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

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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

©CLEO-PR/ISOM/ODF Organizing Committees

*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.

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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

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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.

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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

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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.

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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

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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

©CLEO-PR/ISOM/ODF Organizing Committees

[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.

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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

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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.

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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

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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)

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[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.

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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

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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

©CLEO-PR/ISOM/ODF Organizing Committees

[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.

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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

©CLEO-PR/ISOM/ODF Organizing Committees

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.

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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

©CLEO-PR/ISOM/ODF Organizing Committees

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

©CLEO-PR/ISOM/ODF Organizing Committees

*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.

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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

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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.

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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

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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

©CLEO-PR/ISOM/ODF Organizing Committees

[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.

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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

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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)

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[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.

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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

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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.

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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.

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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

©CLEO-PR/ISOM/ODF Organizing Committees

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.

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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

©CLEO-PR/ISOM/ODF Organizing Committees

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)

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[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.

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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

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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

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*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.

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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

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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

©CLEO-PR/ISOM/ODF Organizing Committees

[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.

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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

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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

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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

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[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.

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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.

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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

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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.

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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

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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.

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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

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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)

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[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

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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

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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

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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.

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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

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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

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[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.

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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

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[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

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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)

©CLEO-PR/ISOM/ODF Organizing Committees

[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)

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[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.

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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

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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.

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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

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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))

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4:30 PM - 4:45 PM

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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

©CLEO-PR/ISOM/ODF Organizing Committees

*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.

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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

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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

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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

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[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

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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

©CLEO-PR/ISOM/ODF Organizing Committees

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))

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[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.

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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

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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.

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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

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[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

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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)

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[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

©CLEO-PR/ISOM/ODF Organizing Committees

[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

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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

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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.

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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

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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

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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.

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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

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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)

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[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.

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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

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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

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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

©CLEO-PR/ISOM/ODF Organizing Committees

[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

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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.

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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

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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.

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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

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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

©CLEO-PR/ISOM/ODF Organizing Committees

*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.

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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

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[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)）

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(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-

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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

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*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

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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.

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(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))

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[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.

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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)）

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(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

©CLEO-PR/ISOM/ODF Organizing Committees

*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˚

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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

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*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)）

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(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))

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[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

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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.

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(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

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*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.

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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))

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(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

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[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.

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(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.

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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)）

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(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.

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