-01] Out-of-plane symmetry-protected bound states in the continuum in a plasmonic nanofin metasurface

[Presentation Style] Online

Andreas Aigner[2], Juan Wang[2], Andreas Tittl[2], Stefan A. Maier[2,3], *Haoran Ren[1] （1. Macquarie University (Australia), 2. Ludwig-Maximilians-University Munich, Munich (Germany), 3. Imperial College London (UK)）

4:00 PM - 4:15 PM

[CWP16H-02] Highly Efficient Green Emissions of InGaN/GaN Quantum Wells with oxide thin films

[Presentation Style] Onsite

*Seiya Kaito[1], Yuki Kamei[1], Tetsuya Matsuyama[1], Kenji Wada[1], Mitsuru Funato[2], Yoichi Kawakami[2], Koichi Okamoto[1] （1. Osaka Metropolitan Univ. (Japan), 2. Kyoto Univ. (Japan)）

4:15 PM - 4:30 PM

[CWP16H-03] Plasmon-enhanced single photon source on an optical nanofiber

[Presentation Style] Onsite

*Yining Xuan[1], Masakazu Sugawara[1], Yasuyoshi Mitsumori[2], Keiichi Edamatsu[1], Mark Sadgrove[3] （1. Tohoku Univ. (Japan), 2. Kitasato Univ. (Japan), 3. Tokyo Univ. of Sci. (Japan)）

4:30 PM - 4:45 PM

[CWP16H-04] Detecting the Source of Surface Plasmon Hot-Electron Emission in Rectennas

[Presentation Style] Online

*Rana Poushimin Poushimin[1], Braulio Antonio[1], Jean-Michel Nunzi[1] （1. Physics department, Queen's University (Canada)）

4:45 PM - 5:00 PM

4:00 PM - 4:15 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Mid-sized Hall B)

[CWP16H-01] Out-of-plane symmetry-protected bound states in the continuum in a plasmonic nanofin metasurface

[Presentation Style] Online

Andreas Aigner[2], Juan Wang[2], Andreas Tittl[2], Stefan A. Maier[2,3], *Haoran Ren[1] (1. Macquarie University (Australia), 2. Ludwig-Maximilians-University Munich, Munich (Germany), 3. Imperial College London (UK))

[Presentation Style] Online

We present a plasmonic nanofin metasurface harnessing the out-of-plane symmetry breaking in parameter space by tuning the triangle angle of 3D laser nanoprinted polymer triangles (named as nanofins) coated with gold. The plasmonic nature of the out-of-plane symmetry-protected BICs enables high field enhancement together with high q-factors from the near- to mid-infrared regions, which were utilised for refractive index and pixelated molecular sensing.

4:15 PM - 4:30 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Mid-sized Hall B)

[CWP16H-02] Highly Efficient Green Emissions of InGaN/GaN Quantum Wells with oxide thin films

[Presentation Style] Onsite

*Seiya Kaito[1], Yuki Kamei[1], Tetsuya Matsuyama[1], Kenji Wada[1], Mitsuru Funato[2], Yoichi Kawakami[2], Koichi Okamoto[1] (1. Osaka Metropolitan Univ. (Japan), 2. Kyoto Univ. (Japan))

[Presentation Style] Onsite

We propose a bran-new method to improve efficiencies of green emissions of InGaN/GaN with oxides thin films. Photoluminescence intensities were enhanced significantly by depositing a thin oxide film and irradiating the surface with ultraviolet light.

4:30 PM - 4:45 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Mid-sized Hall B)

[CWP16H-03] Plasmon-enhanced single photon source on an optical nanofiber

[Presentation Style] Onsite

*Yining Xuan[1], Masakazu Sugawara[1], Yasuyoshi Mitsumori[2], Keiichi Edamatsu[1], Mark Sadgrove[3] (1. Tohoku Univ. (Japan), 2. Kitasato Univ. (Japan), 3. Tokyo Univ. of Sci. (Japan))

[Presentation Style] Onsite

We study a gold nanoparticle-quantum-dot coupled system on an optical nanofiber, serving as enhanced single photon source in a fiber-based communication network. Purcell enhancement and degree-of-polarization enhancement are considered for two different types of nanoparticles.

4:45 PM - 5:00 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Mid-sized Hall B)

[CWP16H-04] Detecting the Source of Surface Plasmon Hot-Electron Emission in Rectennas

[Presentation Style] Online

*Rana Poushimin Poushimin[1], Braulio Antonio[1], Jean-Michel Nunzi[1] （1. Physics department, Queen's University (Canada)）

[Presentation Style] Online

Using gold nanoparticles coated on ITO as a polarization-sensitive photodetector, we intend to locate the source of hot electron emission in the rectenna. This plasmonic photodetector is polarisation sensitive and has the potential to achieve high efficiency across a wide range of frequencies.

Oral Session | CLEO-PR2022 | Session of Excellent Papers in Sensors and Systems

Session of Excellent Papers in Sensors and Systems

Session Chairs: Norimichi Tsumura (Chiba Univ.), George C Cardoso (Univ. of São Paulo)

Wed. Aug 3, 2022 1:30 PM - 3:00 PM Small Hall (2F)

[CWP17A-01 (Invited(P))] Background-Free Vibrational Spectroscopy based on Destructive Interference around 2.3 um

[Presentation Style] Onsite

*Wenqing Song[1], Daiki Okazaki[1], Ikki Morichika[1], Satoshi Ashihara[1] （1. IIS, The Univ. of Tokyo (Japan)）

1:30 PM - 2:00 PM

[CWP17A-02] 50 km-range and 3.5 cm-spatial resolution Brillouin Optical Correlation Domain Analysis with Raman Amplification

[Presentation Style] Onsite

*Wookjin Jeong[1,2], Kwangyong Song[3], Gyutae Kim[2], Sangbae Lee[1], Kwanil Lee[1] （1. Korea Institute of Science and Technology (KIST) (Korea), 2. Korea Univ. (Korea), 3. Chungang Univ. (Korea)）

2:00 PM - 2:15 PM

[CWP17A-03] High NA and Size Reduction in Prism Lens for Silicon Photonics SLG Beam Scanner

[Presentation Style] Onsite

*Riku Kubota[1], Mikiya Kamata[1], Ryo Tetsuya[1], Takemasa Tamanuki[1], Toshihiko Baba[1] （1. Yokohama National Univ. (Japan)）

2:15 PM - 2:30 PM

[CWP17A-04] Near-Infrared Selective Absorber with Single-Material Based on Refractive Index-Tunable Tamm Plasmon Structure

[Presentation Style] Onsite

*So Hee Kim[1], Joo Hwan Ko[1], Young Jin Yoo[1], Min Seok Kim[1], Gil Ju Lee[2], Satoshi Ishii[3], Young Min Song[1] （1. Gwangju Institute of Science and Technology (GIST) (Korea), 2. Pusan National University (Korea), 3. National Institute of Materials Science (NIMS) (Japan)）

2:30 PM - 2:45 PM

[CWP17A-05] High Sensitivity Curvature Sensors Using stretched Four-core Fibers Through a corner-core Excitation

[Presentation Style] Online

Lina Suo[1], Ya-Pei Peng[2,3], Haimiao Zhou[1], Shijie Ren[1], *Nan-Kuang Chen[1] （1. Liaocheng Univ. (China), 2. Shenzhen Tech. Univ. (China), 3. NK Photonics Ltd. (China)）

2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Small Hall)

[CWP17A-01 (Invited(P))] Background-Free Vibrational Spectroscopy based on Destructive Interference around 2.3 um
[Presentation Style] Onsite

*Wenqing Song[1], Daiki Okazaki[1], Ikki Morichika[1], Satoshi Ashihara[1] （1. IIS, The Univ. of Tokyo (Japan)）

[Presentation Style] Onsite

We demonstrate background-free vibrational spectroscopy by using a mode-locked Cr:ZnS laser and a well-stabilized interferometer. The Allan deviation measurement indicates a potential sensitivity of 3.57×10^{-6} $Hz^{-1/2}$ as normalized noise equivalent absorption.

2:00 PM - 2:15 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Small Hall)

[CWP17A-02] 50 km-range and 3.5 cm-spatial resolution Brillouin Optical Correlation Domain Analysis with Raman Amplification
[Presentation Style] Onsite

*Wookjin Jeong[1,2], Kwangyong Song[3], Gyutae Kim[2], Sangbae Lee[1], Kwanil Lee[1] （1. Korea Institute of Science and Technology (KIST) (Korea), 2. Korea Univ. (Korea), 3. Chungang Univ. (Korea)）

[Presentation Style] Onsite

We experimentally realize a long range and high spatial resolution Brillouin sensor through optimizing key parameters in the Raman assisted time domain processing Brillouin optical correlation domain analysis.

2:15 PM - 2:30 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Small Hall)

[CWP17A-03] High NA and Size Reduction in Prism Lens for Silicon Photonics SLG Beam Scanner
[Presentation Style] Onsite

*Riku Kubota[1], Mikiya Kamata[1], Ryo Tetsuya[1], Takemasa Tamanuki[1], Toshihiko Baba[1] （1. Yokohama National Univ. (Japan)）

[Presentation Style] Onsite

Specific prism lenses have been developed for Si photonics SLG beam scanner and solid-state FMCW LiDAR. This study enhanced the NA and reduced the size of this lens for more efficient and compact scanner device.

2:30 PM - 2:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Small Hall)

[CWP17A-04] Near-Infrared Selective Absorber with Single-Material Based on Refractive Index-Tunable Tamm Plasmon

Structure

[Presentation Style] Onsite

*So Hee Kim[1], Joo Hwan Ko[1], Young Jin Yoo[1], Min Seok Kim[1], Gil Ju Lee[2], Satoshi Ishii[3], Young Min Song[1] （1. Gwangju Institute of Science and Technology (GIST) (Korea), 2. Pusan National University (Korea), 3. National Institute of Materials Science (NIMS) (Japan)）

[Presentation Style] Onsite

We suggest a computational model with near-unity absorption (≈99%) and a high Q-factor (≈45) of single-material Tamm plasmon structure (SMTPs). Our structure facilitates the realization of photodetectors for practical applications demanding high-performance TPs.

2:45 PM - 3:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Small Hall)

[CWP17A-05] High Sensitivity Curvature Sensors Using stretched Four-core Fibers Through a corner-core Excitation

[Presentation Style] Online

Lina Suo[1], Ya-Pei Peng[2,3], Haimiao Zhou[1], Shijie Ren[1], *Nan-Kuang Chen[1] （1. Liaocheng Univ. (China), 2. Shenzhen Tech. Univ. (China), 3. NK Photonics Ltd. (China)）

[Presentation Style] Online

The curvature sensing is realized by a tapered four-core fiber (TFCF). When the diameter of TFCF is 7 μm and a tapered length is 2.21 mm, the sensitivity of the curvature sensor is 16.12 nm/m^{-1}.

Oral Session | CLEO-PR2022 | Fiber-based Sensors and Systems

Fiber-based Sensors and Systems

Session Chairs: Norimichi Tsumura (Chiba Univ.), Athikom Roeksabutr (Mahanakorn Univ. of Tech.)
Wed. Aug 3, 2022 3:30 PM - 5:15 PM Small Hall (2F)

[CWP17B-01] Brillouin Fiber Sensor Based on Optical Frequency Comb and Heterodyne Detection

[Presentation Style] Onsite

*Takuma Ono[1], Yosuke Tanaka[2], Tatsutoshi Shioda[1] （1. Saitama Univ (Japan), 2. Tokyo Univ. Agriculture &Tech. (Japan)）

3:30 PM - 3:45 PM

[CWP17B-02] Speckle-Based Pressure Sensing Using Pure Silica Microstructured Optical Fiber

[Presentation Style] Onsite

*Mohammad Istiaque Reja[1,3], Linh V. Nguyen[2], Heike Ebendorff Heidepriem[1], Stephen C. Warren-Smith[2] （1. The University of Adelaide (Australia), 2. University of South Australia (Australia), 3. Chittagong University of Engineering and Technology (Bangladesh)）

3:45 PM - 4:00 PM

[CWP17B-03] Molecule self-organized fiber grating in fiber few-mode interferometers for temperature sensing applications

[Presentation Style] Online

Ya-Pei Peng[1,2], Haimiao Zhou[3], Lina Suo[3], Fan Yang[3], Shijie Ren[3], *Nan-Kuang Chen[3], Xinhe Lu[2], B. M. A. Rahman[4], K.T.V Grattan[4] （1. Shenzhen Tech. Univ. (China), 2. NK Photonics Ltd. (China), 3. Liaocheng Univ. (China), 4. Univ. of London (UK)）

4:00 PM - 4:15 PM

[CWP17B-05] High-sensitivity multicore-fiber strain sensors based on asymmetric supermodes interference

[Presentation Style] Online

Ya-Pei Peng[1,2], Lina Suo[3], Haimiao Zhou[3], Shijie Ren[3], Xinhe Lu[2], *Nan-Kuang Chen[3] （1. Shenzhen Tech. Univ. (China), 2. NK Photonics Ltd. (China), 3. Liaocheng Univ. (China)）

4:30 PM - 4:45 PM

3:30 PM - 3:45 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Small Hall)

[CWP17B-01] Brillouin Fiber Sensor Based on Optical Frequency Comb and Heterodyne Detection
[Presentation Style] Onsite

*Takuma Ono[1], Yosuke Tanaka[2], Tatsutoshi Shioda[1] （1. Saitama Univ (Japan), 2. Tokyo Univ. Agriculture &Tech. (Japan)）

[Presentation Style] Onsite

We have proposed a new detection method of Brillouin frequency shift measurement technique using optical comb and heterodyne detection technology. In this paper, the experimental results are shown for the confirmation of the operation principle.

3:45 PM - 4:00 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Small Hall)

[CWP17B-02] Speckle-Based Pressure Sensing Using Pure Silica Microstructured Optical Fiber
[Presentation Style] Onsite

*Mohammad Istiaque Reja[1,3], Linh V. Nguyen[2], Heike Ebendorff Heidepriem[1], Stephen C. Warren-Smith[2] （1. The University of Adelaide (Australia), 2. University of South Australia (Australia), 3. Chittagong University of Engineering and Technology (Bangladesh)）

[Presentation Style] Onsite

We report a specklegram pressure sensor using a pure silica six-hole novel microstructured optical fiber. This simple and low-cost sensor has the potential for pressure measurement at high temperature harsh environment applications.

4:00 PM - 4:15 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Small Hall)

[CWP17B-03] Molecule self-organized fiber grating in fiber few-mode interferometers for temperature sensing applications
[Presentation Style] Online

Ya-Pei Peng[1,2], Haimiao Zhou[3], Lina Suo[3], Fan Yang[3], Shijie Ren[3], *Nan-Kuang Chen[3], Xinhe Lu[2], B. M. A. Rahman[4], K.T.V Grattan[4] （1. Shenzhen Tech. Univ. (China), 2. NK Photonics Ltd. (China), 3. Liaocheng Univ. (China), 4. Univ. of London (UK)）

[Presentation Style] Online

We demonstrate fiber few-mode interferometers based on self-assembly surface corrugated grating using charged nano-particles for temperature sensors with a maximum resonant wavelength shift of 4.6 nm over 20˚C - 60˚C

4:30 PM - 4:45 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Small Hall)

[CWP17B-05] High-sensitivity multicore-fiber strain sensors based on asymmetric supermodes interference [Presentation Style] Online

Ya-Pei Peng[1,2], Lina Suo[3], Haimiao Zhou[3], Shijie Ren[3], Xinhe Lu[2], *Nan-Kuang Chen[3] （1. Shenzhen Tech. Univ. (China), 2. NK Photonics Ltd. (China), 3. Liaocheng Univ. (China)）

[Presentation Style] Online

The high sensitivity strain sensors using tapered four-core fibers (FCFs) with the sensitivity of 21.85 pm/μ under a tapered diameter of 7.5 μm were demonstrated.

X-ray Lasers and Their Applications I

Session Chair: Makina Yabashi (RIKEN)

Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 201&202 (2F)

[CWP19A-01 (Invited)] Opportunities and challenges of a hard x-ray regenerative amplifier free-electron laser
[Presentation Style] Online

Gabriel Marcus[1], *Rachel Margraf[1] （1. SLAC National Accelerator Laboratory (United States of America)）

1:30 PM - 2:00 PM

[CWP19A-02] Direct Measurement of Hard X-Ray Laser Pulse Duration via Intensity Autocorrelation Techniques
[Presentation Style] Onsite

*Taito Osaka[1], Ichiro Inoue[1], Jumpei Yamada[1,2], Yuichi Inubushi[3,1], Kensuke Tono[3,1], Shotaro Matsumura[2], Shota Nakano[2], Iori Ogasahara[2], Yasuhisa Sano[2], Kazuto Yamauchi[2], Kenji Tamasaku[1,3], Makina Yabashi[1,3] （1. RIKEN SPring-8 Center (Japan), 2. Osaka Univ. (Japan), 3. JASRI (Japan)）

2:00 PM - 2:15 PM

[CWP19A-03 (Invited)] Measurement and applications of high-intensity XFEL interactions with matter
[Presentation Style] Onsite

*Ichiro Inoue[1] （1. RIKEN (Japan)）

2:15 PM - 2:45 PM

[CWP19A-04] Frequency stabilized hard x ray lasers

*Hitoki Yoneda[1], Yurina Michine[1], Yuichi Inubushi[2], Makina Yabashi[3] （1. University of Electro-Communications (Japan), 2. JASRI (Japan), 3. RikenXFEL (Japan)）

2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 201&202)

[CWP19A-01 (Invited)] Opportunities and challenges of a hard x-ray regenerative amplifier free-electron laser [Presentation Style] Online

Gabriel Marcus[1], *Rachel Margraf[1] (1. SLAC National Accelerator Laboratory (United States of America))

[Presentation Style] Online

We discuss opportunities and challenges of hard X-ray regenerative amplifier free-electron lasers and describe ongoing R&D efforts currently underway to realize their full potential at high repetition rate free-electron laser facilities.

2:00 PM - 2:15 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 201&202)

[CWP19A-02] Direct Measurement of Hard X-Ray Laser Pulse Duration via Intensity Autocorrelation Techniques [Presentation Style] Onsite

*Taito Osaka[1], Ichiro Inoue[1], Jumpei Yamada[1,2], Yuichi Inubushi[3,1], Kensuke Tono[3,1], Shotaro Matsumura[2], Shota Nakano[2], Iori Ogasahara[2], Yasuhisa Sano[2], Kazuto Yamauchi[2], Kenji Tamasaku[1,3], Makina Yabashi[1,3] (1. RIKEN SPring-8 Center (Japan), 2. Osaka Univ. (Japan), 3. JASRI (Japan))

[Presentation Style] Onsite

Intensity autocorrelation techniques with x-ray two-photon absorption and second-harmonic generation are demonstrated to directly characterize the pulse duration of hard x-ray free-electron laser pulses.

2:15 PM - 2:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 201&202)

[CWP19A-03 (Invited)] Measurement and applications of high-intensity XFEL interactions with matter [Presentation Style] Onsite

*Ichiro Inoue[1] (1. RIKEN (Japan))

[Presentation Style] Onsite

This talk reviews the recent experimental studies on intense x-ray interaction with matter at SACLA. In particular, measurement of the x-ray-induced transient structural changes and their applications to optical control of XFEL pulses will be discussed.

2:45 PM - 3:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 201&202)

[CWP19A-04] Frequency stabilized hard x ray lasers

*Hitoki Yoneda[1], Yurina Michine[1], Yuichi Inubushi[2], Makina Yabashi[3] (1. University of Electro-Communications (Japan), 2. JASRI (Japan), 3. RikenXFEL (Japan))

By using Bragg condition inside x-ray laser medium, we have succeeded to achieve distribution feedback type laser in hard x ray region. We also use crystal lattice constant so that it is possible to demonstrate the first frequency stabilized hard x ray lasers.

X-ray Lasers and Their Applications II

Session Chair: Hitoki Yoneda (UEC)

Wed. Aug 3, 2022 3:30 PM - 4:30 PM Room 201&202 (2F)

[CWP19B-01 (Invited(P))] XFEL single-nanometer focusing system at SACLA

*Jumpei Yamada[1,2], Satoshi Matsuyama[3], Takato Inoue[2], Atsuki Ito[2], Ichiro Inoue[1], Taito Osaka[1], Yuichi Inubushi[4], Hirokatsu Yumoto[4,1], Takahisa Koyama[4,1], Haruhiko Ohashi[4,1], Kazuto Yamauchi[2], Makina Yabashi[1,4] （1. RIKEN SPring-8 Center (Japan), 2. Osaka University (Japan), 3. Nagoya University (Japan), 4. JASRI (Japan)）

3:30 PM - 4:00 PM

[CWP19B-02 (Invited)] Theoretical studies of X-ray induced damage in optical elements of beamlines at free-electron-laser facilities. [Presentation Style] Online

*Beata Ziaja-Motyka[1,2] （1. Center for Free-Electron Laser Science, DESY (Germany), 2. Institute of Nuclear Physics, PAS (Poland)）

4:00 PM - 4:30 PM

3:30 PM - 4:00 PM (Wed. Aug 3, 2022 3:30 PM - 4:30 PM Room 201&202)

[CWP19B-01 (Invited(P))] XFEL single-nanometer focusing system at SACLA

*Jumpei Yamada[1,2], Satoshi Matsuyama[3], Takato Inoue[2], Atsuki Ito[2], Ichiro Inoue[1], Taito Osaka[1], Yuichi Inubushi[4], Hirokatsu Yumoto[4,1], Takahisa Koyama[4,1], Haruhiko Ohashi[4,1], Kazuto Yamauchi[2], Makina Yabashi[1,4] (1. RIKEN SPring-8 Center (Japan), 2. Osaka University (Japan), 3. Nagoya University (Japan), 4. JASRI (Japan))

A sub-10 nm focusing system for the XFEL has been developed using advanced Kirkpatrick-Baez mirrors based on Wolter-type III geometry.

4:00 PM - 4:30 PM (Wed. Aug 3, 2022 3:30 PM - 4:30 PM Room 201&202)

[CWP19B-02 (Invited)] Theoretical studies of X-ray induced damage in optical elements of beamlines at free-electron-laser facilities.
[Presentation Style] Online

*Beata Ziaja-Motyka[1,2] (1. Center for Free-Electron Laser Science, DESY (Germany), 2. Institute of Nuclear Physics, PAS (Poland))

[Presentation Style] Online

Here we report on our theoretical studies of X-ray induced damage in a few materials relevant for optical elements of beamlines at X-ray free-electron-laser facilities. We present our computational tools and discuss their concrete applications.

Wavelength Conversion and Laser Devices

Session Chair: Akira Shirakawa (UEC)

Thu. Aug 4, 2022 9:00 AM - 10:30 AM Mid-sized Hall B (1F)

[CThA1E-01] Two-stage Double-pass DFG System with 30 pm Narrow-Bandwidth Mid-IR Radiation at 7 μ m

*Lyubomir I. Stoychev[1], Marco Baruzzo[2,3], Jose J. Suárez-Vargas[2,3], Humberto Cabrera[2,4], Ivaylo P. Nikolov[5], Alexander A. Demidovich[5], Miltcho B. Danailov[5], Andrea Vacchi[2,3] (1. ISSP, BAS (Bulgaria), 2. INFN, Triest (Italy), 3. Univ. Udine (Italy), 4. ICTP (Italy), 5. Elettra-Sincotrone (Italy))

9:00 AM - 9:15 AM

[CThA1E-02] Electro-Optic Spectral Tuning in Multi-Wavelength Nonperiodically Poled Lithium Niobate Optical Parametric Oscillator [Presentation Style] Onsite

Lin-Ming Deng[1], Shue-Shan Lin[1], *Tien-Dat Pham[1], Quan-Hsiang Tseng[1], Hung-Pin Chung[1], Wei-Kun Chang[2], Yen-Hung Chen[1] (1. National Central University (Taiwan), 2. National Tsinghua University (Taiwan))

9:15 AM - 9:30 AM

[CThA1E-03] An efficient wavelength upconversion effect in sapphire driven by microjoule femtosecond laser

Ruihong Dai[1], Haoyun Zhang[1], Shiyu Zhu[1], *Fengqiu Wang[1] (1. Nanjing University (China))

9:30 AM - 9:45 AM

[CThA1E-04] Intracavity Lithium Niobate Electro-Optic Modulator for External Cavity Laser Fast-Servo Feedback [Presentation Style] Onsite

*Sonya Palmer[1], Andreas Boes[1], Thach Nguyen[1], Arnan Mitchell[1], Robert E. Scholten[3,2] (1. RMIT Univ. (Australia), 2. Univ. of Melbourne (Australia), 3. MOGLabs (Australia))

9:45 AM - 10:00 AM

[CThA1E-05] Controlling the Emission Spectrum of a Laser with Anisotropic Mirrors [Presentation Style] Online

*Jean-Francois Bisson[1], Koffi Novignon Amouzou[1], Yves Christian Nonguierma[1] (1. Univ. of Moncton (Canada))

10:00 AM - 10:15 AM

[CThA1E-06] Comparison of materials for deep-ultraviolet optical isolator [Presentation Style] Onsite

*Yuki Tamaru[1,2], Hikaru Kumai[1], Atsushi Fuchimukai[2], Hiyori Uehara[1,3], Taisuke Miura[2], Ryo Yasuhara[1,3] (1. SOKENDAI (The Graduate University for Advanced Studies) (Japan), 2. GIGAPHOTON INC. (Japan), 3. National Institutes of Natural Sciences, National Institute for Fusion Science (Japan))

10:15 AM - 10:30 AM

9:00 AM - 9:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Mid-sized Hall B)

[CThA1E-01] Two-stage Double-pass DFG System with 30 pm Narrow-Bandwidth Mid-IR Radiation at 7 μ m

*Lyubomir I. Stoychev[1], Marco Baruzzo[2,3], Jose J. Suárez-Vargas[2,3], Humberto Cabrera[2,4], Ivaylo P. Nikolov[5], Alexander A. Demidovich[5], Miltcho B. Danailov[5], Andrea Vacchi[2,3] （1. ISSP, BAS (Bulgaria), 2. INFN, Triest (Italy), 3. Univ. Udine (Italy), 4. ICTP (Italy), 5. Elettra-Sincotrone (Italy)）

We present a two-stage double-pass difference frequency generation (DFG) laser system emitting tunable, narrow-linewidth (<30 pm), mid-infrared radiation around 6.78 μm. Different non-linear materials were studied as LiInS2, LiInSe2 and BaGa4Se7.

9:15 AM - 9:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Mid-sized Hall B)

[CThA1E-02] Electro-Optic Spectral Tuning in Multi-Wavelength Nonperiodically Poled Lithium Niobate Optical Parametric Oscillator
[Presentation Style] Onsite

Lin-Ming Deng[1], Shue-Shan Lin[1], *Tien-Dat Pham[1], Quan-Hsiang Tseng[1], Hung-Pin Chung[1], Wei-Kun Chang[2], Yen-Hung Chen[1] （1. National Central University (Taiwan), 2. National Tsinghua University (Taiwan)）

[Presentation Style] Onsite

We report an electro-optically (EO) tunable multi-wavelength optical parametric oscillator (OPO) based on a nonperiodically poled lithium niobate. EO spectral tuning rates of 0.5-0.58 nm/(kV/mm) are obtained with this OPO in the telecom C-L bands.

9:30 AM - 9:45 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Mid-sized Hall B)

[CThA1E-03] An efficient wavelength upconversion effect in sapphire driven by microjoule femtosecond laser

Ruihong Dai[1], Haoyun Zhang[1], Shiyu Zhu[1], *Fengqiu Wang[1] （1. Nanjing University (China)）

We investigate the nonlinear wavelength conversion processes in sapphire under microjoule femtosecond laser pumping. With appropriate sapphire thickness and focal arrangement, a >10% wavelength upconversion effect was observed, showing potential use for multi-photon microscopy.

9:45 AM - 10:00 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Mid-sized Hall B)

[CThA1E-04] Intracavity Lithium Niobate Electro-Optic Modulator for External Cavity Laser Fast-Servo Feedback
[Presentation Style] Onsite

*Sonya Palmer[1], Andreas Boes[1], Thach Nguyen[1], Arnan Mitchell[1], Robert E. Scholten[3,2] （1. RMIT Univ. (Australia), 2. Univ. of Melbourne (Australia), 3. MOGLabs (Australia)）
[Presentation Style] Onsite
We demonstrate laser frequency modulation using a small intracavity electro-optic modulator. The high bandwidth of our modulator (13.5 MHz) allows for superior frequency stabilization and linewidth narrowing (<1 kHz) when compared to diode injection current modulation.

10:00 AM - 10:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Mid-sized Hall B)

[CThA1E-05] Controlling the Emission Spectrum of a Laser with Anisotropic Mirrors
[Presentation Style] Online

*Jean-Francois Bisson[1], Koffi Novignon Amouzou[1], Yves Christian Nonguierma[1] （1. Univ. of Moncton (Canada)）
[Presentation Style] Online
Anisotropic lasers mirrors can achieve single frequency emission by eliminating dual polarization emission and spatial hole burning in a standing wave resonator. They can be obtained with nanostructured thin films deposited with physical vapor deposition.

10:15 AM - 10:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Mid-sized Hall B)

[CThA1E-06] Comparison of materials for deep-ultraviolet optical isolator
[Presentation Style] Onsite

*Yuki Tamaru[1,2], Hikaru Kumai[1], Atsushi Fuchimukai[2], Hiyori Uehara[1,3], Taisuke Miura[2], Ryo Yasuhara[1,3] （1. SOKENDAI (The Graduate University for Advanced Studies) (Japan), 2. GIGAPHOTON INC. (Japan), 3. National Institutes of Natural Sciences, National Institute for Fusion Science (Japan)）
[Presentation Style] Onsite
The Verdet constant in deep-ultraviolet region was evaluated and compared in synthetic quartz, $LiY_{0.85}Er_{0.15}F_4$ and $LiYF_4$. The DUV optical isolator can realize with the moderate magnetic field.

Tutorial - Diamond Lasers -

Session Chairs: Ryo Yasuhara (NIFS), Pu Zhou (National Univ. of Defense Tech.)

Thu. Aug 4, 2022 11:00 AM - 12:00 PM Mid-sized Hall B (1F)

[CThA1F-01 (Tutorial)] Stimulated Scattering lasers: Pathways to power and coherence

[Presentation Style] Onsite

*Richard Mildren[1] （1. Macquarie University (Australia)）

11:00 AM - 12:00 PM

11:00 AM - 12:00 PM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Mid-sized Hall B)

[CThA1F-01 (Tutorial)] Stimulated Scattering lasers: Pathways to power and coherence

[Presentation Style] Onsite

*Richard Mildren[1] （1. Macquarie University (Australia)）

[Presentation Style] Onsite

Brillouin and Raman lasers are a curious subclass of laser, taking properties from lasers and nonlinear conversion. This tutorial describes the physics and rules for design, and shows these have great promise for advancing power and coherence.

Attosecond Science and Technology I

Session Chairs: Katsuya Oguri (NTT Basic Research Laboratories), Tomoya Mizuno (Univ. of Tokyo)
Thu. Aug 4, 2022 9:30 AM - 10:30 AM Mid-sized Hall A (1F)

[CThA2G-01 (Invited)] High harmonic generation for probing photochemical reactions

[Presentation Style] Onsite

*Taro Sekikawa[1] (1. Hokkaido University (Japan))

9:30 AM - 10:00 AM

[CThA2G-02] Attosecond electronic dynamics of core-excited N_2O molecules probed by transient soft X-ray spectroscopy

[Presentation Style] Onsite

Saito Nariyuki[1], Nicolas Douguet[2], Nobuhisa Ishii[3], Teruto Kanai[1], Yi Wu[4], Andrew Chew[4], Seunghwoi Han[5], Barry I. Schneider[6], Jeppe Olsen[7], Luca Argenti[4], Zenghu Chang[4], *Jiro Itatani[1] (1. Univ. of Tokyo (Japan), 2. Kennesaw State Univ. (United States of America), 3. National Inst. for Quantum and Radiological Sci. and Tech. (Japan), 4. Univ. of Central Florida (United States of America), 5. Chonnam National Univ. (Korea), 6. National Inst. of Standards and Tech. (United States of America), 7. Aarhus Univ. (Denmark))

10:00 AM - 10:15 AM

[CThA2G-03] Quasi-Phase-Matched Water Window/keV High-Harmonic Generation from He^{1+} Ions

[Presentation Style] Online

*Hsu-hsin Chu[1,2], Yao-Li Liu[3], Jyhpyng Wang[1,2,4] (1. Department of Physics, National Central University (Taiwan), 2. Center for High Energy and High Field Physics, National Central University (Taiwan), 3. Institute of Space and Plasma Sciences, National Cheng Kung University (Taiwan), 4. Institute of Atomic and Molecular Sciences, Academia Sinica (Taiwan))

10:15 AM - 10:30 AM

9:30 AM - 10:00 AM (Thu. Aug 4, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CThA2G-01 (Invited)] High harmonic generation for probing photochemical reactions
[Presentation Style] Onsite

*Taro Sekikawa[1] (1. Hokkaido University (Japan))

[Presentation Style] Onsite

The dynamics of electrocyclic reaction is investigated from various aspects using high harmonic generation: High-harmonic and photoelectron spectroscopy for probing valence electrons and soft X-ray transient absorption to observe core electrons.

10:00 AM - 10:15 AM (Thu. Aug 4, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CThA2G-02] Attosecond electronic dynamics of core-excited N_2O molecules probed by transient soft X-ray spectroscopy
[Presentation Style] Onsite

Saito Nariyuki[1], Nicolas Douguet[2], Nobuhisa Ishii[3], Teruto Kanai[1], Yi Wu[4], Andrew Chew[4], Seunghwoi Han[5], Barry I. Schneider[6], Jeppe Olsen[7], Luca Argenti[4], Zenghu Chang[4], *Jiro Itatani[1] (1. Univ. of Tokyo (Japan), 2. Kennesaw State Univ. (United States of America), 3. National Inst. for Quantum and Radiological Sci. and Tech. (Japan), 4. Univ. of Central Florida (United States of America), 5. Chonnam National Univ. (Korea), 6. National Inst. of Standards and Tech. (United States of America), 7. Aarhus Univ. (Denmark))

[Presentation Style] Onsite

Half-cycle oscillation is observed in transient absorption spectra of N_2O molecules at Nitrogen K edge (400 eV) irradiated by intense IR pulses. The oscillation is attributed to tunneling ionization of core-excited states by TDSE-based simulation.

10:15 AM - 10:30 AM (Thu. Aug 4, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CThA2G-03] Quasi-Phase-Matched Water Window/keV High-Harmonic Generation from He^{1+} Ions
[Presentation Style] Online

*Hsu-hsin Chu[1,2], Yao-Li Liu[3], Jyhpyng Wang[1,2,4] (1. Department of Physics, National Central University (Taiwan), 2. Center for High Energy and High Field Physics, National Central University (Taiwan), 3. Institute of Space and Plasma Sciences, National Cheng Kung University (Taiwan), 4. Institute of Atomic and Molecular Sciences, Academia Sinica (Taiwan))

[Presentation Style] Online

A new scheme of quasi-phase-matched high-harmonic generation from He^{1+} ions is proposed. The relative conversion efficiencies for water window/keV operations are calculated to be about 15% of the perfect phase-matching condition.

High Harmonic Generation in Condensed Matters

Session Chairs: Zhi-Heng Loh (Nanyang Tech. Univ.), Katsuya Oguri (NTT Basic Research Laboratories)
Thu. Aug 4, 2022 11:00 AM - 12:00 PM Mid-sized Hall A (1F)

[CThA2H-01] Optical Field Control of Electron Dynamics in WSe_2 monolayer

[Presentation Style] Onsite

*Arqum Hashmi[1], Shunsuke Yamada[2], Atsushi Yamada[2], Kazuhiro Yabana[2], Tomohito Otobe[1] (1. Kansai Photon Science Institute, National Institutes for Quantum and Radiological Science and Technology (QST) (Japan), 2. Center for Computational Sciences, University of Tsukuba(Japan))

11:00 AM - 11:15 AM

[CThA2H-02] EUV High Harmonic Generation from Solids with Propagation Control Capabilities

[Presentation Style] Onsite

*Seungjai Won[1], Seungman Choi[1], Byunggi Kim[1], Taewon Kim[1], Young-Jin Kim[1], Seung-Woo Kim[1] (1. KAIST (Korea Adv. Inst. of Sci. and Tech.) (Korea))

11:15 AM - 11:30 AM

[CThA2H-03] Dynamic Localization and High Harmonic Generation in Solids

[Presentation Style] Onsite

*Yosuke Kayanuma[1], Tatsuhiko N. Ikeda[2], Satoshi Tanaka[1] (1. Graduate School Sci., Osaka Prefecture Univ. (Japan), 2. Inst. Solid State Phys., Univ. Tokyo (Japan))

11:30 AM - 11:45 AM

[CThA2H-04] Coherent modulation of the high harmonic generation from liquid water using double MIR pulses excitation

[Presentation Style] Onsite

*Tianqi Yang[1,2], Takayuki Kurihara[1], Tomoya Mizuno[1], Teruto Kanai[1], Yoshihisa Harada[1,2], Jiro Itatani[1] (1. ISSP, Univ. Tokyo (Japan), 2. GSFS, Univ. Tokyo (Japan))

11:45 AM - 12:00 PM

11:00 AM - 11:15 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Mid-sized Hall A)

[CThA2H-01] Optical Field Control of Electron Dynamics in WSe_2 monolayer

[Presentation Style] Onsite

*Arqum Hashmi[1], Shunsuke Yamada[2], Atsushi Yamada[2], Kazuhiro Yabana[2], Tomohito Otobe[1] (1. Kansai Photon Science Institute, National Institutes for Quantum and Radiological Science and Technology (QST) (Japan), 2. Center for Computational Sciences, University of Tsukuba(Japan))

[Presentation Style] Onsite

By using time-dependent density functional theory (TDDFT) with spin-orbit interaction (SOI), laser intensity dependence of the valley pseudospin and light propagation in terms of the transmitted and reflected high harmonic generation (HHG) is investigated.

11:15 AM - 11:30 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Mid-sized Hall A)

[CThA2H-02] EUV High Harmonic Generation from Solids with Propagation Control Capabilities

[Presentation Style] Onsite

*Seungjai Won[1], Seungman Choi[1], Byunggi Kim[1], Taewon Kim[1], Young-Jin Kim[1], Seung-Woo Kim[1] (1. KAIST (Korea Adv. Inst. of Sci. and Tech.) (Korea))

[Presentation Style] Onsite

We present a non-collinear irradiation scheme of high harmonic generation from solids, permitting self-convergent focusing of ultrafast EUV pulses to a 400 nm spot for elaborate experiments.

11:30 AM - 11:45 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Mid-sized Hall A)

[CThA2H-03] Dynamic Localization and High Harmonic Generation in Solids

[Presentation Style] Onsite

*Yosuke Kayanuma[1], Tatsuhiko N. Ikeda[2], Satoshi Tanaka[1] (1. Graduate School Sci., Osaka Prefecture Univ. (Japan), 2. Inst. Solid State Phys., Univ. Tokyo (Japan))

[Presentation Style] Onsite

We present a novel theoretical framework to describe the electron dynamics in solids under very high intensity optical pulses. It is pointed out that, due to the dynamic localization, high harmonics of voltex beams will be emitted under the irradiation of circularly polarized pump-pulses.

11:45 AM - 12:00 PM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Mid-sized Hall A)

[CThA2H-04] Coherent modulation of the high harmonic generation from liquid water using double MIR pulses excitation

[Presentation Style] Onsite

*Tianqi Yang[1,2], Takayuki Kurihara[1], Tomoya Mizuno[1], Teruto Kanai[1], Yoshihisa Harada[1,2], Jiro Itatani[1] （1. ISSP, Univ. Tokyo (Japan), 2. GSFS, Univ. Tokyo (Japan)）

[Presentation Style] Onsite

High harmonics are produced in a liquid water jet by two noncollinear MIR pulses. We observed a persisting interference-like modulation in high harmonic signals, suggesting the existence of a coherent polarization.

Comb Metrology I

Session Chair: Kaoru Minoshima (UEC)

Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 204 (2F)

[CThA6C-01 (Tutorial)] Applications of Frequency Comb in Nanotechnology, Industry, and Space Technology and More
[Presentation Style] Onsite
*Seung-Woo Kim[1] (1. KAIST (Korea))
9:00 AM - 10:00 AM

[CThA6C-02] Frequency Comb-to-comb Synchronization through Atmospheric Optical Frequency Transfer over a 1.3-km Free-space
[Presentation Style] Onsite
*Dong IL Lee[1], Jaewon Yang[1], Dong-Chel Shin[1], Young-Jin Kim[1], Seung-Woo Kim[1] (1. KAIST (Korea))
10:00 AM - 10:15 AM

[CThA6C-03] Optical phased array based on optical frequency comb for broadband wavefront control of ultrashort pulse
[Presentation Style] Onsite
*Takashi Kato[1,2], Kaoru Minoshima[1] (1. UEC (Japan), 2. PRESTO, JST (Japan))
10:15 AM - 10:30 AM

9:00 AM - 10:00 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 204)

[CThA6C-01 (Tutorial)] Applications of Frequency Comb in Nanotechnology, Industry, and Space Technology and More
[Presentation Style] Onsite

*Seung-Woo Kim[1] (1. KAIST (Korea))

[Presentation Style] Onsite

Acting as a frequency synthesizer with direct traceability to the microwave and/or optical clocks, the optical frequency comb of an ultrashort laser leads breakthroughs in diverse metrological applications in entire optical regime including terahertz waves.

10:00 AM - 10:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 204)

[CThA6C-02] Frequency Comb-to-comb Synchronization through Atmospheric Optical Frequency Transfer over a 1.3-km Free-space
[Presentation Style] Onsite

*Dong IL Lee[1], Jaewon Yang[1], Dong-Chel Shin[1], Young-Jin Kim[1], Seung-Woo Kim[1] (1. KAIST (Korea))

[Presentation Style] Onsite

We present a1.3-km free-space optical link system stabilizing two frequency combs located in different places. Frequency stability of 1.22×10^{-15} at 1.0 s integration is achieved across the entire spectrum.

10:15 AM - 10:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 204)

[CThA6C-03] Optical phased array based on optical frequency comb for broadband wavefront control of ultrashort pulse
[Presentation Style] Onsite

*Takashi Kato[1,2], Kaoru Minoshima[1] (1. UEC (Japan), 2. PRESTO, JST (Japan))

[Presentation Style] Onsite

We demonstrated wavefront control by pulse-to-pulse interference using optical phased array based on optical frequency comb by controlling the wavefront of ultrashort pulses by only changing the ratio of two frequency parameters of the comb.

Comb Metrology II

Session Chair: Takashi Kato (Univ. of Electro-Communications)
Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 204 (2F)

[CThA6D-01] Shape sensing based on dual-comb demodulation of a fiber Bragg grating sensing array
[Presentation Style] Online

Jianjun Yang[1], *Jiansheng Liu[1], Baorui Yu[1], Minghui Ma[1], Jingyuan Hu[1], Hongfeng Shao[2], Xin Zhao[1], Zheng Zheng[1,3] （1. School of Electronic and Information Engineering, Beihang University (China), 2. School of Instrumentation and Optoelectron, Beihang University, Beijing (China), 3. Shenzhen Institute of Beihang University, Shenzhen, Guangdong (China)）

11:00 AM - 11:15 AM

[CThA6D-02] Simultaneous Measurement of Refractive Index and Lens Surface Spacing in Optical Systems by Dual-Comb Ranging
[Presentation Style] Online

*Chen Lin[1], Siyu Zhou[1], Ruixue Zhang[1], Guanhao Wu[1] （1. Tsinghua Univ. (China)）

11:15 AM - 11:30 AM

[CThA6D-03] Shape Measurement Technique with Self-correction of Air Refractive using a Single-color Comb Interferometer
[Presentation Style] Onsite

*Takuho Tanaka[1], Kanyo Akuzawa[1], Takashi Kato[1,2], Kaoru Minoshima[1] （1. The University of Electro-Communications (Japan), 2. PRESTO JST (Japan)）

11:30 AM - 11:45 AM

[CThA6D-04] Phase Sensitive Surface Profile Measurement Using Swept Multigigahertz Supercontinuum Comb
[Presentation Style] Online

*Samuel Choi[1,4], Takuro Yamazaki[1], Hiroshi Hibino[2,4], Takamasa Suzuki[1], Tatsutoshi Shioda[3] （1. Niigata Univ. (Japan), 2. Osaka Univ. (Japan), 3. Saitama Univ. (Japan), 4. AMED-CREST, AMED (Japan)）

11:45 AM - 12:00 PM

11:00 AM - 11:15 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 204)

[CThA6D-01] Shape sensing based on dual-comb demodulation of a fiber Bragg grating sensing array
[Presentation Style] Online

Jianjun Yang[1], *Jiansheng Liu[1], Baorui Yu[1], Minghui Ma[1], Jingyuan Hu[1], Hongfeng Shao[2], Xin Zhao[1], Zheng Zheng[1,3] (1. School of Electronic and Information Engineering, Beihang University (China), 2. School of Instrumentation and Optoelectron, Beihang University, Beijing (China), 3. Shenzhen Institute of Beihang University, Shenzhen, Guangdong (China))

[Presentation Style] Online

A shape sensing system with 3.85 mm measurement error over a range of 490 mm based on the single-cavity dual-comb spectroscopy technology and a dense all-identical fiber Bragg grating (FBG) sensor array is demonstrated.

11:15 AM - 11:30 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 204)

[CThA6D-02] Simultaneous Measurement of Refractive Index and Lens Surface Spacing in Optical Systems by Dual-Comb Ranging
[Presentation Style] Online

*Chen Lin[1], Siyu Zhou[1], Ruixue Zhang[1], Guanhao Wu[1] (1. Tsinghua Univ. (China))

[Presentation Style] Online

We present a method to measure the refractive index and lens surface spacing in optical systems simultaneously by dual-comb ranging. The repeatability precision of thickness and refractive index is better than 0.18 μm and 1.6×10^{-4}.

11:30 AM - 11:45 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 204)

[CThA6D-03] Shape Measurement Technique with Self-correction of Air Refractive using a Single-color Comb Interferometer
[Presentation Style] Onsite

*Takuho Tanaka[1], Kanyo Akuzawa[1], Takashi Kato[1,2], Kaoru Minoshima[1] (1. The University of Electro-Communications (Japan), 2. PRESTO JST (Japan))

[Presentation Style] Onsite

We developed a technique for precise shape measurements over a long distance in air. We achieved self-correction of air refractive index fluctuation with 3-µm uncertainty over 61-m using two-color method with single-wavelength optical frequency comb.

11:45 AM - 12:00 PM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 204)

[CThA6D-04] Phase Sensitive Surface Profile Measurement Using Swept Multigigahertz Supercontinuum Comb [Presentation Style] Online

*Samuel Choi[1,4], Takuro Yamazaki[1], Hiroshi Hibino[2,4], Takamasa Suzuki[1], Tatsutoshi Shioda[3] （1. Niigata Univ. (Japan), 2. Osaka Univ. (Japan), 3. Saitama Univ. (Japan), 4. AMED-CREST, AMED (Japan)）

[Presentation Style] Online

A full-field surface profiling technique using a frequency-tunable supercontinuum multi-gigahertz comb was proposed and demonstrated simultaneous amplitude and phase detection. Depth resolution was 30 µm and displacement accuracy of the measured plane was 19 nm.

Solid State Photonic Quantum Systems

Session Chair: Man-Jin Zhong (Southern Univ. of Sci. and Tech.)
Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 107&108 (1F)

[CThA7D-01 (Invited)] Efficient Spin-Photon Interfaces for Quantum Networks
[Presentation Style] Onsite
*Jorg Wrachtrup[1] （1. Stuttgart University (Germany)）
9:00 AM - 9:30 AM

[CThA7D-02 (Invited)] Applications of solid state optics in information technologies
[Presentation Style] Online
*Sen Yang[1] （1. Hong Kong University of Science and Technology (Hong Kong)）
9:30 AM - 10:00 AM

[CThA7D-03] Creation of Silicon Vacancy Center in Detonation Nanodiamonds by High Temperature Annealing
[Presentation Style] Onsite
*Konosuke Shimazaki[1], Hiroki Kawaguchi[1], Hideaki Takashima[1], Takuya Fabian Segawa[2,1], Frederick T.-K. So[1], Daiki Terada[1], Shinobu Onoda[3], Takeshi Ohshima[3], Masahiro Shirakawa[1], Shigeki Takeuchi[1] （1. Kyoto Univ. (Japan), 2. ETH Zurich (Switzerland), 3. QST (Japan)）
10:00 AM - 10:15 AM

[CThA7D-04] Photon Pair Correlations in Semiconductor-Superconductor Light Sources
[Presentation Style] Online
*Shlomi Bouscher[1], Dmitry Panna[1], Krishna Balasubramanian[2], Ronen Jacovi[1], Ankit Kumar[1], Christian Schneider[3], Sven Hoefling[3], Alex Hayat[1] （1. Department of Electrical Engineering, Technion, Israel Inst. of Technology (Israel), 2. Electrical Engineering Faculty, Indian Inst. of Technology (India), 3. Technische Physik, Physikalisches Institut and Wilhelm Conrad Röntgen Research Center for Complex Material Systems, Universität Würzburg (Germany)）
10:15 AM - 10:30 AM

9:00 AM - 9:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 107&108)

[CThA7D-01 (Invited)] Efficient Spin-Photon Interfaces for Quantum Networks

[Presentation Style] Onsite

*Jorg Wrachtrup[1] (1. Stuttgart University (Germany))

[Presentation Style] Onsite

Spin defects in wide band gap semiconductors are a leading contender in various areas of quantum technology. Most notably they have been established as a novel tool for nanoscale sensing and as major hardware for long distance quantum entanglement, necessary for quantum repeater structures [1,2]. I will present the use of spin defects in Silicon Carbide (SiC) for quantum photonics and specifically for spin-photon interfaces [3].

9:30 AM - 10:00 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 107&108)

[CThA7D-02 (Invited)] Applications of solid state optics in information technologies

[Presentation Style] Online

*Sen Yang[1] (1. Hong Kong University of Science and Technology (Hong Kong))

[Presentation Style] Online

Solid state optics is a broad field with a wide range of applications from industry to research. Here, I will show several research developments in quantum applications as well as classical counterpart.

10:00 AM - 10:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 107&108)

[CThA7D-03] Creation of Silicon Vacancy Center in Detonation Nanodiamonds by High Temperature Annealing

[Presentation Style] Onsite

*Konosuke Shimazaki[1], Hiroki Kawaguchi[1], Hideaki Takashima[1], Takuya Fabian Segawa[2,1], Frederick T.-K. So[1], Daiki Terada[1], Shinobu Onoda[3], Takeshi Ohshima[3], Masahiro Shirakawa[1], Shigeki Takeuchi[1] (1. Kyoto Univ. (Japan), 2. ETH Zurich (Switzerland), 3. QST (Japan))

[Presentation Style] Onsite

Single-digit detonation nanodiamonds (DNDs) have attracted attention as single-photon emitters in many research fields. Here, the creation of silicon vacancy centers in DNDs by an annealing treatment up to 1100° C in high vacuum is reported.

10:15 AM - 10:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 107&108)

[CThA7D-04] Photon Pair Correlations in Semiconductor-Superconductor Light Sources

[Presentation Style] Online

*Shlomi Bouscher[1], Dmitry Panna[1], Krishna Balasubramanian[2], Ronen Jacovi[1], Ankit Kumar[1], Christian Schneider[3], Sven Hoefling[3], Alex Hayat[1] （1. Department of Electrical Engineering, Technion, Israel Inst. of Technology (Israel), 2. Electrical Engineering Faculty, Indian Inst. of Technology (India), 3. Technische Physik, Physikalisches Institut and Wilhelm Conrad Röntgen Research Center for Complex Material Systems, Universität Würzburg (Germany)）

[Presentation Style] Online

We demonstrate evidence of photon pair correlations, resulting from injected Cooper-pairs in superconductor-semiconductor structures. Such structures can be utilized for multiple applications including enhanced two-photon gain, electrically-driven entangled-photon generation and Bell-state analyzers.

Quantum Communication and Quantum Information Processing

Session Chair: Qiang Zhang (Univ. of Sci. and Tech. of China)

Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 107&108 (1F)

[CThA7E-01 (Invited)] Engineering entanglement for quantum computing on silicon photonics chips

[Presentation Style] Online

*Jianwei Wang[1] （1. Peking University (China)）

11:00 AM - 11:30 AM

[CThA7E-02] Three-photon time-bin entanglement generation using an optical switch

[Presentation Style] Onsite

*Hsin-Pin Lo[1], Takuya Ikuta[1], Koji Azuma[1], Toshimori Honjo[1], William John Munro[1], Hiroki Takesue [1] （1. NTT Basic Research Laboratories (Japan)）

11:30 AM - 11:45 AM

[CThA7E-03] 20-GHz quantum key distribution using Mach-Zehnder intensity modulation and low jitter superconducting single photon detectors

[Presentation Style] Onsite

*Atsushi Taniguchi[1], Yasuyuki Sanari[1], Hirokazu Takahashi[1], Kazuaki Obana[1], Hideki Nishizawa[1], Koichi Takasugi[1], Hsin-Pin Lo[2], Takuya Ikuta[2], Toshimori Honjo[2], Hiroki Takesue[2] （1. NTT Network Innovation Labs., NTT Corp. (Japan), 2. NTT Basic Research Labs., NTT Corp. (Japan)）

11:45 AM - 12:00 PM

11:00 AM - 11:30 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 107&108)

[CThA7E-01 (Invited)] Engineering entanglement for quantum computing on silicon photonics chips
[Presentation Style] Online

*Jianwei Wang[1] (1. Peking University (China))

[Presentation Style] Online

On-chip generating, controlling and detecting quantum states of light with large-scale silicon-photonic circuits opens the way to realizing advanced quantum technologies. In this talk we present recent progress in silicon-photonic quantum devices for quantum computing.

11:30 AM - 11:45 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 107&108)

[CThA7E-02] Three-photon time-bin entanglement generation using an optical switch
[Presentation Style] Onsite

*Hsin-Pin Lo[1], Takuya Ikuta[1], Koji Azuma[1], Toshimori Honjo[1], William John Munro[1], Hiroki Takesue [1] (1. NTT Basic Research Laboratories (Japan))

[Presentation Style] Onsite

We realized the first three-photon time-bin GHZ states using a 2x2 optical switch as a time-dependent beam splitter to entangle a photon from a weak coherent light and a photon from a time-bin entangled photon pair.

11:45 AM - 12:00 PM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 107&108)

[CThA7E-03] 20-GHz quantum key distribution using Mach-Zehnder intensity modulation and low jitter superconducting single photon detectors
[Presentation Style] Onsite

*Atsushi Taniguchi[1], Yasuyuki Sanari[1], Hirokazu Takahashi[1], Kazuaki Obana[1], Hideki Nishizawa[1], Koichi Takasugi[1], Hsin-Pin Lo[2], Takuya Ikuta[2], Toshimori Honjo[2], Hiroki Takesue[2] (1. NTT Network Innovation Labs., NTT Corp. (Japan), 2. NTT Basic Research Labs., NTT Corp. (Japan))

[Presentation Style] Onsite

We report the first 20-GHz clocked QKD using Mach-Zehnder intensity modulation and low jitter superconducting single photon detectors. A 41.8 kbps secure key rate was achieved with 23 dB channel loss by optical attenuation.

High-Q Microresonators and Their Applications

Session Chair: Amol Choudhary (IIT Delhi)

Thu. Aug 4, 2022 9:00 AM - 10:30 AM Small Hall (2F)

[CThA8C-01] A Novel Ultra-high Q Buckle-free Large Silica Rib Microdisk with Sub-Micron Thickness

[Presentation Style] Onsite

*Shahin Honari[1], Tao Lu[1] (1. University of Victoria (Canada))

9:00 AM - 9:15 AM

[CThA8C-02] Kerr comb generation with dispersive waves in silica microsphere coupled to Erbium-fiber gain

[Presentation Style] Online

*Xiaoying Wang[1], Tuo Liu[1], Xinpeng Chen[1], Hairun Guo[1] (1. Shanghai Univ. (China))

9:15 AM - 9:30 AM

[CThA8C-03] Mode-locked Operation in a Coupled Microresonator System with Gain and Nonlinear Loss

[Presentation Style] Onsite

*Riku Imamura[1], Yuki Tate[1], Ayata Nakashima[1], Keigo Nagashima[1], Shun Fujii[1,2], Takasumi Tanabe[1] (1. Keio Univ. (Japan), 2. RIKEN (Japan))

9:30 AM - 9:45 AM

[CThA8C-04] FEC-free dense WDM transmission with Kerr soliton microcombs in crystalline MgF_2 microresonators

[Presentation Style] Onsite

*Koya Tanikawa[1], Shun Tasaka[1], Shun Fujii[1,2], Shuya Tanaka[1], Hajime Kumazaki[1], Koshiro Wada[1], Soma Kogure[1], Satoki Kawanishi[1], Takasumi Tanabe[1] (1. Keio University (Japan), 2. RIKEN Center for Advanced Photonics (Japan))

9:45 AM - 10:00 AM

[CThA8C-05] Off-axis Excitation of Electromagnetically Induced Transparency-like Resonances in the Mid-Infrared Wavelength Range

[Presentation Style] Onsite

*Lal Krishna A.S.[1], Varun Raghunathan[1] (1. Indian Institute of Science (India))

10:00 AM - 10:15 AM

[CThA8C-06] Photogrammetry of Asymmetric Microcavities

[Presentation Style] Onsite

*Shilong Li[1], Ke Tian[1], Mohammed Zia Jalaludeen[1], Síle Nic Chormaic[1] (1. Okinawa Institute of Science and Technology Graduate University (Japan))

10:15 AM - 10:30 AM

9:00 AM - 9:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Small Hall)

[CThA8C-01] A Novel Ultra-high Q Buckle-free Large Silica Rib Microdisk with Sub-Micron Thickness
[Presentation Style] Onsite

*Shahin Honari[1], Tao Lu[1] (1. University of Victoria (Canada))

[Presentation Style] Onsite

In this work we demonstrate a novel buckle-free 1-millimeter-diameter silica rib microdisk with sub-micron thickness. Using this geometery, an optical quality factor as high as $1.2x10^7$ at 970 nm wavelength is reported.

9:15 AM - 9:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Small Hall)

[CThA8C-02] Kerr comb generation with dispersive waves in silica microsphere coupled to Erbium-fiber gain
[Presentation Style] Online

*Xiaoying Wang[1], Tuo Liu[1], Xinpeng Chen[1], Hairun Guo[1] (1. Shanghai Univ. (China))

[Presentation Style] Online

We report the experimental observation of nonlinear phenomena in silica microspheres. Kerr frequency comb is generated with the measured ~25KHz linewidth. And dispersive wave was observed in microspheres at 1454nm.

9:30 AM - 9:45 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Small Hall)

[CThA8C-03] Mode-locked Operation in a Coupled Microresonator System with Gain and Nonlinear Loss
[Presentation Style] Onsite

*Riku Imamura[1], Yuki Tate[1], Ayata Nakashima[1], Keigo Nagashima[1], Shun Fujii[1,2], Takasumi Tanabe[1] (1. Keio Univ. (Japan), 2. RIKEN (Japan))

[Presentation Style] Onsite

We numerically study the mode-locking behavior in a system in which an erbium-doped resonator (gain) is coupled to a carbon-nanotube functionalized resonator (nonlinear loss).

9:45 AM - 10:00 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Small Hall)

[CThA8C-04] FEC-free dense WDM transmission with Kerr soliton microcombs in crystalline MgF_2 microresonators
[Presentation Style] Onsite

*Koya Tanikawa[1], Shun Tasaka[1], Shun Fujii[1,2], Shuya Tanaka[1], Hajime Kumazaki[1], Koshiro Wada[1], Soma Kogure[1], Satoki Kawanishi[1], Takasumi Tanabe[1] （1. Keio University (Japan), 2. RIKEN Center for Advanced Photonics (Japan)）

[Presentation Style] Onsite

We demonstrated forward-error-correction (FEC)-free dense wavelength division multiplexing communication utilizing a Kerr soliton frequency comb generated from a high-Q crystalline microresonator with a 20-GHz free spectral range.

10:00 AM - 10:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Small Hall)

[CThA8C-05] Off-axis Excitation of Electromagnetically Induced Transparency-like Resonances in the Mid-Infrared Wavelength Range

[Presentation Style] Onsite

*Lal Krishna A.S.[1], Varun Raghunathan[1] （1. Indian Institute of Science (India)）

[Presentation Style] Onsite

We experimentally demonstrate off-axis excitation of EIT-like resonances with Q-factor of 360 in the mid-infrared wavelength range through the interaction of guided-mode and quasi-bound states in continuum resonance branches in one-dimensional amorphous-silicon sub-wavelength grating structures.

10:15 AM - 10:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Small Hall)

[CThA8C-06] Photogrammetry of Asymmetric Microcavities

[Presentation Style] Onsite

*Shilong Li[1], Ke Tian[1], Mohammed Zia Jalaludeen[1], Síle Nic Chormaic[1] （1. Okinawa Institute of Science and Technology Graduate University (Japan)）

[Presentation Style] Onsite

We propose to perform a photogrammetric study of asymmetric microcavities as a feasible way to obtain their geometry. Such a photogrammetric study will benefit both optical microcavity and photogrammetry applications.

Oral Session | CLEO-PR2022 | Topological Photonics I

Topological Photonics I

Session Chair: Yasutomo Ota (Univ. of Tokyo)

Thu. Aug 4, 2022 11:00 AM - 12:00 PM Small Hall (2F)

[CThA8D-01 (Invited)] Biphoton entanglement across topologies

[Presentation Style] Online

Cooper Doyle[2], Wei-Wei Zhang[3], Michelle Wang[2], Bryn A Bell[4], Stephen D Bartlett[2], *Andrea Blanco-Redondo[1] （1. Nokia Bell Labs (United States of America), 2. University of Sydney (Australia), 3. Gusu Laboratory of Materials (China), 4. Imperial College (UK)）

11:00 AM - 11:30 AM

[CThA8D-02 (Invited(P))] Topological modes observed in Si photonics SSH integrated circuit

[Presentation Style] Onsite

Reona Nakamura[1], *Toi Nakama[1], Armandas Balcytis[2], Tomoki Ozawa[3], Yasutomo Ota[4], Satoshi Iwamoto[5], Hiroyuki Ito[1], Toshihiko Baba[1] （1. Yokohama National Univ. (Japan), 2. RMIT Univ. (Australia), 3. Tohoku Univ. (Japan), 4. Keio Univ. (Japan), 5. Univ. of Tokyo (Japan)）

11:30 AM - 12:00 PM

11:00 AM - 11:30 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Small Hall)

[CThA8D-01 (Invited)] Biphoton entanglement across topologies

[Presentation Style] Online

Cooper Doyle[2], Wei-Wei Zhang[3], Michelle Wang[2], Bryn A Bell[4], Stephen D Bartlett[2], *Andrea Blanco-Redondo[1] (1. Nokia Bell Labs (United States of America), 2. University of Sydney (Australia), 3. Gusu Laboratory of Materials (China), 4. Imperial College (UK))

[Presentation Style] Online

We report on our recent experimental demonstrations of biphoton entanglement of modes with different topologies. Our findings highlight topology as a new degree of freedom for photonic entanglement.

11:30 AM - 12:00 PM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Small Hall)

[CThA8D-02 (Invited(P))] Topological modes observed in Si photonics SSH integrated circuit

[Presentation Style] Onsite

Reona Nakamura[1], *Toi Nakama[1], Armandas Balcytis[2], Tomoki Ozawa[3], Yasutomo Ota[4], Satoshi Iwamoto[5], Hiroyuki Ito[1], Toshihiko Baba[1] (1. Yokohama National Univ. (Japan), 2. RMIT Univ. (Australia), 3. Tohoku Univ. (Japan), 4. Keio Univ. (Japan), 5. Univ. of Tokyo (Japan))

[Presentation Style] Onsite

We fabricated a sophisticated Si photonic integrated circuit for investigating topological photonics SSH model. In the selective excitation and observation of SSH coupled microrings, we observed the wavefunctions of edge and bulk modes.

Oral Session | CLEO-PR2022 | Fiber Nonlinearity and Devices

Fiber Nonlinearity and Devices

Session Chair: Tetsuya Hayashi (Sumitomo Electric Industries, Ltd.)

Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 206 (2F)

[CThA10C-01] Suppressing stimulated Brillouin scattering through higher order mode excitation in a multimode fiber

[Presentation Style] Onsite

*Stephen C. Warren-Smith[1,2], Kabish Wisal[3], Chun-Wei Chen[3], A. Douglas Stone[3], Linh V. Nguyen[1,2], Ori Henderson-Sapir[2], David Ottaway[2], Heike Ebendorff-Heidepriem[2], Hui Cao[3] (1. Univ. of South Australia (Australia), 2. The Univ. of Adelaide (Australia), 3. Yale Univ. (United States of America))

9:00 AM - 9:15 AM

[CThA10C-02] Optimised Microwave photonic Phase Shifter using Brillouin-induced Low-biasing

[Presentation Style] Onsite

*Reena Parihar[1], Rajveer Dhawan[1], Gurubinder Singh[1], Amol Choudhary[1] (1. UFO-CHIP, Indian Inst. of Tech. (IIT Delhi) (India))

9:15 AM - 9:30 AM

[CThA10C-03] Self-Frequency Shift Controlled Tuning of Third Harmonic Signal in a Silica Nanowire

[Presentation Style] Online

*Akhileshwar Mishra[1], Seth Mathew V[1], Ravi Pant[1] (1. IISER Thiruvananthapuram (India))

9:30 AM - 9:45 AM

[CThA10C-04] Programmable Visible Cylindrical Vector Beams Using Mode Selective Coupler

[Presentation Style] Online

*Mengdie Hou[1], Xuan Zhou[1], Jiangtao Xu[1], Longtao Wang[1], Xianglong Zeng[1] (1. Shanghai University (China))

9:45 AM - 10:00 AM

[CThA10C-05 (Invited)] Ultrafast Parallel Random Number Generation with a Chip-Scale Semiconductor Laser

[Presentation Style] Online

*Hui Cao[1] (1. Yale University (United States of America))

10:00 AM - 10:30 AM

9:00 AM - 9:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 206)

[CThA10C-01] Suppressing stimulated Brillouin scattering through higher order mode excitation in a multimode fiber
[Presentation Style] Onsite

*Stephen C. Warren-Smith[1,2], Kabish Wisal[3], Chun-Wei Chen[3], A. Douglas Stone[3], Linh V. Nguyen[1,2], Ori Henderson-Sapir[2], David Ottaway[2], Heike Ebendorff-Heidepriem[2], Hui Cao[3] (1. Univ. of South Australia (Australia), 2. The Univ. of Adelaide (Australia), 3. Yale Univ. (United States of America))

[Presentation Style] Onsite

We numerically and experimentally demonstrate that spreading power into higher order modes of a multimode optical fiber can be used to suppress stimulated Brillouin scattering for a high-power narrow linewidth system.

9:15 AM - 9:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 206)

[CThA10C-02] Optimised Microwave photonic Phase Shifter using Brillouin-induced Low-biasing
[Presentation Style] Onsite

*Reena Parihar[1], Rajveer Dhawan[1], Gurubinder Singh[1], Amol Choudhary[1] (1. UFO-CHIP, Indian Inst. of Tech. (IIT Delhi) (India))

[Presentation Style] Onsite

Optimisation of the performance metrics of a microwave photonic phase shifter is demonstrated by low-biasing the carrier through Brillouin scattering with improvement in linearity and noise figure up to 1dB and 3dB, respectively.

9:30 AM - 9:45 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 206)

[CThA10C-03] Self-Frequency Shift Controlled Tuning of Third Harmonic Signal in a Silica Nanowire
[Presentation Style] Online

*Akhileshwar Mishra[1], Seth Mathew V[1], Ravi Pant[1] (1. IISER Thiruvananthapuram (India))

[Presentation Style] Online

We exploit Raman induced self-frequency shift of sub-nJ mode locked pulses in a 50 m long polarization maintain fiber to tune the third harmonic signal, generated in a silica nanowire, by ~18 THz

9:45 AM - 10:00 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 206)

[CThA10C-04] Programmable Visible Cylindrical Vector Beams Using Mode Selective Coupler

[Presentation Style] Online

*Mengdie Hou[1], Xuan Zhou[1], Jiangtao Xu[1], Longtao Wang[1], Xianglong Zeng[1] （1. Shanghai University (China)）

[Presentation Style] Online

We experimentally demonstrated a scheme of dynamic switching of cylindrical vector mode and orbital angular momentum beams based on mode selective coupler using programmable electrical polarization controller.

10:00 AM - 10:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 206)

[CThA10C-05 (Invited)] Ultrafast Parallel Random Number Generation with a Chip-Scale Semiconductor Laser [Presentation Style] Online

*Hui Cao[1] （1. Yale University (United States of America)）

[Presentation Style] Online

We employ spatio-temporal interference of many lasing modes for ultrafast and scalable random number generation. The laser diode with specially-designed cavity produces hundreds of bit streams on a total rate two orders-of-magnitude faster than state-of-the-art.

Photonic Computing I

Session Chair: Mikael Mazur (Nokia Bell Labs.)

Thu. Aug 4, 2022 9:00 AM - 10:45 AM Room 201&202 (2F)

[CThA13B-01 (Invited(P))] Demonstration of A Clements-type 16 × 16 Photonic Analog Matrix Processor Based on Silicon Photonics

*Shota Kita[1,2], Kengo Nozaki[1,2], Kenta Takata[1,2], Kohei Ikeda[1,2], Kazuo Aoyama[3], Keijiro Suzuki[4], Yuriko Maegami[4], Morifumi Ohno[4], Guangwei Cong[4], Noritsugu Yamamoto[4], Koji Yamada[4], Akihiko Shinya[1,2], Hiroshi Sawada[3], Masaya Notomi[1,2] (1. NTT Nanophotonics Center (Japan), 2. NTT BRL (Japan), 3. NTT CSL (Japan), 4. AIST (Japan))

9:00 AM - 9:30 AM

[CThA13B-02 (Invited)] Silicon Photonics for Training Deep Neural Networks
[Presentation Style] Online

*Bhavin J. Shastri[1,4], Matthew J. Filipovich[1], Zhimu Guo[1], Paul R Prucnal[4], Sudip Shekhar[2], Volker J. Sorger[3] (1. Queen's University (Canada), 2. University of British Columbia (Canada), 3. George Washington University (United States of America), 4. Princeton University (United States of America))

9:30 AM - 10:00 AM

[CThA13B-03] Deep Reservoir Computing Based on Injection-Locked Quantum Dot Lasers
[Presentation Style] Online

Bao-De Lin[1], Jia-Yan Tang[1], Jingyi Yu[1], Xuming He[1], *Cheng Wang[1] (1. ShanghaiTech University (China))

10:00 AM - 10:15 AM

[CThA13B-04] Prediction and Replication of Chaotic Dynamics Using Photonic Reservoir Computing with Semiconductor Laser
[Presentation Style] Onsite

*Atsuya Kawakami[1], Kazutaka Kanno[1], Atsushi Uchida[1] (1. Saitama Univ. (Japan))

10:15 AM - 10:30 AM

[CThA13B-05] Fourier ptychography multi-parameter neural network with composite physical priori optimization
[Presentation Style] Online

*Delong Yang[1], Shaohui Zhang[1], Chuanjian Zheng[1], Guocheng Zhou[1], Lei Cao[1], Hu Yao[1], Qun Hu Hao[1] (1. Beijing Institution of Technology (China))

10:30 AM - 10:45 AM

9:00 AM - 9:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:45 AM Room 201&202)

[CThA13B-01 (Invited(P))] Demonstration of A Clements-type 16 × 16 Photonic Analog Matrix Processor Based on Silicon Photonics

*Shota Kita[1,2], Kengo Nozaki[1,2], Kenta Takata[1,2], Kohei Ikeda[1,2], Kazuo Aoyama[3], Keijiro Suzuki[4], Yuriko Maegami[4], Morifumi Ohno[4], Guangwei Cong[4], Noritsugu Yamamoto[4], Koji Yamada[4], Akihiko Shinya[1,2], Hiroshi Sawada[3], Masaya Notomi[1,2] （1. NTT Nanophotonics Center (Japan), 2. NTT BRL (Japan), 3. NTT CSL (Japan), 4. AIST (Japan)）

We fabricated and packaged a Clements-type 16×16 photonic matrix processor based on silicon photonics. By applying circuit parameter learning, we have obtained an R2 determination coefficient of ˜0.859 and demonstrated a clear identity matrix implementation.

9:30 AM - 10:00 AM (Thu. Aug 4, 2022 9:00 AM - 10:45 AM Room 201&202)

[CThA13B-02 (Invited)] Silicon Photonics for Training Deep Neural Networks
[Presentation Style] Online

*Bhavin J. Shastri[1,4], Matthew J. Filipovich[1], Zhimu Guo[1], Paul R Prucnal[4], Sudip Shekhar[2], Volker J. Sorger[3] （1. Queen's University (Canada), 2. University of British Columbia (Canada), 3. George Washington University (United States of America), 4. Princeton University (United States of America)）

[Presentation Style] Online

Analog photonic networks as deep learning hardware accelerators are trained on standard digital electronics. We propose an on-chip training of neural networks enabled by a silicon photonic architecture for parallel, efficient, and fast data operations.

10:00 AM - 10:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:45 AM Room 201&202)

[CThA13B-03] Deep Reservoir Computing Based on Injection-Locked Quantum Dot Lasers
[Presentation Style] Online

Bao-De Lin[1], Jia-Yan Tang[1], Jingyi Yu[1], Xuming He[1], *Cheng Wang[1] （1. ShanghaiTech University (China)）

[Presentation Style] Online

This work proposes a deep reservoir computing architecture based on cascading injection-locked quantum dot lasers. It is proved that the four-layer reservoir computing performs better than the single-layer one on multiple benchmark tasks.

10:15 AM - 10:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:45 AM Room 201&202)

[CThA13B-04] Prediction and Replication of Chaotic Dynamics Using Photonic Reservoir Computing with Semiconductor Laser [Presentation Style] Onsite

*Atsuya Kawakami[1], Kazutaka Kanno[1], Atsushi Uchida[1] （1. Saitama Univ. (Japan)）

[Presentation Style] Onsite

We perform short-term prediction of chaotic time series by reservoir computing using a semiconductor laser with optical feedback. We also replicate a chaotic attractor to reproduce the long-term behavior of chaotic dynamics.

10:30 AM - 10:45 AM (Thu. Aug 4, 2022 9:00 AM - 10:45 AM Room 201&202)

[CThA13B-05] Fourier ptychography multi-parameter neural network with composite physical priori optimization [Presentation Style] Online

*Delong Yang[1], Shaohui Zhang[1], Chuanjian Zheng[1], Guocheng Zhou[1], Lei Cao[1], Hu Yao[1], Qun Hu Hao[1] （1. Beijing Institution of Technology (China)）

[Presentation Style] Online

FPM has high requirements for the system construction and data acquisition processes. In this paper, we propose a Fourier ptychography multi-parameter neural network (FPMN) with composite physical prior optimization. A hybrid parameter determination strategy combining physical imaging model and data-driven network training is proposed to recover the multi layers of the network corresponding to different physical parameters.

Oral Session | CLEO-PR2022 | Raman Imaging

Raman Imaging

Session Chair: Mamoru Hashimoto (Hokkaido Univ.)

Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 207 (2F)

[CThA15E-01] T cell activation and differentiation monitored non-invasively with Raman spectroscopy

[Presentation Style] Onsite

Nicolas Pavillon[1], *Nicholas I. Smith[1,2] (1. IFReC, Osaka University (Japan), 2. OTRI, Osaka University (Japan))

9:00 AM - 9:15 AM

[CThA15E-02] PCA and Raman spectroscopy for discrimination of biological tissues and estimation of the basis for discrimination

[Presentation Style] Onsite

*Hayata Tadamasa[1], Takeo Minamikawa[2], Yoshiki Terao[3], Koshirou Hori[1], Takeshi Yasui[2] (1. Grad. Sch. Sci. Tech. Innov. Tokushima Univ. (Japan), 2. pLED. Tokushima Univ. (Japan), 3. Grad. Sch. Adv. Tech. Sci. Tokushima Univ. (Japan))

9:15 AM - 9:30 AM

[CThA15E-03] Detection of Liposomes Encapsulating Neurotransmitters by Optical Trapping Raman Spectroscopy

[Presentation Style] Onsite

*Kyoko Masui[1,2,4], Yasunori Nawa[1,3], Shunsuke Tokumitsu[1,3], Makoto Kawarai[1,3], Wataru Minoshima[1,4], Tomomi Tani[5], Satoshi Fujita[1,3], Hidekazu Ishitobi[1,3,2], Chie Hosokawa[1,4], Yasushi Inouye[1,2,3] (1. PhotoBIO-OIL, AIST (Japan), 2. FBS, Osaka Univ. (Japan), 3. Appl. Phys., Osaka Univ. (Japan), 4. Osaka City Univ. (Japan), 5. Bio. Res. Inst., AIST (Japan))

9:30 AM - 9:45 AM

[CThA15E-04] Raman Imaging of Primary Cultured Hippocampal Neuron for Evaluating Neuronal Maturation

*Takahiro Nagano[1,2], Kyoko Masui[1,3,4], Yasunori Nawa[1,2], Hidekazu Ishitobi[1,2,4], Tomomi Tani[5], Satoshi Fujita[1,2], Katsumasa Fujita[1,2], Chie Hosokawa[1,3], Yasushi Inouye[1,2,4] (1. PhotoBIO-OIL, AIST (Japan), 2. Appl. Phys. Osaka Univ. (Japan), 3. Osaka City Univ. (Japan), 4. Front. Biosci., Osaka Univ. (Japan), 5. Biomed. Res. Inst., AIST (Japan))

9:45 AM - 10:00 AM

[CThA15E-05 (Invited)] Line-illumination Raman microscopy for imaging biological samples

[Presentation Style] Onsite

*Katsumasa Fujita[1,2] (1. Osaka University (Japan), 2. AIST PhotoBIO-OIL (Japan))

10:00 AM - 10:30 AM

9:00 AM - 9:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 207)

[CThA15E-01] T cell activation and differentiation monitored non-invasively with Raman spectroscopy [Presentation Style] Onsite

Nicolas Pavillon[1], *Nicholas I. Smith[1,2] (1. IFReC, Osaka University (Japan), 2. OTRI, Osaka University (Japan))

[Presentation Style] Onsite

We show how Raman spectroscopy can be used to non-invasively monitor the changes occurring at single-cell level during the differentiation of naive T cells into effector cells following activation through in vitro stimulation.

9:15 AM - 9:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 207)

[CThA15E-02] PCA and Raman spectroscopy for discrimination of biological tissues and estimation of the basis for discrimination [Presentation Style] Onsite

*Hayata Tadamasa[1], Takeo Minamikawa[2], Yoshiki Terao[3], Koshirou Hori[1], Takeshi Yasui[2] (1. Grad. Sch. Sci. Tech. Innov. Tokushima Univ. (Japan), 2. pLED. Tokushima Univ. (Japan), 3. Grad. Sch. Adv. Tech. Sci. Tokushima Univ. (Japan))

[Presentation Style] Onsite

We developed a Raman spectral analysis method to estimate the basis for discrimination by using principal component analysis, which leads to the development of a reliable discrimination method of biological tissues.

9:30 AM - 9:45 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 207)

[CThA15E-03] Detection of Liposomes Encapsulating Neurotransmitters by Optical Trapping Raman Spectroscopy [Presentation Style] Onsite

*Kyoko Masui[1,2,4], Yasunori Nawa[1,3], Shunsuke Tokumitsu[1,3], Makoto Kawarai[1,3], Wataru Minoshima[1,4], Tomomi Tani[5], Satoshi Fujita[1,3], Hidekazu Ishitobi[1,3,2], Chie Hosokawa[1,4], Yasushi Inouye[1,2,3] (1. PhotoBIO-OIL, AIST (Japan), 2. FBS, Osaka Univ. (Japan), 3. Appl. Phys., Osaka Univ. (Japan), 4. Osaka City Univ. (Japan), 5. Bio. Res. Inst., AIST (Japan))

[Presentation Style] Onsite

Optical trapping Raman spectroscopy was used for detection of glutamate molecules encapsulated in liposomes as a mimic of synaptic vesicles. The trapping behavior of glutamate molecules was analyzed by the number of Raman intensity.

9:45 AM - 10:00 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 207)

[CThA15E-04] Raman Imaging of Primary Cultured Hippocampal Neuron for Evaluating Neuronal Maturation

*Takahiro Nagano[1,2], Kyoko Masui[1,3,4], Yasunori Nawa[1,2], Hidekazu Ishitobi[1,2,4], Tomomi Tani[5], Satoshi Fujita[1,2], Katsumasa Fujita[1,2], Chie Hosokawa[1,3], Yasushi Inouye[1,2,4] (1. PhotoBIO-OIL, AIST (Japan), 2. Appl. Phys. Osaka Univ. (Japan), 3. Osaka City Univ. (Japan), 4. Front. Biosci., Osaka Univ. (Japan), 5. Biomed. Res. Inst., AIST (Japan))

We investigated the distribution changes of cytochrome *c* in mitochondria of neurons by Raman imaging. Cytochrome *c* gradually spread to neurites, implying that mitochondria increased in areas of high energy demand, including synaptic site.

10:00 AM - 10:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:30 AM Room 207)

[CThA15E-05 (Invited)] Line-illumination Raman microscopy for imaging biological samples
[Presentation Style] Onsite

*Katsumasa Fujita[1,2] (1. Osaka University (Japan), 2. AIST PhotoBIO-OIL (Japan))

[Presentation Style] Onsite

We have developed Raman microscopy techniques for rapid imaging of living cells and tissues to characterize and diagnose their biological state and function, which complements the information provided by other optical techniques.

Oral Session | CLEO-PR2022 | Localization

Localization

Session Chair: Yoshihisa Yamaoka (Saga Univ.)

Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 207 (2F)

[CThA15F-01 (Invited)] Natural Photoreceptive-Protein Toolbox of Microbial Rhodopsins

[Presentation Style] Onsite

*Keiichi Inoue[1] (1. Univ. Tokyo (Japan))

11:00 AM - 11:30 AM

[CThA15F-02] Metal Ion Dynamics Imaging Based on Surface Plasmon Resonance Microscope

[Presentation Style] Onsite

*Hirokazu Tanaka[1,2], Kyoko Masui[2,3,4], Ryugo Tero[5], Hidekazu Ishitobi[1,2,3], Siham Refki[6], Zouheir Sekkat[1,6,7], Yasushi Inouye[1,2,3] (1. Osaka Univ., Applied Physics (Japan), 2. AIST, PhotoBIO-OIL (Japan), 3. Osaka Univ., Frontier Biosciences (Japan), 4. Osaka City Univ., Chemistry (Japan), 5. Toyohashi Tech., Applied Chemistry and Life Science (Japan), 6. MAScIR (Morocco), 7. Mohammed V Univ., Chemistry (Morocco))

11:30 AM - 11:45 AM

[CThA15F-03] NIR-to-NIR Imaging via Harmonic Nanoparticles

[Presentation Style] Online

*Laura Vittadello[1], Jan Klenen[1], Mirco Imlau[1] (1. Osnabrueck Univ. (Germany))

11:45 AM - 12:00 PM

11:00 AM - 11:30 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 207)

[CThA15F-01 (Invited)] Natural Photoreceptive-Protein Toolbox of Microbial Rhodopsins
[Presentation Style] Onsite

*Keiichi Inoue[1] (1. Univ. Tokyo (Japan))

[Presentation Style] Onsite

Microbial rhodopsins are photoreceptive membrane proteins with diverse molecular functions. Biophysical characterization of new types of microbial rhodopsins, spectroscopic and structural biological study on their molecular mechanism, and optogenetic tool development will be presented.

11:30 AM - 11:45 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 207)

[CThA15F-02] Metal Ion Dynamics Imaging Based on Surface Plasmon Resonance Microscope
[Presentation Style] Onsite

*Hirokazu Tanaka[1,2], Kyoko Masui[2,3,4], Ryugo Tero[5], Hidekazu Ishitobi[1,2,3], Siham Refki[6], Zouheir Sekkat[1,6,7], Yasushi Inouye[1,2,3] (1. Osaka Univ., Applied Physics (Japan), 2. AIST, PhotoBIO-OIL (Japan), 3. Osaka Univ., Frontier Biosciences (Japan), 4. Osaka City Univ., Chemistry (Japan), 5. Toyohashi Tech., Applied Chemistry and Life Science (Japan), 6. MAScIR (Morocco), 7. Mohammed V Univ., Chemistry (Morocco))

[Presentation Style] Onsite

We have developed a non-invasive and high-resolution imaging method for the two-dimensional dynamics of metal ions in the vicinity of cells based on Surface Plasmon Resonance Microscope.

11:45 AM - 12:00 PM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 207)

[CThA15F-03] NIR-to-NIR Imaging via Harmonic Nanoparticles
[Presentation Style] Online

*Laura Vittadello[1], Jan Klenen[1], Mirco Imlau[1] (1. Osnabrueck Univ. (Germany))

[Presentation Style] Online

A lack of suitable markers hampered the exploitation of the third and fourth biological windows, an appealing approach for safe in-vivo imaging. Harmonic nanoparticles and nonlinear microscopy offer a valuable solution to bridge this gap.

LIDAR and Remote Sensing

Session Chairs: Hirotsugu Yamamoto (Utsunomiya Univ.), Junghyun Park (Samsung Advanced Inst. of Tech.)
Thu. Aug 4, 2022 9:00 AM - 10:15 AM Room 104&105 (1F)

[CThA17C-01] A Compact and Low-Cost Rolling-LiDAR for Three-Dimensional Mapping

[Presentation Style] Onsite

*Soichiro Nishiguchi[1], Tomohiro Maeda[1,2], Hideyuki Sotobayashi[1], Atsushi Kanno[2] (1. Aoyama Gakuin Univ. (Japan), 2. NICT (Japan))

9:00 AM - 9:15 AM

[CThA17C-02] Demonstration of Coherent Transceiver for Visible-Wavelength Applicable to Communication and Doppler Lidar Systems

[Presentation Style] Online

*Akihito Tamada[1], Yusuke Ito[1], Masaharu Imaki[1], Shumpei Kameyama[1] (1. Mitsubishi Electric Corp. Info. Tech. R&D Center (Japan))

9:15 AM - 9:30 AM

[CThA17C-03] Asynchronous Optical Sampling based on Semiconductor Optical Amplifier for the Absolute Distance Measurement of Multiple Targets

[Presentation Style] Onsite

*Jaeyoung Jang[1], Seung-Woo Kim[1], Young-Jin Kim[1] (1. KAIST (Korea))

9:30 AM - 9:45 AM

[CThA17C-04] Coherent Doppler Lidar using Optical Single Sideband Modulation

[Presentation Style] Onsite

*Sean Wolfe[1,2], Takuma Shirahata[1,2], Shinji Yamashita[1,2], Sze Yun Set[1,2] (1. Univ. of Tokyo (Japan), 2. RCAST (Japan))

9:45 AM - 10:00 AM

[CThA17C-05] Phase Error Correction through Digital Resampling for LiDAR Applications

[Presentation Style] Online

Jhih-Jia Kang[1], *Shih-Hsiang Hsu[1] (1. National Taiwan University of Science and Technology (Taiwan))

10:00 AM - 10:15 AM

9:00 AM - 9:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:15 AM Room 104&105)

[CThA17C-01] A Compact and Low-Cost Rolling-LiDAR for Three-Dimensional Mapping
[Presentation Style] Onsite

*Soichiro Nishiguchi[1], Tomohiro Maeda[1,2], Hideyuki Sotobayashi[1], Atsushi Kanno[2] (1. Aoyama Gakuin Univ. (Japan), 2. NICT (Japan))

[Presentation Style] Onsite

A rolling-LiDAR system is proposed that reconstructs a three-dimensional map by correcting the movement and rotation of the scan data from a two-dimensional LiDAR module. The basic operation of the rolling-LiDAR is experimentally demonstrated.

9:15 AM - 9:30 AM (Thu. Aug 4, 2022 9:00 AM - 10:15 AM Room 104&105)

[CThA17C-02] Demonstration of Coherent Transceiver for Visible-Wavelength Applicable to Communication and Doppler Lidar Systems
[Presentation Style] Online

*Akihito Tamada[1], Yusuke Ito[1], Masaharu Imaki[1], Shumpei Kameyama[1] (1. Mitsubishi Electric Corp. Info. Tech. R&D Center (Japan))

[Presentation Style] Online

The coherent transceiver for visible wavelength is demonstrated. Successful heterodyne-detection is shown including the Doppler shift detection. The experimental results indicate the future possibility for the coherent communication and Doppler lidar for underwater applications.

9:30 AM - 9:45 AM (Thu. Aug 4, 2022 9:00 AM - 10:15 AM Room 104&105)

[CThA17C-03] Asynchronous Optical Sampling based on Semiconductor Optical Amplifier for the Absolute Distance Measurement of Multiple Targets
[Presentation Style] Onsite

*Jaeyoung Jang[1], Seung-Woo Kim[1], Young-Jin Kim[1] (1. KAIST (Korea))

[Presentation Style] Onsite

In this study, we demonstrate the asynchronous optical sampling using a semiconductor optical amplifier with high intensity conversion efficiency. It leads to the applicability to expand the multi-axis measurement channels of laser ranging system.

9:45 AM - 10:00 AM (Thu. Aug 4, 2022 9:00 AM - 10:15 AM Room 104&105)

[CThA17C-04] Coherent Doppler Lidar using Optical Single Sideband Modulation
[Presentation Style] Onsite

*Sean Wolfe[1,2], Takuma Shirahata[1,2], Shinji Yamashita[1,2], Sze Yun Set[1,2] （1. Univ. of Tokyo (Japan), 2. RCAST (Japan)）

[Presentation Style] Onsite

This paper presents the first implementation of Coherent Doppler LiDAR using an Optical Single Sideband Modulator. Experiments show that range resolution and Doppler shift estimates are greatly improved over the traditionally used AOM.

10:00 AM - 10:15 AM (Thu. Aug 4, 2022 9:00 AM - 10:15 AM Room 104&105)

[CThA17C-05] Phase Error Correction through Digital Resampling for LiDAR Applications
[Presentation Style] Online

Jhih-Jia Kang[1], *Shih-Hsiang Hsu[1] （1. National Taiwan University of Science and Technology (Taiwan)）

[Presentation Style] Online

A digital auxiliary interferometer is proposed to correct the laser non-linear frequency sweep by signal resampling through Hilbert-Transform, which demonstrates the superiority of analog zero-crossing in better suppression and repeatability on two different optical-path-delay lengths.

Oral Session | CLEO-PR2022 | Micro/Nano Optical Sensors

Micro/Nano Optical Sensors

Session Chairs: Keiichiro Kagawa (Shizuoka Univ.), Norimichi Tsumura (Chiba Univ.)

Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 104&105 (1F)

[CThA17D-01] A design of high NA reflectie objective for DUV micro-spectroscopy

[Presentation Style] Onsite

*Hikaru Takehara[1], Keiji Sasaki[1], Atsushi Taguchi[1] (1. Hokkaido Univ. (Japan))

11:00 AM - 11:15 AM

[CThA17D-02] Single Si Layer Immersion Optical Ultrasound Sensor with Ultra-thin Opto-mechanical Membrane

[Presentation Style] Onsite

*Dong Ju Choi[1], Sangwoo Nam[1], Dong Uk Kim[1], Young Jae Park[1], Man Jae Her[1], Min Gi Im[1], Myung Seok Hong[1], Hyeju Song[1], Jaesok Yu[1], Sangyoon Han[1] (1. DGIST (Korea))

11:15 AM - 11:30 AM

[CThA17D-03] Real Time RI Sensing of Optofluidic Based Waveguide Particle Plasmon Resonance Sensor

[Presentation Style] Onsite

*Devesh Barshilia[1], Guo En Chang[1] (1. National chung cheng university (Taiwan))

11:30 AM - 11:45 AM

[CThA17D-04] 64×64 spot-array generation based on freeform optics

[Presentation Style] Online

*Haoqiang Wang[1], Zihan Zang[1], Yunpeng Xu[1], Yanjun Han[1], Hongtao Li[1], Yi Luo[1] (1. Tsinghua University (China))

11:45 AM - 12:00 PM

11:00 AM - 11:15 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 104&105)

[CThA17D-01] A design of high NA reflectie objective for DUV micro-spectroscopy

[Presentation Style] Onsite

*Hikaru Takehara[1], Keiji Sasaki[1], Atsushi Taguchi[1] (1. Hokkaido Univ. (Japan))

[Presentation Style] Onsite

Reflective objective is widely used for DUV micro-spectroscopy, however, the NA of reflective objective is limited typically up to 0.6. We designed DUV reflective objective with NA as high as 1.30 using glycerin as immersion.

11:15 AM - 11:30 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 104&105)

[CThA17D-02] Single Si Layer Immersion Optical Ultrasound Sensor with Ultra-thin Opto-mechanical Membrane

[Presentation Style] Onsite

*Dong Ju Choi[1], Sangwoo Nam[1], Dong Uk Kim[1], Young Jae Park[1], Man Jae Her[1], Min Gi Im[1], Myung Seok Hong[1], Hyeju Song[1], Jaesok Yu[1], Sangyoon Han[1] (1. DGIST (Korea))

[Presentation Style] Onsite

We report on an optical ultrasound sensor with a 70 nm-thick opto-mechanical membrane. The device is made of a single silicon layer. The sensitivity and fractional bandwidth of the sensor are 0.41 μV/Pa and 62%, respectively.

11:30 AM - 11:45 AM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 104&105)

[CThA17D-03] Real Time RI Sensing of Optofluidic Based Waveguide Particle Plasmon Resonance Sensor

[Presentation Style] Onsite

*Devesh Barshilia[1], Guo En Chang[1] (1. National chung cheng university (Taiwan))

[Presentation Style] Onsite

The proposed technology employs gold nano particles (AuNPs) to enhance resolution and sensitivity. Sensor was successfully fabricated and characterized. RI sensing performance shows good resolution of 1.19 X 10^{-4} <!-- [if gte vml 1]><v:shapetype id="

11:45 AM - 12:00 PM (Thu. Aug 4, 2022 11:00 AM - 12:00 PM Room 104&105)

[CThA17D-04] 64×64 spot-array generation based on freeform optics

[Presentation Style] Online

*Haoqiang Wang[1], Zihan Zang[1], Yunpeng Xu[1], Yanjun Han[1], Hongtao Li[1], Yi Luo[1] （1. Tsinghua University (China)）

[Presentation Style] Online

A 64×64 spot-array generator using freeform surface is proposed. The Monte Carlo ray tracing simulation shows that the overall efficiency can be as high as 89% and a unique broadband performance can be obtained.

Diamond and Novel Lasers

Session Chairs: Richard Mildren (Macquarie Univ.), Ryo Yasuhara (NIFS)

Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall B (1F)

[CThP1G-01] Modelling of CW cavity-enhanced diamond Raman laser

[Presentation Style] Online

*Muye Li[1,2], Ondrej Kitzler[2], David J Spence[2] （1. Hangzhou Inst. for Advanced Study, Univ. of Chinese Academy of Sci. (China), 2. Macquarie Univ. (Australia)）

1:30 PM - 1:45 PM

[CThP1G-02] Tunable single frequency diamond Raman laser at 590-615 nm

[Presentation Style] Online

*Xuezong Yang[1,2], Yan Feng[1,3], Richard Mildren[2] （1. Hangzhou Institute for Advanced Study, University of Chinese Academy of Sciences (China), 2. MQ Photonics Research Centre, Department of Physics and Astronomy, Macquarie University (Australia), 3. Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences (China)）

1:45 PM - 2:00 PM

[CThP1G-03] A cascaded Brillouin laser using diamond Raman conversion

[Presentation Style] Online

*Hui Chen[1,2], Zhenxu Bai[1,2,3], Yunpeng Cai[1,2], Duo Jin[1,2], Richard Paul Mildren[3], Yulei Wang[1,2], Zhiwei Lu[1,2] （1. Hebei Univ. of Tech. (China), 2. Hebei Key Lab. of Adv. Laser Tech. and Eq. (China), 3. Macquarie Univ. (Australia)）

2:00 PM - 2:15 PM

[CThP1G-04] Thermally Self-stabilized Brillouin Laser in Diamond

[Presentation Style] Online

*Duo Jin[1,2], Zhenxu Bai[1,2,3], Richard Paul Mildren[3], Yulei Wang[1,2], Zhiwei Lu[1,2] （1. Hebei Univ. of Tech. (China), 2. Hebei Key Lab. of Adv. Laser Tech. and Eq. (China), 3. Macquarie Univ. (Australia)）

2:15 PM - 2:30 PM

[CThP1G-05] Regenerative DFB lasing from new silicone elastomer waveguide for printable and imprintable optics fabrication

[Presentation Style] Onsite

*Daichi Takagoshi[1], Keisuke Nakakubo[1], Nasim Obata[1], Takuji Kotani[2], Hiroaki Yoshioka[1], Yuji Oki[1] （1. Kyushu-University (Japan), 2. Fukoku Bussan Co., Ltd (Japan)）

2:30 PM - 2:45 PM

[CThP1G-06] Design of Scatterer Configuration for Spectral Optimization of Random Lasers

[Presentation Style] Onsite

*Takashi Okamoto[1], Kouki Kajisa[1], Ryo Ohshige[1] （1. Kyushu Inst. of Tech. (Japan)）

2:45 PM - 3:00 PM

1:30 PM - 1:45 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CThP1G-01] Modelling of CW cavity-enhanced diamond Raman laser

[Presentation Style] Online

*Muye Li[1,2], Ondrej Kitzler[2], David J Spence[2] (1. Hangzhou Inst. for Advanced Study, Univ. of Chinese Academy of Sci. (China), 2. Macquarie Univ. (Australia))

[Presentation Style] Online

We build the model of continuous-wave resonantly pumped Raman lasers. The experimental results is consistent with the theoretical predictions. The imperfect mode-matching is included in the model and the optimization of mirror reflectivity is derived.

1:45 PM - 2:00 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CThP1G-02] Tunable single frequency diamond Raman laser at 590-615 nm

[Presentation Style] Online

*Xuezong Yang[1,2], Yan Feng[1,3], Richard Mildren[2] (1. Hangzhou Institute for Advanced Study, University of Chinese Academy of Sciences (China), 2. MQ Photonics Research Centre, Department of Physics and Astronomy, Macquarie University (Australia), 3. Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences (China))

[Presentation Style] Online

A single-frequency laser tunable across 590 to 615 nm with output power up to 8 W is demonstrated in an intracavity frequency-doubled diamond Raman resonator pumped by a tunable Yb-doped fiber laser.

2:00 PM - 2:15 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CThP1G-03] A cascaded Brillouin laser using diamond Raman conversion

[Presentation Style] Online

*Hui Chen[1,2], Zhenxu Bai[1,2,3], Yunpeng Cai[1,2], Duo Jin[1,2], Richard Paul Mildren[3], Yulei Wang[1,2], Zhiwei Lu[1,2] (1. Hebei Univ. of Tech. (China), 2. Hebei Key Lab. of Adv. Laser Tech. and Eq. (China), 3. Macquarie Univ. (Australia))

[Presentation Style] Online

We demonstrate a diamond-based Brillouin laser with controllable, cascaded output spanning 15 cascaded SBS-Stokes-orders. Control of the cascading is achieved through both tailoring of the SBS cavity length and the SBS cavity output coupling.

2:15 PM - 2:30 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CThP1G-04] Thermally Self-stabilized Brillouin Laser in Diamond

[Presentation Style] Online

*Duo Jin[1,2], Zhenxu Bai[1,2,3], Richard Paul Mildren[3], Yulei Wang[1,2], Zhiwei Lu[1,2] (1. Hebei Univ. of Tech. (China), 2. Hebei Key Lab. of Adv. Laser Tech. and Eq. (China), 3. Macquarie Univ. (Australia))

[Presentation Style] Online

We report a diamond-based, passive thermo-optical-locked continuous-wave high-power Brillouin laser. This laser outputs a power of 17.3 W with a root-mean-square amplitude variation of less than 1.9% over 60 mins

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2:30 PM - 2:45 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CThP1G-05] Regenerative DFB lasing from new silicone elastomer waveguide for printable and imprintable optics fabrication [Presentation Style] Onsite

*Daichi Takagoshi[1], Keisuke Nakakubo[1], Nasim Obata[1], Takuji Kotani[2], Hiroaki Yoshioka[1], Yuji Oki[1] (1. Kyushu-University (Japan), 2. Fukoku Bussan Co., Ltd (Japan))

[Presentation Style] Onsite

Regenerative dye lasing was demonstrated using new polydimethylsiloxane-based core, with high solubility and thermoplasticity. Furthermore, dry-diffusion of dye-molecules observed in the material. PDMS substrate as a dye-reservoir post-doped dye into core, and regenerative lasing achieved.

2:45 PM - 3:00 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall B)

[CThP1G-06] Design of Scatterer Configuration for Spectral Optimization of Random Lasers [Presentation Style] Onsite

*Takashi Okamoto[1], Kouki Kajisa[1], Ryo Ohshige[1] (1. Kyushu Inst. of Tech. (Japan))

[Presentation Style] Onsite

The scatterer configuration of a random gain medium was designed to obtain the specified emission spectrum from a random laser. The results show that the emitted light can be concentrated within a specific wavelength range.

Solid State and Vortex Lasers

Session Chair: Keisaku Yamane (Hokkaido Univ.)

Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall B (1F)

[CThP1H-01] Handedness control of watt-level 1173 nm vortex mode output from a self-Raman Nd:$GdVO_4$ laser
[Presentation Style] Onsite

*Yuanyuan Ma[1], Haruna Sugahara[1], Andrew J Lee[2,3], Helen M Pask[2], Katsuhiko Miyamoto[1,4], Takashige Omatsu[1,4] (1. Chiba Univ. (Japan), 2. MQ Photonics Res. Centre, Macquarie Univ. (Australia), 3. SCIWRITE (Australia), 4. Molecular Chirality Res. Center (Japan))

3:30 PM - 3:45 PM

[CThP1H-02] Generation of circular geometric modes from Pr^{3+}:YLF laser with spherical aberration
[Presentation Style] Onsite

*Srinivasa Rao Allam[1], Takuya Morohashi[1], Taku Miike[1], Katsuhiko Miyamoto[1], Takashige Omatsu[1] (1. Chiba University (Japan))

3:45 PM - 4:00 PM

[CThP1H-03] Ring Cavity Vortex Laser using a Wedge-Plate Shearing Interferometer
[Presentation Style] Onsite

Abdul-Haseeb Munj[1], *William R Kerridge-Johns[1] (1. Imperial College London (UK))

4:00 PM - 4:15 PM

[CThP1H-04] Intra-Cavity Spiral Phase Plate Laser with Non-Inverting Sagnac Mirror
[Presentation Style] Onsite

*William R Kerridge-Johns[1] (1. Imperial College London (UK))

4:15 PM - 4:30 PM

[CThP1H-05] Engineering synthesized vortex beams
[Presentation Style] Online

*Na Xiao[1], Chen Xie[1], François Courvoisier[2,3], Minglie Hu[1] (1. Tianjin Univ. (China), 2. FEMTO-ST Inst., CNRS (France), 3. Univ. Bourgogne Franche-Comte (France))

4:30 PM - 4:45 PM

[CThP1H-06] High Brightness Microchip Laser with Unstable Resonator
[Presentation Style] Onsite

*Hwan Hong Lim[1], Takunori Taira[1,2] (1. Institute for Molecular Science (Japan), 2. RIKEN SPring-8 Center (Japan))

4:45 PM - 5:00 PM

[CThP1H-07] Direct bonded microchip gain aperture laser system
[Presentation Style] Online

Arvydas Kausas[1,2], Takunori Taira[1,2], *Akihiro Tsuji[1,2], Vincent Yahia[1,2] (1. Institute for Molecular Science (Japan), 2. RIKEN SPring-8 Center (Japan))

5:00 PM - 5:15 PM

[CThP1H-08] Mode-locked and Cavity-dumped Cr:LiSAF Lasers Far Off The Gain Peak: Tunable ns and fs Pulses Near 1 µm
[Presentation Style] Online

*Umit Demirbas[1,2], Jelto Thesinga[1], Martin Kellert[1], Simon Reuter[1], Bernd Sumpf[3], Mikhail

Pergament[1], Franz X. Kärtner[1,4,5] （1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. Antalya Bilim University (Turkey), 3. Leibniz-Institut für Höchstfrequenztechnik (Germany), 4. University of Hamburg (Germany), 5. Hamburg Centre for Ultrafast Imaging (Germany)）

5:15 PM - 5:30 PM

3:30 PM - 3:45 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CThP1H-01] Handedness control of watt-level 1173 nm vortex mode output from a self-Raman Nd:$GdVO_4$ laser

[Presentation Style] Onsite

*Yuanyuan Ma[1], Haruna Sugahara[1], Andrew J Lee[2,3], Helen M Pask[2], Katsuhiko Miyamoto[1,4], Takashige Omatsu[1,4] (1. Chiba Univ. (Japan), 2. MQ Photonics Res. Centre, Macquarie Univ. (Australia), 3. SCIWRITE (Australia), 4. Molecular Chirality Res. Center (Japan))

[Presentation Style] Onsite

We demonstrate, for the first time of the best of our knowledge, the handedness control of a continuous-wave 1173 nm optical vortex output from a self-Raman Nd:$GdVO_4$ laser by employing a tight needle pumping beam with an off-axis pumping geometry.

3:45 PM - 4:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CThP1H-02] Generation of circular geometric modes from Pr^{3+}:YLF laser with spherical aberration

[Presentation Style] Onsite

*Srinivasa Rao Allam[1], Takuya Morohashi[1], Taku Miike[1], Katsuhiko Miyamoto[1], Takashige Omatsu[1] (1. Chiba University (Japan))

[Presentation Style] Onsite

We report on, for the first time, the direct generation of circular geometric modes from a Pr^{3+}:$LiYF_4$ (Pr^{3+}:YLF) laser cavity with an intra-cavity plano-convex lens.

4:00 PM - 4:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CThP1H-03] Ring Cavity Vortex Laser using a Wedge-Plate Shearing Interferometer

[Presentation Style] Onsite

Abdul-Haseeb Munj[1], *William R Kerridge-Johns[1] (1. Imperial College London (UK))

[Presentation Style] Onsite

A unidirectional Nd:YVO_4 ring laser generating watt-level LG_{01} beam output with 98% mode purity in a single longitudinal mode, using a wedge-plate shearing interferometer as a mode converting output coupler. This could be adapted to any gain medium.

4:15 PM - 4:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CThP1H-04] Intra-Cavity Spiral Phase Plate Laser with Non-Inverting Sagnac Mirror

[Presentation Style] Onsite

*William R Kerridge-Johns[1] （1. Imperial College London (UK)）

[Presentation Style] Onsite

We propose and experimentally demonstrate intra-cavity spiral phase plate use with a non-inverting Sagnac mirror. The Nd:YVO_4 laser yielded high purity (>95%) LG_{01} and LG_{02} vortex output. The laser mode self-adapted to optimise LG_{0l} purity.

4:30 PM - 4:45 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CThP1H-05] Engineering synthesized vortex beams

[Presentation Style] Online

*Na Xiao[1], Chen Xie[1], François Courvoisier[2,3], Minglie Hu[1] （1. Tianjin Univ. (China), 2. FEMTO-ST Inst., CNRS (France), 3. Univ. Bourgogne Franche-Comte (France)）

[Presentation Style] Online

We propose an effective scheme to engineer the light tubes of vortex beams with predetermined geometries and controllable intensity profiles. This is beneficial to a broad range of applications such as particle trapping and micromachining.

4:45 PM - 5:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CThP1H-06] High Brightness Microchip Laser with Unstable Resonator

[Presentation Style] Onsite

*Hwan Hong Lim[1], Takunori Taira[1,2] （1. Institute for Molecular Science (Japan), 2. RIKEN SPring-8 Center (Japan)）

[Presentation Style] Onsite

Both record 59.2 MW peak power (24.1 mJ, 407 ps) and record 0.736 PW/(sr cm^2)(effective) brightness air-cooled Nd:YAG/Cr^{4+}:YAG ceramic microchip laser with unstable resonator is presented.

5:00 PM - 5:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CThP1H-07] Direct bonded microchip gain aperture laser system

[Presentation Style] Online

Arvydas Kausas[1,2], Takunori Taira[1,2], *Akihiro Tsuji[1,2], Vincent Yahia[1,2] （1. Institute for Molecular Science (Japan), 2. RIKEN SPring-8 Center (Japan)）

[Presentation Style] Online

We report on gain apertured pre-amplifier system for a microchip laser with beam cleaning stage. Increase in output is expected by use high peak power pump laser diodes both for oscillator and pre-amplifier. In addition, bonded chips for efficient heat removal are incorporated into setup in order to improve overall system performance.

5:15 PM - 5:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall B)

[CThP1H-08] Mode-locked and Cavity-dumped Cr:LiSAF Lasers Far Off The Gain Peak: Tunable ns and fs Pulses Near 1 µm [Presentation Style] Online

*Umit Demirbas[1,2], Jelto Thesinga[1], Martin Kellert[1], Simon Reuter[1], Bernd Sumpf[3], Mikhail Pergament[1], Franz X. Kärtner[1,4,5] (1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. Antalya Bilim University (Turkey), 3. Leibniz-Institut für Höchstfrequenztechnik (Germany), 4. University of Hamburg (Germany), 5. Hamburg Centre for Ultrafast Imaging (Germany))

[Presentation Style] Online

We have developed Cr:LiSAF oscillators around 1 µm, producing sub-200-fs pulses with 80 pJ energy at 150 MHz and 2.5-500 ns pulses with 100 nJ energy at 100 kHz in mode-locked and cavity-dumped regimes, respectively.

Attosecond Science and Technology II

Session Chairs: Taro Sekikawa (Hokkaido Univ.), Nobuhisa Ishii (QST)

Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall A (1F)

[CThP2I-01 (Invited(P))] Broadband and Efficient Out-Coupling of Intra-Cavity High Harmonics by a Coated Grazing-Incidence Plate
[Presentation Style] Onsite

*Julian Fischer[1], Jakub Drs[1], François Labaye[1], Norbert Modsching[1], Michael Müller[1], Valentin J. Wittwer[1], Thomas Südmeyer[1] (1. Univ. of Neuchatel, Time and Frequency Laboratory (LTF) (Switzerland))

1:30 PM - 2:00 PM

[CThP2I-02 (Invited)] Transient refraction spectroscopy with double attosecond pulses in inner-subshell electron
[Presentation Style] Online

*Hiroki Mashiko[1], Akihiro Oshima[2,3], Ming-Chang Chen[4], Ikufumi Katayama[3], Jun Takeda[3], Katsuya Oguri[2] (1. NTT Advanced Technology Corp. (Japan), 2. NTT Basic Research Labs. (Japan), 3. Yokohama National Univ. (Japan), 4. National Tsing Hua Univ. (Taiwan))

2:00 PM - 2:30 PM

[CThP2I-03 (Invited)] High-Order Nonlinear Dipole Response Characterized by Extreme-Ultraviolet Ellipsometry
[Presentation Style] Online

Kuang-Yu Chang[1], Long-Cheng Huang[1], Koji Asaga[2,3], Ming-Shian Tsai[1], Pei-Chi Huang[1], Laura Rego[4], Hiroki Mashiko[2], Katsuya Oguri[2], Carlos Hernandez-Garcia[4], *Ming-Chang Chen[1] (1. National Tsing Hua University (Taiwan), 2. NTT Basic Research Laboratorie (Japan), 3. Tokyo Denki University (Japan), 4. University of Salamanca, Salamanca (Spain))

2:30 PM - 3:00 PM

1:30 PM - 2:00 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CThP2I-01 (Invited(P))] Broadband and Efficient Out-Coupling of Intra-Cavity High Harmonics by a Coated Grazing-Incidence Plate [Presentation Style] Onsite

*Julian Fischer[1], Jakub Drs[1], François Labaye[1], Norbert Modsching[1], Michael Müller[1], Valentin J. Wittwer[1], Thomas Südmeyer[1] (1. Univ. of Neuchatel, Time and Frequency Laboratory (LTF) (Switzerland))

[Presentation Style] Onsite

We develop and implement a coated grazing-incidence-plate for broadband out-coupling of XUV light generated inside a 45-fs thin-disk laser oscillator. We reach >25% XUV out-coupling efficiency for photon energies between 10 to 60 eV.

2:00 PM - 2:30 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CThP2I-02 (Invited)] Transient refraction spectroscopy with double attosecond pulses in inner-subshell electron [Presentation Style] Online

*Hiroki Mashiko[1], Akihiro Oshima[2,3], Ming-Chang Chen[4], Ikufumi Katayama[3], Jun Takeda[3], Katsuya Oguri[2] (1. NTT Advanced Technology Corp. (Japan), 2. NTT Basic Research Labs. (Japan), 3. Yokohama National Univ. (Japan), 4. National Tsing Hua Univ. (Taiwan))

[Presentation Style] Online

We characterized complex dynamics in argon atomic inner-subshell electron by transient refraction spectroscopy with double attosecond pulses (two isolated attosecond pulses). By obtaining intensity and phase with the spectral interferometry, the complex dynamics was revealed.

2:30 PM - 3:00 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Mid-sized Hall A)

[CThP2I-03 (Invited)] High-Order Nonlinear Dipole Response Characterized by Extreme-Ultraviolet Ellipsometry [Presentation Style] Online

Kuang-Yu Chang[1], Long-Cheng Huang[1], Koji Asaga[2,3], Ming-Shian Tsai[1], Pei-Chi Huang[1], Laura Rego[4], Hiroki Mashiko[2], Katsuya Oguri[2], Carlos Hernandez-Garcia[4], *Ming-Chang Chen[1] (1. National Tsing Hua University (Taiwan), 2. NTT Basic Research Laboratorie (Japan), 3. Tokyo Denki University (Japan), 4. University of Salamanca, Salamanca (Spain))

[Presentation Style] Online

We demonstrate that polarization control and characterization of high-harmonic generation in non-collinear geometry performs as an excellent ellipsometry that can fully retrieve the amplitude and phase of ultrafast dipole response, advancing high harmonic spectroscopy.

Oral Session | CLEO-PR2022 | Emerging Attosecond Science

Emerging Attosecond Science

Session Chairs: Jiro Itatani (Univ. of Tokyo), Taro Sekikawa (Hokkaido Univ.)

Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall A (1F)

[CThP2J-01 (Tutorial)] Extreme Ultraviolet Transient Absorption Spectroscopy for Probing Femtosecond and Attosecond Dynamics
[Presentation Style] Online

*Zhi-Heng Loh[1] （1. Nanyang Technological Univ. (Singapore)）

3:30 PM - 4:30 PM

[CThP2J-02 (Invited)] Attosecond electron dynamics in molecules, clusters and liquids
[Presentation Style] Online

*Hans Jakob Wörner[1] （1. ETH Zurich (Switzerland)）

4:30 PM - 5:00 PM

[CThP2J-03 (Invited)] Coherent electron dynamics induced by ultrashort UV pulses in complex molecules
[Presentation Style] Online

*Francesca Calegari[1] （1. DESY-CFEL (Germany)）

5:00 PM - 5:30 PM

3:30 PM - 4:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall A)

[CThP2J-01 (Tutorial)] Extreme Ultraviolet Transient Absorption Spectroscopy for Probing Femtosecond and Attosecond Dynamics [Presentation Style] Online

*Zhi-Heng Loh[1] (1. Nanyang Technological Univ. (Singapore))

[Presentation Style] Online

High-order harmonic generation of ultrashort extreme ultraviolet (XUV) pulses has enabled the core-level absorption probing of femtosecond to attosecond dynamics. The underlying principles and recent applications of ultrafast XUV transient absorption spectroscopy will be introduced.

4:30 PM - 5:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall A)

[CThP2J-02 (Invited)] Attosecond electron dynamics in molecules, clusters and liquids [Presentation Style] Online

*Hans Jakob Wörner[1] (1. ETH Zurich (Switzerland))

[Presentation Style] Online

The measurement of photoionization delays from isolated molecules over clusters to liquids and the first observation of decoherence and revival of attosecond charge migration in a neutral molecule will be presented.

5:00 PM - 5:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Mid-sized Hall A)

[CThP2J-03 (Invited)] Coherent electron dynamics induced by ultrashort UV pulses in complex molecules [Presentation Style] Online

*Francesca Calegari[1] (1. DESY-CFEL (Germany))

[Presentation Style] Online

Here I present the first attosecond beamline combining sub-2fs UV pulses with few-fs IR and/or attosecond XUV pulses for the time-resolved investigation of electronic processes in molecules.

Material Synthesis and Deposition

Session Chair: Daisuke Nakamura (Kyushu Univ.)

Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 206 (2F)

[CThP5C-01 (Invited)] Laser-Assisted Synthesis and Processing of 2D Quantum Materials

[Presentation Style] Online

*Masoud Mahjouri-Samani[1], Nurul Azam[1], Suman Jaiswal[1], Zabiholla Ahmadi[1], Parvin Fathi-Hafshejani[1] (1. Auburn University (United States of America))

1:30 PM - 2:00 PM

[CThP5C-02] Laser-induced-graphene formation on fabric based on femtosecond laser direct writing for flexible strain sensors

[Presentation Style] Onsite

*Dongwook Yang[1], Han Ku Nam[1], Truong-Son Dinh Le[1], Younggeun Lee[1], Byunggi Kim[2], Young-Ryeul Kim[1], Seung-Woo Kim[1], Young-Jin Kim[1] (1. KAIST (Korea), 2. The Univ. of Tokyo (Japan))

2:00 PM - 2:15 PM

[CThP5C-03] Green Home Applications by fs Laser-based Laser-Induced-Graphene Formation Technology on Woods

[Presentation Style] Onsite

*Han Ku Nam[1], Truong-Son Dinh Le[1], Dongwook Yang[1], Younggeun Lee[1], Byunggi Kim[2], Young-Ryeul Kim[1], Seung-Woo Kim[1], Young-Jin Kim[1] (1. Korea Advanced Inst. of Sci. and Tech. (KAIST) (Korea), 2. The Univ. of Tokyo (Japan))

2:15 PM - 2:30 PM

[CThP5C-04] Fabrication of laser-induced graphene-based diffractive optical device using femtosecond laser

[Presentation Style] Onsite

*Younggeun Lee[1], Dongwook Yang[1], Han Ku Nam[1], Truong-Son Dinh Le[1], Young-Ryeul Kim[1], Byunggi Kim[2], Hongki Yoo[1], JooHyung Lee[3], Hyo-sang Yoon[1], Seung-Woo Kim[1], Young-Jin Kim[1] (1. KAIST (Korea), 2. The Univ. of Tokyo (Japan), 3. SEOULTECH (Korea))

2:30 PM - 2:45 PM

[CThP5C-05] Power and precision for laser fabrication of MicroLEDs

[Presentation Style] Onsite

*Burkhard Fechner[1], Ralph Delmdahl[1] (1. Coherent LaserSystems GmbH &Co KG (Germany))

2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 206)

[CThP5C-01 (Invited)] Laser-Assisted Synthesis and Processing of 2D Quantum Materials
[Presentation Style] Online

*Masoud Mahjouri-Samani[1], Nurul Azam[1], Suman Jaiswal[1], Zabiholla Ahmadi[1], Parvin Fathi-Hafshejani[1] (1. Auburn University (United States of America))

[Presentation Style] Online

Two-dimensional (2D) materials have recently emerged as an exciting class of quantum materials that can enable future technological advancements. Thus, developing novel synthesis, processing, and large-scale integration methods is becoming an important area of study.

2:00 PM - 2:15 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 206)

[CThP5C-02] Laser-induced-graphene formation on fabric based on femtosecond laser direct writing for flexible strain sensors
[Presentation Style] Onsite

*Dongwook Yang[1], Han Ku Nam[1], Truong-Son Dinh Le[1], Younggeun Lee[1], Byunggi Kim[2], Young-Ryeul Kim[1], Seung-Woo Kim[1], Young-Jin Kim[1] (1. KAIST (Korea), 2. The Univ. of Tokyo (Japan))

[Presentation Style] Onsite

Laser-induced-graphene formation on Kevlar textile in ambient conditions enables sensing of physical information applied to various types of wearable electronics. Pre-strained technique is used for maximizing strain range, and the sensor can detect finger motion.

2:15 PM - 2:30 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 206)

[CThP5C-03] Green Home Applications by fs Laser-based Laser-Induced-Graphene Formation Technology on Woods
[Presentation Style] Onsite

*Han Ku Nam[1], Truong-Son Dinh Le[1], Dongwook Yang[1], Younggeun Lee[1], Byunggi Kim[2], Young-Ryeul Kim[1], Seung-Woo Kim[1], Young-Jin Kim[1] (1. Korea Advanced Inst. of Sci. and Tech. (KAIST) (Korea), 2. The Univ. of Tokyo (Japan))

[Presentation Style] Onsite

High quality Laser-Induced-Graphene formation on wood by using femtosecond-laser-direct-writing technology is demonstrated for green and smart construction applications. Graphene based heater, temperature sensor, boiler, and inter-connecting electrodes on woods were fabricated.

2:30 PM - 2:45 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 206)

[CThP5C-04] Fabrication of laser-induced graphene-based diffractive optical device using femtosecond laser
[Presentation Style] Onsite

*Younggeun Lee[1], Dongwook Yang[1], Han Ku Nam[1], Truong-Son Dinh Le[1], Young-Ryeul Kim[1], Byunggi Kim[2], Hongki Yoo[1], JooHyung Lee[3], Hyo-sang Yoon[1], Seung-Woo Kim[1], Young-Jin Kim[1] （1. KAIST (Korea), 2. The Univ. of Tokyo (Japan), 3. SEOULTECH (Korea)）

[Presentation Style] Onsite

This is a study to generate laser-induced graphene on colorless polyimide using a femtosecond laser, and to find applications and applications for it as various types of Fresnel zone plates and diffractive optical devices.

2:45 PM - 3:00 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 206)

[CThP5C-05] Power and precision for laser fabrication of MicroLEDs
[Presentation Style] Onsite

*Burkhard Fechner[1], Ralph Delmdahl[1] （1. Coherent LaserSystems GmbH &Co KG (Germany)）

[Presentation Style] Onsite

Abstract: Displays based on MicroLEDs offer high color saturation, wide viewing angle, short response time, high brightness, and low power consumption. Economic MicroLED manufacturing requires lasers combining power and precision driving throughput, yield and productivity

Surface Micromachining and Nanostructuring

Session Chair: Godai Miyaji (Tokyo Univ. of Agriculture and Tech.)

Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 206 (2F)

[CThP5D-01 (Invited)] Formation mechanisms of bumps and their avoidance during laser milling of metals
[Presentation Style] Online

*Andreas Michalowski[1], Fabian Nyenhuis[2] (1. Institut für Strahlwerkzeuge (IFSW), University of Stuttgart (Germany), 2. Oertli Instruments (Switzerland))

3:30 PM - 4:00 PM

[CThP5D-02 (Invited(P))] High-speed ablation of crystalline silicon by femtosecond laser BiBurst mode with GHz burst in MHz burst
[Presentation Style] Onsite

*Kotaro Obata[1], Francesc Caballero-Lucas[1], Shota Kawabata[1,2], Godai Miyaji[2], Koji Sugioka[1] (1. Riken (Japan), 2. Tokyo Univ. of A. and T. (Japan))

4:00 PM - 4:30 PM

[CThP5D-03] Comprehensive Research on LIPSS Formation on ZnO Substrates by Ultrafast Laser Irradiation
[Presentation Style] Online

*Shi Bai[1], Kotaro Obata[1], Koji Sugioka[1] (1. RIKEN (Japan))

4:30 PM - 4:45 PM

[CThP5D-04] Femtosecond Laser Processed Web-like Silicon Nanostructures and Application in Surface Enhanced Raman Spectroscopy.
[Presentation Style] Online

*Reshma Beeram[1], Dipanjan Banerjee[1], Mangababu A[1], Venugopal Rao Soma[1] (1. University of Hyderabad (India))

4:45 PM - 5:00 PM

[CThP5D-05] Polarizing optical elements fabricated by laser induced periodic surface structures
[Presentation Style] Online

*Anna TASOLAMPROU TASOLAMPROU[1], Evangelos Skoulas[1], George Kenanakis[1], Emmanuel Stratakis[1] (1. Institute of Electronic Structure and Laser, Foundation for Research and Technology Hellas (Greece))

5:00 PM - 5:15 PM

3:30 PM - 4:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 206)

[CThP5D-01 (Invited)] Formation mechanisms of bumps and their avoidance during laser milling of metals [Presentation Style] Online

*Andreas Michalowski[1], Fabian Nyenhuis[2] (1. Institut für Strahlwerkzeuge (IFSW), University of Stuttgart (Germany), 2. Oertli Instruments (Switzerland))

[Presentation Style] Online

Studies of surface degradations in laser milling of metals reveal a multistage formation mechanism. Based on the findings on the formation mechanism of the bumps, a process was derived that enables shorter production times.

4:00 PM - 4:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 206)

[CThP5D-02 (Invited(P))] High-speed ablation of crystalline silicon by femtosecond laser BiBurst mode with GHz burst in MHz burst [Presentation Style] Onsite

*Kotaro Obata[1], Francesc Caballero-Lucas[1], Shota Kawabata[1,2], Godai Miyaji[2], Koji Sugioka[1] (1. Riken (Japan), 2. Tokyo Univ. of A. and T. (Japan))

[Presentation Style] Onsite

We demonstrate highly efficient ablation of silicon without degrading the ablation quality by use of femtosecond laser BiBurst mode, which is composed of GHz bursts in MHz bursts.

4:30 PM - 4:45 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 206)

[CThP5D-03] Comprehensive Research on LIPSS Formation on ZnO Substrates by Ultrafast Laser Irradiation [Presentation Style] Online

*Shi Bai[1], Kotaro Obata[1], Koji Sugioka[1] (1. RIKEN (Japan))

[Presentation Style] Online

A comprehensive research is conducted to fabricate laser-induced periodic surface structures (LIPSS) with different morphologies on zinc oxide substrates by ultrafast laser. 1-dimensional or 2-dimensional LIPSS can be created depending on types of laser polarizations.

4:45 PM - 5:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 206)

[CThP5D-04] Femtosecond Laser Processed Web-like Silicon Nanostructures and Application in Surface Enhanced

Raman Spectroscopy.
[Presentation Style] Online

*Reshma Beeram[1], Dipanjan Banerjee[1], Mangababu A[1], Venugopal Rao Soma[1] (1. University of Hyderabad (India))

[Presentation Style] Online

Web-like Si nanostructures were fabricated by laser ablation of Silicon in air with a femtosecond laser oscillator. Further, after gold coating, these nanostructures were used for SERS studies with methylene blue as a probe molecule.

5:00 PM - 5:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 206)

[CThP5D-05] Polarizing optical elements fabricated by laser induced periodic surface structures
[Presentation Style] Online

*Anna TASOLAMPROU TASOLAMPROU[1], Evangelos Skoulas[1], George Kenanakis[1], Emmanuel Stratakis[1] (1. Institute of Electronic Structure and Laser, Foundation for Research and Technology Hellas (Greece))

[Presentation Style] Online

We present a method for the realization of wire grid polarizing metasurface plates operating in transmission at IR and mid-IR exclusively via laser structuring, i.e., laser induced, periodic surface structures formed on nanometer-thick metallic films.

Comb Metrology III

Session Chair: Youngjin Kim (KAIST)

Thu. Aug 4, 2022 1:45 PM - 3:00 PM Room 204 (2F)

[CThP6E-01] Background noise canceling technique in optical measurement using phase-controlled optical frequency comb

[Presentation Style] Onsite

*Takashi Kato[1,2], Tamaki Morito[1], Yasuhisa Nekoshima[1], Kaoru Minoshima[1] (1. UEC (Japan), 2. PRESTO, JST (Japan))

1:45 PM - 2:00 PM

[CThP6E-02] Investigation of the effect of grating profile on the precision of 2D single-shot comb-based interferometer

[Presentation Style] Onsite

*Bao Thai Dinh[1], Chiba Keishi[1], Tuan Cong Truong[2], Shioda Tatsutoshi[1] (1. Saitama Univerisity (Japan), 2. Ha Noi Univerisity of Science and Technology (Viet Nam))

2:00 PM - 2:15 PM

[CThP6E-03] Two-color dual-comb-based asynchronous pump-probe system for investigation of ultrafast spin dynamics

*Daichi Nishikawa[1], Shinichi Watanabe[1], Makoto Okano[1,2] (1. Keio Univ. (Japan), 2. NDA (Japan))

2:15 PM - 2:30 PM

[CThP6E-04] Circular Polarization Switching in Dual-comb Spectroscopy using Coherent-controlled Multi-comb Pulses towards Circular Dichroism Characterization

[Presentation Style] Onsite

*Ruichen Zhu[1], Akifumi Asahara[1], Takashi Kato[1,2], Haochen Tian[1,3], Kaoru Minoshima[1] (1. The University of Electro-Communications (Japan), 2. PRESTO, JST (Japan), 3. The Japan Society for the Promotion of Science (Japan))

2:30 PM - 2:45 PM

[CThP6E-05] RF frequency response measurement for broad-bandwidth optoelectronic devices based on a dual-comb laser

[Presentation Style] Online

*Siyi Jiang[1], Jianjun Yang[1], Quan Zhou[1], Jiansheng Liu[1], Xin Zhao[1], Zheng Zheng[1,2] (1. Beihang Univ. (China), 2. Shenzhen Inst. of Beihang Univ. (China))

2:45 PM - 3:00 PM

1:45 PM - 2:00 PM (Thu. Aug 4, 2022 1:45 PM - 3:00 PM Room 204)

[CThP6E-01] Background noise canceling technique in optical measurement using phase-controlled optical frequency comb

[Presentation Style] Onsite

*Takashi Kato[1,2], Tamaki Morito[1], Yasuhisa Nekoshima[1], Kaoru Minoshima[1] (1. UEC (Japan), 2. PRESTO, JST (Japan))

[Presentation Style] Onsite

Noise canceling technique using phase-controlled optical frequency comb was proposed in an optical pulse interferometric measurement. By precisely controlling the ratio of the two frequency parameters of the comb, broadband background noise is canceled.

2:00 PM - 2:15 PM (Thu. Aug 4, 2022 1:45 PM - 3:00 PM Room 204)

[CThP6E-02] Investigation of the effect of grating profile on the precision of 2D single-shot comb-based interferometer

[Presentation Style] Onsite

*Bao Thai Dinh[1], Chiba Keishi[1], Tuan Cong Truong[2], Shioda Tatsutoshi[1] (1. Saitama Univerisity (Japan), 2. Ha Noi Univerisity of Science and Technology (Viet Nam))

[Presentation Style] Onsite

The research theoretically analyzes the system specifications and designs the experiment to verify the effect of the discrete profile of the grating on the profilometry precision of the novel 2D single-shot comb-based interferometer.

2:15 PM - 2:30 PM (Thu. Aug 4, 2022 1:45 PM - 3:00 PM Room 204)

[CThP6E-03] Two-color dual-comb-based asynchronous pump-probe system for investigation of ultrafast spin dynamics

*Daichi Nishikawa[1], Shinichi Watanabe[1], Makoto Okano[1,2] (1. Keio Univ. (Japan), 2. NDA (Japan))

We demonstrated a high-speed dual-comb-based asynchronous pump-probe measurement with a 2.5-ms scanning time. Owing to its advantages, the measurement of ultrafast spin dynamics with a 16-ns temporal window and sub-picosecond temporal resolution has been achieved.

2:30 PM - 2:45 PM (Thu. Aug 4, 2022 1:45 PM - 3:00 PM Room 204)

[CThP6E-04] Circular Polarization Switching in Dual-comb Spectroscopy using Coherent-controlled Multi-comb Pulses towards Circular Dichroism Characterization

[Presentation Style] Onsite

*Ruichen Zhu[1], Akifumi Asahara[1], Takashi Kato[1,2], Haochen Tian[1,3], Kaoru Minoshima[1] （1. The University of Electro-Communications (Japan), 2. PRESTO, JST (Japan), 3. The Japan Society for the Promotion of Science (Japan)）

[Presentation Style] Onsite

We realize circular polarization switching in polarization-modulated dual-comb spectroscopy. The amplitude and phase spectral changes are evaluated, and well-balanced circular switching is verified. The developed system is expected to be useful in circular dichroism characterizations.

2:45 PM - 3:00 PM (Thu. Aug 4, 2022 1:45 PM - 3:00 PM Room 204)

[CThP6E-05] RF frequency response measurement for broad-bandwidth optoelectronic devices based on a dual-comb laser [Presentation Style] Online

*Siyi Jiang[1], Jianjun Yang[1], Quan Zhou[1], Jiansheng Liu[1], Xin Zhao[1], Zheng Zheng[1,2] （1. Beihang Univ. (China), 2. Shenzhen Inst. of Beihang Univ. (China)）

[Presentation Style] Online

Ultrashort pulses generated by a dual-comb mode-locked fiber laser are leveraged for fast broadband microwave frequency response measurement for large-bandwidth optoelectronic devices. Using an all-fiber-optic design, devices with tens of GHz bandwidth can be measured without high-frequency microwave devices.

Advanced Comb Sources and Applications

Session Chair: Takeshi Yasui (Tokushima Univ.)

Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 204 (2F)

[CThP6F-01] Polarization multiplex dual-comb fiber laser for precise spectroscopy

[Presentation Style] Onsite

*Aki Takahashi[1], Sho Okubo[2], Kana Iwakuni[1] (1. University of Electro-Communications (Japan), 2. National Institute of Advanced Industrial Science and Technology (Japan))

3:30 PM - 3:45 PM

[CThP6F-02] A Simple Scheme for Phase-sensitive Dual-comb Spectroscopy with Mechanical-sharing Dual-comb Laser

[Presentation Style] Onsite

*Takeru Endo[1], Haochen Tian[1,2], Akifumi Asahara[1], Kaoru Minoshima[1] (1. The University of Electro-Communications (Japan), 2. Research Fellow of the Japan Society for the Promotion of Science (Japan))

3:45 PM - 4:00 PM

[CThP6F-03] Comb-line Resolved Dual-comb Spectroscopy Using Free-running Mechanical Sharing Combs

[Presentation Style] Onsite

*Haochen Tian[1,2], Runmin Li[1], Takeru Endo[1], Akifumi Asahara[1], Lukasz A. Sterczewski[3], Kaoru Minoshima[1] (1. The Univ. of Electro-Communications (Japan), 2. Research Fellow of JSPS (Japan), 3. Wroclaw Univ. of Sci. and Tech. (Poland))

4:00 PM - 4:15 PM

[CThP6F-04] Mode-spacing multiplication of optical frequency combs without power loss

[Presentation Style] Onsite

*Taro Hasegawa[1], Taiki Kageyama[1] (1. Keio University (Japan))

4:15 PM - 4:30 PM

[CThP6F-05] Sub-30-fs all-fiber electro-optic comb at 1.5 µm with 25-GHz repetition rate

[Presentation Style] Onsite

*Yugo Kikkawa[1,2], Atsushi Ishizawa[1], Rai Kou[3], Xuejun Xu[1], Koki Yoshida[1,2], Tai Tsuchizawa[4], takuma Aihara[4], Tadashi Nishikawa[2], Guangwei Cong[3], Kenichi Hitachi[1], Noritsugu Yamamoto[3], Koji Yamada[3], Katsuya Oguri[1] (1. NTT Basic Res. Lab., NTT Corp. (Japan), 2. Tokyo Denki Univ. (Japan), 3. Platform Photonic Res. Center, National Inst. of Advanced Indus. Sci. and Tech. (Japan), 4. NTT Device Tech. Lab., NTT corp. (Japan))

4:30 PM - 4:45 PM

[CThP6F-06] Distance Measurement Based on a Coherently Synthesized Two-color EO Comb towards High-accuracy Air-refractive Index Self-Correction

[Presentation Style] Onsite

*Runmin Li[1], Haochen Tian[1,2], Takashi Kato[1,3], Akifumi Asahara[1], Kaoru Minoshima[1] (1. The Univ. of Electro-Communications (Japan), 2. Research Fellow of JSPS (Japan), 3. PRESTO, JST (Japan))

4:45 PM - 5:00 PM

[CThP6F-07] Electro-optical Dual-Comb Spectroscopy: Application to Cavity Ring-Down, Mode Width and Mode Dispersion Measurements
[Presentation Style] Onsite

Dominik Charczun[1], Daniel Lisak[1], Akiko Nishiyama[1,2], Thibault Voumard[3], Thibault Wildi[3], Grzegorz Kowzan[1], Victor Brasch[4], Tobias Herr[3,6], Adam J. Fleischer[5], Joseph T. Hodges[5], Roman Ciuryło[1], Agata Cygan[1], *Piotr Maslowski[1] （1. Institute of Physics, Nicolaus Copernicus University in Torun (Poland), 2. National Metrology Institute of Japan (NMIJ), National Institute of Advanced Industrial Science and Technology (Japan), 3. Deutsches Elektronen-Synchrotron DESY (Germany), 4. CSEM - Swiss Center for Electronics and Microtechnology (Switzerland), 5. Optical Measurements Group, National Institute of Standards and Technology (United States of America), 6. Physics Department, Universität Hamburg UHH (Germany)）

5:00 PM - 5:15 PM

3:30 PM - 3:45 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 204)

[CThP6F-01] Polarization multiplex dual-comb fiber laser for precise spectroscopy

[Presentation Style] Onsite

*Aki Takahashi[1], Sho Okubo[2], Kana Iwakuni[1] (1. University of Electro-Communications (Japan), 2. National Institute of Advanced Industrial Science and Technology (Japan))

[Presentation Style] Onsite

We developed a new polarization-multiplex dual-comb laser for precise molecular spectroscopy. The laser cavity has an electro-optic phase modulator and is mode locked by NALM. The performance of the dual-comb laser is investigated.

3:45 PM - 4:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 204)

[CThP6F-02] A Simple Scheme for Phase-sensitive Dual-comb Spectroscopy with Mechanical-sharing Dual-comb Laser

[Presentation Style] Onsite

*Takeru Endo[1], Haochen Tian[1,2], Akifumi Asahara[1], Kaoru Minoshima[1] (1. The University of Electro-Communications (Japan), 2. Research Fellow of the Japan Society for the Promotion of Science (Japan))

[Presentation Style] Onsite

We developed a simple method to extract and acquire interferograms with the desired phase in dual-comb spectroscopy using a dual-comb laser. This technique leads to useful phase-sensitive spectroscopy using simple and accurate coherent averaging.

4:00 PM - 4:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 204)

[CThP6F-03] Comb-line Resolved Dual-comb Spectroscopy Using Free-running Mechanical Sharing Combs

[Presentation Style] Onsite

*Haochen Tian[1,2], Runmin Li[1], Takeru Endo[1], Akifumi Asahara[1], Lukasz A. Sterczewski[3], Kaoru Minoshima[1] (1. The Univ. of Electro-Communications (Japan), 2. Research Fellow of JSPS (Japan), 3. Wroclaw Univ. of Sci. and Tech. (Poland))

[Presentation Style] Onsite

Phase digital correction is applied to the interferograms sampled from free-running mechanical sharing combs, resulting RF comb modes with >50 dB SNR. Absorption of hydrogen cyanide gas is verified at 1559.8 nm.

4:15 PM - 4:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 204)

[CThP6F-04] Mode-spacing multiplication of optical frequency combs without power loss
[Presentation Style] Onsite

*Taro Hasegawa[1], Taiki Kageyama[1] （1. Keio University (Japan)）

[Presentation Style] Onsite

We demonstrate multiplication of optical frequency comb mode spacing by interleaving and phase demodulation. This scheme provides mode spacing multiplication without power loss in principle, in contrast to the conventional method of mode filtering technique.

4:30 PM - 4:45 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 204)

[CThP6F-05] Sub-30-fs all-fiber electro-optic comb at 1.5 µm with 25-GHz repetition rate
[Presentation Style] Onsite

*Yugo Kikkawa[1,2], Atsushi Ishizawa[1], Rai Kou[3], Xuejun Xu[1], Koki Yoshida[1,2], Tai Tsuchizawa[4], takuma Aihara[4], Tadashi Nishikawa[2], Guangwei Cong[3], Kenichi Hitachi[1], Noritsugu Yamamoto[3], Koji Yamada[3], Katsuya Oguri[1] （1. NTT Basic Res. Lab., NTT Corp. (Japan), 2. Tokyo Denki Univ. (Japan), 3. Platform Photonic Res. Center, National Inst. of Advanced Indus. Sci. and Tech. (Japan), 4. NTT Device Tech. Lab., NTT corp. (Japan)）

[Presentation Style] Onsite

We generated a 24-fs all-fiber electro-optic comb at 1.5 mm with a 25-GHz repetition rate. We also generated a 2/3-octave spanning supercontinuum spectrum using precisely engineered silicon nitride waveguides.

4:45 PM - 5:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 204)

[CThP6F-06] Distance Measurement Based on a Coherently Synthesized Two-color EO Comb towards High-accuracy Air-refractive Index Self-Correction
[Presentation Style] Onsite

*Runmin Li[1], Haochen Tian[1,2], Takashi Kato[1,3], Akifumi Asahara[1], Kaoru Minoshima[1] （1. The Univ. of Electro-Communications (Japan), 2. Research Fellow of JSPS (Japan), 3. PRESTO, JST (Japan)）

[Presentation Style] Onsite

A distance measurement system with <1 µm resolution is demonstrated based on a coherently synthesized two-color EO comb. Air-refractive index self-correction is possible through measuring the optical distances that follow group and phase refractive indices.

5:00 PM - 5:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:15 PM Room 204)

[CThP6F-07] Electro-optical Dual-Comb Spectroscopy: Application to Cavity Ring-Down, Mode Width and Mode Dispersion Measurements

[Presentation Style] Onsite

Dominik Charczun[1], Daniel Lisak[1], Akiko Nishiyama[1,2], Thibault Voumard[3], Thibault Wildi[3], Grzegorz Kowzan[1], Victor Brasch[4], Tobias Herr[3,6], Adam J. Fleischer[5], Joseph T. Hodges[5], Roman Ciuryło[1], Agata Cygan[1], *Piotr Maslowski[1] （1. Institute of Physics, Nicolaus Copernicus University in Torun (Poland), 2. National Metrology Institute of Japan (NMIJ), National Institute of Advanced Industrial Science and Technology (Japan), 3. Deutsches Elektronen-Synchrotron DESY (Germany), 4. CSEM - Swiss Center for Electronics and Microtechnology (Switzerland), 5. Optical Measurements Group, National Institute of Standards and Technology (United States of America), 6. Physics Department, Universität Hamburg UHH (Germany)）

[Presentation Style] Onsite

The advantages of dual-comb spectroscopy with the sensitivity of cavity-enhanced techniques has been combined in a new broadband approach. The experimental demonstration is completed by a comprehensive theoretical framework, underlining the potential of the techniques.

Generation and Measurement of Quantum States I

Session Chair: Rikizo Ikuta (Osaka Univ.)

Thu. Aug 4, 2022 2:00 PM - 3:00 PM Room 107&108 (1F)

[CThP7F-02] Photon-pair generation in standard silicon-on-insulator at 2 microns wavelength

[Presentation Style] Onsite

Dominic Ashley Sulway[1,2], *Sebastian Gordon Currie[1,2], Lawrence Mark Rosenfeld[1,2], Joshua Wimbridge Silverstone[1] (1. Quantum Eng Tech labs, University of Bristol (UK), 2. Quantum Eng Central Doctoral Training, University of Bristol (UK))

2:00 PM - 2:15 PM

[CThP7F-03] Spectral Characterization of parametric Biphoton States Enabled by Frequency-to-time Mapping Technique

[Presentation Style] Onsite

*Anahita Khodadad Kashi[1,5,2], Benjamin Wetzel[3,4], Michael Kues[1,5,2] (1. Leibniz university hannover (Germany), 2. Cluster of Excellence (Germany), 3. Université de Limoges (France), 4. XLIM Research Institute (France), 5. Institute of Photonics (Germany))

2:15 PM - 2:30 PM

[CThP7F-04] Spectral modulation of biphotons via Fourier optical synthesis

[Presentation Style] Onsite

*Takeru Naito[1], Masahiro Yabuno[2], Fumihiro China[2], Shigehito Miki[2], Hirotaka Terai[2], Ryosuke Shimizu[1] (1. The University of Electro-Communications (Japan), 2. Advanced ICT Research Institute, National Institute of Information and Communication Technology (Japan))

2:30 PM - 2:45 PM

[CThP7F-05] Quantum Fourier-transform infrared spectroscopy in the far-infrared region

[Presentation Style] Onsite

*Yu Mukai[1], Ryo Okamoto[1], Shigeki Takeuchi[1] (1. Kyoto Univ. (Japan))

2:45 PM - 3:00 PM

2:00 PM - 2:15 PM (Thu. Aug 4, 2022 2:00 PM - 3:00 PM Room 107&108)

[CThP7F-02] Photon-pair generation in standard silicon-on-insulator at 2 microns wavelength

[Presentation Style] Onsite

Dominic Ashley Sulway[1,2], *Sebastian Gordon Currie[1,2], Lawrence Mark Rosenfeld[1,2], Joshua Wimbridge Silverstone[1] (1. Quantum Eng Tech labs, University of Bristol (UK), 2. Quantum Eng Central Doctoral Training, University of Bristol (UK))

[Presentation Style] Onsite

We demonstrate the first 2-micron photon-pair source on standard 220 nm silicon-on-insulator, using type-0 spontaneous four-wave mixing in the TE1 waveguide mode, and characterise it with efficient 2-micron superconducting detectors.

2:15 PM - 2:30 PM (Thu. Aug 4, 2022 2:00 PM - 3:00 PM Room 107&108)

[CThP7F-03] Spectral Characterization of parametric Biphoton States Enabled by Frequency-to-time Mapping Technique

[Presentation Style] Onsite

*Anahita Khodadad Kashi[1,5,2], Benjamin Wetzel[3,4], Michael Kues[1,5,2] (1. Leibniz university hannover (Germany), 2. Cluster of Excellence (Germany), 3. Université de Limoges (France), 4. XLIM Research Institute (France), 5. Institute of Photonics (Germany))

[Presentation Style] Onsite

Spectral correlations of a biphoton state from a parametric process are characterized with the use of the well-developed frequency-to-time mapping technique, enabling the first demonstration of the Hanbury Brown and Twiss experiment in frequency domain.

2:30 PM - 2:45 PM (Thu. Aug 4, 2022 2:00 PM - 3:00 PM Room 107&108)

[CThP7F-04] Spectral modulation of biphotons via Fourier optical synthesis

[Presentation Style] Onsite

*Takeru Naito[1], Masahiro Yabuno[2], Fumihiro China[2], Shigehito Miki[2], Hirotaka Terai[2], Ryosuke Shimizu[1] (1. The University of Electro-Communications (Japan), 2. Advanced ICT Research Institute, National Institute of Information and Communication Technology (Japan))

[Presentation Style] Onsite

We propose and demonstrate the modulation of the joint spectral intensity of a biphoton wave packet. Manipulating the two discrete joint temporal intensity distributions results in spectral modulation in 2D time-frequency space.

2:45 PM - 3:00 PM (Thu. Aug 4, 2022 2:00 PM - 3:00 PM Room 107&108)

[CThP7F-05] Quantum Fourier-transform infrared spectroscopy in the far-infrared region

[Presentation Style] Onsite

*Yu Mukai[1], Ryo Okamoto[1], Shigeki Takeuchi[1] (1. Kyoto Univ. (Japan))

[Presentation Style] Onsite

Quantum Fourier-transform (QFTIR) spectroscopy enables the estimation of infrared optical properties only by detecting visible or near-infrared light, harnessing the quantum interference between the successive photon-pair generation processes. We demonstrate QFTIR spectroscopy in the finger print region around 10 µm

Generation and Measurement of Quantum States II

Session Chair: Hsin Pin Lo (NTT)

Thu. Aug 4, 2022 3:30 PM - 4:45 PM Room 107&108 (1F)

[CThP7G-01 (Invited(P))] A Programmable Qudit-based Quantum Processor

[Presentation Style] Onsite

*CHI Yulin[1], Jieshan Huang[1], Zhanchuan Zhang[1], Jun Mao[1], Zinan Zhou[1], Xiaojiong Chen[1], Chonghao Zhai[1], Jueming Bao[1], Tianxiang Dai[1], Huihong Yuan[1,2], Ming Zhang[3], Daoxin Dai[3], Bo Tang[4], Yan Yang[4], Zhihua Li[4], Yunhong Ding[5,6], Leif Katsuo Oxenløwe[5,6], Mark Gerard Thompson[7], Jeremy L O'Brien[8], Yan Li[1,9,10], Qihuang Gong[1,2,9,10], Jianwei Wang[1,2,9,10] (1. State Key Lab for Mesoscopic Physics, School of Physics, Peking Univ (China), 2. Beijing Academy of Quantum Info Sci (China), 3. State Key Lab for Modern Optical Instrumentation, College of Optical Sci and Eng, Ningbo Res Inst, Int'l Res Center for Advanced Photonics, Zhejiang Univ (China), 4. Inst of Microelectronics, Chinese Academy of Sci (China), 5. Department of Photonics Eng, Technical Univ of Denmark (Denmark), 6. Center for Silicon Photonics for Optical Communication (SPOC), Technical Univ of Denmark (Denmark), 7. Quantum Eng Tech Labs, H. H. Wills Physics Lab and Department of Electrical and Electronic Eng, Univ of Bristol (UK), 8. Department of Physics, The Univ of Western Australia (Australia), 9. Frontiers Sci Center for Nano-optoelectronics &Collaborative Innovation Center of Quantum Matter, Peking Univ (China), 10. Collaborative Innovation Center of Extreme Optics, Shanxi Univ (China))

3:30 PM - 4:00 PM

[CThP7G-02] Photon-number-dependent visibility in two-photon spectral quantum interference between a thermal field and a heralded-state

[Presentation Style] Onsite

*Anahita Khodadad Kashi[1,2,3], Michael Kues[1,2,3] (1. Leibniz University Hannover (Germany), 2. Institue of Photonics (Germany), 3. Cluster of Excellence PhoenixD (Germany))

4:00 PM - 4:15 PM

[CThP7G-03] Stimulated Raman scattering imaging with quantum-enhanced balanced detection

[Presentation Style] Onsite

*Zicong Xu[1], Kenichi Oguchi[1], Yoshitaka Taguchi[1], Yu Miyawaki[1], Yuki Sano[1], Shun Takahashi[1], Fumiya Harashima[1], Donguk Cheon[1], Kazuhiro Katoh[1], Yasuyuki Ozeki[1] (1. The Univ. of Tokyo (Japan))

4:15 PM - 4:30 PM

[CThP7G-04] *In situ* detection of phase mismatching in optical parametric process for vacuum squeezing

[Presentation Style] Onsite

*Yoshitaka Taguchi[1], Yasuyuki Ozeki[1] (1. The University of Tokyo (Japan))

4:30 PM - 4:45 PM

3:30 PM - 4:00 PM (Thu. Aug 4, 2022 3:30 PM - 4:45 PM Room 107&108)

[CThP7G-01 (Invited(P))] A Programmable Qudit-based Quantum Processor

[Presentation Style] Onsite

*CHI Yulin[1], Jieshan Huang[1], Zhanchuan Zhang[1], Jun Mao[1], Zinan Zhou[1], Xiaojiong Chen[1], Chonghao Zhai[1], Jueming Bao[1], Tianxiang Dai[1], Huihong Yuan[1,2], Ming Zhang[3], Daoxin Dai[3], Bo Tang[4], Yan Yang[4], Zhihua Li[4], Yunhong Ding[5,6], Leif Katsuo Oxenløwe[5,6], Mark Gerard Thompson[7], Jeremy L O'Brien[8], Yan Li[1,9,10], Qihuang Gong[1,2,9,10], Jianwei Wang[1,2,9,10] (1. State Key Lab for Mesoscopic Physics, School of Physics, Peking Univ (China), 2. Beijing Academy of Quantum Info Sci (China), 3. State Key Lab for Modern Optical Instrumentation, College of Optical Sci and Eng, Ningbo Res Inst, Int'l Res Center for Advanced Photonics, Zhejiang Univ (China), 4. Inst of Microelectronics, Chinese Academy of Sci (China), 5. Department of Photonics Eng, Technical Univ of Denmark (Denmark), 6. Center for Silicon Photonics for Optical Communication (SPOC), Technical Univ of Denmark (Denmark), 7. Quantum Eng Tech Labs, H. H. Wills Physics Lab and Department of Electrical and Electronic Eng, Univ of Bristol (UK), 8. Department of Physics, The Univ of Western Australia (Australia), 9. Frontiers Sci Center for Nano-optoelectronics &Collaborative Innovation Center of Quantum Matter, Peking Univ (China), 10. Collaborative Innovation Center of Extreme Optics, Shanxi Univ (China))

[Presentation Style] Onsite

We designed, fabricated, and characterized a programmable qudit-based quantum processor on silicon and several quantum algorithms were implemented using qudits
which shows the logarithmic speed-up, counting rate acceleration and accuracy improvement of the qudit processor.

4:00 PM - 4:15 PM (Thu. Aug 4, 2022 3:30 PM - 4:45 PM Room 107&108)

[CThP7G-02] Photon-number-dependent visibility in two-photon spectral quantum interference between a thermal field and a heralded-state

[Presentation Style] Onsite

*Anahita Khodadad Kashi[1,2,3], Michael Kues[1,2,3] (1. Leibniz University Hannover (Germany), 2. Institue of Photonics (Germany), 3. Cluster of Excellence PhoenixD (Germany))

[Presentation Style] Onsite

Frequency-domain two-photon quantum interference between a thermal field and a heralded-state is studied theoretically and experimentally, revealing the dependency of visibility on the multiphoton components within the heralded-state.

4:15 PM - 4:30 PM (Thu. Aug 4, 2022 3:30 PM - 4:45 PM Room 107&108)

[CThP7G-03] Stimulated Raman scattering imaging with quantum-enhanced balanced detection

[Presentation Style] Onsite

*Zicong Xu[1], Kenichi Oguchi[1], Yoshitaka Taguchi[1], Yu Miyawaki[1], Yuki Sano[1], Shun Takahashi[1], Fumiya Harashima[1], Donguk Cheon[1], Kazuhiro Katoh[1], Yasuyuki Ozeki[1] （1. The Univ. of Tokyo (Japan)）
[Presentation Style] Onsite
We demonstrate the experimental realization of a high-power quantum-enhanced stimulated Raman scattering (QE-SRS) microscopy. By using a 25-mW squeezed light, we achieved 1.74±0.28 dB quantum enhancement in high-speed hyperspectral SRS imaging.

4:30 PM - 4:45 PM (Thu. Aug 4, 2022 3:30 PM - 4:45 PM Room 107&108)

[CThP7G-04] *In situ* detection of phase mismatching in optical parametric process for vacuum squeezing

[Presentation Style] Onsite

*Yoshitaka Taguchi[1], Yasuyuki Ozeki[1] （1. The University of Tokyo (Japan)）
[Presentation Style] Onsite
We propose a method for detecting phase mismatching by using an optical sideband, which imprints a phase shift on the pump light. By measuring this phase shift, phase mismatching can be detected for feedback control.

Oral Session | CLEO-PR2022 | Plasmonics

Plasmonics

Session Chair: Masaaki Ono (NTT Basic Research Laboratories)

Thu. Aug 4, 2022 1:30 PM - 3:00 PM Small Hall (2F)

[CThP8E-01 (Tutorial)] Photonics at the zero-nanometer limits
[Presentation Style] Onsite

*DaiSik Kim[1,2] （1. UNIST (Korea), 2. Seoul National University (Korea)）

1:30 PM - 2:30 PM

[CThP8E-02] "Decomposition of High-Order Eigenmodes in Plasmonic Nanostructures Using Transmission Matrix Analysis"
[Presentation Style] Online

*Young-Ho Jin[1], Juntaek Oh[2,3], Wonshik Choi[2,3], Myung-Ki Kim[1] （1. Light Engineering Labs, KU-KIST Graduate School of Converging Sci. and Tech., Korea Univ. (Korea), 2. Department of Physics, Korea Univ. (Korea), 3. Center for Molecular Spectroscopy and Dynamics, Inst. for Basic Sci. (Korea)）

2:30 PM - 2:45 PM

[CThP8E-03] Extreme light localization from MXene plasmons in short-wave infrared range
[Presentation Style] Onsite

*Changhoon Park[1], Nu-Ri Park[1], Jisung Kwon[1], Hyerim Kim[2], Chong Min Koo[2], Myung-Ki Kim[1] （1. korea Univ. (Korea), 2. KIST (Korea)）

2:45 PM - 3:00 PM

1:30 PM - 2:30 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Small Hall)

[CThP8E-01 (Tutorial)] Photonics at the zero-nanometer limits
[Presentation Style] Onsite

*DaiSik Kim[1,2] (1. UNIST (Korea), 2. Seoul National University (Korea))

[Presentation Style] Onsite

We survey various methods to fabricate (sub)nanogaps, including how to change the gap width in-situ from zero to tens of nanometers. We define 'zerogap' in relation to the broad optical frequency, from microwaves to the visible and discuss potential applications.

2:30 PM - 2:45 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Small Hall)

[CThP8E-02] "Decomposition of High-Order Eigenmodes in Plasmonic Nanostructures Using Transmission Matrix Analysis"
[Presentation Style] Online

*Young-Ho Jin[1], Juntaek Oh[2,3], Wonshik Choi[2,3], Myung-Ki Kim[1] (1. Light Engineering Labs, KU-KIST Graduate School of Converging Sci. and Tech., Korea Univ. (Korea), 2. Department of Physics, Korea Univ. (Korea), 3. Center for Molecular Spectroscopy and Dynamics, Inst. for Basic Sci. (Korea))

[Presentation Style] Online

We propose and demonstrate a near-field transmission matrix-based singular value decomposition method for resolving high-order eigenmodes of 50-nm-spaced double-slots, which are difficult to find with conventional computations and NSOM measurements.

2:45 PM - 3:00 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Small Hall)

[CThP8E-03] Extreme light localization from MXene plasmons in short-wave infrared range
[Presentation Style] Onsite

*Changhoon Park[1], Nu-Ri Park[1], Jisung Kwon[1], Hyerim Kim[2], Chong Min Koo[2], Myung-Ki Kim[1] (1. korea Univ. (Korea), 2. KIST (Korea))

[Presentation Style] Onsite

Light localization with plasmons in 2D material is restricted to mid- or long-wave infrared. Here, we demonstrate plasmons in 2D MXene, covering whole mid-infrared range. MXene plasmon exhibits wavelength 20 times shorter than vacuum wavelength

Si and SiN Photonics

Session Chair: Yuriko Maegami (AIST)

Thu. Aug 4, 2022 3:30 PM - 5:30 PM Small Hall (2F)

[CThP8F-01 (Invited)] Integrated Silicon photodetectors in Silicon Nitride-on-SOI platform

[Presentation Style] Online

*Shankar Kumar Selvaraja[1], Avijit Chatterjee[1], Siddharth Nambiar[1] (1. Indian Institute of Science, Bangalore (India))

3:30 PM - 4:00 PM

[CThP8F-02] Guided Mode Resonance aided In-plane Color Filters for Compact Spectrometer

[Presentation Style] Onsite

*Dipak Rout[1], Venkatachalam P[1], Radhakant Singh[1], Shreelakshmi KP[1], Shankar Kumar Selvaraja[1] (1. Center for Nanoscience and Eng., Indian Institute of Science (India))

4:00 PM - 4:15 PM

[CThP8F-03] Effect of detuning on noise characteristics in a microcomb-based light source

*Soma Kogure[1], Shun Fujii[1,2], Hajime Kumazaki[1], Shota Sota[1], Yosuke Hashimoto[3], Yuta Kobayashi[3], Tomohiro Araki[3], Takasumi Tanabe[1] (1. Keio Univ. (Japan), 2. RIKEN Center for Advanced Photonics (Japan), 3. Japan Aerospace Exploration Agency (Japan))

4:15 PM - 4:30 PM

[CThP8F-04] Silicon-on-Insulator Architectures for Brillouin scattering

[Presentation Style] Onsite

B om Subham[1,2], *Siva Shakthi[1,2], Vivek Venkataraman[2,3], Shankar K. Selvaraja[4], Amol Choudhary[1,2] (1. UFO-CHIP Group, Indian Inst. of Tech. Delhi (India), 2. Department of Electrical Engineering, Indian Inst. of Tech. Delhi (India), 3. Department of Physics, Indian Inst. of Tech. Delhi (India), 4. Cense, Indian Inst. of Science, Bangalore (India))

4:30 PM - 4:45 PM

[CThP8F-05] Observation of Motion and Discrimination of Targets using Si FMCW LiDAR Chip

[Presentation Style] Onsite

*Saneyuki Suyama[1], Takemasa Tamanuki[1], Shota Nawa[1], Hiroyuki Ito[1], Hiroshi Abe[1], Toshihiko Baba[1] (1. Yokohama Nat'l Univ. (Japan))

4:45 PM - 5:00 PM

[CThP8F-06] High-speed, step-like optical beam scanning using Si photonics SLG beam scanner for FMCW LiDAR

[Presentation Style] Onsite

Jun Gondo[1], Takemasa Tamanuki[1], Ryo Tetsuya[1], Mikiya Kamata[1], Hiroyuki Ito[1], *Toshihiko Baba[1] (1. Yokohama National University (Japan))

5:00 PM - 5:15 PM

[CThP8F-07] Programmable MZI Based on Si Photonic MEMS Tunable Delay Line

[Presentation Style] Onsite

*Myung Seok Hong[1], Dong Uk Kim[1], Min gi Lim[1], Dong Ju Choi[1], Man Jae Her[1], Young Jae Park[1], Youngjae Jeong[2], Jongwoo Park[2], Seungjun Han[2], Kyoungsik Yu[2], Sangyoon Han[1] (1. DGIST (Korea), 2. KAIST (Korea))

5:15 PM - 5:30 PM

3:30 PM - 4:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Small Hall)

[CThP8F-01 (Invited)] Integrated Silicon photodetectors in Silicon Nitride-on-SOI platform
[Presentation Style] Online

*Shankar Kumar Selvaraja[1], Avijit Chatterjee[1], Siddharth Nambiar[1] （1. Indian Institute of Science, Bangalore (India)）

[Presentation Style] Online

In this talk, we shall discuss the strategies to integrate silicon photodetector in silicon nitride-on-SOI platform. We shall discuss device design, fabrication challenges and measurement results of detectors for potential sensor and high-speed applications.

4:00 PM - 4:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Small Hall)

[CThP8F-02] Guided Mode Resonance aided In-plane Color Filters for Compact Spectrometer
[Presentation Style] Onsite

*Dipak Rout[1], Venkatachalam P[1], Radhakant Singh[1], Shreelakshmi KP[1], Shankar Kumar Selvaraja[1] （1. Center for Nanoscience and Eng., Indian Institute of Science (India)）

[Presentation Style] Onsite

We design and demonstrate multi-spectral color filters from visible to near-IR using waveguide-coupled 2D guide-mode resonators in silicon nitride-on-sapphire. This is the first demonstration of such novel narrowband in-plane spectral filtering using guided-mode-resonators.

4:15 PM - 4:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Small Hall)

[CThP8F-03] Effect of detuning on noise characteristics in a microcomb-based light source

*Soma Kogure[1], Shun Fujii[1,2], Hajime Kumazaki[1], Shota Sota[1], Yosuke Hashimoto[3], Yuta Kobayashi[3], Tomohiro Araki[3], Takasumi Tanabe[1] （1. Keio Univ. (Japan), 2. RIKEN Center for Advanced Photonics (Japan), 3. Japan Aerospace Exploration Agency (Japan)）

We investigated the pump effective detuning dependence of noise and linewidth characteristics of modulation instability combs. Modulation instability combs are useful for applications if the detuning is smaller than several times the resonace linewidth.

4:30 PM - 4:45 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Small Hall)

[CThP8F-04] Silicon-on-Insulator Architectures for Brillouin scattering
[Presentation Style] Onsite

B om Subham[1,2], *Siva Shakthi[1,2], Vivek Venkataraman[2,3], Shankar K. Selvaraja[4], Amol Choudhary[1,2] (1. UFO-CHIP Group, Indian Inst. of Tech. Delhi (India), 2. Department of Electrical Engineering, Indian Inst. of Tech. Delhi (India), 3. Department of Physics, Indian Inst. of Tech. Delhi (India), 4. Cense, Indian Inst. of Science, Bangalore (India))

[Presentation Style] Onsite

We report Brillouin scattering gain in two novel Silicon-on-Insulator architectures – double slab and double-lobed waveguides. We show that the geometrical parameters influence the Brillouin gain and frequency shift, thereby offering flexibility to maximize gain.

4:45 PM - 5:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Small Hall)

[CThP8F-05] Observation of Motion and Discrimination of Targets using Si FMCW LiDAR Chip

[Presentation Style] Onsite

*Saneyuki Suyama[1], Takemasa Tamanuki[1], Shota Nawa[1], Hiroyuki Ito[1], Hiroshi Abe[1], Toshihiko Baba[1] (1. Yokohama Nat'l Univ. (Japan))

[Presentation Style] Onsite

We used a Si FMCW LiDAR chip with a slow-light grating beam scanner to image the motion of objects. Living objects and fixed solid objects can be distinguished from Doppler shifts in the range signal.

5:00 PM - 5:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Small Hall)

[CThP8F-06] High-speed, step-like optical beam scanning using Si photonics SLG beam scanner for FMCW LiDAR

[Presentation Style] Onsite

Jun Gondo[1], Takemasa Tamanuki[1], Ryo Tetsuya[1], Mikiya Kamata[1], Hiroyuki Ito[1], *Toshihiko Baba[1] (1. Yokohama National University (Japan))

[Presentation Style] Onsite

In Si FMCW LiDAR incorporating SLG scanner, the beam drifts during the frequency modulation. We compensated for this drift using smart thermo-optic control. Through space-time observations, we confirmed fast step-like beam scanning and high-resolution ranging.

5:15 PM - 5:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Small Hall)

[CThP8F-07] Programmable MZI Based on Si Photonic MEMS Tunable Delay Line

[Presentation Style] Onsite

*Myung Seok Hong[1], Dong Uk Kim[1], Min gi Lim[1], Dong Ju Choi[1], Man Jae Her[1], Young Jae Park[1], Youngjae Jeong[2], Jongwoo Park[2], Seungjun Han[2], Kyoungsik Yu[2], Sangyoon Han[1] (1. DGIST (Korea), 2. KAIST (Korea))

[Presentation Style] Onsite

We report on a programmable MZI based on Si photonic MEMS. The device can tune FSR (0.062–0.524 nm) as well as extinction ratio (1–16 dB). Static power consumption is less than 16 nW.

New Applications of Silicon Photonics

Session Chairs: Di Liang (Alibaba Group), Yuya Shoji (Tokyo Tech)

Thu. Aug 4, 2022 2:00 PM - 3:00 PM Room 201&202 (2F)

[CThP12C-02] Direct Observation of Hypersonic Guided Modes

[Presentation Style] Onsite

*Omar Florez[1,2], Guillermo Arregui[1], Marcus Albrechtsen[3], Ryan C. Ng[1], Jordi Gomis[1], Soren Stobbe[3], Clivia Marfa Sotomayor[1,4], Pedro David Garcia[1] （1. Catalan Institute of Nanoscience and Nanotechnology (Spain), 2. Dept. de Física, Universitat Autònoma de Barcelona (Spain), 3. Department of Photonics Engineering, DTU Fotonik, Technical University of Denmark (Denmark), 4. Institució Catalana de Recerca i Estudis Avançats (ICREA) (Spain)）

2:00 PM - 2:15 PM

[CThP12C-04] Practical Implementation of Kerr Modulators in Silicon in the 2-micron Band

[Presentation Style] Onsite

*Marija Radulovic[1,2], Benjamin D.J. Sayers[1,2], Sebastian G Currie[1,2], Dario A. Quintero Dominguez[1], Joshua W. Silverstone[1] （1. Quantum Engineering Technology Labs, H. H. Wills Physics Laboratory and Department of Electrical and Electronic Engineering, University of Bristol (UK), 2. Quantum Engineering Centre for Doctoral Training, H. H. Wills Physics Laboratory and Department of Electrical and Electronic Engineering, University of Bristol (UK)）

2:45 PM - 3:00 PM

2:00 PM - 2:15 PM (Thu. Aug 4, 2022 2:00 PM - 3:00 PM Room 201&202)

[CThP12C-02] Direct Observation of Hypersonic Guided Modes

[Presentation Style] Onsite

*Omar Florez[1,2], Guillermo Arregui[1], Marcus Albrechtsen[3], Ryan C. Ng[1], Jordi Gomis[1], Soren Stobbe[3], Clivia Marfa Sotomayor[1,4], Pedro David Garcia[1] (1. Catalan Institute of Nanoscience and Nanotechnology (Spain), 2. Dept. de Física, Universitat Autònoma de Barcelona (Spain), 3. Department of Photonics Engineering, DTU Fotonik, Technical University of Denmark (Denmark), 4. Institució Catalana de Recerca i Estudis Avançats (ICREA) (Spain))

[Presentation Style] Onsite

We measure two GHz guided modes in a line defect waveguide fabricated in silicon on insulator (SOI), using Brillouin light scattering spectroscopy.

2:45 PM - 3:00 PM (Thu. Aug 4, 2022 2:00 PM - 3:00 PM Room 201&202)

[CThP12C-04] Practical Implementation of Kerr Modulators in Silicon in the 2-micron Band

[Presentation Style] Onsite

*Marija Radulovic[1,2], Benjamin D.J. Sayers[1,2], Sebastian G Currie[1,2], Dario A. Quintero Dominguez[1], Joshua W. Silverstone[1] (1. Quantum Engineering Technology Labs, H. H. Wills Physics Laboratory and Department of Electrical and Electronic Engineering, University of Bristol (UK), 2. Quantum Engineering Centre for Doctoral Training, H. H. Wills Physics Laboratory and Department of Electrical and Electronic Engineering, University of Bristol (UK))

[Presentation Style] Onsite

We design and implement a variety of silicon photonic modulators based on the electro-optic Kerr effect, operating at 2 microns wavelength and consider practical details of their application within quantum photonics.

Oral Session | CLEO-PR2022 | Hybrid Material Integration for Silicon Photonics II

Hybrid Material Integration for Silicon Photonics II

Session Chair: Yuya Shoji (Tokyo Tech)

Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 201&202 (2F)

[CThP12D-01 (Invited)] Strategies for non-volatile alteration of optical components based on mid index waveguides

[Presentation Style] Online

*Frederic Gardes[1], Greta De Paoli[1], Joaquin Faneca[2], Ioannis Zeimpekis[1], Thalia Dominguez Bucio[1], Stefan Ilie[1], Afrooz Shoaa[1], Dan Hewak[1], Alexender I Flint[1], James C Gates[1] (1. Southampton University (UK), 2. Institute of Microelectronics of Barcelona (Spain))

3:30 PM - 4:00 PM

[CThP12D-02] Experimental demonstration of all optical switching using nonlinear multimode interference coupler fabricated with Ta_2O_5 thin film

[Presentation Style] Online

*Yuan-Yao Lin[1], Shih-Er Yang[1], Yu-Lin Deng[1], Chao-Kuei Lee[1], Yi-Ren Chiu[1] (1. National Sun Yat-sen University (Taiwan))

4:00 PM - 4:15 PM

[CThP12D-03] Liquid Crystal Integrated Tunable Micro-ring For Energy-Efficient Programmable Photonic Circuit

[Presentation Style] Online

*Rakshitha Kallega[1], Hassan Yazdani[1,2], G.V.Pavan Kumar[2], Shankar Kumar Selvaraja[1] (1. Indian Institute of Science (India), 2. Indian Institute of Science Education and Research, Pune (India))

4:15 PM - 4:30 PM

[CThP12D-04] Silicon Nitride Material Integration for Enhanced Photonic Functionalities

[Presentation Style] Online

*Thalia Dominguez Bucio[1], Ilias Skandalos[1], Valerio Vitali[1], Lorenzo Mastronardi[1], Teerapat Rutirawut[1], James Hillier[2], Nikolaos Kalfagiannis[2], Periklis Petropoulos[1], Frederic Y. Gardes[1] (1. Optoelectronics Research Centre, Univ. of Southampton (UK), 2. School of Sci. and Tech., Nottingham Trent Univ. (UK))

4:30 PM - 4:45 PM

[CThP12D-05] High Quality Factor Deuterated Silicon-Rich Nitride Micro-Ring Resonators

[Presentation Style] Online

*Xavier Xujie Chia[1], Peng Xing[1], Ju Won Choi[1], Dawn Tse Hui Tan[1,2] (1. Singapore Univ. of Tech. and Design (Singapore), 2. A*STAR Inst. of Microelectronics (IME) (Singapore))

4:45 PM - 5:00 PM

[CThP12D-06] Single soliton generation with deuterated SiN ring resonator fabricated at low temperature

[Presentation Style] Online

*Takuma Aihara[1], Tatsurou Hiraki[1], Hidetaka Nishi[1], Tai Tsuchizawa[1], Shinji Matsuo[1] （1. NTT Device Technology Labs, NTT Corporation (Japan)）

5:00 PM - 5:15 PM

[CThP12D-07] Enhancement of Fiber-to-Waveguide Coupling Efficiency of Silicon Nitride Integrated Optical Circuits

[Presentation Style] Onsite

*Xiaotian ZHU[1], Guangkuo Li[1], Yuhua Li[4], Xiang Wang[2], Roy Davidson[2], Brent E Little[2,3], Sai T CHU[1] （1. City University of Hong Kong (Hong Kong), 2. QXP Technology Inc. (China), 3. State Key Laboratory of Transient Optics and Photonics, XIOPM, CAS, Xi’ an (China), 4. Key Laboratory of Optical Field Manipulation of Zhejiang Province, Department of Physics, Zhejiang Sci-Tech University (China)）

5:15 PM - 5:30 PM

3:30 PM - 4:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 201&202)

[CThP12D-01 (Invited)] Strategies for non-volatile alteration of optical components based on mid index waveguides
[Presentation Style] Online

*Frederic Gardes[1], Greta De Paoli[1], Joaquin Faneca[2], Ioannis Zeimpekis[1], Thalia Dominguez Bucio[1], Stefan Ilie[1], Afrooz Shoaa[1], Dan Hewak[1], Alexender I Flint[1], James C Gates[1] （1. Southampton University (UK), 2. Institute of Microelectronics of Barcelona (Spain)）

[Presentation Style] Online

We demonstrate a range of techniques and materials enabling non-volatile alteration of optical components based on mid index waveguides for C and O band applications.

4:00 PM - 4:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 201&202)

[CThP12D-02] Experimental demonstration of all optical switching using nonlinear multimode interference coupler fabricated with Ta_2O_5 thin film
[Presentation Style] Online

*Yuan-Yao Lin[1], Shih-Er Yang[1], Yu-Lin Deng[1], Chao-Kuei Lee[1], Yi-Ren Chiu[1] （1. National Sun Yat-sen University (Taiwan)）

[Presentation Style] Online

Multimode interference (MMI) couplers were fabricated by Tantalum pentoxide (Ta2O5) thin film grown with e-beam evaporation routes. All optical switching based on nonlinear MMI was experimentally demonstrated under ps laser pulse at sub-nJ energy level.

4:15 PM - 4:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 201&202)

[CThP12D-03] Liquid Crystal Integrated Tunable Micro-ring For Energy-Efficient Programmable Photonic Circuit
[Presentation Style] Online

*Rakshitha Kallega[1], Hassan Yazdani[1,2], G.V.Pavan Kumar[2], Shankar Kumar Selvaraja[1] （1. Indian Institute of Science (India), 2. Indian Institute of Science Education and Research, Pune (India)）

[Presentation Style] Online

We demonstrate a liquid crystal (LC) integrated tunable silicon ring resonator with in-plane electro-optic tuning performance of 0.87 π/mW or 30 pm/V. We present the simulation, fabrication, and characterization results of the device.

4:30 PM - 4:45 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 201&202)

[CThP12D-04] Silicon Nitride Material Integration for Enhanced Photonic Functionalities [Presentation Style] Online

*Thalia Dominguez Bucio[1], Ilias Skandalos[1], Valerio Vitali[1], Lorenzo Mastronardi[1], Teerapat Rutirawut[1], James Hillier[2], Nikolaos Kalfagiannis[2], Periklis Petropoulos[1], Frederic Y. Gardes[1] （1. Optoelectronics Research Centre, Univ. of Southampton (UK), 2. School of Sci. and Tech., Nottingham Trent Univ. (UK)）

[Presentation Style] Online

We demonstrate a novel material integration scheme for the realisation of wavelength division multiplexing devices in the O-band and discuss advanced fabrication methods for the realisation of nonlinear devices for all-optical processing in the C-band.

4:45 PM - 5:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 201&202)

[CThP12D-05] High Quality Factor Deuterated Silicon-Rich Nitride Micro-Ring Resonators [Presentation Style] Online

*Xavier Xujie Chia[1], Peng Xing[1], Ju Won Choi[1], Dawn Tse Hui Tan[1,2] （1. Singapore Univ. of Tech. and Design (Singapore), 2. A*STAR Inst. of Microelectronics (IME) (Singapore)）

[Presentation Style] Online

Micro-Ring Resonators were fabricated on Deuterated Silicon-Rich Nitride films and characterised. Fabricated devices yield intrinsic quality factors of up to 127,000 and propagation losses of less than 2 dB/cm.

5:00 PM - 5:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 201&202)

[CThP12D-06] Single soliton generation with deuterated SiN ring resonator fabricated at low temperature [Presentation Style] Online

*Takuma Aihara[1], Tatsurou Hiraki[1], Hidetaka Nishi[1], Tai Tsuchizawa[1], Shinji Matsuo[1] （1. NTT Device Technology Labs, NTT Corporation (Japan)）

[Presentation Style] Online

We demonstrate single soliton generation in a SiN ring resonator using deuterated SiN film deposited at low temperature. The results show that comb generators can be integrated in photonic integrated circuits by using the back-end-on-line process.

5:15 PM - 5:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 201&202)

[CThP12D-07] Enhancement of Fiber-to-Waveguide Coupling Efficiency of Silicon Nitride Integrated Optical Circuits

[Presentation Style] Onsite

*Xiaotian ZHU[1], Guangkuo Li[1], Yuhua Li[4], Xiang Wang[2], Roy Davidson[2], Brent E Little[2,3], Sai T CHU[1] （1. City University of Hong Kong (Hong Kong), 2. QXP Technology Inc. (China), 3. State Key Laboratory of Transient Optics and Photonics, XIOPM, CAS, Xi’ an (China), 4. Key Laboratory of Optical Field Manipulation of Zhejiang Province, Department of Physics, Zhejiang Sci-Tech University (China)）

[Presentation Style] Onsite

A hybrid approach for the enhancement of the fiber-to-silicon nitride waveguide coupling efficiency is proposed. It shows the coupling efficiency of lower than 0.7 dB/facet across the C band can be achieved

Oral Session | CLEO-PR2022 | Optical Signal Processing for Communication

Optical Signal Processing for Communication

Session Chair: Takashi Inoue (AIST)

Thu. Aug 4, 2022 1:30 PM - 2:30 PM Room 207 (2F)

[CThP13C-01 (Invited)] Latest Progress in Optical Eigenvalue Communications - Dispersion Managed Soliton Case -
[Presentation Style] Onsite

*Akihiro Maruta[1], Hiroki Endo[1] (1. Osaka University (Japan))

1:30 PM - 2:00 PM

[CThP13C-02] Experimental Investigation on Parallel Extension of Optoelectronic Hybrid FIR Filter
[Presentation Style] Onsite

*Shuhei Otsuka[1], Takahide Sakamoto Sakamoto[1] (1. Tokyo Metropolitan University (Japan))

2:00 PM - 2:15 PM

[CThP13C-03] Flexible Data Center Interconnect Based on Optical Aggregation and Electrical Disaggregation
[Presentation Style] Onsite

Asahi Sueyoshi[1], *Ken Mishina[1], Daisuke Hisano[1], Akihiro Maruta[1] (1. Osaka University (Japan))

2:15 PM - 2:30 PM

1:30 PM - 2:00 PM (Thu. Aug 4, 2022 1:30 PM - 2:30 PM Room 207)

[CThP13C-01 (Invited)] Latest Progress in Optical Eigenvalue Communications - Dispersion Managed Soliton Case - [Presentation Style] Onsite

*Akihiro Maruta[1], Hiroki Endo[1] (1. Osaka University (Japan))

[Presentation Style] Onsite

Eigenvalue of dispersion managed (DM) soliton is investigated based on the inverse scattering transform by focusing the anomalous dispersion fiber section. The DM soliton has a discrete eigenvalue which is invariant over long dinstance. So even in DM transmission line, optical eigenvalue communication can be realized.

2:00 PM - 2:15 PM (Thu. Aug 4, 2022 1:30 PM - 2:30 PM Room 207)

[CThP13C-02] Experimental Investigation on Parallel Extension of Optoelectronic Hybrid FIR Filter [Presentation Style] Onsite

*Shuhei Otsuka[1], Takahide Sakamoto Sakamoto[1] (1. Tokyo Metropolitan University (Japan))

[Presentation Style] Onsite

We demonstrated parallel extension of optoelectronic FIR equalizer that enables to increase the number of taps, filter resolution. The parallel expansion of the two filters increased the filter resolution from 6.17 GHz to 3.09 GHz.

2:15 PM - 2:30 PM (Thu. Aug 4, 2022 1:30 PM - 2:30 PM Room 207)

[CThP13C-03] Flexible Data Center Interconnect Based on Optical Aggregation and Electrical Disaggregation [Presentation Style] Onsite

Asahi Sueyoshi[1], *Ken Mishina[1], Daisuke Hisano[1], Akihiro Maruta[1] (1. Osaka University (Japan))

[Presentation Style] Onsite

We investigate the performance of a hybrid transmission system using a 2xPAM4 to 16QAM optical aggregation and 16QAM to 2xQPSK electrical disaggregation as flexible data center interconnects.

Photonic Computing II

Session Chair: Shota Kita (NTT Basic Research Labs.)

Thu. Aug 4, 2022 4:00 PM - 5:15 PM Room 207 (2F)

[CThP13D-02] FemtoComputing: Phase-encoded Schrö dinger Kernel Computing for Femtosecond Instruments

[Presentation Style] Onsite

TINGYI ZHOU[1], *Bahram Jalali[1] （1. University of California, Los Angeles (United States of America)）

4:00 PM - 4:15 PM

[CThP13D-03] Numerical demonstration of spatial photonic Ising machine by using time-division multiplexing

[Presentation Style] Onsite

*Suguru Shimomura[1], Ken-ichi Okubo[1], Hiroshi Yamashita[2], Yusuke Ogura[1], Hideyuki Suzuki[1], Jun Tanida[1] （1. Osaka Univ. (Japan), 2. Univ. of Tokyo (Japan)）

4:15 PM - 4:30 PM

[CThP13D-04] Experiment on Decision Making for Multi-Armed Bandit Problem Using Chaos and Low Frequency Fluctuations in Laser Network

[Presentation Style] Onsite

*Keigo Sasaki[1], Takatomo Mihana[1], Kazutaka Kanno[1], Makoto Naruse[2], Atsushi Uchida[1] （1. Saitama Univ. (Japan), 2. Univ. Tokyo (Japan)）

4:30 PM - 4:45 PM

[CThP13D-05] Application for Decision Making by Controlling Chaotic Mode Competition Dynamics in Multi-Mode Semiconductor Laser

[Presentation Style] Onsite

*Ryugo Iwami[1], Takatomo Mihana[1], Kazutaka Kanno[1], Makoto Naruse[2], Atsushi Uchida[1] （1. Saitama Univ. (Japan), 2. Univ. Tokyo (Japan)）

4:45 PM - 5:00 PM

[CThP13D-06] Experiment on Extraction of Complex Electric-Field Amplitude in Chaotic Semiconductor Laser for Random Number Generation

[Presentation Style] Onsite

*Shota Kudo[1], Shin Numata[1], Kazutaka Kanno[1], Atsushi Uchida[1] （1. Saitama Univ. (Japan)）

5:00 PM - 5:15 PM

4:00 PM - 4:15 PM (Thu. Aug 4, 2022 4:00 PM - 5:15 PM Room 207)

[CThP13D-02] FemtoComputing: Phase-encoded Schrö dinger Kernel Computing for Femtosecond Instruments [Presentation Style] Onsite

TINGYI ZHOU[1], *Bahram Jalali[1] (1. University of California, Los Angeles (United States of America))

[Presentation Style] Onsite

We introduce an ultralow-latency AI hardware-accelerated instrument that utilizes femtosecond pulses not only for single-shot measurements but also for computing. Closed-loop optimization using optical phase-encoding is shown to improve the accuracy in time stretch imaging

4:15 PM - 4:30 PM (Thu. Aug 4, 2022 4:00 PM - 5:15 PM Room 207)

[CThP13D-03] Numerical demonstration of spatial photonic Ising machine by using time-division multiplexing [Presentation Style] Onsite

*Suguru Shimomura[1], Ken-ichi Okubo[1], Hiroshi Yamashita[2], Yusuke Ogura[1], Hideyuki Suzuki[1], Jun Tanida[1] (1. Osaka Univ. (Japan), 2. Univ. of Tokyo (Japan))

[Presentation Style] Onsite

In this study, we present a method for enhancing a function of the spatial photonic Ising machine by using time-division multiplexing. We confirmed that the optimal solution of a given Knapsack problem is effectively obtained by the proposed system.

4:30 PM - 4:45 PM (Thu. Aug 4, 2022 4:00 PM - 5:15 PM Room 207)

[CThP13D-04] Experiment on Decision Making for Multi-Armed Bandit Problem Using Chaos and Low Frequency Fluctuations in Laser Network [Presentation Style] Onsite

*Keigo Sasaki[1], Takatomo Mihana[1], Kazutaka Kanno[1], Makoto Naruse[2], Atsushi Uchida[1] (1. Saitama Univ. (Japan), 2. Univ. Tokyo (Japan))

[Presentation Style] Onsite

We experimentally demonstrate decision making for solving the multi-armed bandit problem using the dynamics of a semiconductor laser network. We compare the performance of decision making by using chaos and low-frequency fluctuations.

4:45 PM - 5:00 PM (Thu. Aug 4, 2022 4:00 PM - 5:15 PM Room 207)

[CThP13D-05] Application for Decision Making by Controlling Chaotic

Mode Competition Dynamics in Multi-Mode Semiconductor Laser
[Presentation Style] Onsite

*Ryugo Iwami[1], Takatomo Mihana[1], Kazutaka Kanno[1], Makoto Naruse[2], Atsushi Uchida[1] （1. Saitama Univ. (Japan), 2. Univ. Tokyo (Japan)）

[Presentation Style] Onsite

We numerically demonstrate decision making for solving the multi-armed bandit problem by controlling chaotic mode competition dynamics in a multi-mode semiconductor laser. The proposed method is effective when the number of slot machines is large.

5:00 PM - 5:15 PM (Thu. Aug 4, 2022 4:00 PM - 5:15 PM Room 207)

[CThP13D-06] Experiment on Extraction of Complex Electric-Field Amplitude in Chaotic Semiconductor Laser for Random Number Generation
[Presentation Style] Onsite

*Shota Kudo[1], Shin Numata[1], Kazutaka Kanno[1], Atsushi Uchida[1] （1. Saitama Univ. (Japan)）

[Presentation Style] Onsite

We experimentally extract the complex electric-field amplitude of chaos in a semiconductor laser with optical feedback by using optical coherent detection. We perform random number generation using the extracted dynamics of the complex electric-field amplitude.

Biomedical Sensors and Systems I

Session Chairs: George C Cardoso (Univ. of São Paulo), Norimichi Tsumura (Chiba Univ.)
Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 104&105 (1F)

[CThP17E-01 (Invited)] Informed learning of spectral super-resolution for mHealth applications
[Presentation Style] Online
Yuhyun Ji[1], Sang Mok Park[1], *Young L. Kim[1] (1. Purdue University (United States of America))
1:30 PM - 2:00 PM

[CThP17E-02] Optical Sensor-based Mass Temperature Screening Network for Infectious Disease Surveillance
[Presentation Style] Onsite
*Sirajit Rayanasukha[1], Armote Somboonkaew[1], Sarun Sumriddetchkajorn[2] (1. Spectroscopic and Sensing Devices Res. Group, National Electronics and Computer Tech. Center, NSTDA (Thailand), 2. National Electronics and Computer Tech. Center, NSTDA (Thailand))
2:00 PM - 2:15 PM

[CThP17E-03] Polarization probe polarization imaging in NIR regime using liquid crystal polarization grating
[Presentation Style] Onsite
*Moritsugu Sakamoto[1,4], Nhan Thanh Huynh[1], Yuki Ono[1], Kimitaka Doi[1], Kohei Noda[1,4], Tomoyuki Sasaki[1,4], Masayuki Tanaka[2,4], Nobuhiro Kawatsuki[3,4], Hiroshi Ono[1,4] (1. Nagaoka Univ. of Tech. (Japan), 2. OPT Gate Co., Ltd. (Japan), 3. Univ. of Hyogo (Japan), 4. CREST, JST (Japan))
2:15 PM - 2:30 PM

[CThP17E-04] Influence of wrist dorsiflexion angle on the measurement signal of radial artery strain with FBG sensor
[Presentation Style] Onsite
*Shouhei Koyama[1], Tatsuya Yoda[1] (1. SHINSHU Univ. (Japan))
2:30 PM - 2:45 PM

[CThP17E-05] Thermo-optic Refraction Interferometry for Milk Turbidity Estimation Using Optical Vortex Beam
[Presentation Style] Onsite
*Pritam P Shetty[1], Jayachandra Bingi[1] (1. IIITDM Kancheepuram (India))
2:45 PM - 3:00 PM

1:30 PM - 2:00 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 104&105)

[CThP17E-01 (Invited)] Informed learning of spectral super-resolution for mHealth applications [Presentation Style] Online

Yuhyun Ji[1], Sang Mok Park[1], *Young L. Kim[1] (1. Purdue University (United States of America))

[Presentation Style] Online

An informed learning approach can be used to overcome the limitations of purely data-driven machine learning of spectral super-resolution or hyperspectral recovery and allows for noninvasive mobile health point-of-care diagnostics using the smartphone camera.

2:00 PM - 2:15 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 104&105)

[CThP17E-02] Optical Sensor-based Mass Temperature Screening Network for Infectious Disease Surveillance [Presentation Style] Onsite

*Sirajit Rayanasukha[1], Armote Somboonkaew[1], Sarun Sumriddetchkajorn[2] (1. Spectroscopic and Sensing Devices Res. Group, National Electronics and Computer Tech. Center, NSTDA (Thailand), 2. National Electronics and Computer Tech. Center, NSTDA (Thailand))

[Presentation Style] Onsite

Due to the current wide spread of infectious diseases in human and animals, we propose and demonstrate here a combination of thermal imaging-based mass temperature screening modules and crowdsourcing approach for low-cost and real-time surveillance purpose across communities.

2:15 PM - 2:30 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 104&105)

[CThP17E-03] Polarization probe polarization imaging in NIR regime using liquid crystal polarization grating [Presentation Style] Onsite

*Moritsugu Sakamoto[1,4], Nhan Thanh Huynh[1], Yuki Ono[1], Kimitaka Doi[1], Kohei Noda[1,4], Tomoyuki Sasaki[1,4], Masayuki Tanaka[2,4], Nobuhiro Kawatsuki[3,4], Hiroshi Ono[1,4] (1. Nagaoka Univ. of Tech. (Japan), 2. OPT Gate Co., Ltd. (Japan), 3. Univ. of Hyogo (Japan), 4. CREST, JST (Japan))

[Presentation Style] Onsite

In this presentation, we propose and demonstrate a polarization probe polarization imaging system using a liquid crystal polarization grating in NIR regime. Our system should be applied to a remote sensing, product inspection, and biomedical-imaging.

2:30 PM - 2:45 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 104&105)

[CThP17E-04] Influence of wrist dorsiflexion angle on the measurement signal of radial artery strain with FBG sensor [Presentation Style] Onsite

*Shouhei Koyama[1], Tatsuya Yoda[1] （1. SHINSHU Univ. (Japan)）

[Presentation Style] Onsite

In the wrist dorsiflexion angle was 60 degrees, the pulsatile strain signal containing vital sign information was measured with a high signal-to-noise ratio by the Fiber Bragg Grating sensor.

2:45 PM - 3:00 PM (Thu. Aug 4, 2022 1:30 PM - 3:00 PM Room 104&105)

[CThP17E-05] Thermo-optic Refraction Interferometry for Milk Turbidity Estimation Using Optical Vortex Beam [Presentation Style] Onsite

*Pritam P Shetty[1], Jayachandra Bingi[1] （1. IIITDM Kancheepuram (India)）

[Presentation Style] Onsite

A new interferometric method called thermo-optic refraction interferometer (TORI) is proposed. Two optical fields out of which one carries vortex phase are passed through turbid media i.e., milk and their interferograms are analyzed.

Biomedical Sensors and Systems II

Session Chairs: George C Cardoso (Univ. of São Paulo), Norimichi Tsumura (Chiba Univ.)

Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 104&105 (1F)

[CThP17F-01 (Invited)] Multimodal Image Analysis of Blood Flow and Blood Components of Rodent Skin Flap for Understanding Necrosis

[Presentation Style] Onsite

*Hideaki Haneishi[1] (1. Chiba University (Japan))

3:30 PM - 4:00 PM

[CThP17F-02] A Simple and Short Temperature Sensor Integrated Optical Fiber Probe for Laser Ablation

[Presentation Style] Online

*Hideki Fukano[1], Shiori Matsuoka[1] (1. Okayama Univ. (Japan))

4:00 PM - 4:15 PM

[CThP17F-03] Estimation of Finger Force by Nail Color Change and Measurement of Capillary Refilling by Finger Pressure

[Presentation Style] Onsite

Takumi Nagasawa[1], Raquel Pantojo de Souza[2], *Kazuki Iwata[1], Keiko Ogawa-Ochiai[3], Norimichi Tsumura[1], George Cunha Cardoso[2] (1. Chiba Univ. (Japan), 2. Univ. of São Paulo (Brazil), 3. Hiroshima Univ. Hospital (Japan))

4:15 PM - 4:30 PM

[CThP17F-04] CNN Technique for Speaker Recognition using Laser Microphone based on Self-coupling Effect of Laser Diode

[Presentation Style] Onsite

*Daisuke Mizushima[1] (1. Aichi Inst. of Tech. (Japan))

4:30 PM - 4:45 PM

[CThP17F-05] Mechanical pressure to reduce skin attenuation coefficient for infrared light

[Presentation Style] Onsite

Raquel Pantojo de Souza[1], Christian T. Dominguez[1], Luciano Bachmann[1], *George C. Cardoso[1] (1. University of Sao Paulo (Brazil))

4:45 PM - 5:00 PM

[CThP17F-06] Low-Cost 3-D Broad-Spectral Imaging Module

[Presentation Style] Onsite

Sarun Sumriddetchkajorn[2], Sirajit Rayanaukha[1], Armote Somboonkaew[1], Sataporn Chanhorm[1], *Uayphorn Wannason[1] (1. Spectroscopic and Sensing Devices Res. Group, National Electronics and Computer Tech. Center, NSTDA (Thailand), 2. National Electronics and Computer Tech. Center, NSTDA (Thailand))

5:00 PM - 5:15 PM

[CThP17F-07] High sensitive fiber biosensor for *Listeria monocytogenes* detection

[Presentation Style] Online

Ling Chen[1], *Jiajun Tian[1], Bang Yang[1], Kedi Tang[1], Dongze Piao[1], Yong Yao[1]
（1. Harbin Institute of Technology (China)）
5:15 PM - 5:30 PM

3:30 PM - 4:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 104&105)

[CThP17F-01 (Invited)] Multimodal Image Analysis of Blood Flow and Blood Components of Rodent Skin Flap for Understanding Necrosis
[Presentation Style] Onsite

*Hideaki Haneishi[1] (1. Chiba University (Japan))

[Presentation Style] Onsite

In this study, the reflection and transmission images of rat flap are captured with a hyper-spectral camera, a color camera, and an infrared camera. Using those images, multidimensional image analysis is performed to understand the vascular structure, blood flow, and those changes over time.

4:00 PM - 4:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 104&105)

[CThP17F-02] A Simple and Short Temperature Sensor Integrated Optical Fiber Probe for Laser Ablation
[Presentation Style] Online

*Hideki Fukano[1], Shiori Matsuoka[1] (1. Okayama Univ. (Japan))

[Presentation Style] Online

A novel optical fiber probe with a very short integrated temperature sensor for laser ablation is proposed and successfully fabricated throughout this study. Laser irradiation and temperature monitoring were performed simultaneously using a wavelength-division-multiplexing technique.

4:15 PM - 4:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 104&105)

[CThP17F-03] Estimation of Finger Force by Nail Color Change and Measurement of Capillary Refilling by Finger Pressure
[Presentation Style] Onsite

Takumi Nagasawa[1], Raquel Pantojo de Souza[2], *Kazuki Iwata[1], Keiko Ogawa-Ochiai[3], Norimichi Tsumura[1], George Cunha Cardoso[2] (1. Chiba Univ. (Japan), 2. Univ. of São Paulo (Brazil), 3. Hiroshima Univ. Hospital (Japan))

[Presentation Style] Onsite

We propose a method for measuring capillary refill time based on skin color changes after releasing finger pressure on the forearm using an RGB camera. We also estimate the finger force from the fingernail color.

4:30 PM - 4:45 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 104&105)

[CThP17F-04] CNN Technique for Speaker Recognition using Laser Microphone based on Self-coupling Effect of Laser Diode

[Presentation Style] Onsite

*Daisuke Mizushima[1] （1. Aichi Inst. of Tech. (Japan)）

[Presentation Style] Onsite

The low signal-to-noise ratio of laser microphone should be solved for the speech recognition applications. In this paper, the image recognition technique adapts to laser microphone. From experiments, the speaker recognition is achieved under limited conditions.

4:45 PM - 5:00 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 104&105)

[CThP17F-05] Mechanical pressure to reduce skin attenuation coefficient for infrared light

[Presentation Style] Onsite

Raquel Pantojo de Souza[1], Christian T. Dominguez[1], Luciano Bachmann[1], *George C. Cardoso[1] （1. University of Sao Paulo (Brazil)）

[Presentation Style] Onsite

Phototherapies often require efficient light penetration into the skin. Using OCT, we found that gentle mechanical pressures of a few kilopascals, exerted by the light source on the skin, reduce dermis attenuation for IR light.

5:00 PM - 5:15 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 104&105)

[CThP17F-06] Low-Cost 3-D Broad-Spectral Imaging Module

[Presentation Style] Onsite

Sarun Sumriddetchkajorn[2], Sirajit Rayanaukha[1], Armote Somboonkaew[1], Sataporn Chanhorm[1], *Uayphorn Wannason[1] （1. Spectroscopic and Sensing Devices Res. Group, National Electronics and Computer Tech. Center, NSTDA (Thailand), 2. National Electronics and Computer Tech. Center, NSTDA (Thailand)）

[Presentation Style] Onsite

Multispectral imaging camera is an important tool for two-dimensional (2-D) and 3-D spectroscopic analysis. Rather than using an available high-end product or prototype, we propose and engineer a low-cost 3-D broad-spectral imaging module, covering blue, green, red, near infrared, and long wave infrared regions. With our own designed software, it can collect 3-D spectral images from each spectral band simultaneously and it can combine these images into 2-D and 3-D fused spectral images. It is designed in a compact 16.9×2.9×7.1 cm^3 with just 310 grams.

5:15 PM - 5:30 PM (Thu. Aug 4, 2022 3:30 PM - 5:30 PM Room 104&105)

[CThP17F-07] High sensitive fiber biosensor for *Listeria monocytogenes* detection

[Presentation Style] Online

Ling Chen[1], *Jiajun Tian[1], Bang Yang[1], Kedi Tang[1], Dongze Piao[1], Yong Yao[1] （1. Harbin Institute of Technology (China)）

[Presentation Style] Online

A label-free immunobiosensor with higher RI sensitivity of 1020 nm/RIU and 3696.8 nm/RIU at the RI range of 1.33 and 1.38 is successfully demonstrated for *Listeria monocytogenes* detection whose detection limit is 10^2 CFU/mL.

2. Photonics in the Quantum Era

Session Chair: Keiichi Edamatsu (Tohoku Univ.)

Thu. Aug 4, 2022 6:00 PM - 8:00 PM Small Hall (2F)

[CThW3-01] Hybrid Quantum Systems using Optical Nanofibers Integrated with Cold Rubidium Atoms

[Presentation Style] Onsite

*Sile Nic Chormaic[1], Alexey Vylegzhanin[1], Zohreh Shahrabifarahani[1], Aswathy Raj[1], Ratnesh Kumar Gupta[1], Dylan Brown[1], Jesse L. Everett[1] (1. OIST Graduate University (Japan))

6:00 PM - 6:30 PM

[CThW3-02] Hybrid photonic quantum processors(TBD)

*Alberto Peruzzo[1] (1. RMIT University (Australia))

6:30 PM - 7:00 PM

[CThW3-03] Integrated photonics for quantum information and communication technologies

[Presentation Style] Onsite

*Nobuyuki Matsuda[1] (1. Tohoku University (Japan))

7:00 PM - 7:30 PM

[CThW3-04] Development of next generation superconducting nanostrip single photon detection technology

[Presentation Style] Onsite

*Shigehito Miki[1] (1. NICT (Japan))

7:30 PM - 8:00 PM

6:00 PM - 6:30 PM (Thu. Aug 4, 2022 6:00 PM - 8:00 PM Small Hall)

[CThW3-01] Hybrid Quantum Systems using Optical Nanofibers Integrated with Cold Rubidium Atoms [Presentation Style] Onsite

*Sile Nic Chormaic[1], Alexey Vylegzhanin[1], Zohreh Shahrabifarahani[1], Aswathy Raj[1], Ratnesh Kumar Gupta[1], Dylan Brown[1], Jesse L. Everett[1] (1. OIST Graduate University (Japan))

[Presentation Style] Onsite

We discuss work on the integration of optical nanofibers with cold atoms. We focus on two aspects, one related to Rydberg atom formation mediated by the nanofiber and the other to optimizing atom trapping.

6:30 PM - 7:00 PM (Thu. Aug 4, 2022 6:00 PM - 8:00 PM Small Hall)

[CThW3-02] Hybrid photonic quantum processors(TBD)

*Alberto Peruzzo[1] (1. RMIT University (Australia))

7:00 PM - 7:30 PM (Thu. Aug 4, 2022 6:00 PM - 8:00 PM Small Hall)

[CThW3-03] Integrated photonics for quantum information and communication technologies [Presentation Style] Onsite

*Nobuyuki Matsuda[1] (1. Tohoku University (Japan))

[Presentation Style] Onsite

Integrated photonic devices such as on-chip waveguides have proved to be powerful tools for quantum information science and technologies using photons. I review the recent status of integrated photonics for quantum information processing and communications.

7:30 PM - 8:00 PM (Thu. Aug 4, 2022 6:00 PM - 8:00 PM Small Hall)

[CThW3-04] Development of next generation superconducting nanostrip single photon detection technology [Presentation Style] Onsite

*Shigehito Miki[1] (1. NICT (Japan))

[Presentation Style] Onsite

we will introduce the diverse research on next generation SNSPD technology, including superconducting digital readout circuit.

4. Perovskite Photonics

Session Chairs: Takashi Kondo (Univ. of Tokyo), Kazuhiro Ema (Sophia Univ.)

Thu. Aug 4, 2022 6:00 PM - 8:00 PM Conference Hall (Oval Room) (1F)

[CThW4-01] Development of halide perovskite photovoltaic devices towards high voltage performance

[Presentation Style] Onsite

*Tsutomu Miyasaka[1] （1. Toin University of Yokohama (Japan)）

6:00 PM - 6:30 PM

[CThW4-02] Perovskite solar cell - thermoelectric tandem system: A novel method for high efficiency and stability(TBD)

[Presentation Style] Online

*Hong Lin[1] （1. Tsinghua University (China)）

6:30 PM - 7:00 PM

[CThW4-03] Photophysics of Perovskite Semiconductors: From Materials to Devices

[Presentation Style] Online

*Yoshihiko Kanemitsu[1] （1. Kyoto Univ. (Japan)）

7:00 PM - 7:30 PM

[CThW4-04] Layered Hybrid Perovskites: From Supramolecular Templating to Multifunctional Materials

[Presentation Style] Online

*Jovana V. Milic[1] （1. University of Fribourg (Switzerland)）

7:30 PM - 8:00 PM

6:00 PM - 6:30 PM (Thu. Aug 4, 2022 6:00 PM - 8:00 PM Conference Hall (Oval Room))

[CThW4-01] Development of halide perovskite photovoltaic devices towards high voltage performance [Presentation Style] Onsite

*Tsutomu Miyasaka[1] (1. Toin University of Yokohama (Japan))

[Presentation Style] Onsite

Lead halide perovskite semiconductors shows unique defect tolerance nature that enables high efficiency in photovoltaic power conversion. Our strategy to enhance voltage output towards theoretical limit levels by compositional engineering of heterojunction interfaces is presented.

6:30 PM - 7:00 PM (Thu. Aug 4, 2022 6:00 PM - 8:00 PM Conference Hall (Oval Room))

[CThW4-02] Perovskite solar cell - thermoelectric tandem system: A novel method for high efficiency and stability(TBD) [Presentation Style] Online

*Hong Lin[1] (1. Tsinghua University (China))

[Presentation Style] Online

A novel perovskite solar cell-thermoelectric tandem system was established with enhanced working stability, higher solar spectrum utilization and raised efficiency for systematically solar-thermal-electric conversion based on highly-efficient perovskite solar cells

7:00 PM - 7:30 PM (Thu. Aug 4, 2022 6:00 PM - 8:00 PM Conference Hall (Oval Room))

[CThW4-03] Photophysics of Perovskite Semiconductors: From Materials to Devices [Presentation Style] Online

*Yoshihiko Kanemitsu[1] (1. Kyoto Univ. (Japan))

[Presentation Style] Online

We discuss luminescence properties, nonlinear optical responses, and electron-phonon interactions in halide perovskites for photonic device applications.

7:30 PM - 8:00 PM (Thu. Aug 4, 2022 6:00 PM - 8:00 PM Conference Hall (Oval Room))

[CThW4-04] Layered Hybrid Perovskites: From Supramolecular Templating to Multifunctional Materials [Presentation Style] Online

*Jovana V. Milic[1] （1. University of Fribourg (Switzerland)）

[Presentation Style] Online

By purposefully tailoring supramolecular interactions to template layered perovskite architectures, we achieve solar cells with superior operational stabilities without compromising photovoltaic performances. Moreover, we extend their functionality to provide a new platform for advanced optoelectronics.

C1. Solid State, Fiber, and Other Laser Sources

Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTh1-01] High power visible supercontinuum generation pumped by all normal dispersion picosecond Yb-doped fiber laser
[Presentation Style] Onsite
*Yukihiro Inoue[1], Juri Ogawa[1], Ryosuke Kaneda[1], Takeshi Higashiguchi[1] (1. Utsunomiya University (Japan))

[P-CTh1-02] Characteristics of supercontinuum beam with Photonic crystal fiber of different length
[Presentation Style] Onsite
*Ryo Kurihara[1], Juri Ogawa[1], Yukihiro Inoue[1], Ryosuke Kaneda[1], Shotaro Hirao[1], Takeshi Higashiguchi[1] (1. Utsunomiya Univ. (Japan))

[P-CTh1-04] Stable noise-like pulse generation from a NALM-based all-PM Tm-doped fiber laser
[Presentation Style] Online
*BO Ren[1], Can Li[1], Tao Wang[1], Kun Guo[1], Pu Zhou[1] (1. National Univ. of Defense Tech. (China))

[P-CTh1-05] Optical Degradations Induced by Unoptimized Intracavity Fiber Connections in a Single-Oscillator 2 µm All-Fiber Laser
[Presentation Style] Online
*Nicolas Dalloz[1], Arnaud Motard[1,2], Christophe Louot[1], Inka Manek-Hönninger[2], Anne Dhollande[1] (1. ISL Inst. (France), 2. Bordeaux Univ. (France))

[P-CTh1-06] Modeling and design of a resonantly pumped Q-switched Ho:YLF laser with an intracavity pumping scheme
[Presentation Style] Onsite
*Atsushi Sato[1], Shoken Ishii[2] (1. Tohoku Inst. of Tech. (Japan), 2. Tokyo Metropolitan Univ. (Japan))

[P-CTh1-07] Evaluation of Thermal Resistance of Direct-Bonded Yb:YAG Ceramic
[Presentation Style] Onsite
*Yasuhiro Kamba[1], Chen Qu[1], Taisuke Miura[1], Miyuki Uomoto[2], Takehito Shimatsu[2] (1. Gigaphoton Inc. (Japan), 2. Tohoku Univ. (Japan))

[P-CTh1-08] Covalent Organic Framework for Q-Switched All-Solid-State Laser
[Presentation Style] Onsite
*Hsuan Sen Wang[1], Ahmed F. M. El Mahdy[2], Shiao Wei Kuo[2], Sih Po Su[1], Kuan Hong Hou[1], Chao Kuei Lee[1] (1. Department of Photonics,National Sun Yat-sen Univ. (Taiwan), 2. Department of Materials and Optoelectronic Science,National Sun Yat-sen Univ. (Taiwan))

[P-CTh1-09] Development of high average power ns-pulse laser using an Yb:YAG thin-rod
[Presentation Style] Onsite
*Shotaro Hirao[1], Ryosuke Kaneda[1], Juri Ogawa[1], Ryo Kurihara[1], Yukihiro Inoue[1], Takeshi higashiguchi[1] (1. Utsunomiya Univ. (Japan))

[P-CTh1-10] Development of compact, high-energy Yb:YAG passive Q-switch laser for pumping intense infrared lasers

[Presentation Style] Online

*Yutaka Akahane[1], Koichi Yamakawa[1] （1. National Inst. for Quantum and Radiological Sci. and Tech. (Japan)）

[P-CTh1-11] Comparing Thermally-Induced Beam Degradation for High-Power Lissajous Modes by a Diode-End-Pumped YVO_4 Laser with Different Nd-Dopant Concentration

[Presentation Style] Online

*Wan-Chen Tsai[1], Kuang-Ting Cheng[1], Pi-Hui Tuan[1] （1. National Chung Cheng Univ. (Taiwan)）

[P-CTh1-12] High-Repetition-Rate Structured Oval Pulsed Fields with Controllable Mode Order by an Nd:YVO_4/Cr^{4+}:YAG Laser in a Near-Hemispherical Resonator

[Presentation Style] Online

*Pi-Hui Tuan[1], Wan-Chen Tsai[1], Yu-Zhe Cheng[1] （1. National Chung Cheng Univ. (Taiwan)）

[P-CTh1-13] Supercontinuum beam generation by two-color pumping using the Yb:YAG thin-disk regenerative amplifier

[Presentation Style] Onsite

*Juri Ogawa[1], Ryosuke Kaneda[1], Ryo Kurihara[1], Shotaro Hirao[1], Yukihiro Inoue[1], Takeshi Higashiguchi[1] （1. Utsunomiya Univ. (Japan)）

[P-CTh1-14] Active Control of Random Lasing Using the Optical Trapping Technique

[Presentation Style] Onsite

*Takashi Kaku[1], Naomichi Yokoi[2], Takashi Okamoto[1] （1. Kyushu Inst. of Tech. (Japan), 2. Chitose Inst. of Sci. and Tech. (Japan)）

[P-CTh1-15] Prevention of Intermittent Chaos in Semiconductor Laser with Optical Feedback

[Presentation Style] Onsite

*Sota Inoue[1], Kazutaka Kanno[1], Atsushi Uchida[1] （1. Saitama Univ. (Japan)）

[P-CTh1-16] Dynamic Characteristics of Quantum Cascade Lasers near Threshold Oscillation with Optical Feedback

[Presentation Style] Onsite

*Harimoto Tetsuo[1] （1. University of Yamanashi (Japan)）

[P-CTh1-17] Femtosecond Laser Writing Circular Cladding Waveguide in Er:SrF_2 Crystal

[Presentation Style] Online

Kaixin Liu[1], Zihao Zhang[1], Zhen Zhang[2], Liangbi Su[2], Zhiyi Wei[3], *Junli Wang[1] （1. Xidian Univ. (China), 2. Shanghai Inst. of Ceramics, Chinese Academy of Sciences (China), 3. Inst. of Physics, Chinese Academy of Sciences (China)）

[P-CTh1-18] Terahertz-wave Beamline Using Coherent Edge Radiation at Nihon University

[Presentation Style] Online

*Norihiro Sei[1], Hiroshi Ogawa[1], Takeshi Sakai[2], Yoske Sumitomo[2], Yasushi Hayakawa[2], Yumiko Takahashi[2], Kyoko Nogami[2], Toshinari Tanaka[2], Ken Hayakawa[2] （1. National Inst. of Advanced Indus. Sci. and Tech. (Japan), 2. Nihon Univ. (Japan)）

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-01] High power visible supercontinuum generation pumped by all normal dispersion picosecond Yb-doped fiber laser
[Presentation Style] Onsite

*Yukihiro Inoue[1], Juri Ogawa[1], Ryosuke Kaneda[1], Takeshi Higashiguchi[1] (1. Utsunomiya University (Japan))

[Presentation Style] Onsite

High power visible supercontinuum source pumped by all normal dispersion picosecond Yb-doped fiber laser was demonstrated. Seed laser is operated in the normal dispersion regime, so it allows significant output power scaling while avoiding pulse breakup. The average power higher than 2 W was achieved with a spectral bandwidth of 1700 nm. The supercontinuum source will be useful for many applications including defect detection and a mask alignment in the nano-in-print lithography.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-02] Characteristics of supercontinuum beam with Photonic crystal fiber of different length
[Presentation Style] Onsite

*Ryo Kurihara[1], Juri Ogawa[1], Yukihiro Inoue[1], Ryosuke Kaneda[1], Shotaro Hirao[1], Takeshi Higashiguchi[1] (1. Utsunomiya Univ. (Japan))

[Presentation Style] Onsite

We generated supercontinuum beam from a nanosecond pulsed Nd:YAG laser by a different length PCF, and the wavelength conversion characteristics were measured.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-04] Stable noise-like pulse generation from a NALM-based all-PM Tm-doped fiber laser
[Presentation Style] Online

*BO Ren[1], Can Li[1], Tao Wang[1], Kun Guo[1], Pu Zhou[1] (1. National Univ. of Defense Tech. (China))

[Presentation Style] Online

An all-polarization maintaining (PM) noise-like pulse (NLP) mode-locked Tm-doped fiber oscillator based on nonlinear amplifying loop mirror (NALM) was experimentally demonstrated. Through series of analysis, the achieved pulse shows a good stability.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-05] Optical Degradations Induced by Unoptimized Intracavity Fiber Connections in a Single-Oscillator 2 µm All-

Fiber Laser

[Presentation Style] Online

*Nicolas Dalloz[1], Arnaud Motard[1,2], Christophe Louot[1], Inka Manek-Hönninger[2], Anne Dhollande[1] (1. ISL Inst. (France), 2. Bordeaux Univ. (France))

[Presentation Style] Online

We show the effects of voluntarily unoptimized intracavity fiber connections on the output optical properties of a 2 µm single oscillator all-fiber laser and propose mitigation actions to limit the degradation of the laser performances.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-06] Modeling and design of a resonantly pumped Q-switched Ho:YLF laser with an intracavity pumping scheme

[Presentation Style] Onsite

*Atsushi Sato[1], Shoken Ishii[2] (1. Tohoku Inst. of Tech. (Japan), 2. Tokyo Metropolitan Univ. (Japan))

[Presentation Style] Onsite

An intracavity pumping scheme for a resonantly pumped Q-switched Ho:YLF laser was investigated. The results of simulations indicated that 100-mJ-level Q-switched operations of the Ho:YLF laser can be expected under 1.5-J diode pumping.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-07] Evaluation of Thermal Resistance of Direct-Bonded Yb:YAG Ceramic

[Presentation Style] Onsite

*Yasuhiro Kamba[1], Chen Qu[1], Taisuke Miura[1], Miyuki Uomoto[2], Takehito Shimatsu[2] (1. Gigaphoton Inc. (Japan), 2. Tohoku Univ. (Japan))

[Presentation Style] Onsite

We report a measurement of thermal resistance between Yb:YAG and aluminum plate contacted via atomic diffusion bonding (ADB). The thermal resistance of Yb:YAG/Al layer via ADB was 3 times lower than that via indium foil.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-08] Covalent Organic Framework for Q-Switched All-Solid-State Laser

[Presentation Style] Onsite

*Hsuan Sen Wang[1], Ahmed F. M. El Mahdy[2], Shiao Wei Kuo[2], Sih Po Su[1], Kuan Hong Hou[1], Chao Kuei Lee[1]
（1. Department of Photonics,National Sun Yat-sen Univ. (Taiwan), 2. Department of Materials and Optoelectronic Science,National Sun Yat-sen Univ. (Taiwan)）
[Presentation Style] Onsite
A novel organic material, Covalent Organic Frameworks (COFs), exhibits versatile optical nonlinear absorption. The first pulsed solid-state laser using COFs as an absorber, the evolution of laser performance as pump power was also characterized.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-09] Development of high average power ns-pulse laser using an Yb:YAG thin-rod
[Presentation Style] Onsite

*Shotaro Hirao[1], Ryosuke Kaneda[1], Juri Ogawa[1], Ryo Kurihara[1], Yukihiro Inoue[1], Takeshi higashiguchi[1] （1. Utsunomiya Univ. (Japan)）
[Presentation Style] Onsite
We demonstrated the 5-ns, 1030-nm amplification by a 30-mm long Yb:YAG thin rod. At an excitation power of 45 W at 940 nm, a maximum average power of 1.3 W was obtained for forward excitation.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-10] Development of compact, high-energy Yb:YAG passive Q-switch laser for pumping intense infrared lasers
[Presentation Style] Online

*Yutaka Akahane[1], Koichi Yamakawa[1] （1. National Inst. for Quantum and Radiological Sci. and Tech. (Japan)）
[Presentation Style] Online
Compact, intense passive Q-switch lasers with Yb:YAG/Cr:YAG composite ceramics have been generated 3-mJ, 3-ns laser pulses at 60-Hz for pumping infrared lasers, which is increased to 6.3-mJ and 12.0-ns with cavity extension.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-11] Comparing Thermally-Induced Beam Degradation for High-Power Lissajous Modes by a Diode-End-Pumped YVO_4 Laser with Different Nd-Dopant Concentration
[Presentation Style] Online

*Wan-Chen Tsai[1], Kuang-Ting Cheng[1], Pi-Hui Tuan[1] （1. National Chung Cheng Univ. (Taiwan)）
[Presentation Style] Online

An Nd:YVO_4 laser was used to explore the pump-induced beam degradation of Lissajous modes by different doping-concentration gain crystals to manifest both the beam structure and geometric phase will be obviously influenced by thermal aberration.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-12] High-Repetition-Rate Structured Oval Pulsed Fields with Controllable Mode Order by an Nd:YVO_4/Cr^{4+}:YAG Laser in a Near-Hemispherical Resonator

[Presentation Style] Online

*Pi-Hui Tuan[1], Wan-Chen Tsai[1], Yu-Zhe Cheng[1] (1. National Chung Cheng Univ. (Taiwan))

[Presentation Style] Online

Structured pulsed fields with oval-shaped morphologies are realized by an Nd:YVO_4/Cr^{4+}:YAG laser to output stable pulse trains with the average/peak power up to 2.2/400 W under an 8-W pump level and 125-kHz repetition-rate operation.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-13] Supercontinuum beam generation by two-color pumping using the Yb:YAG thin-disk regenerative amplifier

[Presentation Style] Onsite

*Juri Ogawa[1], Ryosuke Kaneda[1], Ryo Kurihara[1], Shotaro Hirao[1], Yukihiro Inoue[1], Takeshi Higashiguchi[1] (1. Utsunomiya Univ. (Japan))

[Presentation Style] Onsite

We demonstrated the supercontinuum (SC) beam generation by two-color pumping in order to extend shorter wavelength spectral region using a 10-m long photonic crystal fiber (PCF). The bandwidth of SC beam was achieved to be 480-1050 nm.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-14] Active Control of Random Lasing Using the Optical Trapping Technique

[Presentation Style] Onsite

*Takashi Kaku[1], Naomichi Yokoi[2], Takashi Okamoto[1] (1. Kyushu Inst. of Tech. (Japan), 2. Chitose Inst. of Sci. and Tech. (Japan))

[Presentation Style] Onsite

A method was proposed to control the random laser action of particle-dispersed media using an optical trapping technique. The results showed that the emission properties changed when the trap beam was focused on the sample.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-15] Prevention of Intermittent Chaos in Semiconductor Laser with Optical Feedback

[Presentation Style] Onsite

*Sota Inoue[1], Kazutaka Kanno[1], Atsushi Uchida[1] (1. Saitama Univ. (Japan))

[Presentation Style] Onsite

We numerically predict the occurrence of intermittent chaos in a semiconductor laser with optical feedback using the information on a chaotic attractor. We succeed in preventing the intermittent chaos by perturbing the optical feedback phase.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-16] Dynamic Characteristics of Quantum Cascade Lasers near Threshold Oscillation with Optical Feedback

[Presentation Style] Onsite

*Harimoto Tetsuo[1] (1. University of Yamanashi (Japan))

[Presentation Style] Onsite

The dynamic characteristics of quantum cascade lasers with optical feedback are numerically analyzed with a conventional rate-equation model. Simulation results showed that chaotic phenomena also occur in the quantum cascade laser near the threshold oscillation with optical feedback.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-17] Femtosecond Laser Writing Circular Cladding Waveguide in Er:SrF_2 Crystal

[Presentation Style] Online

Kaixin Liu[1], Zihao Zhang[1], Zhen Zhang[2], Liangbi Su[2], Zhiyi Wei[3], *Junli Wang[1] (1. Xidian Univ. (China), 2. Shanghai Inst. of Ceramics, Chinese Academy of Sciences (China), 3. Inst. of Physics, Chinese Academy of Sciences (China))

[Presentation Style] Online

We report on the use of femtosecond laser to inscribe circular cladding waveguides in Er:SrF_2 infrared crystals, and the minimum propagation loss (0.612 dB/cm) of the waveguide is determined at 976 nm wavelength.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh1-18] Terahertz-wave Beamline Using Coherent Edge Radiation at Nihon University

[Presentation Style] Online

*Norihiro Sei[1], Hiroshi Ogawa[1], Takeshi Sakai[2], Yoske Sumitomo[2], Yasushi Hayakawa[2], Yumiko Takahashi[2], Kyoko Nogami[2], Toshinari Tanaka[2], Ken Hayakawa[2] （1. National Inst. of Advanced Indus. Sci. and Tech. (Japan), 2. Nihon Univ. (Japan)）

[Presentation Style] Online

We have developed a terahertz beamline at an electron accelerator facility of Nihon University. Coherent edge radiation with energy of 0.2 mJ can be used for various measurements in the frequency region of 0.3-3 THz.

Poster Session | CLEO-PR2022 | Poster Session

C5. Laser Processing and Innovative Applications

Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTh5-01] High-Speed Imaging of Ice Crystallization Dynamics Triggered by Laser Ablation

[Presentation Style] Onsite

*Hozumi Takahashi[1], Yuka Tsuri[1], Mihoko Maruyama[1,2,3], Masashi Yoshimura[4], Seiichiro Nakabayashi[5,6], Yusuke Mori[1], Hiroshi Y Yoshikawa[1] （1. Grad. Sch. of Eng., Osaka Univ. (Japan), 2. IACCS, Osaka Univ. (Japan), 3. Grad. Sch. of Life and Environ. Sci., Kyoto Pref. Univ. (Japan), 4. ILE, Osaka Univ. (Japan), 5. Dept. of Chem., Saitama Univ. (Japan), 6. Div. of Strategic Res. and Develop., Grad. Sch. of Sci. and Eng.,Saitama Univ. (Japan)）

[P-CTh5-02] Ultrafast Laser Surface Patterning of Gold and Zirconia

*David Pallares Aldeiturriaga[1], Luca Leggio[1], Cyril Mauclair[1,2], Xxx Sedao[1,2] （1. Hubert Curien Laboratory, University of Lyon, Jean Monnet University, UMR 5516 CNRS (France), 2. GIE Manutech-USD (France)）

[P-CTh5-03] Surface cleavage of zinc oxide induced by femtosecond laser irradiation

[Presentation Style] Onsite

*Xi Yu[1], Yuma Takeda[2], Shuta Hamasaki[3], Takafumi Ishida[1,3], Makoto Kuwahara[1,3], Koh Saitoh[1,3], Fumihiro Itoigawa[4], Shingo Ono[2] （1. IMaSS, Nagoya Univ. (Japan), 2. Dept. Phys. Sci. and Eng., Nitech (Japan), 3. Grad. Sch. Eng., Nagoya Univ. (Japan), 4. Dept. Electr. and Mech., Nitech (Japan)）

[P-CTh5-04] Direct Writing of Conductive Patterns by Bubble Printing of Liquid Metal Nanoparticles

[Presentation Style] Onsite

*Tatsuya Kobayashi[1], Masaru Mukai[1], Kazuhide Ueno[1], Taichi Furukawa[1], Shoji Maruo[1] （1. Yokohama National University (Japan)）

[P-CTh5-05] Droplet-Based Multi-Material Two-Photon Lithography for Heterogeneous 3D Structures

[Presentation Style] Onsite

*Kanata Togashi[1], Hotaka Hirata[1], Taichi Furukawa[1], Masaru Mukai[1], Shoji Maruo[1] （1. Yokohama National Univ. (Japan)）

[P-CTh5-06] Deep Hole Drilling of Wide Bandgap Materials using Hybrid ArF Laser

[Presentation Style] Onsite

*Takashi Onose[1], Hironori Igarashi[1], Yasuhiro Kamba[1], Taisuke Miura[1], Kouji Kakizaki[1] （1. Gigaphoton Inc. (Japan)）

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh5-01] High-Speed Imaging of Ice Crystallization Dynamics Triggered by Laser Ablation
[Presentation Style] Onsite

*Hozumi Takahashi[1], Yuka Tsuri[1], Mihoko Maruyama[1,2,3], Masashi Yoshimura[4], Seiichiro Nakabayashi[5,6], Yusuke Mori[1], Hiroshi Y Yoshikawa[1] (1. Grad. Sch. of Eng., Osaka Univ. (Japan), 2. IACCS, Osaka Univ. (Japan), 3. Grad. Sch. of Life and Environ. Sci., Kyoto Pref. Univ. (Japan), 4. ILE, Osaka Univ. (Japan), 5. Dept. of Chem., Saitama Univ. (Japan), 6. Div. of Strategic Res. and Develop., Grad. Sch. of Sci. and Eng.,Saitama Univ. (Japan))

[Presentation Style] Onsite

We have demonstrated ice crystallization by laser ablation of water with a single laser pulse. The results showed the ice crystallization with bubbles that were formed by laser ablation of water.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh5-02] Ultrafast Laser Surface Patterning of Gold and Zirconia

*David Pallares Aldeiturriaga[1], Luca Leggio[1], Cyril Mauclair[1,2], Xxx Sedao[1,2] (1. Hubert Curien Laboratory, University of Lyon, Jean Monnet University, UMR 5516 CNRS (France), 2. GIE Manutech-USD (France))

A parametric study of ultrafast laser processing of gold and zirconia is presented. Laser micromachining quality indicators such as surface roughness, engraving depth and taper angle were evaluated, and optimal process condition at high process speed is suggested.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh5-03] Surface cleavage of zinc oxide induced by femtosecond laser irradiation
[Presentation Style] Onsite

*Xi Yu[1], Yuma Takeda[2], Shuta Hamasaki[3], Takafumi Ishida[1,3], Makoto Kuwahara[1,3], Koh Saitoh[1,3], Fumihiro Itoigawa[4], Shingo Ono[2] (1. IMaSS, Nagoya Univ. (Japan), 2. Dept. Phys. Sci. and Eng., Nitech (Japan), 3. Grad. Sch. Eng., Nagoya Univ. (Japan), 4. Dept. Electr. and Mech., Nitech (Japan))

[Presentation Style] Onsite

Cleavage along the crystalline and cleavage-melt shift were observed on the surface of a ZnO substrate when it was irradiated by single and multiple femtosecond laser pulses, respectively.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh5-04] Direct Writing of Conductive Patterns by Bubble Printing of Liquid Metal Nanoparticles
[Presentation Style] Onsite

*Tatsuya Kobayashi[1], Masaru Mukai[1], Kazuhide Ueno[1], Taichi Furukawa[1], Shoji Maruo[1] （1. Yokohama National University (Japan)）
[Presentation Style] Onsite
Bubble printing of Ga-In liquid metal nanoparticles was demonstrated. Fine line patterns with line width of several µm were formed. The conductivity of the resultant line patterns was improved by galvanic replacement using silver nitrate.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh5-05] Droplet-Based Multi-Material Two-Photon Lithography for Heterogeneous 3D Structures

[Presentation Style] Onsite

*Kanata Togashi[1], Hotaka Hirata[1], Taichi Furukawa[1], Masaru Mukai[1], Shoji Maruo[1] （1. Yokohama National Univ. (Japan)）
[Presentation Style] Onsite
We propose a multi-material two-photon lithography system by remotely manipulating droplets using far-infrared heating. After 3D printing of multi-polymer models, heterogeneous 3D structures composed of polymer and metal were also fabricated by using electroless plating.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh5-06] Deep Hole Drilling of Wide Bandgap Materials using Hybrid ArF Laser

[Presentation Style] Onsite

*Takashi Onose[1], Hironori Igarashi[1], Yasuhiro Kamba[1], Taisuke Miura[1], Kouji Kakizaki[1] （1. Gigaphoton Inc. (Japan)）
[Presentation Style] Onsite
We demonstrated a laser drilling on sintered SiC plate using hybrid ArF laser at the wavelength of 193 nm. We obtained a diagonal hole on 2-mm thick SiC plate at a slant angle of 20˚

Poster Session | CLEO-PR2022 | Poster Session

C6. Optical and Photonic Metrology

Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTh6-01] Active light shift suppression in CPT atomic clock
[Presentation Style] Online
*Valeriy Andryushkov[1], Daba Radnatarov[1], Sergey Kobtsev[1], Maksim Basalaev[1], Valeriy Yudin[1] (1. Novosibirsk State Univ. (Russia))

[P-CTh6-02] A novel scheme for narrow-linewidth measurement based on a delayed self-heterodyne interferometer
[Presentation Style] Online
*Zhongan Zhao[1,2], Zhenxu Bai[1,2,3], Duo Jin[1,2], Richard P. Mildren[3], Yulei Wang[1,2], Zhiwei Lu[1,2] (1. Hebei Univ. of Tech. (China), 2. Hebei Key Lab. of Adv. Laser Tech. and Eq. (China), 3. Macquarie Univ. (Australia))

[P-CTh6-03] Linewidth Simulation of Littman/Metcalf External Cavity Diode Laser using Curvature Controlled End Mirror
[Presentation Style] Onsite
*Naoaki Kato[1], Yu Takiguchi[1] (1. Hamamatsu Photonics K.K. (Japan))

[P-CTh6-04] Laser oscillation of spectral drill cavity including gain media
[Presentation Style] Onsite
*Seigo Ohno[1], Katsuhiko Miyamoto[2], Shin'ichiro Hayashi[3], Yoshiharu Urata[4], Norihiko Seikine[3] (1. Tohoku Univ. (Japan), 2. Chiba Univ. (Japan), 3. NICT (Japan), 4. PHLUXi, Inc. (Japan))

[P-CTh6-05] RF signal estimation utilizing low-frequency beat signal due to harmonics of phase-modulation lightwave
[Presentation Style] Onsite
*Akito Chiba[1], Yusuke Sunaga[1] (1. Gunma Univ. (Japan))

[P-CTh6-06] A robust frequency stabilized of Er:fiber frequency comb with relative frequency instability of E-18
[Presentation Style] Online
*Lulu Yan[1], Mingkun Li[1,2], Xiguang Yang[1,2], Yanyan Zhang[1], Pan Zhang[1,2], Bingjie Rao[1], Xin Chen[1], Ru Yuan[1], Wenge Guo[4], Shougang Zhang[1,2], Haifeng Jiang[1,2,3] (1. Key Laboratory of Time and Frequency Primary Standards, National Time Service Center, Chinese Academy of Sciences (China), 2. School of Astronomy and Space Sciences, University of Chinese Academy of Sciences (China), 3. University of Science and Technology of China (China), 4. School of Science, Xi'an Shiyou University (China))

[P-CTh6-07] Spectral Restoration of Optical Comb by Low-Resolution Spectrum Analyzer Combined with Inverse Matrix Deconvolution Processing
[Presentation Style] Online
*Takumi Hidaka[1], Tatsuki Ishijima[1], Takahide Sakamoto[1] (1. Tokyo Metropolitan University (Japan))

[P-CTh6-08] Active-dummy compensation of temperature drift in refractive-index-sensing optical comb by use of mechanically-sharing dual-comb configuration
[Presentation Style] Online

*Shogo Miyamura[1], Ryo Oe[2], Taira Kajisa[3], Yu Tokizane[4], Takeo Minamikawa[4], Shuji Taue[5], Takeshi Yasui[4] （1. Grad. Sch. Sci. Tech. Innov., Tokushima Univ. (Japan), 2. Grad. Sch. Tech. Ind. Soc. Sci., Tokushima Univ. (Japan), 3. Grad. Sch. Interdiscip. New Sci., Toyo Univ (Japan), 4. pLED, Tokushima Univ. (Japan), 5. Sch. System Eng., Kochi Univ. Tech. (Japan)）

[P-CTh6-09] Combination of Dual-Comb Spectroscopy with Jones-Matrix Polarimetry

[Presentation Style] Onsite

*Hidenori Koresawa[1], Eiji Hase[2], Yu Tokizane[2], Takeo Minamikawa[2], Takeshi Yasui[2] （1. Graduate School of Advanced Technology and Science, Tokushima University (Japan), 2. Institute of Post-LED Photonics (pLED), Tokushima University (Japan)）

[P-CTh6-10] Development of mode-extracting optical frequency comb for rapid wavelength-scanning digital holography

[Presentation Style] Onsite

*KAZUKI SADAHIRO[1], Yu Tokizane[2], Eiji Hase[2], Takeo Minamikawa[2], Takeshi Yasui[2] （1. Grad.Sch.Sci.Tech.Innovation,Tokushima Univ. (Japan), 2. pLED, Tokushima Univ. (Japan)）

[P-CTh6-11] Diagnosis of Unstained Biological Blood Cells Using Phase Hologram

[Presentation Style] Online

*Dahi Ibrahim[1] （1. National Institute of Standards (Egypt)）

[P-CTh6-12] Digital Holographic Reconstruction of a Diffusely Reflecting Object Using Single-shot Fresnel Approach.

[Presentation Style] Online

*Dahi Ibrahim[1] （1. National Institute of Standards (Egypt)）

[P-CTh6-13] Counterfactual Polarimetry of a Polarising Object

[Presentation Style] Online

*Jonte R Hance[1], John Rarity[1] （1. Univ. of Bristol (UK)）

[P-CTh6-14] Step Height Measurement via Vortex Beam Diffraction

[Presentation Style] Online

*Dina Grace C. Banguilan[1], Nathaniel P. Hermosa II[1] （1. University of the Philippines Diliman (Philippines)）

[P-CTh6-16] Broadband UV Confocal Spectroscopy and its Applications

[Presentation Style] Online

Guo-Hao Lu[1], Chao-Feng Liu[1], *Chun-Jen Weng[1] （1. Taiwan Instrument Research Institute, NARLabs, Taiwan (Taiwan)）

[P-CTh6-17] Wide-bandgap Semiconductors Testing and Oscillatory Stresses Detection Using the Non-steady-state Photo-EMF Technique

*Igor Sokolov[1], Mikhail Bryushinin[1] （1. Ioffe Institute (Russia)）

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-01] Active light shift suppression in CPT atomic clock
[Presentation Style] Online

*Valeriy Andryushkov[1], Daba Radnatarov[1], Sergey Kobtsev[1], Maksim Basalaev[1], Valeriy Yudin[1] (1. Novosibirsk State Univ. (Russia))

[Presentation Style] Online

We demonstrated experimental implementation of coherent population trapping resonance phase-jump spectroscopy consisting of discrete phase modulation of the bichromatic pumping radiation frequency difference which allows error signal generation for the resonance active light shift elimination.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-02] A novel scheme for narrow-linewidth measurement based on a delayed self-heterodyne interferometer
[Presentation Style] Online

*Zhongan Zhao[1,2], Zhenxu Bai[1,2,3], Duo Jin[1,2], Richard P. Mildren[3], Yulei Wang[1,2], Zhiwei Lu[1,2] (1. Hebei Univ. of Tech. (China), 2. Hebei Key Lab. of Adv. Laser Tech. and Eq. (China), 3. Macquarie Univ. (Australia))

[Presentation Style] Online

In this work we examine the beat note envelope spectrum generated by a short fiber-based, delayed self-heterodyne structure and we present a novel linewidth measurement scheme suitable for characterizing narrow-linewidth lasers.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-03] Linewidth Simulation of Littman/Metcalf External Cavity Diode Laser using Curvature Controlled End Mirror
[Presentation Style] Onsite

*Naoaki Kato[1], Yu Takiguchi[1] (1. Hamamatsu Photonics K.K. (Japan))

[Presentation Style] Onsite

A dynamic and broad linewidth modulation method with an external cavity diode laser is introduced. The transmission line laser model simulation revealed the tuning range of linewidth from 250 kHz to 50 GHz.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-04] Laser oscillation of spectral drill cavity including gain media
[Presentation Style] Onsite

*Seigo Ohno[1], Katsuhiko Miyamoto[2], Shin' ichiro Hayashi[3], Yoshiharu Urata[4], Norihiko Seikine[3] (1. Tohoku Univ. (Japan), 2. Chiba Univ. (Japan), 3. NICT (Japan), 4. PHLUXi, Inc. (Japan))

[Presentation Style] Onsite

We have developed a spectral drill, which is a Fabry Perot cavity tunable through a geometric phase shifter. A gain medium was additionally introduced within the spectral drill cavity and laser oscillation was observed.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-05] RF signal estimation utilizing low-frequency beat signal due to harmonics of phase-modulation lightwave [Presentation Style] Onsite

*Akito Chiba[1], Yusuke Sunaga[1] (1. Gunma Univ. (Japan))

[Presentation Style] Onsite

We propose a method for estimating parameters of an RF-signal within high-frequency region, by adopting a low-frequency reference RF signal source to generate harmonics of the modulation lightwave.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-06] A robust frequency stabilized of Er:fiber frequency comb with relative frequency instability of E-18 [Presentation Style] Online

*Lulu Yan[1], Mingkun Li[1,2], Xiguang Yang[1,2], Yanyan Zhang[1], Pan Zhang[1,2], Bingjie Rao[1], Xin Chen[1], Ru Yuan[1], Wenge Guo[4], Shougang Zhang[1,2], Haifeng Jiang[1,2,3] (1. Key Laboratory of Time and Frequency Primary Standards, National Time Service Center, Chinese Academy of Sciences (China), 2. School of Astronomy and Space Sciences, University of Chinese Academy of Sciences (China), 3. University of Science and Technology of China (China), 4. School of Science, Xi' an Shiyou University (China))

[Presentation Style] Online

Highly stable and long-term frequency-controlled femtosecond optical frequency comb is demonstrated in this paper. We stabilized carrier envelope offset frequency onto a RF reference and obtained the in-loop frequency instability is about 4.3×10^{-18}@1s. We stabilized repetition rate onto an ultrastable laser. The relative frequency instability is 5.3×10^{-18}@1s.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-07] Spectral Restoration of Optical Comb by Low-Resolution Spectrum Analyzer Combined with Inverse Matrix Deconvolution Processing [Presentation Style] Online

*Takumi Hidaka[1], Tatsuki Ishijima[1], Takahide Sakamoto[1] (1. Tokyo Metropolitan University (Japan))

[Presentation Style] Online

We demonstrate spectral measurement of frequency components generated from an electro-optic-modulator-based comb generator. Even with a cost-effective low-resolution spectrum analyzer, an inverse

matrix deconvolution processing helps restore the comb lines under measurement.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-08] Active-dummy compensation of temperature drift in refractive-index-sensing optical comb by use of mechanically-sharing dual-comb configuration
[Presentation Style] Online

*Shogo Miyamura[1], Ryo Oe[2], Taira Kajisa[3], Yu Tokizane[4], Takeo Minamikawa[4], Shuji Taue[5], Takeshi Yasui[4] (1. Grad. Sch. Sci. Tech. Innov., Tokushima Univ. (Japan), 2. Grad. Sch. Tech. Ind. Soc. Sci., Tokushima Univ. (Japan), 3. Grad. Sch. Interdiscip. New Sci., Toyo Univ (Japan), 4. pLED, Tokushima Univ. (Japan), 5. Sch. System Eng., Kochi Univ. Tech. (Japan))

[Presentation Style] Online

We suppress the temperature drift in the refractive-index-sensing optical frequency comb (RI-sensing OFC) by using the difference of repetition frequency between an active RI-sensing OFC and a dummy one in the mechanical-sharing dual-fiber-cavity configuration.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-09] Combination of Dual-Comb Spectroscopy with Jones-Matrix Polarimetry
[Presentation Style] Onsite

*Hidenori Koresawa[1], Eiji Hase[2], Yu Tokizane[2], Takeo Minamikawa[2], Takeshi Yasui[2] (1. Graduate School of Advanced Technology and Science, Tokushima University (Japan), 2. Institute of Post-LED Photonics (pLED), Tokushima University (Japan))

[Presentation Style] Onsite

We combine dual-comb spectroscopy with Jones-Matrix polarimetry for rapid, high- precision, and broadband spectroscopic polarimetry benefiting from no polarization modulation techniques.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-10] Development of mode-extracting optical frequency comb for rapid wavelength-scanning digital holography
[Presentation Style] Onsite

*KAZUKI SADAHIRO[1], Yu Tokizane[2], Eiji Hase[2], Takeo Minamikawa[2], Takeshi Yasui[2] (1. Grad.Sch.Sci.Tech.Innovation,Tokushima Univ. (Japan), 2. pLED, Tokushima Univ. (Japan))

[Presentation Style] Onsite

We demonstrate mode-extracting optical frequency comb as a light source for rapid, high-precision wavelength-scanning digital holography, enabling the shape measurement of an object with wide axial dynamic range from the correlation between wavelength and phase.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-11] Diagnosis of Unstained Biological Blood Cells Using Phase Hologram
[Presentation Style] Online

*Dahi Ibrahim[1] (1. National Institute of Standards (Egypt))

[Presentation Style] Online

A technology employs spatial light modulator for displaying the phase hologram and Fourier lens for its reconstruction is presented. The noise level of the reconstructed object is reduced by 42% using windowed Fourier filtering method.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-12] Digital Holographic Reconstruction of a Diffusely Reflecting Object Using Single-shot Fresnel Approach.
[Presentation Style] Online

*Dahi Ibrahim[1] (1. National Institute of Standards (Egypt))

[Presentation Style] Online

Rough samples are reconstructed using single-shot Fresnel approach. Windowed Fourier filtering (WFF) is used to improve the quality of the reconstructed image. The WFF can be used before or after the reconstruction of the interferogram.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-13] Counterfactual Polarimetry of a Polarising Object
[Presentation Style] Online

*Jonte R Hance[1], John Rarity[1] (1. Univ. of Bristol (UK))

[Presentation Style] Online

We extend counterfactual imaging to polarimetry of a polarising object. This allows imaging of these samples with far less absorbed energy - a key concern when imaging with high-frequency radiation.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-14] Step Height Measurement via Vortex Beam Diffraction
[Presentation Style] Online

*Dina Grace C. Banguilan[1], Nathaniel P. Hermosa II[1] (1. University of the Philippines Diliman (Philippines))
[Presentation Style] Online
We measure the height of a single reflective step through vortex beam diffraction by a triangular aperture. By calculating the SSIM index between the patterns, we can identify theoretically within 0 to \lambda/4 height difference.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-16] Broadband UV Confocal Spectroscopy and its Applications [Presentation Style] Online

Guo-Hao Lu[1], Chao-Feng Liu[1], *Chun-Jen Weng[1] (1. Taiwan Instrument Research Institute, NARLabs, Taiwan (Taiwan))
[Presentation Style] Online
This paper reports on the integration of a broadband light source with reflective optics to enable broadband UV confocal spectroscopy across a bandwidth of 250 nm to 1100 nm.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh6-17] Wide-bandgap Semiconductors Testing and Oscillatory Stresses Detection Using the Non-steady-state Photo-EMF Technique

*Igor Sokolov[1], Mikhail Bryushinin[1] (1. Ioffe Institute (Russia))
The non-steady-state photoelectromotive force is excited in beta-Ga_2O_3 and SiC crystals. The photoelectric parameters of these materials are determined and detection of mechanical oscillations in a fiber optic plate is demonstrated.

Poster Session | CLEO-PR2022 | Poster Session

C7. Quantum Optics, Atomic Physics and Quantum Information

Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTh7-01] Temperature dependence of biexciton luminescence by joint spectral intensity measurement

[Presentation Style] Onsite

*Hiroya Seki[1], Keita Hashimoto[2], Jun Ishihara[2], Kensuke Miyajima[2], Ryosuke Shimizu[1] (1. The University of Electro-Communications (Japan), 2. Tokyo University of Science (Japan))

[P-CTh7-02] Measurement and Simulation of Micro-machined Filters for Scattered Light Suppression in Integrated Optics

[Presentation Style] Onsite

*Quinn Palmer[1,2,3], Benjamin Stratton[1,2,3], Joshua W Silverstone[1,2] (1. Univ of Bristol (UK), 2. Quantum Eng. Tech. labs Univ of Bristol (UK), 3. Quantum Eng. centre for doctoral training Univ of Bristol (UK))

[P-CTh7-03] Conditional uncertainties of two-path interferences

[Presentation Style] Onsite

*Shunichi Kuroki[1], Tomonori Matsushita[1], Masataka Iinuma[1], Holger F. Hofmann[1] (1. Hiroshima University (Japan))

[P-CTh7-04] On the Constraints in Convex Optimization to Estimate POVM Elements of a Photon-Number-Resolving Detector from Coherent-State Inputs

[Presentation Style] Onsite

*Akio Yoshizawa[1], Daiji Fukuda[1,2] (1. AIST (Japan), 2. OPERANDO-OIL (Japan))

[P-CTh7-05] Highly Excited Atom Interactions with an Optical Nanofiber

[Presentation Style] Onsite

*Alexey Vylegzhanin[1], Aswathy Raj[1], Dylan Brown[1], Sile Nic Chormaic[1] (1. Okinawa Institute of Science and Technology (Japan))

[P-CTh7-06] Toward A 1D Chain Of Cold Rydberg Atoms Next To An Optical Nanofiber

[Presentation Style] Onsite

*Dylan Brown[1], Alexey Vylegzhanin [1], Aswathy Raj[1], Síle Nic Chormaic[1] (1. Okinawa Institute of Science and Technology (Japan))

[P-CTh7-08] Effect of Polariton Non-adiabatic Transition on Efficiency of Optomechanical Quantum Engine

[Presentation Style] Onsite

*Tetsuo Kishi[1], Hajime Ishihara[2,1], Nobuhiko Yokoshi[1] (1. Osaka Prefecture Univ. (Japan), 2. Osaka Univ. (Japan))

[P-CTh7-09] Higher-order Bloch sphere: geometric representation of Larmor precession of the higher-order spin states

[Presentation Style] Online

*Sota Sato[1], Toshiki Matsumoto[1], Satoshi Iba[2], Katsuhiko Miyamoto[1], Takashige Omatsu[1], Ken Morita[1] (1. Chiba Univ. (Japan), 2. AIST. (Japan))

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh7-01] Temperature dependence of biexciton luminescence by joint spectral intensity measurement
[Presentation Style] Onsite

*Hiroya Seki[1], Keita Hashimoto[2], Jun Ishihara[2], Kensuke Miyajima[2], Ryosuke Shimizu[1] (1. The University of Electro-Communications (Japan), 2. Tokyo University of Science (Japan))

[Presentation Style] Onsite

We measured two-dimensional spectra for photon pairs generated from biexciton in CuCl, changing the crystal temperature. Spectral diffusion by the degradation of the biexciton state appeared in a specific direction in the two-dimensional spectrum.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh7-02] Measurement and Simulation of Micro-machined Filters for Scattered Light Suppression in Integrated Optics
[Presentation Style] Onsite

*Quinn Palmer[1,2,3], Benjamin Stratton[1,2,3], Joshua W Silverstone[1,2] (1. Univ of Bristol (UK), 2. Quantum Eng. Tech. labs Univ of Bristol (UK), 3. Quantum Eng. centre for doctoral training Univ of Bristol (UK))

[Presentation Style] Onsite

Solutions to reducing scattered light is silicon photonic devices is achieved through micro machined, chip scale trench patterns where full die height features promote scattering and diffusion. Device performance is demonstrated through measurement and simulation.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh7-03] Conditional uncertainties of two-path interferences
[Presentation Style] Onsite

*Shunichi Kuroki[1], Tomonori Matsushita[1], Masataka Iinuma[1], Holger F. Hofmann[1] (1. Hiroshima University (Japan))

[Presentation Style] Onsite

The uncertainties in the path of a single photon conditioned by the outcome of an interference experiment can be observed using small polarization rotations. Constructive and destructive interferences correspond to different distributions between the paths.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh7-04] On the Constraints in Convex Optimization to Estimate POVM Elements of a Photon-Number-Resolving Detector from Coherent-State Inputs

[Presentation Style] Onsite

*Akio Yoshizawa[1], Daiji Fukuda[1,2] （1. AIST (Japan), 2. OPERANDO-OIL (Japan)）

[Presentation Style] Onsite

Smoothing regulation in constrained convex optimization is numerically studied to well estimate POVM elements of a photon-number-resolving detector from coherent-state inputs. Smoothing itself should be optimized with the detection efficiency in mind.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh7-05] Highly Excited Atom Interactions with an Optical Nanofiber

[Presentation Style] Onsite

*Alexey Vylegzhanin[1], Aswathy Raj[1], Dylan Brown[1], Sile Nic Chormaic[1] （1. Okinawa Institute of Science and Technology (Japan)）

[Presentation Style] Onsite

We perform the excitation of cold Rb87 atoms to Rydberg levels next to an optical nanofiber to exploit such an interface for use in quantum information processing.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh7-06] Toward A 1D Chain Of Cold Rydberg Atoms Next To An Optical Nanofiber

[Presentation Style] Onsite

*Dylan Brown[1], Alexey Vylegzhanin [1], Aswathy Raj[1], Síle Nic Chormaic[1] （1. Okinawa Institute of Science and Technology (Japan)）

[Presentation Style] Onsite

We experimentally generate Rydberg atoms next to an optical nanofiber via the evanescent field to investigate the impact of the fiber on the excitation, with the goal of producing a 1D chain of Rydberg atoms.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh7-08] Effect of Polariton Non-adiabatic Transition on Efficiency of Optomechanical Quantum Engine

[Presentation Style] Onsite

*Tetsuo Kishi[1], Hajime Ishihara[2,1], Nobuhiko Yokoshi[1] （1. Osaka Prefecture Univ. (Japan), 2. Osaka Univ. (Japan)）

[Presentation Style] Onsite

We consider optomechanical heat engine with feedback-controlled light which realizes Otto cycle and calculate effect upon its efficiency of the quantum superposition of upper and lower hybridized polariton excitations, and non-adiabatic Landau-Zener transition between them.

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh7-09] Higher-order Bloch sphere: geometric representation of Larmor precession of the higher-order spin states [Presentation Style] Online

*Sota Sato[1], Toshiki Matsumoto[1], Satoshi Iba[2], Katsuhiko Miyamoto[1], Takashige Omatsu[1], Ken Morita[1] (1. Chiba Univ. (Japan), 2. AIST. (Japan))

[Presentation Style] Online

We propose an analogous sphere, herein referred a higher-order Bloch sphere (HOBS), to visualize the Larmor precession of higher-order spin. Our proposed HOBS is potentially applied to advanced quantum information processing.

C13. Optical Signal Processing

Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3) (1F)

[P-CTh13-01] Classifying Nitrate in Aqueous Solution using Supervised Machine Learning based on Spectroscopic Technique
[Presentation Style] Onsite

*Rozita Sulaiman[1], Nur Hidayah Azeman[1], Nur Afifah Ahmad Nazri[1], Mohd Hafiz Abu Bakar[1], Athiyah Sakinah Masran[1], Ahmad Ashrif A Bakar[1] （1. Universiti Kebangsaan Malaysia (Malaysia)）

(Thu. Aug 4, 2022 6:00 PM - 8:00 PM Main Hall (1/3))

[P-CTh13-01] Classifying Nitrate in Aqueous Solution using Supervised Machine Learning based on Spectroscopic Technique

[Presentation Style] Onsite

*Rozita Sulaiman[1], Nur Hidayah Azeman[1], Nur Afifah Ahmad Nazri[1], Mohd Hafiz Abu Bakar[1], Athiyah Sakinah Masran[1], Ahmad Ashrif A Bakar[1] (1. Universiti Kebangsaan Malaysia (Malaysia))

[Presentation Style] Onsite

We demonstrate the classification of nitrate concentration in mixed solution based on spectroscopy measurements. Dimensionality reduction techniques and supervised machine learning classifiers were employed where the PCA-SVM model outperforms other models with 97.8% accuracy.

Ultrafast Lasers and Frequency Combs

Session Chair: Norihiko Nishizawa (Nagoya Univ.)

Fri. Aug 5, 2022 9:15 AM - 10:30 AM Mid-sized Hall B (1F)

[CFA1I-01 (Invited)] Ultrafast Laser Systems for High Repetition Rate X-Ray Free Electron Laser Facilities

[Presentation Style] Onsite

*Ingmar Hartl[1] （1. DESY (Germany)）

9:15 AM - 9:45 AM

[CFA1I-02] A novel and highly stable 840 MHz repetition rate femtosecond fiber laser

[Presentation Style] Online

*Ruoao Yang[1], MingHe Zhao[1,2], Xingang Jin[3], Qian Li[2], Zhangyuan Chen[1], Aimin Wang[1], Zhigang Zhang[1] （1. State Key Laboratory of Advanced Optical Communication System and Networks, School of Electronics, Peking University (China), 2. School of Electronic and Computer Engineering, Peking University (China), 3. Jiaxing Xurui Electronics Tech Co Ltd (China)）

9:45 AM - 10:00 AM

[CFA1I-03] Low noise Tm-fiber laser comb via nonlinear amplifying loop mirror

[Presentation Style] Online

*Jincan Lin[1], Zimin Zha[1], Huanhuan Liu[2], Jiaqi Zhou[3,4], Hairun Guo[1] （1. Shanghai Univ. (China), 2. Southern Univ. of Sci. and Tech. (China), 3. Shanghai Institute of Optics and Fine Mechanics (China), 4. Univ. of the Chinese Academy of Sci. (China)）

10:00 AM - 10:15 AM

[CFA1I-04] Controllable Spectral Peak Generation with Ultrashort Pulses using LCOS-SLM Spectral Filter

[Presentation Style] Onsite

*Sakiko Kobata[1], Shotaro Kitajima[1], Norihiko Nishizawa[1] （1. Nagoya University (Japan)）

10:15 AM - 10:30 AM

9:15 AM - 9:45 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Mid-sized Hall B)

[CFA1I-01 (Invited)] Ultrafast Laser Systems for High Repetition Rate X-Ray Free Electron Laser Facilities

[Presentation Style] Onsite

*Ingmar Hartl[1] (1. DESY (Germany))

[Presentation Style] Onsite

The ultrafast laser systems required by modern high repetition X-ray free electron laser facilities for electron beam generation and manipulation, femtosecond timing distribution and pump-probe science experiments will be described

9:45 AM - 10:00 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Mid-sized Hall B)

[CFA1I-02] A novel and highly stable 840 MHz repetition rate femtosecond fiber laser

[Presentation Style] Online

*Ruoao Yang[1], MingHe Zhao[1,2], Xingang Jin[3], Qian Li[2], Zhangyuan Chen[1], Aimin Wang[1], Zhigang Zhang[1] (1. State Key Laboratory of Advanced Optical Communication System and Networks, School of Electronics, Peking University (China), 2. School of Electronic and Computer Engineering, Peking University (China), 3. Jiaxing Xurui Electronics Tech Co Ltd (China))

[Presentation Style] Online

We demonstrate a novel and highly stable femtosecond fiber laser at a repetition rate of 840 MHz. The timing jitter is 130 as for the integration range of 10 kHz to 1 MHz.

10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Mid-sized Hall B)

[CFA1I-03] Low noise Tm-fiber laser comb via nonlinear amplifying loop mirror

[Presentation Style] Online

*Jincan Lin[1], Zimin Zha[1], Huanhuan Liu[2], Jiaqi Zhou[3,4], Hairun Guo[1] (1. Shanghai Univ. (China), 2. Southern Univ. of Sci. and Tech. (China), 3. Shanghai Institute of Optics and Fine Mechanics (China), 4. Univ. of the Chinese Academy of Sci. (China))

[Presentation Style] Online

We have setup an all polarization maintaining mode-locked Tm-fiber laser with nonlinear amplifying loop mirror, which is intrinsically of low noise and is readily for optical frequency comb applications at the onset of mid-infrared.

10:15 AM - 10:30 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Mid-sized Hall B)

[CFA1I-04] Controllable Spectral Peak Generation with Ultrashort Pulses using LCOS-SLM Spectral Filter

[Presentation Style] Onsite

*Sakiko Kobata[1], Shotaro Kitajima[1], Norihiko Nishizawa[1] （1. Nagoya University (Japan)）

[Presentation Style] Onsite

Arbitrary controlled spectral peak generation was demonstrated using ultrashort pulse fiber laser and spectral filter with LCOS-SLM. The intense, sharp spectral peak with record high contrast up to 143 was successfully obtained.

Ultra-high Rep Lasers and Frequency Comb

Session Chairs: Jungwon Kim (KAIST), Norihiko Nishizawa (Nagoya Univ.)

Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall B (1F)

[CFA1J-01 (Invited)] Above 20-GHz repetition-rate, Kerr-lens mode-locked lasers
[Presentation Style] Onsite

*Yohei Kobayashi[1] （1. University of Tokyo (Japan)）

11:00 AM - 11:30 AM

[CFA1J-02] Multi-GHz Femtosecond Mode-locked Ytterbium-doped Double Tungstate Waveguide Laser
[Presentation Style] Onsite

*Ji Eun Bae[1], Xavier Mateos[2], Magdalena Aguiló[2], Francesc Díaz[2], Javier García Ajates[3], Carolina Romero[3], Javier Rodríguez Vázquez de Aldana[3], Fabian Rotermund[1] （1. Korea Advanced Inst. of Sci. and Tech. (Korea), 2. Univ. of Rovira i Virgili (Spain), 3. Univ. of Salamanca (Spain)）

11:30 AM - 11:45 AM

[CFA1J-03] A Standalone Soliton Microcomb Prototype
[Presentation Style] Online

*Chaoxiang Xi[1], Chenhua Hu[2], Yang Shen[1], Lefeng Zhou[1], Hui Wang[2], Guangqiang He[1] （1. State Key Lab. of Advanced Optical Communication Systems and Networks, School of Electronic Info. and Electrical Engineering, Shanghai Jiao Tong Univ. (China), 2. State Key Lab. of Advanced Optical Communication Systems and Networks, School of Physics and Astronomy, Shanghai Jiao Tong Univ. (China)）

11:45 AM - 12:00 PM

11:00 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall B)

[CFA1J-01 (Invited)] Above 20-GHz repetition-rate, Kerr-lens mode-locked lasers

[Presentation Style] Onsite

*Yohei Kobayashi[1] (1. University of Tokyo (Japan))

[Presentation Style] Onsite

We have developed very high repetition rate, Kerr-lens mode-locked oscillators by using Yb-doped ceramics as gain materials. We have demonstrated comb-tooth resolved spectroscopy and a resonant excitation of acoustic phonons in solids.

11:30 AM - 11:45 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall B)

[CFA1J-02] Multi-GHz Femtosecond Mode-locked Ytterbium-doped Double Tungstate Waveguide Laser

[Presentation Style] Onsite

*Ji Eun Bae[1], Xavier Mateos[2], Magdalena Aguiló[2], Francesc Díaz[2], Javier García Ajates[3], Carolina Romero[3], Javier Rodríguez Vázquez de Aldana[3], Fabian Rotermund[1] (1. Korea Advanced Inst. of Sci. and Tech. (Korea), 2. Univ. of Rovira i Virgili (Spain), 3. Univ. of Salamanca (Spain))

[Presentation Style] Onsite

Multi-GHz continuous-wave mode-locking of an Yb:KLuW channel waveguide laser is reported using single-walled carbon nanotubes. The 3.55-GHz fundamentally mode-locked laser efficiently emits stable 876-fs pulses in the extended cavity scheme.

11:45 AM - 12:00 PM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall B)

[CFA1J-03] A Standalone Soliton Microcomb Prototype

[Presentation Style] Online

*Chaoxiang Xi[1], Chenhua Hu[2], Yang Shen[1], Lefeng Zhou[1], Hui Wang[2], Guangqiang He[1] (1. State Key Lab. of Advanced Optical Communication Systems and Networks, School of Electronic Info. and Electrical Engineering, Shanghai Jiao Tong Univ. (China), 2. State Key Lab. of Advanced Optical Communication Systems and Networks, School of Physics and Astronomy, Shanghai Jiao Tong Univ. (China))

[Presentation Style] Online

We built a standalone prototype for generating soliton microcombs. Our prototype supports both manual and automatic soliton generation methods, laying a good foundation for the commercial application of microcombs while maintaining professionalism.

Precision Clock and Network

Session Chair: Masayuki Katsuragawa (Univ. of Electro-Communications)
Fri. Aug 5, 2022 9:00 AM - 10:30 AM Room 204 (2F)

[CFA6G-01 (Invited)] Comparing distant optical clocks to realize the redefinition of the second
[Presentation Style] Onsite
*Tetsuya Ido[1] (1. NICT (Japan))
9:00 AM - 9:30 AM

[CFA6G-02 (Invited(P))] Highly stable laser repeater system with frequency instability below 10^{-21}
[Presentation Style] Onsite
*Tomoya Akatsuka[1], Hiromitsu Imai[1], Kaoru Arai[1], Hiroki Sakuma[1], Atsushi Ishizawa[1], Takashi Goh[2], Toshikazu Hashimoto[3], Masao Takamoto[4], Hidetoshi Katori[4,5], Katsuya Oguri[1], Hideki Gotoh[1], Tetsuomi Sogawa[6] (1. NTT Basic Research Labs. (Japan), 2. NTT Device Innovation Center (Japan), 3. NTT Device Technology Labs. (Japan), 4. RIKEN (Japan), 5. The Univ. of Tokyo (Japan), 6. NTT Science and Core Technology Laboratory Group (Japan))
9:30 AM - 10:00 AM

[CFA6G-03] Optical-phase-conjugation-based phase noise cancellation for fiber delivery of optical frequency reference
[Presentation Style] Onsite
*Takeshi Umeki[1], Tomoya Akatsuka[2], Atsushi Ishizawa[2], Hiromitsu Imai[2], Takushi Kazama[1], Takahiro Kashiwazaki[1], Kei Watanabe[1], Katsuya Oguri[2], Ryoichi Kasahara[1] (1. NTT Device Technology Labs. (Japan), 2. NTT Basic Research Labs. (Japan))
10:00 AM - 10:15 AM

[CFA6G-04] Absolute Frequency Measurement of an Iodine-stabilized Laser at 556 nm for Laser Cooling of Yb
[Presentation Style] Onsite
*Yuto Tanabe[1], Yuma Sakamoto[1], Takuya Kohno[2], Daisuke Akamatsu[1], Feng-Lei Hong[1] (1. Yokohama National University (Japan), 2. National Institute of Technology, Gifu College (Japan))
10:15 AM - 10:30 AM

9:00 AM - 9:30 AM (Fri. Aug 5, 2022 9:00 AM - 10:30 AM Room 204)

[CFA6G-01 (Invited)] Comparing distant optical clocks to realize the redefinition of the second
[Presentation Style] Onsite

*Tetsuya Ido[1] (1. NICT (Japan))

[Presentation Style] Onsite

Various methods to compare physically separated optical frequencies will be discussed. Particularly, an intercontinental comparison (Japan – Italy) of optical clocks using very long baseline interferometry (VLBI) will be presented in detail.

9:30 AM - 10:00 AM (Fri. Aug 5, 2022 9:00 AM - 10:30 AM Room 204)

[CFA6G-02 (Invited(P))] Highly stable laser repeater system with frequency instability below 10^{-21}
[Presentation Style] Onsite

*Tomoya Akatsuka[1], Hiromitsu Imai[1], Kaoru Arai[1], Hiroki Sakuma[1], Atsushi Ishizawa[1], Takashi Goh[2], Toshikazu Hashimoto[3], Masao Takamoto[4], Hidetoshi Katori[4,5], Katsuya Oguri[1], Hideki Gotoh[1], Tetsuomi Sogawa[6] (1. NTT Basic Research Labs. (Japan), 2. NTT Device Innovation Center (Japan), 3. NTT Device Technology Labs. (Japan), 4. RIKEN (Japan), 5. The Univ. of Tokyo (Japan), 6. NTT Science and Core Technology Laboratory Group (Japan))

[Presentation Style] Onsite

We report an ultralow-noise laser repeater system based on a narrow-linewidth laser and a planar lightwave circuit chip. An out-of-loop measurement demonstrates a record frequency instability of 3×10^{-22} at 30,000 s averaging time.

10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:00 AM - 10:30 AM Room 204)

[CFA6G-03] Optical-phase-conjugation-based phase noise cancellation for fiber delivery of optical frequency reference
[Presentation Style] Onsite

*Takeshi Umeki[1], Tomoya Akatsuka[2], Atsushi Ishizawa[2], Hiromitsu Imai[2], Takushi Kazama[1], Takahiro Kashiwazaki[1], Kei Watanabe[1], Katsuya Oguri[2], Ryoichi Kasahara[1] (1. NTT Device Technology Labs. (Japan), 2. NTT Basic Research Labs. (Japan))

[Presentation Style] Onsite

We propose and experimentally demonstrate a novel method for fiber delivery of optical frequency references by all-optical cancellation of fiber-induced degradation on the outward trip during the return trip without any active feedback control.

10:15 AM - 10:30 AM (Fri. Aug 5, 2022 9:00 AM - 10:30 AM Room 204)

[CFA6G-04] Absolute Frequency Measurement of an Iodine-stabilized Laser at 556 nm for Laser Cooling of Yb

[Presentation Style] Onsite

*Yuto Tanabe[1], Yuma Sakamoto[1], Takuya Kohno[2], Daisuke Akamatsu[1], Feng-Lei Hong[1] (1. Yokohama National University (Japan), 2. National Institute of Technology, Gifu College (Japan))

[Presentation Style] Onsite

The precision spectroscopy of the iodine transitions at 556 nm will benefit research on Yb cold atoms as a frequency reference of 2nd-stage cooling laser. We perform Doppler-free spectroscopy of laser frequency stabilization using iodine.

Oral Session | CLEO-PR2022 | Highly Sensitive Quantum Sensing

Highly Sensitive Quantum Sensing

Session Chair: Akifumi Asahara (Univ. of Electro-Communications)

Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 204 (2F)

[CFA6H-01] Imaging of Magnitude and Phase of AC Magnetic Field Using Continuous-Wave Scheme with Diamond Sensor

[Presentation Style] Onsite

*Takumi Mikawa[1], Karl J. Hallbäck[1], Yuichiro Matsuzaki[2], Yuta Nakano[3], Norio Tokuda[3], Kento Sasaki[3], Kensuke Kobayashi[4], Junko Ishi-Hayase[4] (1. Keio Univ. (Japan), 2. National Inst. of Advanced Indus. Sci. and Tech. (Japan), 3. Kanazawa Univ. (Japan), 4. The Univ. of Tokyo (Japan))

11:00 AM - 11:15 AM

[CFA6H-02] Optically-Detected Continuous-Wave Temperature Sensing using RF-Dressed States of Electronic Spins in Diamond

[Presentation Style] Onsite

*Hibiki Tabuchi[1], Yuichiro Matsuzaki[2], Hideyuki Watanabe[2], Yuta Nakano[3], Norio Tokuda[3], Norikazu Mizuochi[4], Junko Ishi-Hayase[1] (1. Keio Univ. (Japan), 2. AIST (Japan), 3. Kanazawa Univ. (Japan), 4. Kyoto Univ. (Japan))

11:15 AM - 11:30 AM

[CFA6H-03] Investigation of Electronic Spin Triple-Resonance of Nitrogen-Vacancy Centers in Diamond for Sensing

[Presentation Style] Onsite

*Ryusei Okaniwa[1,2], Yuichiro Matsuzaki[3,4], Tatsuma Yamaguchi[1], Hideyuki Watanabe[5], Norikazu Mizuochi[6], Norio Tokuda[7,8], Yuta Nakano[7], Kensuke Kobayashi[9,10], Kento Sasaki[9], Junko Ishi-Hayase[1,2] (1. School of Fundamental Sci. and Tech., Keio Univ. (Japan), 2. Center for Spintronics Res. Network, Keio Univ. (Japan), 3. Res. Center for Emerging Computing Tech., National Inst. of Advanced Indus. Sci. and Tech. (AIST) (Japan), 4. NEC-AIST Quantum Tech., Cooperative Res. Lab. National Inst. of Advanced Indus. Sci. and Tech. (AIST) (Japan), 5. Device Tech. Res. Inst., National Inst. of Advanced Indust. Sci. and Tech. (AIST) (Japan), 6. Inst. for Chemical Res., Kyoto Univ. (Japan), 7. Graduate School of Natural Sci. and Tech., Kanazawa Univ. (Japan), 8. Nanomaterials Res. Inst., Kanazawa Univ. (Japan), 9. Depertment of Physics, The Univ. of Tokyo (Japan), 10. Inst. for Physics of Intelligence, The Univ. of Tokyo (Japan))

11:30 AM - 11:45 AM

[CFA6H-04] Fractal Superconducting Nanowire Single-Photon Detectors and Their Applications in Imaging

[Presentation Style] Online

*Yifan Feng[1], Yun Meng[1], Kai Zou[1], Nan Hu[1], Zifan Hao[1], Xingyu Cui[1], Xiangjun Yin[1], Jingyu Yang[1], Samuel Gyger[2], Stephan Steinhauer[2], Val Zwiller[2], Xiaolong Hu[1] (1. Tianjin Univ. (China), 2. Royal Institute of Technology (KTH) (Sweden))

11:45 AM - 12:00 PM

11:00 AM - 11:15 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 204)

[CFA6H-01] Imaging of Magnitude and Phase of AC Magnetic Field Using Continuous-Wave Scheme with Diamond Sensor

[Presentation Style] Onsite

*Takumi Mikawa[1], Karl J. Hallbäck[1], Yuichiro Matsuzaki[2], Yuta Nakano[3], Norio Tokuda[3], Kento Sasaki[3], Kensuke Kobayashi[4], Junko Ishi-Hayase[4] (1. Keio Univ. (Japan), 2. National Inst. of Advanced Indus. Sci. and Tech. (Japan), 3. Kanazawa Univ. (Japan), 4. The Univ. of Tokyo (Japan))

[Presentation Style] Onsite

We successfully measured the spatial-distribution of the magnitude and the phase of MHz-range AC magnetic field resonant to nitrogen-vacancy center by the continuous application of green laser and microwave

11:15 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 204)

[CFA6H-02] Optically-Detected Continuous-Wave Temperature Sensing using RF-Dressed States of Electronic Spins in Diamond

[Presentation Style] Onsite

*Hibiki Tabuchi[1], Yuichiro Matsuzaki[2], Hideyuki Watanabe[2], Yuta Nakano[3], Norio Tokuda[3], Norikazu Mizuochi[4], Junko Ishi-Hayase[1] (1. Keio Univ. (Japan), 2. AIST (Japan), 3. Kanazawa Univ. (Japan), 4. Kyoto Univ. (Japan))

[Presentation Style] Onsite

We propose and experimentally demonstrate highly-sensitive temperature sensing using continuous-wave optically-detected magnetic resonance of electronic spin state of nitrogen-vacancy centers in diamond dressed by a MHz-range radio-frequency fields.

11:30 AM - 11:45 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 204)

[CFA6H-03] Investigation of Electronic Spin Triple-Resonance of Nitrogen-Vacancy Centers in Diamond for Sensing

[Presentation Style] Onsite

*Ryusei Okaniwa[1,2], Yuichiro Matsuzaki[3,4], Tatsuma Yamaguchi[1], Hideyuki Watanabe[5], Norikazu Mizuochi[6], Norio Tokuda[7,8], Yuta Nakano[7], Kensuke Kobayashi[9,10], Kento Sasaki[9], Junko Ishi-Hayase[1,2] (1. School of Fundamental Sci. and Tech., Keio Univ. (Japan), 2. Center for Spintronics Res. Network, Keio Univ. (Japan), 3. Res. Center for Emerging Computing Tech., National Inst. of Advanced Indus. Sci. and Tech. (AIST) (Japan), 4. NEC-AIST Quantum Tech., Cooperative Res. Lab. National Inst. of Advanced Indus. Sci. and Tech. (AIST) (Japan), 5. Device Tech. Res. Inst., National Inst. of Advanced Indust. Sci. and Tech. (AIST) (Japan), 6. Inst. for Chemical Res., Kyoto Univ. (Japan), 7. Graduate School of Natural Sci. and Tech., Kanazawa Univ. (Japan), 8. Nanomaterials Res. Inst., Kanazawa Univ. (Japan), 9. Depertment of Physics, The Univ. of Tokyo (Japan), 10. Inst. for Physics of Intelligence, The Univ. of Tokyo (Japan))

[Presentation Style] Onsite

We investigate electronic spin triple-resonance of nitrogen-vacancy centers in diamond by measuring continuous-wave optically-detected magnetic resonance spectra under simultaneous applications of microwave and radio-frequency fields with different frequencies toward realizing frequency-tunable AC magnetic field sensor.

11:45 AM - 12:00 PM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 204)

[CFA6H-04] Fractal Superconducting Nanowire Single-Photon Detectors and Their Applications in Imaging

[Presentation Style] Online

*Yifan Feng[1], Yun Meng[1], Kai Zou[1], Nan Hu[1], Zifan Hao[1], Xingyu Cui[1], Xiangjun Yin[1], Jingyu Yang[1], Samuel Gyger[2], Stephan Steinhauer[2], Val Zwiller[2], Xiaolong Hu[1] （1. Tianjin Univ. (China), 2. Royal Institute of Technology (KTH) (Sweden)）

[Presentation Style] Online

We present our research on fractal superconducting nanowire single-photon detectors and their applications in light detection and ranging (LiDAR), full-Stokes polarimetric imaging, and non-line-of-sight imaging.

Oral Session | CLEO-PR2022 | Quantum Optics and Information Theory

Quantum Optics and Information Theory

Session Chair: Qiong-Yi He (Peking Univ.)

Fri. Aug 5, 2022 9:30 AM - 10:30 AM Mid-sized Hall A (1F)

[CFA7H-03] Reducing the resources needed to implement quantum error correction codes using quantum multiplexing

[Presentation Style] Onsite

*Shin Nishio[1,2], Nicolò Lo Piparo[2], Michael Hanks[3], William John Munro[4,2], Kae Nemoto[2,1] (1. SOKENDAI (The Graduate Univ. for Advanced Studies) (Japan), 2. National Inst. of Informatics (Japan), 3. QOLS, Blackett Lab., Imperial College London (UK), 4. NTT Basic Res. Labs. &NTT Res. Center for Theoretical Quantum Physics, NTT Corp. (Japan))

9:30 AM - 9:45 AM

[CFA7H-04] Optimal encoding of contextuality in polarization entangled photon states

[Presentation Style] Onsite

*Ming Ji[1], Kengo Matsuyama[1], Masataka Iinuma[1], Holger F. Hofmann[1] (1. Hiroshima University (Japan))

9:45 AM - 10:00 AM

[CFA7H-05] Resolution of quantum phase measurements using multi-photon states

[Presentation Style] Onsite

*Tomonori Matsushita[1], Holger F. Hofmann[1] (1. Hiroshima University (Japan))

10:00 AM - 10:15 AM

[CFA7H-06] Error-Disturbance relations in spin measurement using Faraday interaction

[Presentation Style] Onsite

*Bin Ho Le[1], Keiichi Edamatsu[1] (1. Tohoku University (Japan))

10:15 AM - 10:30 AM

9:30 AM - 9:45 AM (Fri. Aug 5, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CFA7H-03] Reducing the resources needed to implement quantum error correction codes using quantum multiplexing

[Presentation Style] Onsite

*Shin Nishio[1,2], Nicolò Lo Piparo[2], Michael Hanks[3], William John Munro[4,2], Kae Nemoto[2,1] (1. SOKENDAI (The Graduate Univ. for Advanced Studies) (Japan), 2. National Inst. of Informatics (Japan), 3. QOLS, Blackett Lab., Imperial College London (UK), 4. NTT Basic Res. Labs. &NTT Res. Center for Theoretical Quantum Physics, NTT Corp. (Japan))

[Presentation Style] Onsite

Quantum error correction is an indispensable tool for quantum technologies. However, its implementation requires significant physical resources. Here, we reduce the number of two-qubit gates required to implement an error correction code using quantum multiplexing.

9:45 AM - 10:00 AM (Fri. Aug 5, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CFA7H-04] Optimal encoding of contextuality in polarization entangled photon states

[Presentation Style] Onsite

*Ming Ji[1], Kengo Matsuyama[1], Masataka Iinuma[1], Holger F. Hofmann[1] (1. Hiroshima University (Japan))

[Presentation Style] Onsite

It is shown that the simultaneous validity of seemingly contradictory statements about the linear and circular polarizations of two photons is optimized by a careful adjustment of the balance between entanglement and local polarization.

10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CFA7H-05] Resolution of quantum phase measurements using multi-photon states

[Presentation Style] Onsite

*Tomonori Matsushita[1], Holger F. Hofmann[1] (1. Hiroshima University (Japan))

[Presentation Style] Onsite

We discuss the effects of multi-photon coherence on the probability of successfully distinguishing two different phase shifts in a single measurement of the photon number distribution in the output of an interferometer.

10:15 AM - 10:30 AM (Fri. Aug 5, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CFA7H-06] Error-Disturbance relations in spin measurement using Faraday interaction

[Presentation Style] Onsite

*Bin Ho Le[1], Keiichi Edamatsu[1] （1. Tohoku University (Japan)）

[Presentation Style] Onsite

We model the quantum measurement of spin systems under the Faraday inter- action with a polarized light meter and examine the error-disturbance relations comparing the Heisenberg-Arthurs-Kelly and the Branciard-Ozawa relations.

Quantum Frequency Conversion

Session Chair: Hiroki Takesue (NTT Corp.)

Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall A (1F)

[CFA7I-01] Optical frequency conversion using a resonator that is pre-resonated only to the desired converted frequency

[Presentation Style] Onsite

*Rikizo Ikuta[1], Masayo Yokota[1], Toshiki Kobayashi[1], Nobuyuki Imoto[1], Takashi Yamamoto[1] (1. Osaka Univ. (Japan))

11:00 AM - 11:15 AM

[CFA7I-02] Ultrafast Measuement of Femtosecond Time-bin Qubits Using Optimized Up-conversion Single Photon Detector

[Presentation Style] Online

*Yuta Kochi[1], Sunao Kurimura[2], Junko Ishi-Hayase[1] (1. Keio Univ. (Japan), 2. NIMS (Japan))

11:15 AM - 11:30 AM

[CFA7I-04] Polarization Multiplexing of an Ultrafast Single-Photon Detector by Optical Kerr Gating

[Presentation Style] Onsite

*Takahisa Kuwana[1], Masahiro Yabuno[2], Fumihiro China[2], Shigehito Miki[2], Hirotaka Terai[2], Peter J. Mosley[3], Rui-Bo Jin[4], Ryosuke Shimizu[1] (1. The University of Electro-Communications (Japan), 2. Advanced ICT Research Institute, National Institute of Information and Communications Technology (Japan), 3. Centre for Photonics and Photonic Materials, Department of Physics, University of Bath (UK), 4. Hubei Key Laboratory of Optical Information and Pattern Recognition, Wuhan Institute of Technology (China))

11:45 AM - 12:00 PM

11:00 AM - 11:15 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall A)

[CFA7I-01] Optical frequency conversion using a resonator that is pre-resonated only to the desired converted frequency [Presentation Style] Onsite

*Rikizo Ikuta[1], Masayo Yokota[1], Toshiki Kobayashi[1], Nobuyuki Imoto[1], Takashi Yamamoto[1] (1. Osaka Univ. (Japan))

[Presentation Style] Onsite

We have achieved optical frequency conversion based on secondary optical nonlinearity using a resonator that is pre-resonated only to the desired converted frequency. This new frequency converter has many advantages over traditional frequency converters.

11:15 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall A)

[CFA7I-02] Ultrafast Measuement of Femtosecond Time-bin Qubits Using Optimized Up-conversion Single Photon Detector [Presentation Style] Online

*Yuta Kochi[1], Sunao Kurimura[2], Junko Ishi-Hayase[1] (1. Keio Univ. (Japan), 2. NIMS (Japan))

[Presentation Style] Online

We developed and optimized the up-conversion single photon detector with the temporal resolution of 415 fs. Consequently, we successfully evaluated single-photon level pseudo time-bin qubits with their pulse interval of only 800 fs.

11:45 AM - 12:00 PM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall A)

[CFA7I-04] Polarization Multiplexing of an Ultrafast Single-Photon Detector by Optical Kerr Gating [Presentation Style] Onsite

*Takahisa Kuwana[1], Masahiro Yabuno[2], Fumihiro China[2], Shigehito Miki[2], Hirotaka Terai[2], Peter J. Mosley[3], Rui-Bo Jin[4], Ryosuke Shimizu[1] (1. The University of Electro-Communications (Japan), 2. Advanced ICT Research Institute, National Institute of Information and Communications Technology (Japan), 3. Centre for Photonics and Photonic Materials, Department of Physics, University of Bath (UK), 4. Hubei Key Laboratory of Optical Information and Pattern Recognition, Wuhan Institute of Technology (China))

[Presentation Style] Onsite

We develop an ultrafast single-photon detector with optical Kerr gating using a photonic crystal fiber. Adopting the polarization-multiplexing technique, we achieved the sub-picosecond resolution in the single-photon detection of each polarization mode.

Mestasurface, Radiation Control, and Quantum Dots

Session Chair: Pin Christophe Louis Marie (Hokkaido Univ.)

Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall (2F)

[CFA8G-01] Super Absorbing Germanium Metasurface with quasi-Bound States in the Continuum

[Presentation Style] Online

*Reza Masoudian Saadabad[1], Lujun Huang[1], Andrey E Miroshnichenko[1] (1. University of New South Wales (Australia))

9:15 AM - 9:30 AM

[CFA8G-02] Design of an All-dielectric Magneto-optical Metasurface with Giant Faraday Effect and High Light Transmission

[Presentation Style] Onsite

*Siyuan Gao[1,2], Yasutomo Ota[3], Tianji Liu[4], Satoshi Iwamoto[1,2] (1. RCAST, Univ. of Tokyo (Japan), 2. IIS, Univ. of Tokyo (Japan), 3. Keio Univ. (Japan), 4. GPL Photonics lab., SKLAO, CIOMP, Chinese Academy of Sci. (China))

9:30 AM - 9:45 AM

[CFA8G-03] The space cooling capability of *Janus* emitter with different enclosure temperature

[Presentation Style] Onsite

*Do Hyeon Kim[1], Gil Ju Lee[2], Se-Yeon Heo[1], Il-Suk Kang[3], Young Min Song[1] (1. School of Electrical Engineering and Computer Sci., Gwangju Inst. of Sci. and Tech. (Korea), 2. Department of Electronics Engineering, Pusan National Univ. (Korea), 3. National Nanofab center, Korea Advanced Inst. of Sci. and Tech. (Korea))

9:45 AM - 10:00 AM

[CFA8G-04] Size-Controllable Fabrication of Quantum Dot Micro-Beads Using a Custom Developed UV-Curable CdSe and InP QD Photoresist

[Presentation Style] Onsite

*Byeongseok Kim[1], Bumsoo Chon[1], Samir Kumar[1], Sanghoon Shin[1], Taewoo Ko[1], Sang Ook Kang[1], Ho-Jin Son[1], Sungkyu Seo[1] (1. Korea Univ. (Korea))

10:00 AM - 10:15 AM

[CFA8G-05] Colloidal Quantum Dot Nanopatterning with E-beam lithography on flexible PET

[Presentation Style] Onsite

*Taewoo Ko[1], Samir Kumar[1], Sanghoon Shin[1], Byeongseok Kim[1], Sungkyu Seo[1] (1. Korea Univ. (Korea))

10:15 AM - 10:30 AM

9:15 AM - 9:30 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall)

[CFA8G-01] Super Absorbing Germanium Metasurface with quasi-Bound States in the Continuum

[Presentation Style] Online

*Reza Masoudian Saadabad[1], Lujun Huang[1], Andrey E Miroshnichenko[1] (1. University of New South Wales (Australia))

[Presentation Style] Online

Germanium is the proper material for fiber-optic communication due to low-intrinsic dissipative losses at the telecommunication C-band. But specific applications need stronger absorption. We demonstrate super-absorbing germanium metasurfaces designed by quasi-bound states in the continuum.

9:30 AM - 9:45 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall)

[CFA8G-02] Design of an All-dielectric Magneto-optical Metasurface with Giant Faraday Effect and High Light Transmission

[Presentation Style] Onsite

*Siyuan Gao[1,2], Yasutomo Ota[3], Tianji Liu[4], Satoshi Iwamoto[1,2] (1. RCAST, Univ. of Tokyo (Japan), 2. IIS, Univ. of Tokyo (Japan), 3. Keio Univ. (Japan), 4. GPL Photonics lab., SKLAO, CIOMP, Chinese Academy of Sci. (China))

[Presentation Style] Onsite

We design an all-dielectric metasurface exhibiting giant enhancement of magneto-optical Faraday rotation and high light transmission. A 760-times larger Faraday rotation than that in the unprocessed host material of the same thickness was numerically observed.

9:45 AM - 10:00 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall)

[CFA8G-03] The space cooling capability of *Janus* emitter with different enclosure temperature

[Presentation Style] Onsite

*Do Hyeon Kim[1], Gil Ju Lee[2], Se-Yeon Heo[1], Il-Suk Kang[3], Young Min Song[1] (1. School of Electrical Engineering and Computer Sci., Gwangju Inst. of Sci. and Tech. (Korea), 2. Department of Electronics Engineering, Pusan National Univ. (Korea), 3. National Nanofab center, Korea Advanced Inst. of Sci. and Tech. (Korea))

[Presentation Style] Onsite

A *Janus* emitter (*J*ET) allows releasing heat from enclosures efficiently. However, space-cooling is not demanded at night or winter. This study analyzes space-cooling performance of *J*ET with different temperature gaps between outer and inner space.

10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall)

[CFA8G-04] Size-Controllable Fabrication of Quantum Dot Micro-Beads Using a Custom Developed UV-Curable CdSe and InP QD Photoresist

[Presentation Style] Onsite

*Byeongseok Kim[1], Bumsoo Chon[1], Samir Kumar[1], Sanghoon Shin[1], Taewoo Ko[1], Sang Ook Kang[1], Ho-Jin Son[1], Sungkyu Seo[1] (1. Korea Univ. (Korea))

[Presentation Style] Onsite

This study reports the size on-demand fabrication of Quantum Dot (QD) micro-beads using a microfluidic chip with a specially designed InP/ZnSeS/ZnS and CdSe/ZnS QD photoresist mixed with a UV-curable composition called Super Coater.

10:15 AM - 10:30 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall)

[CFA8G-05] Colloidal Quantum Dot Nanopatterning with E-beam lithography on flexible PET

[Presentation Style] Onsite

*Taewoo Ko[1], Samir Kumar[1], Sanghoon Shin[1], Byeongseok Kim[1], Sungkyu Seo[1] (1. Korea Univ. (Korea))

[Presentation Style] Onsite

Quantum Dot(QD) patterning of at least 100nm resolution is possible through electron beam lithography on various substrates of chromium, silicon, and flexible ITO substrates. The QD pattern fabricated with E-beam was durable in bending.

Topological Photonics II

Session Chair: Kenta Takata (NTT Basic Research Laboratories)

Fri. Aug 5, 2022 11:00 AM - 11:45 AM Small Hall (2F)

[CFA8H-01] Observation of topological edge states in long connected plasmonic zigzag chains

[Presentation Style] Online

*Yuto Moritake[1], Masaaki Ono[2,3], Masaya Notomi[1,2,3] （1. Tokyo Inst. of Tech. (Japan), 2. NTT Basic Res. Lab. (Japan), 3. NTT Nanophotonics Center (Japan)）

11:00 AM - 11:15 AM

[CFA8H-02] Investigation of circularly polarized standing-wave states using topological polarization singularities

[Presentation Style] Onsite

*Tomoki Honda[1,2], Taiki Yoda[2], Yuto Moritake[1], Masaaki Ono[2], Eiichi Kuramochi[2], Masaya Notomi[1,2,3] （1. Tokyo Inst. of Tech. (Japan), 2. NTT Basic Res. Labs. (Japan), 3. Nanophotonics Center (Japan)）

11:15 AM - 11:30 AM

[CFA8H-03] Microwave Hinge State in a Three-Dimensional Photonic Crystal Composed of Simple Cubic Lattices

[Presentation Style] Onsite

*Yuya Ashida[1], Kenichi Yamashita[1], Tetsuya Ueda[1], Katsunori Wakabayashi[2], Satoshi Iwamoto[3,4], Shun Takahashi[1] （1. Kyoto Inst. of Tech. (Japan), 2. School of Eng., Kwansei Gakuin Univ. (Japan), 3. Inst. of Indus. Sci., The Univ. of Tokyo (Japan), 4. Res. Center for Advanced Sci. and Tech., The Univ. of Tokyo (Japan)）

11:30 AM - 11:45 AM

11:00 AM - 11:15 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Small Hall)

[CFA8H-01] Observation of topological edge states in long connected plasmonic zigzag chains
[Presentation Style] Online

*Yuto Moritake[1], Masaaki Ono[2,3], Masaya Notomi[1,2,3] (1. Tokyo Inst. of Tech. (Japan), 2. NTT Basic Res. Lab. (Japan), 3. NTT Nanophotonics Center (Japan))

[Presentation Style] Online

We proposed and experimentally observed the photonic topological edge states of zigzag plasmonic chains using far-field imaging. By using long-connected chain, edge states were spatially and spectrally divided from the bulk, which enables far-filed observation.

11:15 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Small Hall)

[CFA8H-02] Investigation of circularly polarized standing-wave states using topological polarization singularities
[Presentation Style] Onsite

*Tomoki Honda[1,2], Taiki Yoda[2], Yuto Moritake[1], Masaaki Ono[2], Eiichi Kuramochi[2], Masaya Notomi[1,2,3] (1. Tokyo Inst. of Tech. (Japan), 2. NTT Basic Res. Labs. (Japan), 3. Nanophotonics Center (Japan))

[Presentation Style] Onsite

We have numerically and experimentally demonstrated the formation of standing wave modes with circularly polarized states at the edge of the photonic band gap using topological singular points with half-integer charges in photonic crystals.

11:30 AM - 11:45 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Small Hall)

[CFA8H-03] Microwave Hinge State in a Three-Dimensional Photonic Crystal Composed of Simple Cubic Lattices
[Presentation Style] Onsite

*Yuya Ashida[1], Kenichi Yamashita[1], Tetsuya Ueda[1], Katsunori Wakabayashi[2], Satoshi Iwamoto[3,4], Shun Takahashi[1] (1. Kyoto Inst. of Tech. (Japan), 2. School of Eng., Kwansei Gakuin Univ. (Japan), 3. Inst. of Indus. Sci., The Univ. of Tokyo (Japan), 4. Res. Center for Advanced Sci. and Tech., The Univ. of Tokyo (Japan))

[Presentation Style] Onsite

We demonstrated a higher-order topological state in a three-dimensional photonic crystal for microwave. Shifting a part of the structure by a half period in two orthogonal directions provided different Zak phases, forming a hinge state.

Advanced Designs of Silicon Photonics Devices

Session Chairs: Wei Shi (Université Laval), Kazuhiro Ikeda(AIST)

Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108 (1F)

[CFA12E-01] Metasurface Doublet-Integrated Bidirectional Grating Antenna Using Dual Polarization For Efficient Wavelength-Controlled Beam Steering

[Presentation Style] Onsite

*Woo-Bin Lee[1], Bishal Bhandari[1], Duk-Yong Choi[2], Sang-Shin Lee[1] (1. Kwangwoon University (Korea), 2. Australian National University (Australia))

9:00 AM - 9:15 AM

[CFA12E-02] Vortex beam generation by engineering spin-orbit interaction of light in the multimode microring resonator

[Presentation Style] Online

*shu wen yang[1,2,3,4], shuang Zheng[1,2,3,4], wei feng Zhang[1,2,3,4] (1. Radar Research Lab, School of Information and Electronics, Beijing Institute of TechnologyBeijing Institute of Technology Univ (China), 2. Key Laboratory of Electronic and Information Technology in Satellite Navigation (Beijing Institute of Technology), Ministry of Education (China), 3. Beijing Institute of Technology Chongqing Innovation Center (China), 4. Chongqing Key Laboratory of Novel Civilian Radar (China))

9:15 AM - 9:30 AM

[CFA12E-03] Phase-Combining Unit for Aliasing Suppression in Optical Phased Array

[Presentation Style] Online

*Dachuan Wu[1], Yasha Yi[1], Bowen Yu[1] (1. University of Michigan (United States of America))

9:30 AM - 9:45 AM

[CFA12E-04] Low-loss adiabatic silicon chip-to-fibre couplers in the mid-infrared and applications to nonlinear optics

[Presentation Style] Onsite

*Dominic Ashley Sulway[1,2], Yuya Yonezu[4], Lawrence Mark Rosenfeld[2,1], Pisu Jiang[2], John G Rarity[2], Takao Aoki[3], Joshua W Silverstone[2] (1. University of Bristol CDT (UK), 2. University of Bristol QETLabs (UK), 3. Waseda University (Japan), 4. NTT Japan Basic Research Laboritories (Japan))

9:45 AM - 10:00 AM

[CFA12E-05] Deep Transfer Learning for Nanophotonic Device Design

[Presentation Style] Onsite

*Keisuke Kojima[1], Minwoo Jung[2], Toshiaki Koike-Akino[1], Ye Wang[1], Matthew Brand[1], Kieran Parsons[1] (1. Mitsubishi Electric Research Labs. (MERL) (United States of America), 2. Cornel Univ. (United States of America))

10:00 AM - 10:15 AM

9:00 AM - 9:15 AM (Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108)

[CFA12E-01] Metasurface Doublet-Integrated Bidirectional Grating Antenna Using Dual Polarization For Efficient Wavelength-Controlled Beam Steering
[Presentation Style] Onsite

*Woo-Bin Lee[1], Bishal Bhandari[1], Duk-Yong Choi[2], Sang-Shin Lee[1] (1. Kwangwoon University (Korea), 2. Australian National University (Australia))

[Presentation Style] Onsite

We demonstrate a metasurface doublet-integrated bidirectional grating antenna to mitigate the limitation of the beam steering range of the optical phased array. We show that a wavelength-controlled beam steering efficiency is improved by 0.888 deg/nm.

9:15 AM - 9:30 AM (Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108)

[CFA12E-02] Vortex beam generation by engineering spin-orbit interaction of light in the multimode microring resonator
[Presentation Style] Online

*shu wen yang[1,2,3,4], shuang Zheng[1,2,3,4], wei feng Zhang[1,2,3,4] (1. Radar Research Lab, School of Information and Electronics, Beijing Institute of TechnologyBeijing Institute of Technology Univ (China), 2. Key Laboratory of Electronic and Information Technology in Satellite Navigation (Beijing Institute of Technology), Ministry of Education (China), 3. Beijing Institute of Technology Chongqing Innovation Center (China), 4. Chongqing Key Laboratory of Novel Civilian Radar (China))

[Presentation Style] Online

We propose a vortex beam generator that can emit radially, azimuthally, circularly polarized beams by engineering transverse spin angular momentum induced spin-orbit interaction of the high-order mode in the multimode microring resonator.

9:30 AM - 9:45 AM (Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108)

[CFA12E-03] Phase-Combining Unit for Aliasing Suppression in Optical Phased Array
[Presentation Style] Online

*Dachuan Wu[1], Yasha Yi[1], Bowen Yu[1] (1. University of Michigan (United States of America))

[Presentation Style] Online

We proposed a phase-combining unit to suppress the aliasing effect in OPA devices. It can control 2N-1 emitters with N phase shifters. Theoretical analysis, numerical simulation, and experimental results have been completed and presented.

9:45 AM - 10:00 AM (Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108)

[CFA12E-04] Low-loss adiabatic silicon chip-to-fibre couplers in the mid-infrared and applications to nonlinear optics

[Presentation Style] Onsite

*Dominic Ashley Sulway[1,2], Yuya Yonezu[4], Lawrence Mark Rosenfeld[2,1], Pisu Jiang[2], John G Rarity[2], Takao Aoki[3], Joshua W Silverstone[2] (1. University of Bristol CDT (UK), 2. University of Bristol QETLabs (UK), 3. Waseda University (Japan), 4. NTT Japan Basic Research Laboritories (Japan))

[Presentation Style] Onsite

Utilising novel, low-loss couplers (−0.58 dB), we characterise a potential TE0 pair-photon source via stimulated four-wave mixing in a phase-matched, air-clad 220 nm silicon waveguide. This is the lowest insertion-loss nonlinear behaviour characterised at 2 μm wavelengths

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10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108)

[CFA12E-05] Deep Transfer Learning for Nanophotonic Device Design

[Presentation Style] Onsite

*Keisuke Kojima[1], Minwoo Jung[2], Toshiaki Koike-Akino[1], Ye Wang[1], Matthew Brand[1], Kieran Parsons[1] (1. Mitsubishi Electric Research Labs. (MERL) (United States of America), 2. Cornel Univ. (United States of America))

[Presentation Style] Onsite

Applying a transfer-learning technique for generative deep neural networks, we demonstrate a very time-efficient inverse design framework for photonic integrated circuit devices, when there are new demands for structural/material parameters from an existing device library.

Novel Functional Silicon Photonics Devices

Session Chairs: Di Liang (Alibaba Group), Kazuhiro Ikeda (AIST)
Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 107&108 (1F)

[CFA12F-01 (Invited(P))] Programmable Waveguides on 2D Coupled Silicon Ring Resonator Array
[Presentation Style] Onsite
*Ryotaro Konoike[1], Kazuhiro Ikeda[1] (1. AIST (Japan))
11:00 AM - 11:30 AM

[CFA12F-02] Increasing the Q-Factor-Product and Efficiency of Raman Silicon Nanocavity Lasers Fabricated by Photolithography
[Presentation Style] Onsite
*Yuji Ota[1], Makoto Okano[2], Yasushi Takahashi[1] (1. Osaka Prefecure Univ. (Japan), 2. National Inst. of Indus. Sci. and Tech. (Japan))
11:30 AM - 11:45 AM

[CFA12F-03] Multi-Wavelength Operation of Non-Isometric Electro-Optic Digital-to-Analog Converters
[Presentation Style] Onsite
*Kohei Ikeda[1,2], Shota Kita[1,2], Guanwei Cong[3], Kengo Nozaki[1,2], Yuriko Maegami[3], Morifumi Ohno[3], Noritsugu Yamamoto[3], Koji Yamada[3], Akihiko Shinya[1,2], Masaya Notomi[1,2] (1. NTT Nanophotonics Center, Nippon Telegraph and Telephone Corp. (Japan), 2. NTT Basic Research Labs., Nippon Telegraph and Telephone Corp. (Japan), 3. National Institute of Advanced Industrial Science and Technology (AIST) (Japan))
11:45 AM - 12:00 PM

11:00 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 107&108)

[CFA12F-01 (Invited(P))] Programmable Waveguides on 2D Coupled Silicon Ring Resonator Array [Presentation Style] Onsite

*Ryotaro Konoike[1], Kazuhiro Ikeda[1] (1. AIST (Japan))

[Presentation Style] Onsite

We propose and demonstrate dynamic formation of programmable waveguides on 2D coupled silicon ring resonator array with the size of 5×5. We successfully formed straight and bend waveguides with identical transmission spectra.

11:30 AM - 11:45 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 107&108)

[CFA12F-02] Increasing the Q-Factor-Product and Efficiency of Raman Silicon Nanocavity Lasers Fabricated by Photolithography [Presentation Style] Onsite

*Yuji Ota[1], Makoto Okano[2], Yasushi Takahashi[1] (1. Osaka Prefecure Univ. (Japan), 2. National Inst. of Indus. Sci. and Tech. (Japan))

[Presentation Style] Onsite

By optimizing a thermal treatment, the quality-factor-product and energy efficiency of a Raman silicon nanocavity laser fabricated by CMOS-compatible processes are improved by factors of 2.4 and 15, respectively, compared to the previously reported values.

11:45 AM - 12:00 PM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 107&108)

[CFA12F-03] Multi-Wavelength Operation of Non-Isometric Electro-Optic Digital-to-Analog Converters [Presentation Style] Onsite

*Kohei Ikeda[1,2], Shota Kita[1,2], Guanwei Cong[3], Kengo Nozaki[1,2], Yuriko Maegami[3], Morifumi Ohno[3], Noritsugu Yamamoto[3], Koji Yamada[3], Akihiko Shinya[1,2], Masaya Notomi[1,2] (1. NTT Nanophotonics Center, Nippon Telegraph and Telephone Corp. (Japan), 2. NTT Basic Research Labs., Nippon Telegraph and Telephone Corp. (Japan), 3. National Institute of Advanced Industrial Science and Technology (AIST) (Japan))

[Presentation Style] Onsite

We demonstrate a circuits-topology-based electro-optic digital-to-analog converter with a non-isometric reference for broader multi-wavelength operation. By tuning the input wavelengths properly, we could obtain more similar waveforms for different wavelengths than the isometric one.

Oral Session | CLEO-PR2022 | Interferometric Sensing

Interferometric Sensing

Session Chairs: Hideaki Haneishi (Chiba Univ.), Young L. Kim (Purdue Univ.)

Fri. Aug 5, 2022 9:15 AM - 10:15 AM Room 104&105 (1F)

[CFA17G-02] An instance hole measurement using a low-coherence interferometer with a high repetition rate during laser-welding process

[Presentation Style] Onsite

*Neisei HAYASHI[1], Takuma FUJITA[2], Takahiro DEGUCHI[2], Ryo NOMURA[2], Hiroshi HASEGAWA[2], Takeshi MAKINO[3], Takahiro HASHIMOTO[3], Hideaki FURUKAWA[3], Naoya WADA[3], Katsuhiro ISHII[1] （1. GPI (Japan), 2. Nadex Products Co., Ltd. Laser R&D Center (Japan), 3. NICT (Japan)）

9:15 AM - 9:30 AM

[CFA17G-03] Accuracy Improvement for Polarization Grating Based Circular Dichroism Measurements

[Presentation Style] Onsite

*Yi Chen[1], Yu-Cheng Liang[2], Chun-Ta Wang[2], Shie-Chang Jeng[3], Chao-Kuei Lee[2] （1. College of Photonics, National Yang Ming Chiao Tung Univ. (Taiwan), 2. Department of Photonics, National Sun Yet-Sen Univ. (Taiwan), 3. Institute of Imaging and Biomedical Photonics, National Yang Ming Chiao Tung Univ. (Taiwan)）

9:30 AM - 9:45 AM

[CFA17G-04] Out-of-the-laboratory transfer of an optical sensor: inspection of dielectric thin films on industrial rough aluminum

[Presentation Style] Online

*Yannic Toschke[1], Bjoern Bourdon[1], Mirco Imlau[1] （1. Osnabrueck University (Germany)）

9:45 AM - 10:00 AM

[CFA17G-05] Elongated fiber abrupt-tapered interferometers for High sensitivity strain sensors

[Presentation Style] Online

Haimiao Zhou[1], Ya-Pei Peng[2,3], Lina Suo[1], Cheng-Kai Yao[4], Xinhe Lu[3], *Nan-Kuang Chen[1] （1. Liaocheng Univ. (China), 2. Shenzhen Tech. Univ. (China), 3. NK Photonics Ltd. (China), 4. National Taipei Univ. of Tech. (China)）

10:00 AM - 10:15 AM

9:15 AM - 9:30 AM (Fri. Aug 5, 2022 9:15 AM - 10:15 AM Room 104&105)

[CFA17G-02] An instance hole measurement using a low-coherence interferometer with a high repetition rate during laser-welding process
[Presentation Style] Onsite

*Neisei HAYASHI[1], Takuma FUJITA[2], Takahiro DEGUCHI[2], Ryo NOMURA[2], Hiroshi HASEGAWA[2], Takeshi MAKINO[3], Takahiro HASHIMOTO[3], Hideaki FURUKAWA[3], Naoya WADA[3], Katsuhiro ISHII[1] (1. GPI (Japan), 2. Nadex Products Co., Ltd. Laser R&D Center (Japan), 3. NICT (Japan))

[Presentation Style] Onsite

The shape of an instance hole (keyhole) created via a high-power laser was measured using a low-coherence interferometer with a 10-MHz repetition rate, a 10-um absolute spatial resolution and a 5-mm measurement range.

9:30 AM - 9:45 AM (Fri. Aug 5, 2022 9:15 AM - 10:15 AM Room 104&105)

[CFA17G-03] Accuracy Improvement for Polarization Grating Based Circular Dichroism Measurements
[Presentation Style] Onsite

*Yi Chen[1], Yu-Cheng Liang[2], Chun-Ta Wang[2], Shie-Chang Jeng[3], Chao-Kuei Lee[2] (1. College of Photonics, National Yang Ming Chiao Tung Univ. (Taiwan), 2. Department of Photonics, National Sun Yet-Sen Univ. (Taiwan), 3. Institute of Imaging and Biomedical Photonics, National Yang Ming Chiao Tung Univ. (Taiwan))

[Presentation Style] Onsite

In this work, by using a liquid crystal polarization grating, the error is effectively decreased from 34.4% to 0.1% for improving the accuracy in the circular dichroism measurement system. Meanwhile, the role of the residue is presented and discussed.

9:45 AM - 10:00 AM (Fri. Aug 5, 2022 9:15 AM - 10:15 AM Room 104&105)

[CFA17G-04] Out-of-the-laboratory transfer of an optical sensor: inspection of dielectric thin films on industrial rough aluminum
[Presentation Style] Online

*Yannic Toschke[1], Bjoern Bourdon[1], Mirco Imlau[1] (1. Osnabrueck University (Germany))

[Presentation Style] Online

We demonstrate a novel interference based optical sensor for the inspection of trivalent chromium conversion coatings on cold-rolled aluminum. The focus is placed on an out-of-the-laboratory, open-source prototype employing the emerging field of 3D-printing.

10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:15 AM - 10:15 AM Room 104&105)

[CFA17G-05] Elongated fiber abrupt-tapered interferometers for High sensitivity strain sensors

[Presentation Style] Online

Haimiao Zhou[1], Ya-Pei Peng[2,3], Lina Suo[1], Cheng-Kai Yao[4], Xinhe Lu[3], *Nan-Kuang Chen[1] （1. Liaocheng Univ. (China), 2. Shenzhen Tech. Univ. (China), 3. NK Photonics Ltd. (China), 4. National Taipei Univ. of Tech. (China)）

[Presentation Style] Online

We demonstrate high sensitivity fiber strain sensors based on an elongated abrupt taper. The measured best strain sensitivity was 118.77 pm/ με and the coefficient of determination R^2 of linear fitting exhibits high linearity.

Spectroscopy Sensors and Systems

Session Chairs: Hideaki Haneishi (Chiba Univ.), Norimichi Tsumura (Chiba Univ.)

Fri. Aug 5, 2022 11:00 AM - 11:45 AM Room 104&105 (1F)

[CFA17H-01] Differential Measurement of NH_3 and CO_2 in Gas Mixture with Photoacoustic Spectroscopy Technique using Supercontinuum Laser

[Presentation Style] Onsite

*Mohammad Zaid[1], Saran Kumar[1], Esther Blesso Vidhya[1], Tiju Thomas[1], Nilesh J. Vasa[1] (1. Indian Institute of Technology Madras (India))

11:00 AM - 11:15 AM

[CFA17H-02] Analysis of spectral coverage and resolution performance in spectral focusing CARS spectroscopy

[Presentation Style] Online

*Laura Monroy[1], Josh Magnus[2], Miguel González-Herráez[1], Fernando Bernabé Naranjo[1], Khanh Kieu[2] (1. Univ. of Alcala (Spain), 2. Univ. of Arizona (United States of America))

11:15 AM - 11:30 AM

[CFA17H-03] Broadband Photoacoustic Spectroscopy Technique in 2 μ m Wavelength Range for Sensing of Moisture and Carbon dioxide

[Presentation Style] Onsite

*Saran Kumar Krishnamoorthy[1], Ester Blesso Vidhya[1], Ramya Selvaraj[2], Satyanarayanan S[1], Nilesh J [1] (1. IIT Madras (India), 2. NIT Raipur (India))

11:30 AM - 11:45 AM

11:00 AM - 11:15 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Room 104&105)

[CFA17H-01] Differential Measurement of NH_3 and CO_2 in Gas Mixture with Photoacoustic Spectroscopy Technique using Supercontinuum Laser

[Presentation Style] Onsite

*Mohammad Zaid[1], Saran Kumar[1], Esther Blesso Vidhya[1], Tiju Thomas[1], Nilesh J. Vasa[1] (1. Indian Institute of Technology Madras (India))

[Presentation Style] Onsite

Detection of NH_3 and CO_2 using photoacoustic spectroscopy is developed. For 1525 nm filter, cell resonance is observed at 830 Hz with intensity of 1.85 mV/A, Q-factor of 9.22 and NH_3 LDL of 7 ppb.

11:15 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Room 104&105)

[CFA17H-02] Analysis of spectral coverage and resolution performance in spectral focusing CARS spectroscopy

[Presentation Style] Online

*Laura Monroy[1], Josh Magnus[2], Miguel González-Herráez[1], Fernando Bernabé Naranjo[1], Khanh Kieu[2] (1. Univ. of Alcala (Spain), 2. Univ. of Arizona (United States of America))

[Presentation Style] Online

An open-code simulation tool for spectral focusing Coherent Anti-Stokes Raman Scattering (SF-CARS) spectroscopy has been developed for the analysis of spectral coverage and resolution performance. The main limitation has been found due to high-order dispersion
and nonlinearities in laser source.

11:30 AM - 11:45 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Room 104&105)

[CFA17H-03] Broadband Photoacoustic Spectroscopy Technique in 2 μm Wavelength Range for Sensing of Moisture and Carbon dioxide

[Presentation Style] Onsite

*Saran Kumar Krishnamoorthy[1], Ester Blesso Vidhya[1], Ramya Selvaraj[2], Satyanarayanan S[1], Nilesh J [1] (1. IIT Madras (India), 2. NIT Raipur (India))

[Presentation Style] Onsite

Dual-wavelength, broadband photoacoustic technique is demonstrated for measurement of multiple gas species using a supercontinuum laser source. H_2O vapor and CO_2 measurements are demonstrated near 1920 and 2000 nm.

Ultrafast and Highly Nonlinear Metrology

Session Chair: Kazumichi Yoshii (Tokushima Univ.)

Fri. Aug 5, 2022 1:45 PM - 3:00 PM Room 204 (2F)

[CFP6I-01 (Invited)] Precision time-domain spectroscopy of infrared waves
[Presentation Style] Online

Philip Jacob[1,2], Alexander Weigel[1,3], Wolfgang Schweinberger[1,2,3], Theresa Buberl[1,2], Maximilian Högner[1], Patrik Karandušovský[3], Christina Hofer[1,2,3], Michael Trubetskov[1], Marinus Huber[1], Ferenc Krausz[1,2,3], *Ioachim Pupeza[1,2] （1. Max Planck Institute of Quantum Optics (Germany), 2. Ludwig-Maximilian-Universität München (Germany), 3. Center for Molecular Fingerprinting (Hungary)）

1:45 PM - 2:15 PM

[CFP6I-02] Engineering of nonlinear optical processes by arbitrarily manipulating the relevant optical phases
[Presentation Style] Onsite

*Weiyong Liu[1], Chiaki Ohae[1,2], Souma Tahara[1], Jian Zheng[1], Masaru Suzuki[1,2], Kaoru Minoshima[1,2], Masayuki Katsuragawa[1,2] （1. Graduate School of Informatics and Engineering, University of Electro-Communications (Japan), 2. Institute for Advanced Science, University of Electro-Communications (Japan)）

2:15 PM - 2:30 PM

[CFP6I-03] Common Path Frequency Domain Optical Correlation System for Ultrafast Optical Waveform Analysis
[Presentation Style] Onsite

*Kaito Fukushi[1], Tatsutoshi Shioda[1] （1. Saitama Univ. (Japan)）

2:30 PM - 2:45 PM

[CFP6I-04] "150 GHz Single Shot Ultrafast Imaging Spectroscopy based on Femtosecond Laser
[Presentation Style] Online

*Dae Hee Kim[1], Ji-Won Hahm[1], In-Jae Lee[1], Geon-Ho Lee[1], Seung-Woo Kim[1], Young-Jin Kim[1] （1. KAIST, Daejeon, Korea (Korea)）

2:45 PM - 3:00 PM

1:45 PM - 2:15 PM (Fri. Aug 5, 2022 1:45 PM - 3:00 PM Room 204)

[CFP6I-01 (Invited)] Precision time-domain spectroscopy of infrared waves

[Presentation Style] Online

Philip Jacob[1,2], Alexander Weigel[1,3], Wolfgang Schweinberger[1,2,3], Theresa Buberl[1,2], Maximilian Högner[1], Patrik Karandušovský[3], Christina Hofer[1,2,3], Michael Trubetskov[1], Marinus Huber[1], Ferenc Krausz[1,2,3], *Ioachim Pupeza[1,2] (1. Max Planck Institute of Quantum Optics (Germany), 2. Ludwig-Maximilian-Universität München (Germany), 3. Center for Molecular Fingerprinting (Hungary))

[Presentation Style] Online

We demonstrate rapid electro-optic sampling of broadband mid-infrared waveforms using a dual-oscillator setup employing a narrowband, waveform-stable calibration signal obtained by intra-pulse difference frequency mixing. Sub-attosecond waveform jitter is obtained for 1-s integration time.

2:15 PM - 2:30 PM (Fri. Aug 5, 2022 1:45 PM - 3:00 PM Room 204)

[CFP6I-02] Engineering of nonlinear optical processes by arbitrarily manipulating the relevant optical phases

[Presentation Style] Onsite

*Weiyong Liu[1], Chiaki Ohae[1,2], Souma Tahara[1], Jian Zheng[1], Masaru Suzuki[1,2], Kaoru Minoshima[1,2], Masayuki Katsuragawa[1,2] (1. Graduate School of Informatics and Engineering, University of Electro-Communications (Japan), 2. Institute for Advanced Science, University of Electro-Communications (Japan))

[Presentation Style] Onsite

We report a typical experimental demonstration of how widely nonlinear optical processes can be engineered by arbitrarily manipulating the relevant optical fields, including the phase of nonlinear polarization as a function of interaction length.

2:30 PM - 2:45 PM (Fri. Aug 5, 2022 1:45 PM - 3:00 PM Room 204)

[CFP6I-03] Common Path Frequency Domain Optical Correlation System for Ultrafast Optical Waveform Analysis

[Presentation Style] Onsite

*Kaito Fukushi[1], Tatsutoshi Shioda[1] (1. Saitama Univ. (Japan))

[Presentation Style] Onsite

We propose a principle for single-shot ultrafast optical waveform measurement using frequency domain optical correlation, which can observe irreversible signals with femto-second sampling and nano-second time range. The principle was confirmed in simulation and experiment.

2:45 PM - 3:00 PM (Fri. Aug 5, 2022 1:45 PM - 3:00 PM Room 204)

[CFP6I-04] "150 GHz Single Shot Ultrafast Imaging Spectroscopy based on Femtosecond Laser [Presentation Style] Online

*Dae Hee Kim[1], Ji-Won Hahm[1], In-Jae Lee[1], Geon-Ho Lee[1], Seung-Woo Kim[1], Young-Jin Kim[1] （1. KAIST, Daejeon, Korea (Korea)）

[Presentation Style] Online

In this investigation, we propose a single-shot ultrafast imaging spectroscopy over 150 GHz based on femtosecond laser. Furthermore, we introduce an application of a phase spectroscopy for ultra-high resolution by utilizing nano-structure with proposed system.

Applied Metrology and Sensing

Session Chair: Tatsutoshi Shioda (Saitama Univ.)

Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204 (2F)

[CFP6J-01] Tomography of light in space, time, spectrum, and polarization

[Presentation Style] Online

*Martin Ploschner[1], Marcos Maestre Morote[1], Daniel Dahl[1], Mickael Mounaix[1], Greta Light[2], Aleksandar Rakic[1], Joel Carpenter[1] (1. The University of Queensland (Australia), 2. II-VI Incorporated (United States of America))

3:30 PM - 3:45 PM

[CFP6J-02] Phase-Modulated Optical Interferometer with Time-Domain Analysis and its Application to Dynamic Displacement Measurement of Soft Tissue

[Presentation Style] Online

*Yuki Noda[1], Sora Matsumoto[1], Mikiya Fujimori[1], Yosuke Tanaka[1] (1. Tokyo University of Agriculture and Technology (Japan))

3:45 PM - 4:00 PM

[CFP6J-03] Development of Multi-Foci Raman Spectrophotometer for High-Throughput Biochemical Screening

[Presentation Style] Onsite

*Hao-Xiang Liao[1], Kazuki Bando[1], Menglu Li[1,2], Katsumasa Fujita[1,2,3] (1. Department of Applied physics Graduate School of Engineering, Osaka University (Japan), 2. Advanced Photonics and Biosensing Open Innovation Laboratory, AIST-Osaka University (Japan), 3. Transdimensional Life Imaging Division, Institute for Open and Transdisciplinary Research Initiatives, Osaka University (Japan))

4:00 PM - 4:15 PM

[CFP6J-04] Scatterometry using deep learning for analysis of oil including phosphor

[Presentation Style] Onsite

*Tetsuya Hoshino[1], Shintaro Narioka[1], Sadao Aoki[1], Masahide Itoh[1], Masami Kobayashi[2] (1. Inst. of Applied Physics., University of Tsukuba (Japan), 2. Inst. of Materials Science., University of Tsukuba (Japan))

4:15 PM - 4:30 PM

[CFP6J-05] ULTRA-STABLE, CONTINUOUS-WAVE UV LIGHT SOURCE FOR PRECISION THERMOMETRY

[Presentation Style] Onsite

*sara pourjamal[1], Thomas Lindvall[1], thomas fordell[1] (1. National Metrology Institute VTT MIKES (Finland))

4:30 PM - 4:45 PM

3:30 PM - 3:45 PM (Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204)

[CFP6J-01] Tomography of light in space, time, spectrum, and polarization
[Presentation Style] Online

*Martin Ploschner[1], Marcos Maestre Morote[1], Daniel Dahl[1], Mickael Mounaix[1], Greta Light[2], Aleksandar Rakic[1], Joel Carpenter[1] (1. The University of Queensland (Australia), 2. II-VI Incorporated (United States of America))

[Presentation Style] Online

We present a technique for complete characterization of light in space, time, spectrum, and polarization using a spatial light modulator to display projective holograms and a single-mode fiber to route the projected light to photodiode/spectrometer.

3:45 PM - 4:00 PM (Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204)

[CFP6J-02] Phase-Modulated Optical Interferometer with Time-Domain Analysis and its Application to Dynamic Displacement Measurement of Soft Tissue
[Presentation Style] Online

*Yuki Noda[1], Sora Matsumoto[1], Mikiya Fujimori[1], Yosuke Tanaka[1] (1. Tokyo University of Agriculture and Technology (Japan))

[Presentation Style] Online

We developed a phase-modulated optical interferometer based on time-domain analysis using a laser diode with a wavelength of 1.3 μm. Feasibility to measure the vibration of biological soft tissues was assessed by using gelatin sample.

4:00 PM - 4:15 PM (Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204)

[CFP6J-03] Development of Multi-Foci Raman Spectrophotometer for High-Throughput Biochemical Screening
[Presentation Style] Onsite

*Hao-Xiang Liao[1], Kazuki Bando[1], Menglu Li[1,2], Katsumasa Fujita[1,2,3] (1. Department of Applied physics Graduate School of Engineering, Osaka University (Japan), 2. Advanced Photonics and Biosensing Open Innovation Laboratory, AIST-Osaka University (Japan), 3. Transdimensional Life Imaging Division, Institute for Open and Transdisciplinary Research Initiatives, Osaka University (Japan))

[Presentation Style] Onsite

We developed a Raman spectrophotometer with multi-foci for high-throughput screening that produces 96 focal spots on analytes in 96 well-plate and collects their Raman spectra simultaneously, which enables fast discrimination and monitoring of 96 samples.

4:15 PM - 4:30 PM (Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204)

[CFP6J-04] Scatterometry using deep learning for analysis of oil including phosphor

[Presentation Style] Onsite

*Tetsuya Hoshino[1], Shintaro Narioka[1], Sadao Aoki[1], Masahide Itoh[1], Masami Kobayashi[2] (1. Inst. of Applied Physics., University of Tsukuba (Japan), 2. Inst. of Materials Science., University of Tsukuba (Japan))

[Presentation Style] Onsite

Deep learning was introduced to the scatterometry of isolated particles. We applied this method to oil droplets containing phosphors and analyzed the relationship between the amount of phosphor and the emission intensity.

4:30 PM - 4:45 PM (Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204)

[CFP6J-05] ULTRA-STABLE, CONTINUOUS-WAVE UV LIGHT SOURCE FOR PRECISION THERMOMETRY

[Presentation Style] Onsite

*sara pourjamal[1], Thomas Lindvall[1], thomas fordell[1] (1. National Metrology Institute VTT MIKES (Finland))

[Presentation Style] Onsite

An ultra-stable light source and optical detection set-up for high-precision measurements of ^{114}Cd absorption lines is presented. The experimental setup for ultraviolet light at 326.2 nm is described with an aim toward primary thermometry.

Photonic Crystal Waveguide Devices

Session Chair: Masato Takiguchi (NTT Basic Research Labs.)

Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall (2F)

[CFP8I-01] Low-cost photonic crystal spectrometer using up-conversion

[Presentation Style] Onsite

*Ryo Sugano[1], Shengji Jin[1], Joceyln Hofs[1], Koki Yube[1], Keigo Nagashima[1], Takumasa Kodama[1], Takasumi Tanabe[1] (1. Keio Univ. (Japan))

1:30 PM - 1:45 PM

[CFP8I-02] Design of Si Photonic Crystal Waveguide for High Performing Slow Light Devices

[Presentation Style] Onsite

*Keisuke Hirotani[1], Rikuto Taira[1], Ryo Shiratori[1], Toshihiko Baba[1] (1. Yokohama National Univ. (Japan))

1:45 PM - 2:00 PM

[CFP8I-03] Transmission via Sharp Bends in Glide-symmetric Photonic-Crystal Waveguides

[Presentation Style] Onsite

*Wei Dai[1], Taiki Yoda[2], Yuto Moritake[1,4], Masaya Notomi[1,2,3] (1. Tokyo Institute of Tech. (Japan), 2. NTT Basic Res. Lab. (Japan), 3. NTT Nanophotonic Center (Japan), 4. JST PRESTO (Japan))

2:00 PM - 2:15 PM

[CFP8I-04] Beam Trajectory Bending and Meandering by Distorted Photonic Crystal

[Presentation Style] Onsite

Misaki Honda[1], Kanji Nanjyo[1], Jinpei Hashizume[1], Hitoshi Kitagawa[1], *Kyoko Kitamura[1,2] (1. Kyoto Inst. of Tech. (Japan), 2. JST PRESTO (Japan))

2:15 PM - 2:30 PM

[CFP8I-05] Coherent Backscattering in Triangular Lattice Photonic Crystals

[Presentation Style] Online

*Tomoya Kuribara[1,2], Yuto Moritake[1,3], Masaya Notomi[1,2,4] (1. Department of Physics, Tokyo Tech (Japan), 2. NTT-BRL, NTT Corp. (Japan), 3. JST (Japan), 4. Nanophotonics Center, NTT Corp. (Japan))

2:30 PM - 2:45 PM

[CFP8I-06] Novel dual-mode photonic crystal waveguide for stable resonant excitation of quantum dots with high β-factor

[Presentation Style] Online

*Xiaoyan Zhou[1,2], Peter Lodahl[2], Leonardo Midolo[2] (1. Tianjin Univ. (China), 2. Niels Bohr Inst. (Denmark))

2:45 PM - 3:00 PM

1:30 PM - 1:45 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-01] Low-cost photonic crystal spectrometer using up-conversion [Presentation Style] Onsite

*Ryo Sugano[1], Shengji Jin[1], Joceyln Hofs[1], Koki Yube[1], Keigo Nagashima[1], Takumasa Kodama[1], Takasumi Tanabe[1] (1. Keio Univ. (Japan))

[Presentation Style] Onsite

We used up-conversion to capture the localized light of a photonic crystal spectrometer with an inexpensive CMOS camera. We employed this data to detect a single wavelength using deep learning.

1:45 PM - 2:00 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-02] Design of Si Photonic Crystal Waveguide for High Performing Slow Light Devices [Presentation Style] Onsite

*Keisuke Hirotani[1], Rikuto Taira[1], Ryo Shiratori[1], Toshihiko Baba[1] (1. Yokohama National Univ. (Japan))

[Presentation Style] Onsite

We optimized SiO_2-cladded Si photonic crystal waveguide for low-dispersion slow light with $n_g \approx 20$ at full C-band with efficient transition structures. We also investigated air-cladded waveguide that expands the FOV for LiDAR applications.

2:00 PM - 2:15 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-03] Transmission via Sharp Bends in Glide-symmetric Photonic-Crystal Waveguides [Presentation Style] Onsite

*Wei Dai[1], Taiki Yoda[2], Yuto Moritake[1,4], Masaya Notomi[1,2,3] (1. Tokyo Institute of Tech. (Japan), 2. NTT Basic Res. Lab. (Japan), 3. NTT Nanophotonic Center (Japan), 4. JST PRESTO (Japan))

[Presentation Style] Onsite

We demonstrate that the guided light modes travelling through sharp bends in glide-symmetric photonic crystal waveguides experience abrupt change in transmission near the band degeneracy and explore the possible origin of this phenomenon.

2:15 PM - 2:30 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-04] Beam Trajectory Bending and Meandering by Distorted Photonic Crystal [Presentation Style] Onsite

Misaki Honda[1], Kanji Nanjyo[1], Jinpei Hashizume[1], Hitoshi Kitagawa[1], *Kyoko Kitamura[1,2] (1. Kyoto Inst. of Tech. (Japan), 2. JST PRESTO (Japan))
[Presentation Style] Onsite
We demonstrate distorted photonic crystals (DPCs) that are capable of on-chip beam trajectory bending and meandering, even when a homogeneous refractive index is maintained.

2:30 PM - 2:45 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-05] Coherent Backscattering in Triangular Lattice Photonic Crystals
[Presentation Style] Online

*Tomoya Kuribara[1,2], Yuto Moritake[1,3], Masaya Notomi[1,2,4] (1. Department of Physics, Tokyo Tech (Japan), 2. NTT-BRL, NTT Corp. (Japan), 3. JST (Japan), 4. Nanophotonics Center, NTT Corp. (Japan))
[Presentation Style] Online
We numerically demonstrated that the suppression of coherent backscattering near the Dirac point in a triangular lattice photonic crystal occurs over a wide frequency range. Furthermore, we clarify the effects of intervalley scattering and trigonal warping on the suppression.

2:45 PM - 3:00 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-06] Novel dual-mode photonic crystal waveguide for stable resonant excitation of quantum dots with high β-factor
[Presentation Style] Online

*Xiaoyan Zhou[1,2], Peter Lodahl[2], Leonardo Midolo[2] (1. Tianjin Univ. (China), 2. Niels Bohr Inst. (Denmark))
[Presentation Style] Online
We propose a novel dual-mode photonic-crystal waveguide that realizes direct in-plane resonant excitation of the QDs, which exhibits a single-photon collection efficiency β>0.95 and impurity ε<5×10^{-3} over a broad spectral and spatial range.

Nano Laser, Optical Trapping, and Chiral Photonics

Session Chair: Kyoko KITAMURA (Kyoto Institute of Technology)

Fri. Aug 5, 2022 3:30 PM - 5:00 PM Small Hall (2F)

[CFP8J-01] Lasing oscillation from vertically standing hollow-core GaN nanowire on sapphire substrate

[Presentation Style] Onsite

*Masato Takiguchi[1,2], Sylvain Sergent[1,2], Benjamin Damilano[3], Stéphane Vézian[3], Sébastien Chenot[3], Nicole Yazigi[3], Taiki Yoda[1,2], Tai Tsuchizawa[1,4], Hisashi Sumikura[1,2], Akihiko Shinya[1,2], Masaya Notomi[1,2] （1. NTT Nanophotonics Center (Japan), 2. NTT Basic Research Labs (Japan), 3. CNRS-CRHEA (France), 4. NTT Device Technology Labs (Japan)）

3:30 PM - 3:45 PM

[CFP8J-02] Plasma Induced Surface Nanostructure on Semiconductors for The Application of Random Laser

[Presentation Style] Onsite

*Quan Shi[1], Hedeki Fujiwara[2], Ryusei Osaka[2], Shin Kajita[3], Ryo Yasuhara[1], Noriyasu Ohno[4], Hiyori Uehara[1] （1. National Inst. for Fusion Sci. (Japan), 2. Faculty of Eng., Hokkai-Gakuen Univ. (Japan), 3. Graduate School of Frontier Sci., The Univ. of Tokyo (Japan), 4. Graduate School of Eng., Nagoya Univ. (Japan)）

3:45 PM - 4:00 PM

[CFP8J-03] Direct trapping of micro particles with a 2μ m Tm-doped fiber laser

[Presentation Style] Online

*Roukuya Mamuti[1], Takao Fuji[1], Tetsuhiro Kudo[1] （1. Toyota Technological Inst. (Japan)）

4:00 PM - 4:15 PM

[CFP8J-04] Optical trapping and manipulation of phase-change material nanoparticles

[Presentation Style] Onsite

*Ryo Kakuta[1], Christophe Pin[1], Keiji Sasaki[1] （1. Hokkaido Univ. (Japan)）

4:15 PM - 4:30 PM

[CFP8J-05] Robust Angular Anisotropy of Circularly Polarized Luminescence from Chiral Twisted Bipolar Conjugated Polymer Microspheres

[Presentation Style] Onsite

*Yohei Yamamoto[1], Osamu Oki[1], Hiroshi Yamagishi[1], Chidambar Kulkarni[2], Stefan C. J. Meskers[2], E. W. Meijer[2], Zhan-Hong Lin[3], Jer-Shing Huang[3] （1. Univ. Tsukuba (Japan), 2. Eindhoven Univ. Tech. (Netherlands), 3. Leibniz Inst. Photonics Tech. (Germany)）

4:30 PM - 4:45 PM

[CFP8J-06] Transport of Circularly Polarized Light in Three-Dimensional Chiral Photonic Crystals

[Presentation Style] Onsite

*Shun Takahashi[1], Takeyoshi Tajiri[2], Yasuhiko Arakawa[3], Satoshi Iwamoto[4,5], Willem L. Vos[6] （1. Kyoto Inst. of Tech. (Japan), 2. Dep. of Communication Eng. and Info., The Univ. of Electro-Communications (Japan), 3. Inst. for Nano Quantum Info. Electronics, The Univ. of Tokyo (Japan), 4. Res. Center for Advanced Sci. and Tech., The Univ. of Tokyo (Japan), 5. Inst. of Indus. Sci., The Univ. of Tokyo (Japan), 6. COPS, MESA+ Inst. for Nanotech., Univ. of Twente

(Netherlands))
4:45 PM - 5:00 PM

3:30 PM - 3:45 PM (Fri. Aug 5, 2022 3:30 PM - 5:00 PM Small Hall)

[CFP8J-01] Lasing oscillation from vertically standing hollow-core GaN nanowire on sapphire substrate
[Presentation Style] Onsite

*Masato Takiguchi[1,2], Sylvain Sergent[1,2], Benjamin Damilano[3], Stéphane Vézian[3], Sébastien Chenot[3], Nicole Yazigi[3], Taiki Yoda[1,2], Tai Tsuchizawa[1,4], Hisashi Sumikura[1,2], Akihiko Shinya[1,2], Masaya Notomi[1,2] （1. NTT Nanophotonics Center (Japan), 2. NTT Basic Research Labs (Japan), 3. CNRS-CRHEA (France), 4. NTT Device Technology Labs (Japan)）

[Presentation Style] Onsite

We demonstrate lasing oscillation from a vertically standing hollow-core GaN nanowire fabricated on sapphire substrate by sublimation method. This unique laser has a potential to generate a vector light beam and are promising for future monolithic on-chip devices.

3:45 PM - 4:00 PM (Fri. Aug 5, 2022 3:30 PM - 5:00 PM Small Hall)

[CFP8J-02] Plasma Induced Surface Nanostructure on Semiconductors for The Application of Random Laser
[Presentation Style] Onsite

*Quan Shi[1], Hedeki Fujiwara[2], Ryusei Osaka[2], Shin Kajita[3], Ryo Yasuhara[1], Noriyasu Ohno[4], Hiyori Uehara[1] （1. National Inst. for Fusion Sci. (Japan), 2. Faculty of Eng., Hokkai-Gakuen Univ. (Japan), 3. Graduate School of Frontier Sci., The Univ. of Tokyo (Japan), 4. Graduate School of Eng., Nagoya Univ. (Japan)）

[Presentation Style] Onsite

Unique surface nanostructures were formed on semiconductors over a large area by Ar plasma irradiation with RF sample bias. As an application of these wavelength ordered size structure, we have demonstrated a random laser emission at UV region.

4:00 PM - 4:15 PM (Fri. Aug 5, 2022 3:30 PM - 5:00 PM Small Hall)

[CFP8J-03] Direct trapping of micro particles with a 2 μ m Tm-doped fiber laser
[Presentation Style] Online

*Roukuya Mamuti[1], Takao Fuji[1], Tetsuhiro Kudo[1] （1. Toyota Technological Inst. (Japan)）

[Presentation Style] Online

We report on opto-thermophoretic trapping of micro/nanoparticles with a 2 μm Tm-doped fiber laser. The infrared continuous-wave laser is directly and strongly absorbed by water solution, and the particles are migrated along the temperature gradient.

4:15 PM - 4:30 PM (Fri. Aug 5, 2022 3:30 PM - 5:00 PM Small Hall)

[CFP8J-04] Optical trapping and manipulation of phase-change material nanoparticles
[Presentation Style] Onsite

*Ryo Kakuta[1], Christophe Pin[1], Keiji Sasaki[1] (1. Hokkaido Univ. (Japan))

[Presentation Style] Onsite

In this study, we performed optical trapping of VO_2 nanoparticles. Because of the temperature-dependent nonlinear change of the VO_2 refractive index, VO_2 particles are stably trapped on a circular orbit around the laser focus.

4:30 PM - 4:45 PM (Fri. Aug 5, 2022 3:30 PM - 5:00 PM Small Hall)

[CFP8J-05] Robust Angular Anisotropy of Circularly Polarized Luminescence from Chiral Twisted Bipolar Conjugated Polymer Microspheres
[Presentation Style] Onsite

*Yohei Yamamoto[1], Osamu Oki[1], Hiroshi Yamagishi[1], Chidambar Kulkarni[2], Stefan C. J. Meskers[2], E. W. Meijer[2], Zhan-Hong Lin[3], Jer-Shing Huang[3] (1. Univ. Tsukuba (Japan), 2. Eindhoven Univ. Tech. (Netherlands), 3. Leibniz Inst. Photonics Tech. (Germany))

[Presentation Style] Onsite

We present that conjugated polymer bearing chiral side chains self-assemble into solid microspheres with a twisted bipolar interior. The single microsphere exhibits distinct angularly anisotropic CPL with g_{lum} up to ~ 0.5 in the equatorial plane, which is 2.5-fold greater than that along the polar axis.

4:45 PM - 5:00 PM (Fri. Aug 5, 2022 3:30 PM - 5:00 PM Small Hall)

[CFP8J-06] Transport of Circularly Polarized Light in Three-Dimensional Chiral Photonic Crystals
[Presentation Style] Onsite

*Shun Takahashi[1], Takeyoshi Tajiri[2], Yasuhiko Arakawa[3], Satoshi Iwamoto[4,5], Willem L. Vos[6] (1. Kyoto Inst. of Tech. (Japan), 2. Dep. of Communication Eng. and Info., The Univ. of Electro-Communications (Japan), 3. Inst. for Nano Quantum Info. Electronics, The Univ. of Tokyo (Japan), 4. Res. Center for Advanced Sci. and Tech., The Univ. of Tokyo (Japan), 5. Inst. of Indus. Sci., The Univ. of Tokyo (Japan), 6. COPS, MESA+ Inst. for Nanotech., Univ. of Twente (Netherlands))

[Presentation Style] Onsite

Circular dichroism in layer-by-layer chiral photonic crystals is numerically studied. Stop gaps for circular polarization in the stacking direction can be modified by tuning the in-plane period, which is new compared to one-dimensional Bragg structures.