Plenary Session 2 (CLEO-PR2022/ODF'22)

Session Chairs: Hibiki Tatsuno (Ricoh Co., Ltd.), Takashige Omatsu (Chiba Univ.)

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

[OP] Opening Remark

9:00 AM - 9:15 AM

[Plenary2-C1] All in a spin: rotational levitated optomechanics

[Presentation Style] Onsite

*Kishan Dholakia[1] （1. University of St Andrews (UK)）

9:15 AM - 10:00 AM

[Plenary2-C2] Fluctuation for Nanophotonics

[Presentation Style] Onsite

*Satoshi Kawata[1] （1. Osaka University and RIKEN (Japan)）

10:00 AM - 10:45 AM

[Plenary2-O3] Lens design for parallel super cameras

[Presentation Style] Onsite

*David J Brady[1], Jose Sasian[1] （1. University of Arizona (United States of America)）

10:45 AM - 11:30 AM

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

[OP] Opening Remark

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

[Plenary2-C1] All in a spin: rotational levitated optomechanics

[Presentation Style] Onsite

*Kishan Dholakia[1] (1. University of St Andrews (UK))

[Presentation Style] Onsite

Optically levitated micro and nanoparticles in vacuum offer new approaches for precision measurement and fundamental physics. We will discuss the use of rotational degree of freedom for achieving high Q values and studying limit cycles.

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

[Plenary2-C2] Fluctuation for Nanophotonics

[Presentation Style] Onsite

*Satoshi Kawata[1] (1. Osaka University and RIKEN (Japan))

[Presentation Style] Onsite

In the field of nanophotonics, suppression of fluctuations in detectors, light sources, and the environment is an important issue because they cause fatal errors in results. In this talk, I would like to discuss the positive use of fluctuations rather as a signal source, using micro- and nano-Raman imaging and 3D-nanofabrication as examples.

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

[Plenary2-O3] Lens design for parallel super cameras

[Presentation Style] Onsite

*David J Brady[1], Jose Sasian[1] (1. University of Arizona (United States of America))

[Presentation Style] Onsite

For compact gigapixel-scale cameras, multiscale lens designs are needed, but recent array camera designs utilize discrete heterogeneous arrays. This presentation reviews heterogenous array designs and discusses the motivation for this design choice.

Ultrashort Pulse Generation and Nonlinear Propagation I

Session Chairs: Nobuhisa Ishii (QST), Jiro Itatani (Univ. of Tokyo)

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

[CWP2E-01] Continuous Synthesis of Arbitrary Optical Waveforms on a Sub-Femtosecond Timescale

[Presentation Style] Onsite

*Akihiro Tomura[1], Chiaki Ohae[2], Ken-ichi Nakagawa[3], Kaoru Minoshima[1,2], Masayuki Katsuragawa[1,2] （1. Graduate School of Informatics and Engineering, University of Electro-Communications (Japan), 2. Institute for Advanced Science, University of Electro-Communications (Japan), 3. Institute for Laser Science, University of Electro-Communications (Japan)）

1:30 PM - 1:45 PM

[CWP2E-02] High-Quality Compression of Ultrafast UV Light in Gas-Filled Hollow-Core Photonic Crystal Fibers

[Presentation Style] Online

*David Novoa[1,2,3], Jie Luan[1], Philip St.J. Russell[1] （1. Max Planck Institute for the Science of Light (Germany), 2. University of the Basque Country (UPV/EHU) (Spain), 3. Ikerbasque, Basque Foundation for Science (Spain)）

1:45 PM - 2:00 PM

[CWP2E-03] High-energy, sub-8 fs green pulse generation

[Presentation Style] Online

Chia-Lun Tsai[1], An-Yuan Liang[1], Liang-Xian Xie[1], Shih-Cheng Liu[1], Po-Wei Lai[1], Ming-Shiang Tsai[1], *Ming-Wei Lin[1], Ming-Chang Chen[1] （1. National Tsing Hua Univ. (Taiwan)）

2:00 PM - 2:15 PM

[CWP2E-04] Energy-Scaling of Multi-Pass Cell Post-Compression: The Bow Tie MPC Scheme

[Presentation Style] Onsite

*Arthur Schoenberg[1], Markus Seidel[1], Esmerando Escoto[1], Stefanos Carlström[4,5], Gunnar Arisholm[6], Tino Lang[1], Ingmar Hartl[1], Christoph M. Heyl[1,2,3] （1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. Helmholtz-Institut Jena (Germany), 3. GSI Helmholtzzentrum für Schwerionenforschung GmbH (Germany), 4. Department of Physics, Lund University (Sweden), 5. Max-Born-Institut (Germany), 6. FFI (Norwegian Defence Research Establishment) (Norway)）

2:15 PM - 2:30 PM

[CWP2E-05] A series of phase-matched spectral peaks generated in gas-filled antiresonant hollow core fiber

[Presentation Style] Onsite

*TRIVIKRAMARAO GAVARA[1], WONKEUN CHANG[1] （1. Nanyang Technological University (Singapore)）

2:30 PM - 2:45 PM

[CWP2E-06] Enhancing optical nonlinear effects with spectrally periodic solitons

[Presentation Style] Online

Joshua P. Lourdesamy[1], *Antoine F. J. Runge[1], Tristram J. Alexander[1], Darren D. Hudson[2],

Andrea Blanco-Redondo[3], C. Martijn de Sterke[1] （1. University of Sydney (Australia), 2. CACI Photonics (United States of America), 3. Nokia Bell labs (United States of America)）

2:45 PM - 3:00 PM

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

[CWP2E-01] Continuous Synthesis of Arbitrary Optical Waveforms on a Sub-Femtosecond Timescale
[Presentation Style] Onsite

*Akihiro Tomura[1], Chiaki Ohae[2], Ken-ichi Nakagawa[3], Kaoru Minoshima[1,2], Masayuki Katsuragawa[1,2] (1. Graduate School of Informatics and Engineering, University of Electro-Communications (Japan), 2. Institute for Advanced Science, University of Electro-Communications (Japan), 3. Institute for Laser Science, University of Electro-Communications (Japan))

[Presentation Style] Onsite

We report a technology for synthesizing electric fields of light of arbitrary waveforms on a sub-femtosecond timescale. Five discrete harmonics are arbitrarily manipulated to generate a train of ultrashort waveforms with 890-attosecond temporal duration.

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

[CWP2E-02] High-Quality Compression of Ultrafast UV Light in Gas-Filled Hollow-Core Photonic Crystal Fibers
[Presentation Style] Online

*David Novoa[1,2,3], Jie Luan[1], Philip St.J. Russell[1] (1. Max Planck Institute for the Science of Light (Germany), 2. University of the Basque Country (UPV/EHU) (Spain), 3. Ikerbasque, Basque Foundation for Science (Spain))

[Presentation Style] Online

Nonlinear self-compression in gas-filled hollow-core fibers generates ~8.5 fs UV pulses with ~98% of the pulse energy within a single temporal lobe. The approach may find applications in time-resolved spectroscopy and chemistry

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

[CWP2E-03] High-energy, sub-8 fs green pulse generation
[Presentation Style] Online

Chia-Lun Tsai[1], An-Yuan Liang[1], Liang-Xian Xie[1], Shih-Cheng Liu[1], Po-Wei Lai[1], Ming-Shiang Tsai[1], *Ming-Wei Lin[1], Ming-Chang Chen[1] (1. National Tsing Hua Univ. (Taiwan))

[Presentation Style] Online

We propose a new method of pulse post-compression, named CAScaded foCusing AnD comprEssing (CASCADE) to nonlinearly compress 0.6-mJ, 515-nm pulses from 148 fs to 7.8 fs with an output energy of 0.28 mJ.

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

[CWP2E-04] Energy-Scaling of Multi-Pass Cell Post-Compression: The Bow Tie MPC Scheme
[Presentation Style] Onsite

*Arthur Schoenberg[1], Markus Seidel[1], Esmerando Escoto[1], Stefanos Carlström[4,5], Gunnar Arisholm[6], Tino Lang[1], Ingmar Hartl[1], Christoph M. Heyl[1,2,3] (1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. Helmholtz-Institut Jena (Germany), 3. GSI Helmholtzzentrum für Schwerionenforschung GmbH (Germany), 4. Department of Physics, Lund University (Sweden), 5. Max-Born-Institut (Germany), 6. FFI (Norwegian Defence Research Establishment) (Norway))

[Presentation Style] Onsite

We introduce the bow tie multi-pass cell as a new scheme for post-compression of high-energy laser pulses, overcoming current limits of Herriott-type multi-pass cell-based post-compression imposed mainly by mirror damage threshold limitations.

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

[CWP2E-05] A series of phase-matched spectral peaks generated in gas-filled antiresonant hollow core fiber
[Presentation Style] Onsite

*TRIVIKRAMARAO GAVARA[1], WONKEUN CHANG[1] (1. Nanyang Technological University (Singapore))

[Presentation Style] Onsite

We report the generation of a series of phased-matched spectral peaks in a gas-filled antiresonant hollow core fiber. They appear due to rapid changes in the dispersion profile near the structural resonances in the fiber.

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

[CWP2E-06] Enhancing optical nonlinear effects with spectrally periodic solitons
[Presentation Style] Online

Joshua P. Lourdesamy[1], *Antoine F. J. Runge[1], Tristram J. Alexander[1], Darren D. Hudson[2], Andrea Blanco-Redondo[3], C. Martijn de Sterke[1] (1. University of Sydney (Australia), 2. CACI Photonics (United States of America), 3. Nokia Bell labs (United States of America))

[Presentation Style] Online

We report the generation of high-intensity pulses consisting of equally spaced spectral components through linear dispersion engineering. Their interference leads to an enhanced effective nonlinearity that monotonically increases with the number of frequency components.

Ultrashort Pulse Generation and Nonlinear Propagation II

Session Chairs: Masayuki Katsuragawa (Univ. of Electro-Communications), Takayuki Kurihara (Univ. of Tokyo)
Wed. Aug 3, 2022 3:30 PM - 5:15 PM Mid-sized Hall A (1F)

[CWP2F-01 (Tutorial)] Few-Cycle Optical Pulses
[Presentation Style] Online
*Andy Kung[1,2] （1. Academia Sinica (Taiwan), 2. National Tsing Hua Univ. (Taiwan)）
3:30 PM - 4:30 PM

[CWP2F-02] Influence of Resonant Bands on UV Generation in Gas-filled Antiresonant Hollow-core Fiber
[Presentation Style] Onsite
*DAIQI XIONG[1], Yuxi Wang[1], Wonkeun Chang[1] （1. Nanyang Technological Univerisity (Singapore)）
4:30 PM - 4:45 PM

[CWP2F-03] Soft Time Stretch: Boosting the Stretch Factor by Deep Learning
[Presentation Style] Onsite
Yiming Zhou[1], Tingyi Zhou[1], *Bahram Jalali[1] （1. Univ. of California, Los Angeles (United States of America)）
4:45 PM - 5:00 PM

[CWP2F-04] Efficient Simulation of Supercontinua from Cubic, Quadratic and Cascaded Nonlinearities
[Presentation Style] Online
*Thibault Voumard[1], Markus Ludwig[1], Thibault Wildi[1], Tobias Herr[1,2] （1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. UHH Univ. (Germany)）
5:00 PM - 5:15 PM

3:30 PM - 4:30 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Mid-sized Hall A)

[CWP2F-01 (Tutorial)] Few-Cycle Optical Pulses
[Presentation Style] Online

*Andy Kung[1,2] (1. Academia Sinica (Taiwan), 2. National Tsing Hua Univ. (Taiwan))

[Presentation Style] Online

This is an overview and a brief step-by-step guide to the process of converting a femtosecond laser pulse to a pulse of a few optical cycles.

4:30 PM - 4:45 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Mid-sized Hall A)

[CWP2F-02] Influence of Resonant Bands on UV Generation in Gas-filled Antiresonant Hollow-core Fiber
[Presentation Style] Onsite

*DAIQI XIONG[1], Yuxi Wang[1], Wonkeun Chang[1] (1. Nanyang Technological Univerisity (Singapore))

[Presentation Style] Onsite

We investigate the influence of resonant bands in ultraviolet generation in gas-filled antiresonant hollow-core fibers. Their presence in the vicinity of the phase-matching point substantially degrades the efficiency and quality of the frequency up-conversion process.

4:45 PM - 5:00 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Mid-sized Hall A)

[CWP2F-03] Soft Time Stretch: Boosting the Stretch Factor by Deep Learning
[Presentation Style] Onsite

Yiming Zhou[1], Tingyi Zhou[1], *Bahram Jalali[1] (1. Univ. of California, Los Angeles (United States of America))

[Presentation Style] Onsite

We propose the concept of Soft Time Stretch, a technique that boosts the stretch factor of classic time-stretch systems by exploiting deep learning and nonlinear optics.

5:00 PM - 5:15 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Mid-sized Hall A)

[CWP2F-04] Efficient Simulation of Supercontinua from Cubic, Quadratic and Cascaded Nonlinearities
[Presentation Style] Online

*Thibault Voumard[1], Markus Ludwig[1], Thibault Wildi[1], Tobias Herr[1,2] (1. Deutsches Elektronen-Synchrotron DESY (Germany), 2. UHH Univ. (Germany))

[Presentation Style] Online

Chip-integrated nonlinear waveguides with quadratic and cubic optical nonlinearities can give rise to multi-octave spanning supercontinua. An efficient implementation for numerically simulating such ultra-broadband

spectra is presented.

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

High Power, High Energy Lasers III

Session Chairs: Martin Smrz (HiLASE Centre), Shigeki Tokita (Kyoto Univ.)

Wed. Aug 3, 2022 2:00 PM - 3:00 PM Room 204 (2F)

[CWP4C-02] Lasing performance of Yb:YAG thin-disk with crystalline coatings directly bonded onto silicon carbide heatsink

[Presentation Style] Onsite

*Martin Cimrman[1,2], Jan Cvrček[1,2], David Vojna[1,2], Denisa Štěpánková[1,2], Ondřej Foršt[1,2], Martin Smrž[1], Ondřej Novák[1], Ondřej Slezák[1], Michal Chyla[1], Michal Jelínek[2], Jiří Mužík[1], Tomáš Mocek[1] （1. HiLASE Centre, Institute of Physics AS CR (Czech Republic), 2. Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering (Czech Republic)）

2:00 PM - 2:15 PM

[CWP4C-03] 19 kW Output Power of Tandem Pumped APS Fiber Amplifier with Higher Ytterbium Concentration

[Presentation Style] Online

*Changle Shen[1], Fengyun Li[1], Jiangyun Dai[1], Nian Liu[1], Honglei He[1], Fang Li[1], Lihua Zhang[1], Jiakun Lv[1], Lei Jiang[1], Honghuan Lin[1], Jianjun Wang[1], Feng Jing[1], Cong Gao[1] （1. Laser Fusion Research Center, China Academy of Engineering Physics (China)）

2:15 PM - 2:30 PM

[CWP4C-04] Picosecond CPA Fiber Laser with 0.4 mJ Pulse Energy and 423 W Average Power Based on XLMA Triple-clad Fiber

[Presentation Style] Online

*bei bei Wang[1], zhigang Peng[1], yan Xu[1], zhaocheng Cheng[1], pu Wang[1] （1. Beijing Univ of Tech (China)）

2:30 PM - 2:45 PM

[CWP4C-05] Parametric Amplification of Passively Phase Locked Intense Mid-Infrared Pulses with 100 kHz repetition

[Presentation Style] Onsite

*Takayuki KURIHARA KURIHARA[1], Tianqi Yang[1], Tomoya Mizuno[1], Teruto Kanai[1], Jiro Itatani[1] （1. The University of Tokyo (Japan)）

2:45 PM - 3:00 PM

2:00 PM - 2:15 PM (Wed. Aug 3, 2022 2:00 PM - 3:00 PM Room 204)

[CWP4C-02] Lasing performance of Yb:YAG thin-disk with crystalline coatings directly bonded onto silicon carbide heatsink [Presentation Style] Onsite

*Martin Cimrman[1,2], Jan Cvrček[1,2], David Vojna[1,2], Denisa Štěpánková[1,2], Ondřej Foršt[1,2], Martin Smrž[1], Ondřej Novák[1], Ondřej Slezák[1], Michal Chyla[1], Michal Jelínek[2], Jiří Mužík[1], Tomáš Mocek[1] （1. HiLASE Centre, Institute of Physics AS CR (Czech Republic), 2. Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering (Czech Republic)）

[Presentation Style] Onsite

The lasing properties of a crystalline-coated Yb:YAG thin disk bonded onto a SiC heatsink in a multi-mode cavity are investigated, including disk temperature, output power, and dioptric power. The coatings show improvement over conventional ones.

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

[CWP4C-03] 19 kW Output Power of Tandem Pumped APS Fiber Amplifier with Higher Ytterbium Concentration [Presentation Style] Online

*Changle Shen[1], Fengyun Li[1], Jiangyun Dai[1], Nian Liu[1], Honglei He[1], Fang Li[1], Lihua Zhang[1], Jiakun Lv[1], Lei Jiang[1], Honghuan Lin[1], Jianjun Wang[1], Feng Jing[1], Cong Gao[1] （1. Laser Fusion Research Center, China Academy of Engineering Physics (China)）

[Presentation Style] Online

We report our recent work on power scaling of tandem pumped fiber laser up to 19 kW by increasing the doping concentration of ytterbium up to 0.3(mol)% and using larger core/clad ratio of 60/400.

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

[CWP4C-04] Picosecond CPA Fiber Laser with 0.4 mJ Pulse Energy and 423 W Average Power Based on XLMA Triple-clad Fiber [Presentation Style] Online

*bei bei Wang[1], zhigang Peng[1], yan Xu[1], zhaocheng Cheng[1], pu Wang[1] （1. Beijing Univ of Tech (China)）

[Presentation Style] Online

We demonstrate a chirped pulse amplification (CPA) system which delivers an average power of 423 W, pulse energy of 0.4 mJ, pulse duration of 7.6 ps based on an 100/400/480 μm Triple Clad Fiber.

2:45 PM - 3:00 PM (Wed. Aug 3, 2022 2:00 PM - 3:00 PM Room 204)

[CWP4C-05] Parametric Amplification of Passively Phase Locked Intense Mid-Infrared Pulses with 100 kHz repetition

[Presentation Style] Onsite

*Takayuki KURIHARA KURIHARA[1], Tianqi Yang[1], Tomoya Mizuno[1], Teruto Kanai[1], Jiro Itatani[1] （1. The University of Tokyo (Japan)）

[Presentation Style] Onsite

Few-cycle femtosecond optical parametric amplifier in the 1.8-2.5 um region is developed based on Yb;KGW source, exhibiting passively stabilized carrier-envelope phase, pulse energy of tens of uJ and tunable repetition rates up to 100 kHz.

Oral Session | CLEO-PR2022 | Fiber Lasers and Amplifier Devices

Fiber Lasers and Amplifier Devices

Session Chair: Takashi Matsui (NTT Corp.)

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

[CWP10A-01 (Invited(P))] Mode-locking state switchable Er-doped fiber laser based on a hybrid scheme of graphene oxide and nonlinear polarization rotation

[Presentation Style] Onsite

*Wei Cai[1], Chih-Hsien Cheng[1], Guanyu Ye[1], Lei Jin[1], Li Li[2], Sze Yun Set[1], Shinji Yamashita[1] (1. Univ. of tokyo (Japan), 2. Harbin Engineering Univ. (China))

1:30 PM - 2:00 PM

[CWP10A-02] Distributed spectral measurement of supercontinuum generation along an optical nanofiber

[Presentation Style] Onsite

*Yosri Haddad[1], Jean-Charles Beugnot[1], Samuel Margueron[1], Gil Fanjoux[1] (1. Institut FEMTO-ST, UMR 6174 CNRS / Université Bourgogne Franche-Comté (France))

2:00 PM - 2:15 PM

[CWP10A-03] High-Q fiber Fabry-Pé rot resonator of sub-centimeter length for stimulated Brillouin scattering laser

[Presentation Style] Onsite

*Shinya Kato[1,2], Takao Aoki[2] (1. Waseda Institute for Advanced Study, Waseda Univ. (Japan), 2. Department of Applied Physics, Waseda Univ. (Japan))

2:15 PM - 2:30 PM

[CWP10A-04] A High-Gain Cladded Erbium-Doped LNOI Waveguide Amplifier Fabricated by PLACE

[Presentation Style] Online

*Youting Liang[1], Junxia Zhou[1], Zhaoxiang Liu[1], Haisu Zhang[1], Zhiwei Fang[1], Yuan Zhou[2], Difeng Yin[2], Jintian Lin[2], Jianping Yu[2], Rongbo Wu[2], Min Wang[1], Ya Cheng[1,2,3,4,5] (1. East China Normal Univ. (China), 2. Shanghai Institute of Optics and Fine Mechanics (China), 3. Shanghai Research Center for Quantum Sciences (China), 4. Shanxi Univ. (China), 5. Shandong Univ. (China))

2:30 PM - 2:45 PM

[CWP10A-05] Angle-tuned bremsstrahlung light sources in an electron microscope

[Presentation Style] Online

*Luo-Hao Peng[1], Long Ho[1], Alexey Kopeykin[1], Yen-Chieh Huang[1] (1. National Tsing Hua Univ. (Taiwan))

2:45 PM - 3:00 PM

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

[CWP10A-01 (Invited(P))] Mode-locking state switchable Er-doped fiber laser based on a hybrid scheme of graphene oxide and nonlinear polarization rotation [Presentation Style] Onsite

*Wei Cai[1], Chih-Hsien Cheng[1], Guanyu Ye[1], Lei Jin[1], Li Li[2], Sze Yun Set[1], Shinji Yamashita[1] (1. Univ. of tokyo (Japan), 2. Harbin Engineering Univ. (China))

[Presentation Style] Onsite

We demonstrated a mode-locking state switchable Er-doped fiber laser based on the hybrid mode-locking scheme composed by nonlinear polarization rotation and graphene oxide coated side-polished fiber. Four stable switchable mode-locking states were confirmed

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

[CWP10A-02] Distributed spectral measurement of supercontinuum generation along an optical nanofiber [Presentation Style] Onsite

*Yosri Haddad[1], Jean-Charles Beugnot[1], Samuel Margueron[1], Gil Fanjoux[1] (1. Institut FEMTO-ST, UMR 6174 CNRS / Université Bourgogne Franche-Comté (France))

[Presentation Style] Onsite

This work presents preliminary experimental results concerning distributed measurements along an optical nanofiber of the generation of a supercontinuum in the visible range, for a spatial and spectral dynamics analysis.

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

[CWP10A-03] High-Q fiber Fabry-Pé rot resonator of sub-centimeter length for stimulated Brillouin scattering laser [Presentation Style] Onsite

*Shinya Kato[1,2], Takao Aoki[2] (1. Waseda Institute for Advanced Study, Waseda Univ. (Japan), 2. Department of Applied Physics, Waseda Univ. (Japan))

[Presentation Style] Onsite

We demonstrate a stimulated Brillouin scattering (SBS) laser using a high-Q optical fiber Fabry-Pérot resonator. The free spectral range coincides with the SBS shift and the resonator length is about 5 mm.

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

[CWP10A-04] A High-Gain Cladded Erbium-Doped LNOI Waveguide

Amplifier Fabricated by PLACE
[Presentation Style] Online

*Youting Liang[1], Junxia Zhou[1], Zhaoxiang Liu[1], Haisu Zhang[1], Zhiwei Fang[1], Yuan Zhou[2], Difeng Yin[2], Jintian Lin[2], Jianping Yu[2], Rongbo Wu[2], Min Wang[1], Ya Cheng[1,2,3,4,5] (1. East China Normal Univ. (China), 2. Shanghai Institute of Optics and Fine Mechanics (China), 3. Shanghai Research Center for Quantum Sciences (China), 4. Shanxi Univ. (China), 5. Shandong Univ. (China))

[Presentation Style] Online

Erbium doped thin film lithium niobate waveguide amplifier is fabricated using photolithography assisted chemo-mechanical etching technique. A thin cladding layer of tantalum pentoxide is deposited to boost the optical gain exceeding 20 dB.

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

[CWP10A-05] Angle-tuned bremsstrahlung light sources in an electron microscope
[Presentation Style] Online

*Luo-Hao Peng[1], Long Ho[1], Alexey Kopeykin[1], Yen-Chieh Huang[1] (1. National Tsing Hua Univ. (Taiwan))

[Presentation Style] Online

By using a 100-keV electron beam, we report bremsstrahlung induced blue fluorescence from silica and demonstrate angle-tuned light emission between 450-500 nm from a thin-film coated glass substrate.

Passive and Active Waveguide Devices

Session Chair: Keisuke Kojima (Mitsubishi Electric Research Laboratories)
Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206 (2F)

[CWP10B-01 (Invited)] Optical Waveguides in Crystals Fabricated by Femtosecond Laser Writing: Recent Advances and Perspectives
[Presentation Style] Online
*Feng Chen[1] (1. Shandong University (China))
3:30 PM - 4:00 PM

[CWP10B-02] Cascaded multi-stage directional coupler on silicon-on-insulator
[Presentation Style] Online
*Cheng Tse Tang[1], Chewn Pu Jou[1], Lan Chou Cho[1], Fong Wei Kuo[1], Ming Yang Chung[1], Tai Chun Huang[1], Yung Jr Hung[2] (1. TSMC Manufac. (Taiwan), 2. NSYSU Univ. (Taiwan))
4:00 PM - 4:15 PM

[CWP10B-03] Poling Free Second-Order Nonlinear Waveguides in LNOI using Bound State in the Continuum
[Presentation Style] Onsite
*Jackson Jacob Chakkoria[1,2], Andreas Boes[1], Shankar Kumar Selvaraja[2], Arnan Mitchell[1] (1. School of Engineering, RMIT University, Melbourne (Australia), 2. Centre for Nano Science and Engineering, Indian Institute of Science (India))
4:15 PM - 4:30 PM

[CWP10B-04] Experimental Demonstration of High Extinction TE-Pass Polarizers in Thin Film Lithium Niobate on Insulator
[Presentation Style] Onsite
*Aditya Dubey[1], Andreas Boes [1], Andreas Frigg[1,2], Guanghui Ren[1], Thach G. Nguyen[1], Sumeet Walia [1], Arnan Mitchell[1] (1. School of Engineering, RMIT Univ. (Australia), 2. Ligentec SA (Switzerland))
4:30 PM - 4:45 PM

[CWP10B-05] Cascaded Wavefront-Matching-Method Designed 6-Mode-Exchangers for MDL Management in MDM Transmission
[Presentation Style] Onsite
Yuichi Asama[1], *Takeshi FUJISAWA[1], Takanori Sato[1], Takayoshi Mori[2], Taiji Sakamoto[2], Ryota Imada[2], Yoko Yamashita[2], Kazuhide Nakajima[2], Kunimasa Saitoh[1] (1. Hokkaido University (Japan), 2. NTT Access Network Service System Laboratories (Japan))
4:45 PM - 5:00 PM

[CWP10B-06 (Invited)] Time reversed optical waves by arbitrary vector spatiotemporal field generation
[Presentation Style] Online
*Joel Carpenter[1], Mickael Mounaix[1], Nicolas Fontaine[2], David T Neilson[2], Roland Ryf[2], Haoshuo Chen[2], Juan Carlos Alvarado-Zacarias[2] (1. University of Queensland (Australia), 2. Nokia Bell Labs (United States of America))

5:00 PM - 5:30 PM

3:30 PM - 4:00 PM (Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206)

[CWP10B-01 (Invited)] Optical Waveguides in Crystals Fabricated by Femtosecond Laser Writing: Recent Advances and Perspectives
[Presentation Style] Online

*Feng Chen[1] (1. Shandong University (China))

[Presentation Style] Online

Femtosecond-laser-direct writing (FsLDW) allows rapid prototyping of on-demand waveguide geometries buried in crystals. This presentation summarizes the recent advances of FsLDW fabrication of waveguides and provides perspectives for potential future directions on this topic.

4:00 PM - 4:15 PM (Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206)

[CWP10B-02] Cascaded multi-stage directional coupler on silicon-on-insulator
[Presentation Style] Online

*Cheng Tse Tang[1], Chewn Pu Jou[1], Lan Chou Cho[1], Fong Wei Kuo[1], Ming Yang Chung[1], Tai Chun Huang[1], Yung Jr Hung[2] (1. TSMC Manufac. (Taiwan), 2. NSYSU Univ. (Taiwan))

[Presentation Style] Online

We demonstrate the feasibility of a width-engineered cascaded multi-stage directional coupler on silicon-on-insulator for broadband (within 5% power variation over 100 nm wavelength range) and fabrication tolerant operation (1 standard deviation= 2.5% across 12-inch wafer).

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

[CWP10B-03] Poling Free Second-Order Nonlinear Waveguides in LNOI using Bound State in the Continuum
[Presentation Style] Onsite

*Jackson Jacob Chakkoria[1,2], Andreas Boes[1], Shankar Kumar Selvaraja[2], Arnan Mitchell[1] (1. School of Engineering, RMIT University, Melbourne (Australia), 2. Centre for Nano Science and Engineering, Indian Institute of Science (India))

[Presentation Style] Onsite

We report a theoretical analysis of second-order nonlinear conversion by combining modal phase matching and bound state in the continuum in SiN strip loaded lithium niobate on insulator waveguides predicting an efficiency of 400% W^{-1} cm^{-2}

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

[CWP10B-04] Experimental Demonstration of High Extinction TE-Pass Polarizers in Thin Film Lithium Niobate on Insulator
[Presentation Style] Onsite

*Aditya Dubey[1], Andreas Boes [1], Andreas Frigg[1,2], Guanghui Ren[1], Thach G. Nguyen[1], Sumeet Walia [1], Arnan Mitchell[1] （1. School of Engineering, RMIT Univ. (Australia), 2. Ligentec SA (Switzerland)）

[Presentation Style] Onsite

In this contribution, we present an experimental demonstration of high extinction TE-pass polarizers by using lateral leakage in the thin film lithium niobate on insulator waveguides, achieving a TM mode polarization suppression of 262 dB/cm.

4:45 PM - 5:00 PM (Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206)

[CWP10B-05] Cascaded Wavefront-Matching-Method Designed 6-Mode-Exchangers for MDL Management in MDM Transmission
[Presentation Style] Onsite

Yuichi Asama[1], *Takeshi FUJISAWA[1], Takanori Sato[1], Takayoshi Mori[2], Taiji Sakamoto[2], Ryota Imada[2], Yoko Yamashita[2], Kazuhide Nakajima[2], Kunimasa Saitoh[1] （1. Hokkaido University (Japan), 2. NTT Access Network Service System Laboratories (Japan)）

[Presentation Style] Onsite

6-mode-exchangers composed of side- and top-grating-like waveguides designed with an optimization algorithm is proposed for mode-division-multiplexing system. By cascading these devices, an efficient reduction of mode-dependent-loss is possible with only one-time mode exchanging operation.

5:00 PM - 5:30 PM (Wed. Aug 3, 2022 3:30 PM - 5:30 PM Room 206)

[CWP10B-06 (Invited)] Time reversed optical waves by arbitrary vector spatiotemporal field generation
[Presentation Style] Online

*Joel Carpenter[1], Mickael Mounaix[1], Nicolas Fontaine[2], David T Neilson[2], Roland Ryf[2], Haoshuo Chen[2], Juan Carlos Alvarado-Zacarias[2] （1. University of Queensland (Australia), 2. Nokia Bell Labs (United States of America)）

[Presentation Style] Online

We discuss a device for the generation of arbitrary spatiotemporal vector fields in optics. A type of spectral pulse shaper that can also control spatial/polarisation wavefront in a temporally resolved fashion.

Oral Session | CLEO-PR2022 | Silicon Photonics Devices for Communications

Silicon Photonics Devices for Communications

Session Chairs: Dawn Tan (Singapore Univ. of Tech. and Design), Kazuhiro Ikeda (AIST)
Wed. Aug 3, 2022 1:30 PM - 2:45 PM Room 104&105 (1F)

[CWP12A-01] 110 Gbaud PAM-4 Silicon Microring Modulator operating in the C-band

[Presentation Style] Online

*David Weng U Chan[1], Xiong Wu[2], Zunyue Zhang[1], Chao Lu[2], Alan Pak To Lau[2], Hon Ki Tsang[1] （1. The Chinese Univ. of Hong Kong (Hong Kong), 2. The Hong Kong Polytechnic Univ. (Hong Kong)）

1:30 PM - 1:45 PM

[CWP12A-02] High Performance Si and InP/EO Polymer Hybrid Optical Modulators for Data Communication and Computing

[Presentation Style] Onsite

*Tomoki Sakuma[1], Shiyoshi Yokoyama[2], Junichi Fujikata[1] （1. Tokushima University (Japan), 2. Kyushu University (Japan)）

1:45 PM - 2:00 PM

[CWP12A-03] Free-Space Optical Transmission using Si Photonics Slow Light Grating Beam Switching Device

[Presentation Style] Onsite

*Ryo Tetsuya[1], Naoya Kodama[1], Mikiya Kamata[1], Takemasa Tamanuki[1], Toshihiko Baba[1] （1. Yokohama Nat'l Univ. (Japan)）

2:00 PM - 2:15 PM

[CWP12A-04] A low crosstalk optical wavelength filter consisting of a Si arrayed-waveguide grating and Bragg grating tunable filters

[Presentation Style] Onsite

*Yuta Yagi[1], Hiroyuki Tsuda[1] （1. Keio Univ. (Japan)）

2:15 PM - 2:30 PM

[CWP12A-05] Imaging of Electromagnetic-Waves using RoF System Based on Si Photonics Microring Modulator Array

[Presentation Style] Onsite

*Liucun Li[1], Hiroyuki Arai[1], Toshihiko Baba[1] （1. Yokohama National Univ. (Japan)）

2:30 PM - 2:45 PM

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

[CWP12A-01] 110 Gbaud PAM-4 Silicon Microring Modulator operating in the C-band

[Presentation Style] Online

*David Weng U Chan[1], Xiong Wu[2], Zunyue Zhang[1], Chao Lu[2], Alan Pak To Lau[2], Hon Ki Tsang[1] (1. The Chinese Univ. of Hong Kong (Hong Kong), 2. The Hong Kong Polytechnic Univ. (Hong Kong))

[Presentation Style] Online

We present a compact silicon microring modulator (MRM) which has over 67GHz bandwidth and support over 100 Gbaud PAM-4 transmission. We measured 110 Gbaud PAM-4 transmission (220 Gb/s) with bit error rates below 3.8 E-3.

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

[CWP12A-02] High Performance Si and InP/EO Polymer Hybrid Optical Modulators for Data Communication and Computing

[Presentation Style] Onsite

*Tomoki Sakuma[1], Shiyoshi Yokoyama[2], Junichi Fujikata[1] (1. Tokushima University (Japan), 2. Kyushu University (Japan))

[Presentation Style] Onsite

High performance Si and InP/EO polymer hybrid optical modulators (HMOD) are studied. We demonstrated 112Gbps-PAM4 high-speed modulation and high-efficiency. We also propose efficient optical neural network with slow light effect by InP/EO polymer HMOD.

2:00 PM - 2:15 PM (Wed. Aug 3, 2022 1:30 PM - 2:45 PM Room 104&105)

[CWP12A-03] Free-Space Optical Transmission using Si Photonics Slow Light Grating Beam Switching Device

[Presentation Style] Onsite

*Ryo Tetsuya[1], Naoya Kodama[1], Mikiya Kamata[1], Takemasa Tamanuki[1], Toshihiko Baba[1] (1. Yokohama Nat'l Univ. (Japan))

[Presentation Style] Onsite

We demonstrate free-space optical transmission using silicon photonics slow-light grating beam switching device based on slow light grating. 20 Gbps transmission was observed with a switching time of approximately 10 ms between two reception points.

2:15 PM - 2:30 PM (Wed. Aug 3, 2022 1:30 PM - 2:45 PM Room 104&105)

[CWP12A-04] A low crosstalk optical wavelength filter consisting of a Si arrayed-waveguide grating and Bragg grating tunable

filters

[Presentation Style] Onsite

*Yuta Yagi[1], Hiroyuki Tsuda[1] （1. Keio Univ. (Japan)）

[Presentation Style] Onsite

A low crosstalk optical wavelength filter consisting of a Si arrayed-waveguide grating and Bragg grating tunable filters was designed and fabricated. The simulation results indicated the crosstalk of the optical wavelength filter was dramatically improved.

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

[CWP12A-05] Imaging of Electromagnetic-Waves using RoF System Based on Si Photonics Microring Modulator Array

[Presentation Style] Onsite

*Liucun Li[1], Hiroyuki Arai[1], Toshihiko Baba[1] （1. Yokohama National Univ. (Japan)）

[Presentation Style] Onsite

We propose an electromagnetic wave imaging RoF system consisting of RF sensor and Si microring modulator arrays. It was demonstrated in a POC experiment at 3.5 GHz, for which we confirmed the agreement with simulations.

Hybrid Material Integration for Silicon Photonics I

Session Chair: Kazuhiro Ikeda (AIST)

Wed. Aug 3, 2022 4:00 PM - 5:00 PM Room 104&105 (1F)

[CWP12B-02] Annealing sequence dependence of directly bonded InP/Si substrate for GaInAsP LDs on silicon platform

[Presentation Style] Online

*Liang Zhao[1], Motonari Sato[1], Kota Shibukawa[1], Shingo Ito[1], Koji Agata[1], Kazuhiko Shimomura[1] (1. Sophia University (Japan))

4:00 PM - 4:15 PM

[CWP12B-03] Heterostructure vertical p-i-n GeSn Light-Emitting Diodes on Silicon-on-Insulator for 2µm Wavelength Band.

[Presentation Style] Onsite

*Radhika Bansal[1], Guo En Chang[1] (1. National Chung Cheng University (Taiwan))

4:15 PM - 4:30 PM

[CWP12B-04] Single and Multi-photon Absorption Induced Resonance Tuning in Gallium Selenide Integrated Silicon Nitride Ring Resonators

[Presentation Style] Onsite

*Asish Prosad[1], Rabindra Biswas[1], Lal Krishna A.S.[1], Srinivas Talabattula[1], Varun Raghunathan[1] (1. Indian Institute of Science, Bangalore (India))

4:30 PM - 4:45 PM

[CWP12B-05] Photothermal nonlinearity in a graphene oxide covered silicon micro-ring resonator

[Presentation Style] Online

*Chih-Hsien Chen[1], Chang-Yi Wu[1], Nai-Wen Cheng[1], Tzu-Hsiang Yen[1], Chia-Wei Huang[1], Chin-Shih Huang[2], Hao-Chun Hsieh[2], Hung-Chun Pan[2], Yu-Fu Wu[2], Tai-Chi Yang[2], Yung-Jr Hung[1] (1. National Sun Yat-sen Univ. (Taiwan), 2. Wistron Corp. (Taiwan))

4:45 PM - 5:00 PM

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

[CWP12B-02] Annealing sequence dependence of directly bonded InP/Si substrate for GaInAsP LDs on silicon platform [Presentation Style] Online

*Liang Zhao[1], Motonari Sato[1], Kota Shibukawa[1], Shingo Ito[1], Koji Agata[1], Kazuhiko Shimomura[1] （1. Sophia University (Japan)）

[Presentation Style] Online

We demonstrated the bonding of thin film InP and Si using wafer direct bonding technique, described the heating process of the InP-Si directly attached substrate. The evaluation of the prepared InP-Si substrate by observing the surface state with Nomarski-mode images is better than previous annealing sequence. We have successfully obtained lasing characteristics of GaInAsP MQW LD using this substrate.

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

[CWP12B-03] Heterostructure vertical p-i-n GeSn Light-Emitting Diodes on Silicon-on-Insulator for 2µm Wavelength Band. [Presentation Style] Onsite

*Radhika Bansal[1], Guo En Chang[1] （1. National Chung Cheng University (Taiwan)）

[Presentation Style] Onsite

We report on GeSn vertical p-i-n heterostructure light-emitting diode grown on silicon-on-insulator platform. Room-temperature electroluminescence spectra were demonstrated. These results pave the pathway for efficient on-chip light sources for integrated photonics in 2µm wavelength band.

4:30 PM - 4:45 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Room 104&105)

[CWP12B-04] Single and Multi-photon Absorption Induced Resonance Tuning in Gallium Selenide Integrated Silicon Nitride Ring Resonators [Presentation Style] Onsite

*Asish Prosad[1], Rabindra Biswas[1], Lal Krishna A.S.[1], Srinivas Talabattula[1], Varun Raghunathan[1] （1. Indian Institute of Science, Bangalore (India)）

[Presentation Style] Onsite

We study resonance tuning in Gallium Selenide integrated Silicon Nitride ring resonators in the 700-800 nm wavelength range using single- and multi-photon absorption processes. Blue-shift observed in the resonances is attributed to free-carrier refraction effects.

4:45 PM - 5:00 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Room 104&105)

[CWP12B-05] Photothermal nonlinearity in a graphene oxide covered silicon micro-ring resonator
[Presentation Style] Online

*Chih-Hsien Chen[1], Chang-Yi Wu[1], Nai-Wen Cheng[1], Tzu-Hsiang Yen[1], Chia-Wei Huang[1], Chin-Shih Huang[2], Hao-Chun Hsieh[2], Hung-Chun Pan[2], Yu-Fu Wu[2], Tai-Chi Yang[2], Yung-Jr Hung[1] （1. National Sun Yat-sen Univ. (Taiwan), 2. Wistron Corp. (Taiwan)）

[Presentation Style] Online

We fabricated highly-oxidized graphene oxide (GO) thin film to provide enhanced photothermal nonlinearity in GO-covered silicon micro-ring resonators. We observed 2~3 times increases in wavelength shifts of ring resonators under a fixed pumping power.

Oral Session | CLEO-PR2022 | Optical Signal Processing for FSO and Sensing

Optical Signal Processing for FSO and Sensing

Session Chair: Amol Choudhary (IIT Delhi)

Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207 (2F)

[CWP13A-01] Robust High-Order Free-Space Mode Sorting Enabled by a Software Defined Photonic Mesh
[Presentation Style] Online

*Aleksandr Boldin[1], Rakan Edrees Alsaigh[1], Maziyar Milanizadeh[2], Charalambos Klitis[1], Fabio Toso[2], Nicolas Fontaine[3], Andrea Melloni[2], Giorgio Ferrari[2], Marc Sorel[1], David A. B. Miller[4], Francesco Morichetti[2], Martin P. J. Lavery[1] (1. James Watt School of Engineering, University of Glasgow (UK), 2. Department of electronics, information and bioengineering (DEIB), Politecnico di Milano (Italy), 3. Nokia Bell Labs (United States of America), 4. Ginzton Laboratory, Stanford University (United States of America))

1:30 PM - 1:45 PM

[CWP13A-02] Entropy of Mode Mixers for Optical Unitary Converter based on Multi-Plane Light Conversion
[Presentation Style] Onsite

*Ryota Tanomura[1], Yoshitaka Taguchi[1], Rui Tang[1], Takuo Tanemura[1], Yoshiaki Nakano[1] (1. The Univ. Tokyo (Japan))

1:45 PM - 2:00 PM

[CWP13A-03 (Invited)] Integrated Microwave Photonics for Radar Applications
[Presentation Style] Online

Giovanni Serafino[1,3], Salvatore Maresca[2], *Manuel Reza[1], Claudio Porzi[1], Antonio Malacarne[3], Filippo Scotti[3], Paolo Ghelfi[3], Antonella Bogoni[1,3] (1. Sant'Anna School of Advanced Studies (Italy), 2. Consiglio Nazionale delle Ricerche (Italy), 3. Consorzio Nazionale Interuniversitario per le Telecomunicazioni (Italy))

2:00 PM - 2:30 PM

[CWP13A-04] Demonstration of highly efficient EO polymer modulator in visible light
[Presentation Style] Onsite

*Shun Kamada[1], Rieko Ueda[1], Chiyumi Yamada[1], Kouichi Tanaka[1], Toshiki Yamada[1], Akira Otomo[1] (1. National Inst. of Info. and Communications Tech. (Japan))

2:30 PM - 2:45 PM

[CWP13A-05] Improvement of Visualization of Sound Wave Propagation by Optical Microphone based on Digital Holography
[Presentation Style] Onsite

Kohei Itaya[1], Xiangyu Quan[1], Yasuhiro Awatsuji[2], *Osamu Matoba[1] (1. Kobe Univ. (Japan), 2. Kyoto Inst. Tech. (Japan))

2:45 PM - 3:00 PM

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

[CWP13A-01] Robust High-Order Free-Space Mode Sorting Enabled by a Software Defined Photonic Mesh

[Presentation Style] Online

*Aleksandr Boldin[1], Rakan Edrees Alsaigh[1], Maziyar Milanizadeh[2], Charalambos Klitis[1], Fabio Toso[2], Nicolas Fontaine[3], Andrea Melloni[2], Giorgio Ferrari[2], Marc Sorel[1], David A. B. Miller[4], Francesco Morichetti[2], Martin P. J. Lavery[1] （1. James Watt School of Engineering, University of Glasgow (UK), 2. Department of electronics, information and bioengineering (DEIB), Politecnico di Milano (Italy), 3. Nokia Bell Labs (United States of America), 4. Ginzton Laboratory, Stanford University (United States of America)）

[Presentation Style] Online

We propose a new free-space mode-sorter that can distinguish 15 spatial-modes with high efficiency, high fill factor and low crosstalk in non-perfect optical systems through the integrations of custom mode filter coupled with software-controllable photonic-mesh.

1:45 PM - 2:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207)

[CWP13A-02] Entropy of Mode Mixers for Optical Unitary Converter based on Multi-Plane Light Conversion

[Presentation Style] Onsite

*Ryota Tanomura[1], Yoshitaka Taguchi[1], Rui Tang[1], Takuo Tanemura[1], Yoshiaki Nakano[1] （1. The Univ. Tokyo (Japan)）

[Presentation Style] Onsite

Requirement of mode mixers in optical unitary converters based on multi-plane light conversion is examined. The “entropy” of each mixer, which describes the degree of mixing, is revealed to be crucial in determining the performance.

2:00 PM - 2:30 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207)

[CWP13A-03 (Invited)] Integrated Microwave Photonics for Radar Applications

[Presentation Style] Online

Giovanni Serafino[1,3], Salvatore Maresca[2], *Manuel Reza[1], Claudio Porzi[1], Antonio Malacarne[3], Filippo Scotti[3], Paolo Ghelfi[3], Antonella Bogoni[1,3] （1. Sant'Anna School of Advanced Studies (Italy), 2. Consiglio Nazionale delle Ricerche (Italy), 3. Consorzio Nazionale Interuniversitario per le Telecomunicazioni (Italy)）

[Presentation Style] Online

Integrated microwave photonics enables high-performance, compact, and rugged radar systems for applications in diverse domains. This paper provides a brief overview of promising photonic integrated solutions for maritime surveillance and Earth observation.

2:30 PM - 2:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207)

[CWP13A-04] Demonstration of highly efficient EO polymer modulator in visible light

[Presentation Style] Onsite

*Shun Kamada[1], Rieko Ueda[1], Chiyumi Yamada[1], Kouichi Tanaka[1], Toshiki Yamada[1], Akira Otomo[1] (1. National Inst. of Info. and Communications Tech. (Japan))

[Presentation Style] Onsite

We demonstrated the optical modulator using electro-optic polymers at visible wavelength. Modulation properties was evaluated using a Mach-Zehnder interferometer. The modulator was driven at wavelength 640 nm and successfully operated at a low voltage-length product.

2:45 PM - 3:00 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 207)

[CWP13A-05] Improvement of Visualization of Sound Wave Propagation by Optical Microphone based on Digital Holography

[Presentation Style] Onsite

Kohei Itaya[1], Xiangyu Quan[1], Yasuhiro Awatsuji[2], *Osamu Matoba[1] (1. Kobe Univ. (Japan), 2. Kyoto Inst. Tech. (Japan))

[Presentation Style] Onsite

In the optical microphone based on digital holography, the noise reduction method of phase images of sound fields is applied and then it is verified that the propagation of sound waves is more clearly observed.

Oral Session | CLEO-PR2022 | Theory and Fundamentals

Theory and Fundamentals

Session Chairs: Yu-Jung Lu (Academia Sinica), Takuo Tanaka (RIKEN)
Wed. Aug 3, 2022 1:30 PM - 3:00 PM Mid-sized Hall B (1F)

[CWP16G-01] Resonant Coupling between Image Dipoles of Gold Nanoparticles and Fano Resonance of Capped Gold Nanoslits for Enhanced Oligonucleotide Detection

[Presentation Style] Onsite

*Sheng Hann Wang[1], Chia-Wen Kuo[1,2], Shu Cheng Lo[1,3], Wei-Han Yong[4], Ya-Lun Ho[2], Jean-Jacques Delaunay[2], Wan-Shao Tsai[4], Pei-Kuen Wei[1] （1. Academia Sinica (Taiwan), 2. The University of Tokyo (Japan), 3. National Taiwan University (Taiwan), 4. National Chung Hsing University (Taiwan)）

1:30 PM - 1:45 PM

[CWP16G-02] Metasurfaces for molecular emitter

[Presentation Style] Onsite

*Yoshiaki Nishijima[1] （1. Yokohama National University (Japan)）

1:45 PM - 2:00 PM

[CWP16G-03] Topological surface states at C4 rotational symmetry photonic crystals bounded by air

[Presentation Style] Online

*Anna TASOLAMPROU TASOLAMPROU[1], Maria Kafesaki[1], Costas Soukoulis[1], Eleftherios Economou[1], Thomas KOschny[2] （1. Institute of Electronic Structure and Laser, Foundation for Research and Technology Hellas (Greece), 2. Ames Laboratory and Department of Physics and Astronomy, Iowa State University (United States of America)）

2:00 PM - 2:15 PM

[CWP16G-04] Phase calculation scheme for designing highly customizable metalens-based devices

[Presentation Style] Onsite

*Hongliang Li[1], Changyi Zhou[1], Woo-Bin Lee[1], Duk-Yong Choi[2], Sang-Shin Lee[1] （1. Department of Electronic Engineering, Kwangwoon University (Korea), 2. Department of Quantum Science and Technology, Research School of Physics, Australian National University (Australia)）

2:15 PM - 2:30 PM

[CWP16G-05] Nonlocality-enabled Topological Engineering Towards New Applications of Anisotropic Metamaterials

[Presentation Style] Online

*Bartosz Janaszek[1], Marcin Kieliszczyk[1], Anna Tyszka-Zawadzka[1], Paweł Szczepański[1,2], Xiaowei Li[3], Lingling Huang[4], Zhaoxian Su[4], Yandong Gong[5] （1. Institute of Microelectronics and Optoelectronics, Warsaw University of Technology (Poland), 2. National Institute of Telecommunications (Poland), 3. Laser Micro/Nano-Fabrication Laboratory, School of Mechanical Engineering, Beijing Institute of Technology (China), 4. Beijing Engineering Research Center of Mixed Reality and Advanced Display, School of Optics and Photonics, Beijing Institute of Technology (China), 5. School of Instrument Science and Optoelectronics Engineering, Beijing Information Science and Technology

University (China))

2:30 PM - 2:45 PM

[CWP16G-06] Expanded Optical Waveguide Theory with Magneto-Optical Effect and Magnetoelectrical Effect

[Presentation Style] Onsite

*Yoshihiro Honda[1], Eri Igarashi[1], Tomohiro Amemiya[2] (1. Sony Group Corp. (Japan), 2. Tokyo Institute of Technology (Japan))

2:45 PM - 3:00 PM

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

[CWP16G-01] Resonant Coupling between Image Dipoles of Gold Nanoparticles and Fano Resonance of Capped Gold Nanoslits for Enhanced Oligonucleotide Detection [Presentation Style] Onsite

*Sheng Hann Wang[1], Chia-Wen Kuo[1,2], Shu Cheng Lo[1,3], Wei-Han Yong[4], Ya-Lun Ho[2], Jean-Jacques Delaunay[2], Wan-Shao Tsai[4], Pei-Kuen Wei[1] （1. Academia Sinica (Taiwan), 2. The University of Tokyo (Japan), 3. National Taiwan University (Taiwan), 4. National Chung Hsing University (Taiwan)）

[Presentation Style] Onsite

The progressing Bloch wave surface plasmon polaritons depressed by the image dipole of AuNPs on the capped gold nanoslit results in dramatic Fano peak drops and significantly enhance the oligonucleotide detection to 100 fM level.

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

[CWP16G-02] Metasurfaces for molecular emitter [Presentation Style] Onsite

*Yoshiaki Nishijima[1] （1. Yokohama National University (Japan)）

[Presentation Style] Onsite

We demonstrate extraordinarily spectrally selective narrowband mid-infrared radiation absorbance and thermal emittance with the strong surface enhancement of molecular infrared absorption (SEIRA) using mid-midinfrared metasurfaces.

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

[CWP16G-03] Topological surface states at C4 rotational symmetry photonic crystals bounded by air [Presentation Style] Online

*Anna TASOLAMPROU TASOLAMPROU[1], Maria Kafesaki[1], Costas Soukoulis[1], Eleftherios Economou[1], Thomas KOschny[2] （1. Institute of Electronic Structure and Laser, Foundation for Research and Technology Hellas (Greece), 2. Ames Laboratory and Department of Physics and Astronomy, Iowa State University (United States of America)）

[Presentation Style] Online

We present an approach for manipulating topological states sustained at free space interfaces. Eigenvalue analysis corroborated by direct scattering simulations demonstrate the topological invariant jump, the mode's unidirectionalilty and immunity to defects and back-scattering.

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

[CWP16G-04] Phase calculation scheme for designing highly customizable metalens-based devices [Presentation Style] Onsite

*Hongliang Li[1], Changyi Zhou[1], Woo-Bin Lee[1], Duk-Yong Choi[2], Sang-Shin Lee[1] (1. Department of Electronic Engineering, Kwangwoon University (Korea), 2. Department of Quantum Science and Technology, Research School of Physics, Australian National University (Australia))

[Presentation Style] Onsite

A phase calculation scheme, which gives required phase profiles extracted from pre-designed geometric lenses, was proposed and demonstrated for designing highly customizable metalens-based devices expanding the related research and practical applications.

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

[CWP16G-05] Nonlocality-enabled Topological Engineering Towards New Applications of Anisotropic Metamaterials [Presentation Style] Online

*Bartosz Janaszek[1], Marcin Kieliszczyk[1], Anna Tyszka-Zawadzka[1], Paweł Szczepański[1,2], Xiaowei Li[3], Lingling Huang[4], Zhaoxian Su[4], Yandong Gong[5] (1. Institute of Microelectronics and Optoelectronics, Warsaw University of Technology (Poland), 2. National Institute of Telecommunications (Poland), 3. Laser Micro/Nano-Fabrication Laboratory, School of Mechanical Engineering, Beijing Institute of Technology (China), 4. Beijing Engineering Research Center of Mixed Reality and Advanced Display, School of Optics and Photonics, Beijing Institute of Technology (China), 5. School of Instrument Science and Optoelectronics Engineering, Beijing Information Science and Technology University (China))

[Presentation Style] Online

We investigate topological phase transitions of iso-frequency of dispersion of anisotropic metamaterials via use of nonlocality engineering, which may lead to optical isolation or simultaneous generation of orthogonally polarized beams at different frequencies.

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

[CWP16G-06] Expanded Optical Waveguide Theory with Magneto-Optical Effect and Magnetoelectrical Effect [Presentation Style] Onsite

*Yoshihiro Honda[1], Eri Igarashi[1], Tomohiro Amemiya[2] (1. Sony Group Corp. (Japan), 2. Tokyo Institute of Technology (Japan))

[Presentation Style] Onsite

We proposed a comprehensive optical waveguide theory including magneto-optical (MO) effect and magnetoelectrical (ME) effect. This expanded theory revealed the interaction between MO effect and ME effect greatly enhanced the nonreciprocity of the propagating light.

Oral Session | CLEO-PR2022 | Photon Emission Devices and Related Technologies

Photon Emission Devices and Related Technologies

Session Chair: Koichi Okamoto (Osaka Metropolitan Univ.)

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

[CWP16H-01] Out-of-plane symmetry-protected bound states in the continuum in a plasmonic nanofin metasurface

[Presentation Style] Online

Andreas Aigner[2], Juan Wang[2], Andreas Tittl[2], Stefan A. Maier[2,3], *Haoran Ren[1] （1. Macquarie University (Australia), 2. Ludwig-Maximilians-University Munich, Munich (Germany), 3. Imperial College London (UK)）

4:00 PM - 4:15 PM

[CWP16H-02] Highly Efficient Green Emissions of InGaN/GaN Quantum Wells with oxide thin films

[Presentation Style] Onsite

*Seiya Kaito[1], Yuki Kamei[1], Tetsuya Matsuyama[1], Kenji Wada[1], Mitsuru Funato[2], Yoichi Kawakami[2], Koichi Okamoto[1] （1. Osaka Metropolitan Univ. (Japan), 2. Kyoto Univ. (Japan)）

4:15 PM - 4:30 PM

[CWP16H-03] Plasmon-enhanced single photon source on an optical nanofiber

[Presentation Style] Onsite

*Yining Xuan[1], Masakazu Sugawara[1], Yasuyoshi Mitsumori[2], Keiichi Edamatsu[1], Mark Sadgrove[3] （1. Tohoku Univ. (Japan), 2. Kitasato Univ. (Japan), 3. Tokyo Univ. of Sci. (Japan)）

4:30 PM - 4:45 PM

[CWP16H-04] Detecting the Source of Surface Plasmon Hot-Electron Emission in Rectennas

[Presentation Style] Online

*Rana Poushimin Poushimin[1], Braulio Antonio[1], Jean-Michel Nunzi[1] （1. Physics department, Queen's University (Canada)）

4:45 PM - 5:00 PM

4:00 PM - 4:15 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Mid-sized Hall B)

[CWP16H-01] Out-of-plane symmetry-protected bound states in the continuum in a plasmonic nanofin metasurface

[Presentation Style] Online

Andreas Aigner[2], Juan Wang[2], Andreas Tittl[2], Stefan A. Maier[2,3], *Haoran Ren[1] (1. Macquarie University (Australia), 2. Ludwig-Maximilians-University Munich, Munich (Germany), 3. Imperial College London (UK))

[Presentation Style] Online

We present a plasmonic nanofin metasurface harnessing the out-of-plane symmetry breaking in parameter space by tuning the triangle angle of 3D laser nanoprinted polymer triangles (named as nanofins) coated with gold. The plasmonic nature of the out-of-plane symmetry-protected BICs enables high field enhancement together with high q-factors from the near- to mid-infrared regions, which were utilised for refractive index and pixelated molecular sensing.

4:15 PM - 4:30 PM (Wed. Aug 3, 2022 4:00 PM - 5:00 PM Mid-sized Hall B)

[CWP16H-02] Highly Efficient Green Emissions of InGaN/GaN Quantum Wells with oxide thin films

[Presentation Style] Onsite

*Seiya Kaito[1], Yuki Kamei[1], Tetsuya Matsuyama[1], Kenji Wada[1], Mitsuru Funato[2], Yoichi Kawakami[2], Koichi Okamoto[1] (1. Osaka Metropolitan Univ. (Japan), 2. Kyoto Univ. (Japan))

[Presentation Style] Onsite

We propose a bran-new method to improve efficiencies of green emissions of InGaN/GaN with oxides thin films. Photoluminescence intensities were enhanced significantly by depositing a thin oxide film and irradiating the surface with ultraviolet light.

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

[CWP16H-03] Plasmon-enhanced single photon source on an optical nanofiber

[Presentation Style] Onsite

*Yining Xuan[1], Masakazu Sugawara[1], Yasuyoshi Mitsumori[2], Keiichi Edamatsu[1], Mark Sadgrove[3] (1. Tohoku Univ. (Japan), 2. Kitasato Univ. (Japan), 3. Tokyo Univ. of Sci. (Japan))

[Presentation Style] Onsite

We study a gold nanoparticle-quantum-dot coupled system on an optical nanofiber, serving as enhanced single photon source in a fiber-based communication network. Purcell enhancement and degree-of-polarization enhancement are considered for two different types of nanoparticles.

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

[CWP16H-04] Detecting the Source of Surface Plasmon Hot-Electron Emission in Rectennas

[Presentation Style] Online

*Rana Poushimin Poushimin[1], Braulio Antonio[1], Jean-Michel Nunzi[1] （1. Physics department, Queen's University (Canada)）

[Presentation Style] Online

Using gold nanoparticles coated on ITO as a polarization-sensitive photodetector, we intend to locate the source of hot electron emission in the rectenna. This plasmonic photodetector is polarisation sensitive and has the potential to achieve high efficiency across a wide range of frequencies.

Oral Session | CLEO-PR2022 | Session of Excellent Papers in Sensors and Systems

Session of Excellent Papers in Sensors and Systems

Session Chairs: Norimichi Tsumura (Chiba Univ.), George C Cardoso (Univ. of São Paulo)

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

[CWP17A-01 (Invited(P))] Background-Free Vibrational Spectroscopy based on Destructive Interference around 2.3 um

[Presentation Style] Onsite

*Wenqing Song[1], Daiki Okazaki[1], Ikki Morichika[1], Satoshi Ashihara[1] （1. IIS, The Univ. of Tokyo (Japan)）

1:30 PM - 2:00 PM

[CWP17A-02] 50 km-range and 3.5 cm-spatial resolution Brillouin Optical Correlation Domain Analysis with Raman Amplification

[Presentation Style] Onsite

*Wookjin Jeong[1,2], Kwangyong Song[3], Gyutae Kim[2], Sangbae Lee[1], Kwanil Lee[1] （1. Korea Institute of Science and Technology (KIST) (Korea), 2. Korea Univ. (Korea), 3. Chungang Univ. (Korea)）

2:00 PM - 2:15 PM

[CWP17A-03] High NA and Size Reduction in Prism Lens for Silicon Photonics SLG Beam Scanner

[Presentation Style] Onsite

*Riku Kubota[1], Mikiya Kamata[1], Ryo Tetsuya[1], Takemasa Tamanuki[1], Toshihiko Baba[1] （1. Yokohama National Univ. (Japan)）

2:15 PM - 2:30 PM

[CWP17A-04] Near-Infrared Selective Absorber with Single-Material Based on Refractive Index-Tunable Tamm Plasmon Structure

[Presentation Style] Onsite

*So Hee Kim[1], Joo Hwan Ko[1], Young Jin Yoo[1], Min Seok Kim[1], Gil Ju Lee[2], Satoshi Ishii[3], Young Min Song[1] （1. Gwangju Institute of Science and Technology (GIST) (Korea), 2. Pusan National University (Korea), 3. National Institute of Materials Science (NIMS) (Japan)）

2:30 PM - 2:45 PM

[CWP17A-05] High Sensitivity Curvature Sensors Using stretched Four-core Fibers Through a corner-core Excitation

[Presentation Style] Online

Lina Suo[1], Ya-Pei Peng[2,3], Haimiao Zhou[1], Shijie Ren[1], *Nan-Kuang Chen[1] （1. Liaocheng Univ. (China), 2. Shenzhen Tech. Univ. (China), 3. NK Photonics Ltd. (China)）

2:45 PM - 3:00 PM

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

[CWP17A-01 (Invited(P))] Background-Free Vibrational Spectroscopy based on Destructive Interference around 2.3 um
[Presentation Style] Onsite

*Wenqing Song[1], Daiki Okazaki[1], Ikki Morichika[1], Satoshi Ashihara[1] （1. IIS, The Univ. of Tokyo (Japan)）

[Presentation Style] Onsite

We demonstrate background-free vibrational spectroscopy by using a mode-locked Cr:ZnS laser and a well-stabilized interferometer. The Allan deviation measurement indicates a potential sensitivity of 3.57×10^{-6} $Hz^{-1/2}$ as normalized noise equivalent absorption.

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

[CWP17A-02] 50 km-range and 3.5 cm-spatial resolution Brillouin Optical Correlation Domain Analysis with Raman Amplification
[Presentation Style] Onsite

*Wookjin Jeong[1,2], Kwangyong Song[3], Gyutae Kim[2], Sangbae Lee[1], Kwanil Lee[1] （1. Korea Institute of Science and Technology (KIST) (Korea), 2. Korea Univ. (Korea), 3. Chungang Univ. (Korea)）

[Presentation Style] Onsite

We experimentally realize a long range and high spatial resolution Brillouin sensor through optimizing key parameters in the Raman assisted time domain processing Brillouin optical correlation domain analysis.

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

[CWP17A-03] High NA and Size Reduction in Prism Lens for Silicon Photonics SLG Beam Scanner
[Presentation Style] Onsite

*Riku Kubota[1], Mikiya Kamata[1], Ryo Tetsuya[1], Takemasa Tamanuki[1], Toshihiko Baba[1] （1. Yokohama National Univ. (Japan)）

[Presentation Style] Onsite

Specific prism lenses have been developed for Si photonics SLG beam scanner and solid-state FMCW LiDAR. This study enhanced the NA and reduced the size of this lens for more efficient and compact scanner device.

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

[CWP17A-04] Near-Infrared Selective Absorber with Single-Material Based on Refractive Index-Tunable Tamm Plasmon

Structure

[Presentation Style] Onsite

*So Hee Kim[1], Joo Hwan Ko[1], Young Jin Yoo[1], Min Seok Kim[1], Gil Ju Lee[2], Satoshi Ishii[3], Young Min Song[1] （1. Gwangju Institute of Science and Technology (GIST) (Korea), 2. Pusan National University (Korea), 3. National Institute of Materials Science (NIMS) (Japan)）

[Presentation Style] Onsite

We suggest a computational model with near-unity absorption (≈99%) and a high Q-factor (≈45) of single-material Tamm plasmon structure (SMTPs). Our structure facilitates the realization of photodetectors for practical applications demanding high-performance TPs.

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

[CWP17A-05] High Sensitivity Curvature Sensors Using stretched Four-core Fibers Through a corner-core Excitation

[Presentation Style] Online

Lina Suo[1], Ya-Pei Peng[2,3], Haimiao Zhou[1], Shijie Ren[1], *Nan-Kuang Chen[1] （1. Liaocheng Univ. (China), 2. Shenzhen Tech. Univ. (China), 3. NK Photonics Ltd. (China)）

[Presentation Style] Online

The curvature sensing is realized by a tapered four-core fiber (TFCF). When the diameter of TFCF is 7 μm and a tapered length is 2.21 mm, the sensitivity of the curvature sensor is 16.12 nm/m^{-1}.

Oral Session | CLEO-PR2022 | Fiber-based Sensors and Systems

Fiber-based Sensors and Systems

Session Chairs: Norimichi Tsumura (Chiba Univ.), Athikom Roeksabutr (Mahanakorn Univ. of Tech.)
Wed. Aug 3, 2022 3:30 PM - 5:15 PM Small Hall (2F)

[CWP17B-01] Brillouin Fiber Sensor Based on Optical Frequency Comb and Heterodyne Detection

[Presentation Style] Onsite

*Takuma Ono[1], Yosuke Tanaka[2], Tatsutoshi Shioda[1] （1. Saitama Univ (Japan), 2. Tokyo Univ. Agriculture &Tech. (Japan)）

3:30 PM - 3:45 PM

[CWP17B-02] Speckle-Based Pressure Sensing Using Pure Silica Microstructured Optical Fiber

[Presentation Style] Onsite

*Mohammad Istiaque Reja[1,3], Linh V. Nguyen[2], Heike Ebendorff Heidepriem[1], Stephen C. Warren-Smith[2] （1. The University of Adelaide (Australia), 2. University of South Australia (Australia), 3. Chittagong University of Engineering and Technology (Bangladesh)）

3:45 PM - 4:00 PM

[CWP17B-03] Molecule self-organized fiber grating in fiber few-mode interferometers for temperature sensing applications

[Presentation Style] Online

Ya-Pei Peng[1,2], Haimiao Zhou[3], Lina Suo[3], Fan Yang[3], Shijie Ren[3], *Nan-Kuang Chen[3], Xinhe Lu[2], B. M. A. Rahman[4], K.T.V Grattan[4] （1. Shenzhen Tech. Univ. (China), 2. NK Photonics Ltd. (China), 3. Liaocheng Univ. (China), 4. Univ. of London (UK)）

4:00 PM - 4:15 PM

[CWP17B-05] High-sensitivity multicore-fiber strain sensors based on asymmetric supermodes interference

[Presentation Style] Online

Ya-Pei Peng[1,2], Lina Suo[3], Haimiao Zhou[3], Shijie Ren[3], Xinhe Lu[2], *Nan-Kuang Chen[3] （1. Shenzhen Tech. Univ. (China), 2. NK Photonics Ltd. (China), 3. Liaocheng Univ. (China)）

4:30 PM - 4:45 PM

3:30 PM - 3:45 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Small Hall)

[CWP17B-01] Brillouin Fiber Sensor Based on Optical Frequency Comb and Heterodyne Detection
[Presentation Style] Onsite

*Takuma Ono[1], Yosuke Tanaka[2], Tatsutoshi Shioda[1] （1. Saitama Univ (Japan), 2. Tokyo Univ. Agriculture &Tech. (Japan)）

[Presentation Style] Onsite

We have proposed a new detection method of Brillouin frequency shift measurement technique using optical comb and heterodyne detection technology. In this paper, the experimental results are shown for the confirmation of the operation principle.

3:45 PM - 4:00 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Small Hall)

[CWP17B-02] Speckle-Based Pressure Sensing Using Pure Silica Microstructured Optical Fiber
[Presentation Style] Onsite

*Mohammad Istiaque Reja[1,3], Linh V. Nguyen[2], Heike Ebendorff Heidepriem[1], Stephen C. Warren-Smith[2] （1. The University of Adelaide (Australia), 2. University of South Australia (Australia), 3. Chittagong University of Engineering and Technology (Bangladesh)）

[Presentation Style] Onsite

We report a specklegram pressure sensor using a pure silica six-hole novel microstructured optical fiber. This simple and low-cost sensor has the potential for pressure measurement at high temperature harsh environment applications.

4:00 PM - 4:15 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Small Hall)

[CWP17B-03] Molecule self-organized fiber grating in fiber few-mode interferometers for temperature sensing applications
[Presentation Style] Online

Ya-Pei Peng[1,2], Haimiao Zhou[3], Lina Suo[3], Fan Yang[3], Shijie Ren[3], *Nan-Kuang Chen[3], Xinhe Lu[2], B. M. A. Rahman[4], K.T.V Grattan[4] （1. Shenzhen Tech. Univ. (China), 2. NK Photonics Ltd. (China), 3. Liaocheng Univ. (China), 4. Univ. of London (UK)）

[Presentation Style] Online

We demonstrate fiber few-mode interferometers based on self-assembly surface corrugated grating using charged nano-particles for temperature sensors with a maximum resonant wavelength shift of 4.6 nm over 20˚C - 60˚C

4:30 PM - 4:45 PM (Wed. Aug 3, 2022 3:30 PM - 5:15 PM Small Hall)

[CWP17B-05] High-sensitivity multicore-fiber strain sensors based on asymmetric supermodes interference [Presentation Style] Online

Ya-Pei Peng[1,2], Lina Suo[3], Haimiao Zhou[3], Shijie Ren[3], Xinhe Lu[2], *Nan-Kuang Chen[3] （1. Shenzhen Tech. Univ. (China), 2. NK Photonics Ltd. (China), 3. Liaocheng Univ. (China)）

[Presentation Style] Online

The high sensitivity strain sensors using tapered four-core fibers (FCFs) with the sensitivity of 21.85 pm/μ under a tapered diameter of 7.5 μm were demonstrated.

X-ray Lasers and Their Applications I

Session Chair: Makina Yabashi (RIKEN)

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

[CWP19A-01 (Invited)] Opportunities and challenges of a hard x-ray regenerative amplifier free-electron laser
[Presentation Style] Online

Gabriel Marcus[1], *Rachel Margraf[1] （1. SLAC National Accelerator Laboratory (United States of America)）

1:30 PM - 2:00 PM

[CWP19A-02] Direct Measurement of Hard X-Ray Laser Pulse Duration via Intensity Autocorrelation Techniques
[Presentation Style] Onsite

*Taito Osaka[1], Ichiro Inoue[1], Jumpei Yamada[1,2], Yuichi Inubushi[3,1], Kensuke Tono[3,1], Shotaro Matsumura[2], Shota Nakano[2], Iori Ogasahara[2], Yasuhisa Sano[2], Kazuto Yamauchi[2], Kenji Tamasaku[1,3], Makina Yabashi[1,3] （1. RIKEN SPring-8 Center (Japan), 2. Osaka Univ. (Japan), 3. JASRI (Japan)）

2:00 PM - 2:15 PM

[CWP19A-03 (Invited)] Measurement and applications of high-intensity XFEL interactions with matter
[Presentation Style] Onsite

*Ichiro Inoue[1] （1. RIKEN (Japan)）

2:15 PM - 2:45 PM

[CWP19A-04] Frequency stabilized hard x ray lasers

*Hitoki Yoneda[1], Yurina Michine[1], Yuichi Inubushi[2], Makina Yabashi[3] （1. University of Electro-Communications (Japan), 2. JASRI (Japan), 3. RikenXFEL (Japan)）

2:45 PM - 3:00 PM

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

[CWP19A-01 (Invited)] Opportunities and challenges of a hard x-ray regenerative amplifier free-electron laser [Presentation Style] Online

Gabriel Marcus[1], *Rachel Margraf[1] (1. SLAC National Accelerator Laboratory (United States of America))

[Presentation Style] Online

We discuss opportunities and challenges of hard X-ray regenerative amplifier free-electron lasers and describe ongoing R&D efforts currently underway to realize their full potential at high repetition rate free-electron laser facilities.

2:00 PM - 2:15 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 201&202)

[CWP19A-02] Direct Measurement of Hard X-Ray Laser Pulse Duration via Intensity Autocorrelation Techniques [Presentation Style] Onsite

*Taito Osaka[1], Ichiro Inoue[1], Jumpei Yamada[1,2], Yuichi Inubushi[3,1], Kensuke Tono[3,1], Shotaro Matsumura[2], Shota Nakano[2], Iori Ogasahara[2], Yasuhisa Sano[2], Kazuto Yamauchi[2], Kenji Tamasaku[1,3], Makina Yabashi[1,3] (1. RIKEN SPring-8 Center (Japan), 2. Osaka Univ. (Japan), 3. JASRI (Japan))

[Presentation Style] Onsite

Intensity autocorrelation techniques with x-ray two-photon absorption and second-harmonic generation are demonstrated to directly characterize the pulse duration of hard x-ray free-electron laser pulses.

2:15 PM - 2:45 PM (Wed. Aug 3, 2022 1:30 PM - 3:00 PM Room 201&202)

[CWP19A-03 (Invited)] Measurement and applications of high-intensity XFEL interactions with matter [Presentation Style] Onsite

*Ichiro Inoue[1] (1. RIKEN (Japan))

[Presentation Style] Onsite

This talk reviews the recent experimental studies on intense x-ray interaction with matter at SACLA. In particular, measurement of the x-ray-induced transient structural changes and their applications to optical control of XFEL pulses will be discussed.

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

[CWP19A-04] Frequency stabilized hard x ray lasers

*Hitoki Yoneda[1], Yurina Michine[1], Yuichi Inubushi[2], Makina Yabashi[3] (1. University of Electro-Communications (Japan), 2. JASRI (Japan), 3. RikenXFEL (Japan))

By using Bragg condition inside x-ray laser medium, we have succeeded to achieve distribution feedback type laser in hard x ray region. We also use crystal lattice constant so that it is possible to demonstrate the first frequency stabilized hard x ray lasers.

X-ray Lasers and Their Applications II

Session Chair: Hitoki Yoneda (UEC)

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

[CWP19B-01 (Invited(P))] XFEL single-nanometer focusing system at SACLA

*Jumpei Yamada[1,2], Satoshi Matsuyama[3], Takato Inoue[2], Atsuki Ito[2], Ichiro Inoue[1], Taito Osaka[1], Yuichi Inubushi[4], Hirokatsu Yumoto[4,1], Takahisa Koyama[4,1], Haruhiko Ohashi[4,1], Kazuto Yamauchi[2], Makina Yabashi[1,4] （1. RIKEN SPring-8 Center (Japan), 2. Osaka University (Japan), 3. Nagoya University (Japan), 4. JASRI (Japan)）

3:30 PM - 4:00 PM

[CWP19B-02 (Invited)] Theoretical studies of X-ray induced damage in optical elements of beamlines at free-electron-laser facilities. [Presentation Style] Online

*Beata Ziaja-Motyka[1,2] （1. Center for Free-Electron Laser Science, DESY (Germany), 2. Institute of Nuclear Physics, PAS (Poland)）

4:00 PM - 4:30 PM

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

[CWP19B-01 (Invited(P))] XFEL single-nanometer focusing system at SACLA

*Jumpei Yamada[1,2], Satoshi Matsuyama[3], Takato Inoue[2], Atsuki Ito[2], Ichiro Inoue[1], Taito Osaka[1], Yuichi Inubushi[4], Hirokatsu Yumoto[4,1], Takahisa Koyama[4,1], Haruhiko Ohashi[4,1], Kazuto Yamauchi[2], Makina Yabashi[1,4] (1. RIKEN SPring-8 Center (Japan), 2. Osaka University (Japan), 3. Nagoya University (Japan), 4. JASRI (Japan))

A sub-10 nm focusing system for the XFEL has been developed using advanced Kirkpatrick-Baez mirrors based on Wolter-type III geometry.

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

[CWP19B-02 (Invited)] Theoretical studies of X-ray induced damage in optical elements of beamlines at free-electron-laser facilities.
[Presentation Style] Online

*Beata Ziaja-Motyka[1,2] (1. Center for Free-Electron Laser Science, DESY (Germany), 2. Institute of Nuclear Physics, PAS (Poland))

[Presentation Style] Online

Here we report on our theoretical studies of X-ray induced damage in a few materials relevant for optical elements of beamlines at X-ray free-electron-laser facilities. We present our computational tools and discuss their concrete applications.