Ultrafast Lasers and Frequency Combs

Session Chair: Norihiko Nishizawa (Nagoya Univ.)

Fri. Aug 5, 2022 9:15 AM - 10:30 AM Mid-sized Hall B (1F)

[CFA1I-01 (Invited)] Ultrafast Laser Systems for High Repetition Rate X-Ray Free Electron Laser Facilities

[Presentation Style] Onsite

*Ingmar Hartl[1] （1. DESY (Germany)）

9:15 AM - 9:45 AM

[CFA1I-02] A novel and highly stable 840 MHz repetition rate femtosecond fiber laser

[Presentation Style] Online

*Ruoao Yang[1], MingHe Zhao[1,2], Xingang Jin[3], Qian Li[2], Zhangyuan Chen[1], Aimin Wang[1], Zhigang Zhang[1] （1. State Key Laboratory of Advanced Optical Communication System and Networks, School of Electronics, Peking University (China), 2. School of Electronic and Computer Engineering, Peking University (China), 3. Jiaxing Xurui Electronics Tech Co Ltd (China)）

9:45 AM - 10:00 AM

[CFA1I-03] Low noise Tm-fiber laser comb via nonlinear amplifying loop mirror

[Presentation Style] Online

*Jincan Lin[1], Zimin Zha[1], Huanhuan Liu[2], Jiaqi Zhou[3,4], Hairun Guo[1] （1. Shanghai Univ. (China), 2. Southern Univ. of Sci. and Tech. (China), 3. Shanghai Institute of Optics and Fine Mechanics (China), 4. Univ. of the Chinese Academy of Sci. (China)）

10:00 AM - 10:15 AM

[CFA1I-04] Controllable Spectral Peak Generation with Ultrashort Pulses using LCOS-SLM Spectral Filter

[Presentation Style] Onsite

*Sakiko Kobata[1], Shotaro Kitajima[1], Norihiko Nishizawa[1] （1. Nagoya University (Japan)）

10:15 AM - 10:30 AM

9:15 AM - 9:45 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Mid-sized Hall B)

[CFA1I-01 (Invited)] Ultrafast Laser Systems for High Repetition Rate X-Ray Free Electron Laser Facilities

[Presentation Style] Onsite

*Ingmar Hartl[1] (1. DESY (Germany))

[Presentation Style] Onsite

The ultrafast laser systems required by modern high repetition X-ray free electron laser facilities for electron beam generation and manipulation, femtosecond timing distribution and pump-probe science experiments will be described

9:45 AM - 10:00 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Mid-sized Hall B)

[CFA1I-02] A novel and highly stable 840 MHz repetition rate femtosecond fiber laser

[Presentation Style] Online

*Ruoao Yang[1], MingHe Zhao[1,2], Xingang Jin[3], Qian Li[2], Zhangyuan Chen[1], Aimin Wang[1], Zhigang Zhang[1] (1. State Key Laboratory of Advanced Optical Communication System and Networks, School of Electronics, Peking University (China), 2. School of Electronic and Computer Engineering, Peking University (China), 3. Jiaxing Xurui Electronics Tech Co Ltd (China))

[Presentation Style] Online

We demonstrate a novel and highly stable femtosecond fiber laser at a repetition rate of 840 MHz. The timing jitter is 130 as for the integration range of 10 kHz to 1 MHz.

10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Mid-sized Hall B)

[CFA1I-03] Low noise Tm-fiber laser comb via nonlinear amplifying loop mirror

[Presentation Style] Online

*Jincan Lin[1], Zimin Zha[1], Huanhuan Liu[2], Jiaqi Zhou[3,4], Hairun Guo[1] (1. Shanghai Univ. (China), 2. Southern Univ. of Sci. and Tech. (China), 3. Shanghai Institute of Optics and Fine Mechanics (China), 4. Univ. of the Chinese Academy of Sci. (China))

[Presentation Style] Online

We have setup an all polarization maintaining mode-locked Tm-fiber laser with nonlinear amplifying loop mirror, which is intrinsically of low noise and is readily for optical frequency comb applications at the onset of mid-infrared.

10:15 AM - 10:30 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Mid-sized Hall B)

[CFA1I-04] Controllable Spectral Peak Generation with Ultrashort Pulses using LCOS-SLM Spectral Filter

[Presentation Style] Onsite

*Sakiko Kobata[1], Shotaro Kitajima[1], Norihiko Nishizawa[1] （1. Nagoya University (Japan)）

[Presentation Style] Onsite

Arbitrary controlled spectral peak generation was demonstrated using ultrashort pulse fiber laser and spectral filter with LCOS-SLM. The intense, sharp spectral peak with record high contrast up to 143 was successfully obtained.

Ultra-high Rep Lasers and Frequency Comb

Session Chairs: Jungwon Kim (KAIST), Norihiko Nishizawa (Nagoya Univ.)

Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall B (1F)

[CFA1J-01 (Invited)] Above 20-GHz repetition-rate, Kerr-lens mode-locked lasers
[Presentation Style] Onsite

*Yohei Kobayashi[1] （1. University of Tokyo (Japan)）

11:00 AM - 11:30 AM

[CFA1J-02] Multi-GHz Femtosecond Mode-locked Ytterbium-doped Double Tungstate Waveguide Laser
[Presentation Style] Onsite

*Ji Eun Bae[1], Xavier Mateos[2], Magdalena Aguiló[2], Francesc Díaz[2], Javier García Ajates[3], Carolina Romero[3], Javier Rodríguez Vázquez de Aldana[3], Fabian Rotermund[1] （1. Korea Advanced Inst. of Sci. and Tech. (Korea), 2. Univ. of Rovira i Virgili (Spain), 3. Univ. of Salamanca (Spain)）

11:30 AM - 11:45 AM

[CFA1J-03] A Standalone Soliton Microcomb Prototype
[Presentation Style] Online

*Chaoxiang Xi[1], Chenhua Hu[2], Yang Shen[1], Lefeng Zhou[1], Hui Wang[2], Guangqiang He[1] （1. State Key Lab. of Advanced Optical Communication Systems and Networks, School of Electronic Info. and Electrical Engineering, Shanghai Jiao Tong Univ. (China), 2. State Key Lab. of Advanced Optical Communication Systems and Networks, School of Physics and Astronomy, Shanghai Jiao Tong Univ. (China)）

11:45 AM - 12:00 PM

11:00 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall B)

[CFA1J-01 (Invited)] Above 20-GHz repetition-rate, Kerr-lens mode-locked lasers

[Presentation Style] Onsite

*Yohei Kobayashi[1] (1. University of Tokyo (Japan))

[Presentation Style] Onsite

We have developed very high repetition rate, Kerr-lens mode-locked oscillators by using Yb-doped ceramics as gain materials. We have demonstrated comb-tooth resolved spectroscopy and a resonant excitation of acoustic phonons in solids.

11:30 AM - 11:45 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall B)

[CFA1J-02] Multi-GHz Femtosecond Mode-locked Ytterbium-doped Double Tungstate Waveguide Laser

[Presentation Style] Onsite

*Ji Eun Bae[1], Xavier Mateos[2], Magdalena Aguiló[2], Francesc Díaz[2], Javier García Ajates[3], Carolina Romero[3], Javier Rodríguez Vázquez de Aldana[3], Fabian Rotermund[1] (1. Korea Advanced Inst. of Sci. and Tech. (Korea), 2. Univ. of Rovira i Virgili (Spain), 3. Univ. of Salamanca (Spain))

[Presentation Style] Onsite

Multi-GHz continuous-wave mode-locking of an Yb:KLuW channel waveguide laser is reported using single-walled carbon nanotubes. The 3.55-GHz fundamentally mode-locked laser efficiently emits stable 876-fs pulses in the extended cavity scheme.

11:45 AM - 12:00 PM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall B)

[CFA1J-03] A Standalone Soliton Microcomb Prototype

[Presentation Style] Online

*Chaoxiang Xi[1], Chenhua Hu[2], Yang Shen[1], Lefeng Zhou[1], Hui Wang[2], Guangqiang He[1] (1. State Key Lab. of Advanced Optical Communication Systems and Networks, School of Electronic Info. and Electrical Engineering, Shanghai Jiao Tong Univ. (China), 2. State Key Lab. of Advanced Optical Communication Systems and Networks, School of Physics and Astronomy, Shanghai Jiao Tong Univ. (China))

[Presentation Style] Online

We built a standalone prototype for generating soliton microcombs. Our prototype supports both manual and automatic soliton generation methods, laying a good foundation for the commercial application of microcombs while maintaining professionalism.

Precision Clock and Network

Session Chair: Masayuki Katsuragawa (Univ. of Electro-Communications)
Fri. Aug 5, 2022 9:00 AM - 10:30 AM Room 204 (2F)

[CFA6G-01 (Invited)] Comparing distant optical clocks to realize the redefinition of the second
[Presentation Style] Onsite
*Tetsuya Ido[1] (1. NICT (Japan))
9:00 AM - 9:30 AM

[CFA6G-02 (Invited(P))] Highly stable laser repeater system with frequency instability below 10^{-21}
[Presentation Style] Onsite
*Tomoya Akatsuka[1], Hiromitsu Imai[1], Kaoru Arai[1], Hiroki Sakuma[1], Atsushi Ishizawa[1], Takashi Goh[2], Toshikazu Hashimoto[3], Masao Takamoto[4], Hidetoshi Katori[4,5], Katsuya Oguri[1], Hideki Gotoh[1], Tetsuomi Sogawa[6] (1. NTT Basic Research Labs. (Japan), 2. NTT Device Innovation Center (Japan), 3. NTT Device Technology Labs. (Japan), 4. RIKEN (Japan), 5. The Univ. of Tokyo (Japan), 6. NTT Science and Core Technology Laboratory Group (Japan))
9:30 AM - 10:00 AM

[CFA6G-03] Optical-phase-conjugation-based phase noise cancellation for fiber delivery of optical frequency reference
[Presentation Style] Onsite
*Takeshi Umeki[1], Tomoya Akatsuka[2], Atsushi Ishizawa[2], Hiromitsu Imai[2], Takushi Kazama[1], Takahiro Kashiwazaki[1], Kei Watanabe[1], Katsuya Oguri[2], Ryoichi Kasahara[1] (1. NTT Device Technology Labs. (Japan), 2. NTT Basic Research Labs. (Japan))
10:00 AM - 10:15 AM

[CFA6G-04] Absolute Frequency Measurement of an Iodine-stabilized Laser at 556 nm for Laser Cooling of Yb
[Presentation Style] Onsite
*Yuto Tanabe[1], Yuma Sakamoto[1], Takuya Kohno[2], Daisuke Akamatsu[1], Feng-Lei Hong[1] (1. Yokohama National University (Japan), 2. National Institute of Technology, Gifu College (Japan))
10:15 AM - 10:30 AM

9:00 AM - 9:30 AM (Fri. Aug 5, 2022 9:00 AM - 10:30 AM Room 204)

[CFA6G-01 (Invited)] Comparing distant optical clocks to realize the redefinition of the second
[Presentation Style] Onsite

*Tetsuya Ido[1] (1. NICT (Japan))

[Presentation Style] Onsite

Various methods to compare physically separated optical frequencies will be discussed. Particularly, an intercontinental comparison (Japan – Italy) of optical clocks using very long baseline interferometry (VLBI) will be presented in detail.

9:30 AM - 10:00 AM (Fri. Aug 5, 2022 9:00 AM - 10:30 AM Room 204)

[CFA6G-02 (Invited(P))] Highly stable laser repeater system with frequency instability below 10^{-21}
[Presentation Style] Onsite

*Tomoya Akatsuka[1], Hiromitsu Imai[1], Kaoru Arai[1], Hiroki Sakuma[1], Atsushi Ishizawa[1], Takashi Goh[2], Toshikazu Hashimoto[3], Masao Takamoto[4], Hidetoshi Katori[4,5], Katsuya Oguri[1], Hideki Gotoh[1], Tetsuomi Sogawa[6] (1. NTT Basic Research Labs. (Japan), 2. NTT Device Innovation Center (Japan), 3. NTT Device Technology Labs. (Japan), 4. RIKEN (Japan), 5. The Univ. of Tokyo (Japan), 6. NTT Science and Core Technology Laboratory Group (Japan))

[Presentation Style] Onsite

We report an ultralow-noise laser repeater system based on a narrow-linewidth laser and a planar lightwave circuit chip. An out-of-loop measurement demonstrates a record frequency instability of 3×10^{-22} at 30,000 s averaging time.

10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:00 AM - 10:30 AM Room 204)

[CFA6G-03] Optical-phase-conjugation-based phase noise cancellation for fiber delivery of optical frequency reference
[Presentation Style] Onsite

*Takeshi Umeki[1], Tomoya Akatsuka[2], Atsushi Ishizawa[2], Hiromitsu Imai[2], Takushi Kazama[1], Takahiro Kashiwazaki[1], Kei Watanabe[1], Katsuya Oguri[2], Ryoichi Kasahara[1] (1. NTT Device Technology Labs. (Japan), 2. NTT Basic Research Labs. (Japan))

[Presentation Style] Onsite

We propose and experimentally demonstrate a novel method for fiber delivery of optical frequency references by all-optical cancellation of fiber-induced degradation on the outward trip during the return trip without any active feedback control.

10:15 AM - 10:30 AM (Fri. Aug 5, 2022 9:00 AM - 10:30 AM Room 204)

[CFA6G-04] Absolute Frequency Measurement of an Iodine-stabilized Laser at 556 nm for Laser Cooling of Yb

[Presentation Style] Onsite

*Yuto Tanabe[1], Yuma Sakamoto[1], Takuya Kohno[2], Daisuke Akamatsu[1], Feng-Lei Hong[1] (1. Yokohama National University (Japan), 2. National Institute of Technology, Gifu College (Japan))

[Presentation Style] Onsite

The precision spectroscopy of the iodine transitions at 556 nm will benefit research on Yb cold atoms as a frequency reference of 2nd-stage cooling laser. We perform Doppler-free spectroscopy of laser frequency stabilization using iodine.

Oral Session | CLEO-PR2022 | Highly Sensitive Quantum Sensing

Highly Sensitive Quantum Sensing

Session Chair: Akifumi Asahara (Univ. of Electro-Communications)

Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 204 (2F)

[CFA6H-01] Imaging of Magnitude and Phase of AC Magnetic Field Using Continuous-Wave Scheme with Diamond Sensor

[Presentation Style] Onsite

*Takumi Mikawa[1], Karl J. Hallbäck[1], Yuichiro Matsuzaki[2], Yuta Nakano[3], Norio Tokuda[3], Kento Sasaki[3], Kensuke Kobayashi[4], Junko Ishi-Hayase[4] (1. Keio Univ. (Japan), 2. National Inst. of Advanced Indus. Sci. and Tech. (Japan), 3. Kanazawa Univ. (Japan), 4. The Univ. of Tokyo (Japan))

11:00 AM - 11:15 AM

[CFA6H-02] Optically-Detected Continuous-Wave Temperature Sensing using RF-Dressed States of Electronic Spins in Diamond

[Presentation Style] Onsite

*Hibiki Tabuchi[1], Yuichiro Matsuzaki[2], Hideyuki Watanabe[2], Yuta Nakano[3], Norio Tokuda[3], Norikazu Mizuochi[4], Junko Ishi-Hayase[1] (1. Keio Univ. (Japan), 2. AIST (Japan), 3. Kanazawa Univ. (Japan), 4. Kyoto Univ. (Japan))

11:15 AM - 11:30 AM

[CFA6H-03] Investigation of Electronic Spin Triple-Resonance of Nitrogen-Vacancy Centers in Diamond for Sensing

[Presentation Style] Onsite

*Ryusei Okaniwa[1,2], Yuichiro Matsuzaki[3,4], Tatsuma Yamaguchi[1], Hideyuki Watanabe[5], Norikazu Mizuochi[6], Norio Tokuda[7,8], Yuta Nakano[7], Kensuke Kobayashi[9,10], Kento Sasaki[9], Junko Ishi-Hayase[1,2] (1. School of Fundamental Sci. and Tech., Keio Univ. (Japan), 2. Center for Spintronics Res. Network, Keio Univ. (Japan), 3. Res. Center for Emerging Computing Tech., National Inst. of Advanced Indus. Sci. and Tech. (AIST) (Japan), 4. NEC-AIST Quantum Tech., Cooperative Res. Lab. National Inst. of Advanced Indus. Sci. and Tech. (AIST) (Japan), 5. Device Tech. Res. Inst., National Inst. of Advanced Indust. Sci. and Tech. (AIST) (Japan), 6. Inst. for Chemical Res., Kyoto Univ. (Japan), 7. Graduate School of Natural Sci. and Tech., Kanazawa Univ. (Japan), 8. Nanomaterials Res. Inst., Kanazawa Univ. (Japan), 9. Depertment of Physics, The Univ. of Tokyo (Japan), 10. Inst. for Physics of Intelligence, The Univ. of Tokyo (Japan))

11:30 AM - 11:45 AM

[CFA6H-04] Fractal Superconducting Nanowire Single-Photon Detectors and Their Applications in Imaging

[Presentation Style] Online

*Yifan Feng[1], Yun Meng[1], Kai Zou[1], Nan Hu[1], Zifan Hao[1], Xingyu Cui[1], Xiangjun Yin[1], Jingyu Yang[1], Samuel Gyger[2], Stephan Steinhauer[2], Val Zwiller[2], Xiaolong Hu[1] (1. Tianjin Univ. (China), 2. Royal Institute of Technology (KTH) (Sweden))

11:45 AM - 12:00 PM

11:00 AM - 11:15 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 204)

[CFA6H-01] Imaging of Magnitude and Phase of AC Magnetic Field Using Continuous-Wave Scheme with Diamond Sensor

[Presentation Style] Onsite

*Takumi Mikawa[1], Karl J. Hallbäck[1], Yuichiro Matsuzaki[2], Yuta Nakano[3], Norio Tokuda[3], Kento Sasaki[3], Kensuke Kobayashi[4], Junko Ishi-Hayase[4] (1. Keio Univ. (Japan), 2. National Inst. of Advanced Indus. Sci. and Tech. (Japan), 3. Kanazawa Univ. (Japan), 4. The Univ. of Tokyo (Japan))

[Presentation Style] Onsite

We successfully measured the spatial-distribution of the magnitude and the phase of MHz-range AC magnetic field resonant to nitrogen-vacancy center by the continuous application of green laser and microwave

11:15 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 204)

[CFA6H-02] Optically-Detected Continuous-Wave Temperature Sensing using RF-Dressed States of Electronic Spins in Diamond

[Presentation Style] Onsite

*Hibiki Tabuchi[1], Yuichiro Matsuzaki[2], Hideyuki Watanabe[2], Yuta Nakano[3], Norio Tokuda[3], Norikazu Mizuochi[4], Junko Ishi-Hayase[1] (1. Keio Univ. (Japan), 2. AIST (Japan), 3. Kanazawa Univ. (Japan), 4. Kyoto Univ. (Japan))

[Presentation Style] Onsite

We propose and experimentally demonstrate highly-sensitive temperature sensing using continuous-wave optically-detected magnetic resonance of electronic spin state of nitrogen-vacancy centers in diamond dressed by a MHz-range radio-frequency fields.

11:30 AM - 11:45 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 204)

[CFA6H-03] Investigation of Electronic Spin Triple-Resonance of Nitrogen-Vacancy Centers in Diamond for Sensing

[Presentation Style] Onsite

*Ryusei Okaniwa[1,2], Yuichiro Matsuzaki[3,4], Tatsuma Yamaguchi[1], Hideyuki Watanabe[5], Norikazu Mizuochi[6], Norio Tokuda[7,8], Yuta Nakano[7], Kensuke Kobayashi[9,10], Kento Sasaki[9], Junko Ishi-Hayase[1,2] (1. School of Fundamental Sci. and Tech., Keio Univ. (Japan), 2. Center for Spintronics Res. Network, Keio Univ. (Japan), 3. Res. Center for Emerging Computing Tech., National Inst. of Advanced Indus. Sci. and Tech. (AIST) (Japan), 4. NEC-AIST Quantum Tech., Cooperative Res. Lab. National Inst. of Advanced Indus. Sci. and Tech. (AIST) (Japan), 5. Device Tech. Res. Inst., National Inst. of Advanced Indust. Sci. and Tech. (AIST) (Japan), 6. Inst. for Chemical Res., Kyoto Univ. (Japan), 7. Graduate School of Natural Sci. and Tech., Kanazawa Univ. (Japan), 8. Nanomaterials Res. Inst., Kanazawa Univ. (Japan), 9. Depertment of Physics, The Univ. of Tokyo (Japan), 10. Inst. for Physics of Intelligence, The Univ. of Tokyo (Japan))

[Presentation Style] Onsite

We investigate electronic spin triple-resonance of nitrogen-vacancy centers in diamond by measuring continuous-wave optically-detected magnetic resonance spectra under simultaneous applications of microwave and radio-frequency fields with different frequencies toward realizing frequency-tunable AC magnetic field sensor.

11:45 AM - 12:00 PM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 204)

[CFA6H-04] Fractal Superconducting Nanowire Single-Photon Detectors and Their Applications in Imaging

[Presentation Style] Online

*Yifan Feng[1], Yun Meng[1], Kai Zou[1], Nan Hu[1], Zifan Hao[1], Xingyu Cui[1], Xiangjun Yin[1], Jingyu Yang[1], Samuel Gyger[2], Stephan Steinhauer[2], Val Zwiller[2], Xiaolong Hu[1] （1. Tianjin Univ. (China), 2. Royal Institute of Technology (KTH) (Sweden)）

[Presentation Style] Online

We present our research on fractal superconducting nanowire single-photon detectors and their applications in light detection and ranging (LiDAR), full-Stokes polarimetric imaging, and non-line-of-sight imaging.

Oral Session | CLEO-PR2022 | Quantum Optics and Information Theory

Quantum Optics and Information Theory

Session Chair: Qiong-Yi He (Peking Univ.)

Fri. Aug 5, 2022 9:30 AM - 10:30 AM Mid-sized Hall A (1F)

[CFA7H-03] Reducing the resources needed to implement quantum error correction codes using quantum multiplexing

[Presentation Style] Onsite

*Shin Nishio[1,2], Nicolò Lo Piparo[2], Michael Hanks[3], William John Munro[4,2], Kae Nemoto[2,1] (1. SOKENDAI (The Graduate Univ. for Advanced Studies) (Japan), 2. National Inst. of Informatics (Japan), 3. QOLS, Blackett Lab., Imperial College London (UK), 4. NTT Basic Res. Labs. &NTT Res. Center for Theoretical Quantum Physics, NTT Corp. (Japan))

9:30 AM - 9:45 AM

[CFA7H-04] Optimal encoding of contextuality in polarization entangled photon states

[Presentation Style] Onsite

*Ming Ji[1], Kengo Matsuyama[1], Masataka Iinuma[1], Holger F. Hofmann[1] (1. Hiroshima University (Japan))

9:45 AM - 10:00 AM

[CFA7H-05] Resolution of quantum phase measurements using multi-photon states

[Presentation Style] Onsite

*Tomonori Matsushita[1], Holger F. Hofmann[1] (1. Hiroshima University (Japan))

10:00 AM - 10:15 AM

[CFA7H-06] Error-Disturbance relations in spin measurement using Faraday interaction

[Presentation Style] Onsite

*Bin Ho Le[1], Keiichi Edamatsu[1] (1. Tohoku University (Japan))

10:15 AM - 10:30 AM

9:30 AM - 9:45 AM (Fri. Aug 5, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CFA7H-03] Reducing the resources needed to implement quantum error correction codes using quantum multiplexing

[Presentation Style] Onsite

*Shin Nishio[1,2], Nicolò Lo Piparo[2], Michael Hanks[3], William John Munro[4,2], Kae Nemoto[2,1] (1. SOKENDAI (The Graduate Univ. for Advanced Studies) (Japan), 2. National Inst. of Informatics (Japan), 3. QOLS, Blackett Lab., Imperial College London (UK), 4. NTT Basic Res. Labs. &NTT Res. Center for Theoretical Quantum Physics, NTT Corp. (Japan))

[Presentation Style] Onsite

Quantum error correction is an indispensable tool for quantum technologies. However, its implementation requires significant physical resources. Here, we reduce the number of two-qubit gates required to implement an error correction code using quantum multiplexing.

9:45 AM - 10:00 AM (Fri. Aug 5, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CFA7H-04] Optimal encoding of contextuality in polarization entangled photon states

[Presentation Style] Onsite

*Ming Ji[1], Kengo Matsuyama[1], Masataka Iinuma[1], Holger F. Hofmann[1] (1. Hiroshima University (Japan))

[Presentation Style] Onsite

It is shown that the simultaneous validity of seemingly contradictory statements about the linear and circular polarizations of two photons is optimized by a careful adjustment of the balance between entanglement and local polarization.

10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CFA7H-05] Resolution of quantum phase measurements using multi-photon states

[Presentation Style] Onsite

*Tomonori Matsushita[1], Holger F. Hofmann[1] (1. Hiroshima University (Japan))

[Presentation Style] Onsite

We discuss the effects of multi-photon coherence on the probability of successfully distinguishing two different phase shifts in a single measurement of the photon number distribution in the output of an interferometer.

10:15 AM - 10:30 AM (Fri. Aug 5, 2022 9:30 AM - 10:30 AM Mid-sized Hall A)

[CFA7H-06] Error-Disturbance relations in spin measurement using Faraday interaction

[Presentation Style] Onsite

*Bin Ho Le[1], Keiichi Edamatsu[1] （1. Tohoku University (Japan)）

[Presentation Style] Onsite

We model the quantum measurement of spin systems under the Faraday inter- action with a polarized light meter and examine the error-disturbance relations comparing the Heisenberg-Arthurs-Kelly and the Branciard-Ozawa relations.

Quantum Frequency Conversion

Session Chair: Hiroki Takesue (NTT Corp.)

Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall A (1F)

[CFA7I-01] Optical frequency conversion using a resonator that is pre-resonated only to the desired converted frequency

[Presentation Style] Onsite

*Rikizo Ikuta[1], Masayo Yokota[1], Toshiki Kobayashi[1], Nobuyuki Imoto[1], Takashi Yamamoto[1] (1. Osaka Univ. (Japan))

11:00 AM - 11:15 AM

[CFA7I-02] Ultrafast Measuement of Femtosecond Time-bin Qubits Using Optimized Up-conversion Single Photon Detector

[Presentation Style] Online

*Yuta Kochi[1], Sunao Kurimura[2], Junko Ishi-Hayase[1] (1. Keio Univ. (Japan), 2. NIMS (Japan))

11:15 AM - 11:30 AM

[CFA7I-04] Polarization Multiplexing of an Ultrafast Single-Photon Detector by Optical Kerr Gating

[Presentation Style] Onsite

*Takahisa Kuwana[1], Masahiro Yabuno[2], Fumihiro China[2], Shigehito Miki[2], Hirotaka Terai[2], Peter J. Mosley[3], Rui-Bo Jin[4], Ryosuke Shimizu[1] (1. The University of Electro-Communications (Japan), 2. Advanced ICT Research Institute, National Institute of Information and Communications Technology (Japan), 3. Centre for Photonics and Photonic Materials, Department of Physics, University of Bath (UK), 4. Hubei Key Laboratory of Optical Information and Pattern Recognition, Wuhan Institute of Technology (China))

11:45 AM - 12:00 PM

11:00 AM - 11:15 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall A)

[CFA7I-01] Optical frequency conversion using a resonator that is pre-resonated only to the desired converted frequency [Presentation Style] Onsite

*Rikizo Ikuta[1], Masayo Yokota[1], Toshiki Kobayashi[1], Nobuyuki Imoto[1], Takashi Yamamoto[1] (1. Osaka Univ. (Japan))

[Presentation Style] Onsite

We have achieved optical frequency conversion based on secondary optical nonlinearity using a resonator that is pre-resonated only to the desired converted frequency. This new frequency converter has many advantages over traditional frequency converters.

11:15 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall A)

[CFA7I-02] Ultrafast Measuement of Femtosecond Time-bin Qubits Using Optimized Up-conversion Single Photon Detector [Presentation Style] Online

*Yuta Kochi[1], Sunao Kurimura[2], Junko Ishi-Hayase[1] (1. Keio Univ. (Japan), 2. NIMS (Japan))

[Presentation Style] Online

We developed and optimized the up-conversion single photon detector with the temporal resolution of 415 fs. Consequently, we successfully evaluated single-photon level pseudo time-bin qubits with their pulse interval of only 800 fs.

11:45 AM - 12:00 PM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Mid-sized Hall A)

[CFA7I-04] Polarization Multiplexing of an Ultrafast Single-Photon Detector by Optical Kerr Gating [Presentation Style] Onsite

*Takahisa Kuwana[1], Masahiro Yabuno[2], Fumihiro China[2], Shigehito Miki[2], Hirotaka Terai[2], Peter J. Mosley[3], Rui-Bo Jin[4], Ryosuke Shimizu[1] (1. The University of Electro-Communications (Japan), 2. Advanced ICT Research Institute, National Institute of Information and Communications Technology (Japan), 3. Centre for Photonics and Photonic Materials, Department of Physics, University of Bath (UK), 4. Hubei Key Laboratory of Optical Information and Pattern Recognition, Wuhan Institute of Technology (China))

[Presentation Style] Onsite

We develop an ultrafast single-photon detector with optical Kerr gating using a photonic crystal fiber. Adopting the polarization-multiplexing technique, we achieved the sub-picosecond resolution in the single-photon detection of each polarization mode.

Mestasurface, Radiation Control, and Quantum Dots

Session Chair: Pin Christophe Louis Marie (Hokkaido Univ.)

Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall (2F)

[CFA8G-01] Super Absorbing Germanium Metasurface with quasi-Bound States in the Continuum

[Presentation Style] Online

*Reza Masoudian Saadabad[1], Lujun Huang[1], Andrey E Miroshnichenko[1] (1. University of New South Wales (Australia))

9:15 AM - 9:30 AM

[CFA8G-02] Design of an All-dielectric Magneto-optical Metasurface with Giant Faraday Effect and High Light Transmission

[Presentation Style] Onsite

*Siyuan Gao[1,2], Yasutomo Ota[3], Tianji Liu[4], Satoshi Iwamoto[1,2] (1. RCAST, Univ. of Tokyo (Japan), 2. IIS, Univ. of Tokyo (Japan), 3. Keio Univ. (Japan), 4. GPL Photonics lab., SKLAO, CIOMP, Chinese Academy of Sci. (China))

9:30 AM - 9:45 AM

[CFA8G-03] The space cooling capability of *Janus* emitter with different enclosure temperature

[Presentation Style] Onsite

*Do Hyeon Kim[1], Gil Ju Lee[2], Se-Yeon Heo[1], Il-Suk Kang[3], Young Min Song[1] (1. School of Electrical Engineering and Computer Sci., Gwangju Inst. of Sci. and Tech. (Korea), 2. Department of Electronics Engineering, Pusan National Univ. (Korea), 3. National Nanofab center, Korea Advanced Inst. of Sci. and Tech. (Korea))

9:45 AM - 10:00 AM

[CFA8G-04] Size-Controllable Fabrication of Quantum Dot Micro-Beads Using a Custom Developed UV-Curable CdSe and InP QD Photoresist

[Presentation Style] Onsite

*Byeongseok Kim[1], Bumsoo Chon[1], Samir Kumar[1], Sanghoon Shin[1], Taewoo Ko[1], Sang Ook Kang[1], Ho-Jin Son[1], Sungkyu Seo[1] (1. Korea Univ. (Korea))

10:00 AM - 10:15 AM

[CFA8G-05] Colloidal Quantum Dot Nanopatterning with E-beam lithography on flexible PET

[Presentation Style] Onsite

*Taewoo Ko[1], Samir Kumar[1], Sanghoon Shin[1], Byeongseok Kim[1], Sungkyu Seo[1] (1. Korea Univ. (Korea))

10:15 AM - 10:30 AM

9:15 AM - 9:30 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall)

[CFA8G-01] Super Absorbing Germanium Metasurface with quasi-Bound States in the Continuum

[Presentation Style] Online

*Reza Masoudian Saadabad[1], Lujun Huang[1], Andrey E Miroshnichenko[1] (1. University of New South Wales (Australia))

[Presentation Style] Online

Germanium is the proper material for fiber-optic communication due to low-intrinsic dissipative losses at the telecommunication C-band. But specific applications need stronger absorption. We demonstrate super-absorbing germanium metasurfaces designed by quasi-bound states in the continuum.

9:30 AM - 9:45 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall)

[CFA8G-02] Design of an All-dielectric Magneto-optical Metasurface with Giant Faraday Effect and High Light Transmission

[Presentation Style] Onsite

*Siyuan Gao[1,2], Yasutomo Ota[3], Tianji Liu[4], Satoshi Iwamoto[1,2] (1. RCAST, Univ. of Tokyo (Japan), 2. IIS, Univ. of Tokyo (Japan), 3. Keio Univ. (Japan), 4. GPL Photonics lab., SKLAO, CIOMP, Chinese Academy of Sci. (China))

[Presentation Style] Onsite

We design an all-dielectric metasurface exhibiting giant enhancement of magneto-optical Faraday rotation and high light transmission. A 760-times larger Faraday rotation than that in the unprocessed host material of the same thickness was numerically observed.

9:45 AM - 10:00 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall)

[CFA8G-03] The space cooling capability of *Janus* emitter with different enclosure temperature

[Presentation Style] Onsite

*Do Hyeon Kim[1], Gil Ju Lee[2], Se-Yeon Heo[1], Il-Suk Kang[3], Young Min Song[1] (1. School of Electrical Engineering and Computer Sci., Gwangju Inst. of Sci. and Tech. (Korea), 2. Department of Electronics Engineering, Pusan National Univ. (Korea), 3. National Nanofab center, Korea Advanced Inst. of Sci. and Tech. (Korea))

[Presentation Style] Onsite

A *Janus* emitter (*J*ET) allows releasing heat from enclosures efficiently. However, space-cooling is not demanded at night or winter. This study analyzes space-cooling performance of *J*ET with different temperature gaps between outer and inner space.

10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall)

[CFA8G-04] Size-Controllable Fabrication of Quantum Dot Micro-Beads Using a Custom Developed UV-Curable CdSe and InP QD Photoresist

[Presentation Style] Onsite

*Byeongseok Kim[1], Bumsoo Chon[1], Samir Kumar[1], Sanghoon Shin[1], Taewoo Ko[1], Sang Ook Kang[1], Ho-Jin Son[1], Sungkyu Seo[1] (1. Korea Univ. (Korea))

[Presentation Style] Onsite

This study reports the size on-demand fabrication of Quantum Dot (QD) micro-beads using a microfluidic chip with a specially designed InP/ZnSeS/ZnS and CdSe/ZnS QD photoresist mixed with a UV-curable composition called Super Coater.

10:15 AM - 10:30 AM (Fri. Aug 5, 2022 9:15 AM - 10:30 AM Small Hall)

[CFA8G-05] Colloidal Quantum Dot Nanopatterning with E-beam lithography on flexible PET

[Presentation Style] Onsite

*Taewoo Ko[1], Samir Kumar[1], Sanghoon Shin[1], Byeongseok Kim[1], Sungkyu Seo[1] (1. Korea Univ. (Korea))

[Presentation Style] Onsite

Quantum Dot(QD) patterning of at least 100nm resolution is possible through electron beam lithography on various substrates of chromium, silicon, and flexible ITO substrates. The QD pattern fabricated with E-beam was durable in bending.

Topological Photonics II

Session Chair: Kenta Takata (NTT Basic Research Laboratories)

Fri. Aug 5, 2022 11:00 AM - 11:45 AM Small Hall (2F)

[CFA8H-01] Observation of topological edge states in long connected plasmonic zigzag chains

[Presentation Style] Online

*Yuto Moritake[1], Masaaki Ono[2,3], Masaya Notomi[1,2,3] （1. Tokyo Inst. of Tech. (Japan), 2. NTT Basic Res. Lab. (Japan), 3. NTT Nanophotonics Center (Japan)）

11:00 AM - 11:15 AM

[CFA8H-02] Investigation of circularly polarized standing-wave states using topological polarization singularities

[Presentation Style] Onsite

*Tomoki Honda[1,2], Taiki Yoda[2], Yuto Moritake[1], Masaaki Ono[2], Eiichi Kuramochi[2], Masaya Notomi[1,2,3] （1. Tokyo Inst. of Tech. (Japan), 2. NTT Basic Res. Labs. (Japan), 3. Nanophotonics Center (Japan)）

11:15 AM - 11:30 AM

[CFA8H-03] Microwave Hinge State in a Three-Dimensional Photonic Crystal Composed of Simple Cubic Lattices

[Presentation Style] Onsite

*Yuya Ashida[1], Kenichi Yamashita[1], Tetsuya Ueda[1], Katsunori Wakabayashi[2], Satoshi Iwamoto[3,4], Shun Takahashi[1] （1. Kyoto Inst. of Tech. (Japan), 2. School of Eng., Kwansei Gakuin Univ. (Japan), 3. Inst. of Indus. Sci., The Univ. of Tokyo (Japan), 4. Res. Center for Advanced Sci. and Tech., The Univ. of Tokyo (Japan)）

11:30 AM - 11:45 AM

11:00 AM - 11:15 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Small Hall)

[CFA8H-01] Observation of topological edge states in long connected plasmonic zigzag chains
[Presentation Style] Online

*Yuto Moritake[1], Masaaki Ono[2,3], Masaya Notomi[1,2,3] (1. Tokyo Inst. of Tech. (Japan), 2. NTT Basic Res. Lab. (Japan), 3. NTT Nanophotonics Center (Japan))

[Presentation Style] Online

We proposed and experimentally observed the photonic topological edge states of zigzag plasmonic chains using far-field imaging. By using long-connected chain, edge states were spatially and spectrally divided from the bulk, which enables far-filed observation.

11:15 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Small Hall)

[CFA8H-02] Investigation of circularly polarized standing-wave states using topological polarization singularities
[Presentation Style] Onsite

*Tomoki Honda[1,2], Taiki Yoda[2], Yuto Moritake[1], Masaaki Ono[2], Eiichi Kuramochi[2], Masaya Notomi[1,2,3] (1. Tokyo Inst. of Tech. (Japan), 2. NTT Basic Res. Labs. (Japan), 3. Nanophotonics Center (Japan))

[Presentation Style] Onsite

We have numerically and experimentally demonstrated the formation of standing wave modes with circularly polarized states at the edge of the photonic band gap using topological singular points with half-integer charges in photonic crystals.

11:30 AM - 11:45 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Small Hall)

[CFA8H-03] Microwave Hinge State in a Three-Dimensional Photonic Crystal Composed of Simple Cubic Lattices
[Presentation Style] Onsite

*Yuya Ashida[1], Kenichi Yamashita[1], Tetsuya Ueda[1], Katsunori Wakabayashi[2], Satoshi Iwamoto[3,4], Shun Takahashi[1] (1. Kyoto Inst. of Tech. (Japan), 2. School of Eng., Kwansei Gakuin Univ. (Japan), 3. Inst. of Indus. Sci., The Univ. of Tokyo (Japan), 4. Res. Center for Advanced Sci. and Tech., The Univ. of Tokyo (Japan))

[Presentation Style] Onsite

We demonstrated a higher-order topological state in a three-dimensional photonic crystal for microwave. Shifting a part of the structure by a half period in two orthogonal directions provided different Zak phases, forming a hinge state.

Advanced Designs of Silicon Photonics Devices

Session Chairs: Wei Shi (Université Laval), Kazuhiro Ikeda(AIST)

Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108 (1F)

[CFA12E-01] Metasurface Doublet-Integrated Bidirectional Grating Antenna Using Dual Polarization For Efficient Wavelength-Controlled Beam Steering

[Presentation Style] Onsite

*Woo-Bin Lee[1], Bishal Bhandari[1], Duk-Yong Choi[2], Sang-Shin Lee[1] (1. Kwangwoon University (Korea), 2. Australian National University (Australia))

9:00 AM - 9:15 AM

[CFA12E-02] Vortex beam generation by engineering spin-orbit interaction of light in the multimode microring resonator

[Presentation Style] Online

*shu wen yang[1,2,3,4], shuang Zheng[1,2,3,4], wei feng Zhang[1,2,3,4] (1. Radar Research Lab, School of Information and Electronics, Beijing Institute of TechnologyBeijing Institute of Technology Univ (China), 2. Key Laboratory of Electronic and Information Technology in Satellite Navigation (Beijing Institute of Technology), Ministry of Education (China), 3. Beijing Institute of Technology Chongqing Innovation Center (China), 4. Chongqing Key Laboratory of Novel Civilian Radar (China))

9:15 AM - 9:30 AM

[CFA12E-03] Phase-Combining Unit for Aliasing Suppression in Optical Phased Array

[Presentation Style] Online

*Dachuan Wu[1], Yasha Yi[1], Bowen Yu[1] (1. University of Michigan (United States of America))

9:30 AM - 9:45 AM

[CFA12E-04] Low-loss adiabatic silicon chip-to-fibre couplers in the mid-infrared and applications to nonlinear optics

[Presentation Style] Onsite

*Dominic Ashley Sulway[1,2], Yuya Yonezu[4], Lawrence Mark Rosenfeld[2,1], Pisu Jiang[2], John G Rarity[2], Takao Aoki[3], Joshua W Silverstone[2] (1. University of Bristol CDT (UK), 2. University of Bristol QETLabs (UK), 3. Waseda University (Japan), 4. NTT Japan Basic Research Laboritories (Japan))

9:45 AM - 10:00 AM

[CFA12E-05] Deep Transfer Learning for Nanophotonic Device Design

[Presentation Style] Onsite

*Keisuke Kojima[1], Minwoo Jung[2], Toshiaki Koike-Akino[1], Ye Wang[1], Matthew Brand[1], Kieran Parsons[1] (1. Mitsubishi Electric Research Labs. (MERL) (United States of America), 2. Cornel Univ. (United States of America))

10:00 AM - 10:15 AM

9:00 AM - 9:15 AM (Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108)

[CFA12E-01] Metasurface Doublet-Integrated Bidirectional Grating Antenna Using Dual Polarization For Efficient Wavelength-Controlled Beam Steering
[Presentation Style] Onsite

*Woo-Bin Lee[1], Bishal Bhandari[1], Duk-Yong Choi[2], Sang-Shin Lee[1] (1. Kwangwoon University (Korea), 2. Australian National University (Australia))

[Presentation Style] Onsite

We demonstrate a metasurface doublet-integrated bidirectional grating antenna to mitigate the limitation of the beam steering range of the optical phased array. We show that a wavelength-controlled beam steering efficiency is improved by 0.888 deg/nm.

9:15 AM - 9:30 AM (Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108)

[CFA12E-02] Vortex beam generation by engineering spin-orbit interaction of light in the multimode microring resonator
[Presentation Style] Online

*shu wen yang[1,2,3,4], shuang Zheng[1,2,3,4], wei feng Zhang[1,2,3,4] (1. Radar Research Lab, School of Information and Electronics, Beijing Institute of TechnologyBeijing Institute of Technology Univ (China), 2. Key Laboratory of Electronic and Information Technology in Satellite Navigation (Beijing Institute of Technology), Ministry of Education (China), 3. Beijing Institute of Technology Chongqing Innovation Center (China), 4. Chongqing Key Laboratory of Novel Civilian Radar (China))

[Presentation Style] Online

We propose a vortex beam generator that can emit radially, azimuthally, circularly polarized beams by engineering transverse spin angular momentum induced spin-orbit interaction of the high-order mode in the multimode microring resonator.

9:30 AM - 9:45 AM (Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108)

[CFA12E-03] Phase-Combining Unit for Aliasing Suppression in Optical Phased Array
[Presentation Style] Online

*Dachuan Wu[1], Yasha Yi[1], Bowen Yu[1] (1. University of Michigan (United States of America))

[Presentation Style] Online

We proposed a phase-combining unit to suppress the aliasing effect in OPA devices. It can control 2N-1 emitters with N phase shifters. Theoretical analysis, numerical simulation, and experimental results have been completed and presented.

9:45 AM - 10:00 AM (Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108)

[CFA12E-04] Low-loss adiabatic silicon chip-to-fibre couplers in the mid-infrared and applications to nonlinear optics

[Presentation Style] Onsite

*Dominic Ashley Sulway[1,2], Yuya Yonezu[4], Lawrence Mark Rosenfeld[2,1], Pisu Jiang[2], John G Rarity[2], Takao Aoki[3], Joshua W Silverstone[2] (1. University of Bristol CDT (UK), 2. University of Bristol QETLabs (UK), 3. Waseda University (Japan), 4. NTT Japan Basic Research Laboritories (Japan))

[Presentation Style] Onsite

Utilising novel, low-loss couplers (−0.58 dB), we characterise a potential TE0 pair-photon source via stimulated four-wave mixing in a phase-matched, air-clad 220 nm silicon waveguide. This is the lowest insertion-loss nonlinear behaviour characterised at 2 μm wavelengths

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10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:00 AM - 10:15 AM Room 107&108)

[CFA12E-05] Deep Transfer Learning for Nanophotonic Device Design

[Presentation Style] Onsite

*Keisuke Kojima[1], Minwoo Jung[2], Toshiaki Koike-Akino[1], Ye Wang[1], Matthew Brand[1], Kieran Parsons[1] (1. Mitsubishi Electric Research Labs. (MERL) (United States of America), 2. Cornel Univ. (United States of America))

[Presentation Style] Onsite

Applying a transfer-learning technique for generative deep neural networks, we demonstrate a very time-efficient inverse design framework for photonic integrated circuit devices, when there are new demands for structural/material parameters from an existing device library.

Novel Functional Silicon Photonics Devices

Session Chairs: Di Liang (Alibaba Group), Kazuhiro Ikeda (AIST)
Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 107&108 (1F)

[CFA12F-01 (Invited(P))] Programmable Waveguides on 2D Coupled Silicon Ring Resonator Array
[Presentation Style] Onsite
*Ryotaro Konoike[1], Kazuhiro Ikeda[1] (1. AIST (Japan))
11:00 AM - 11:30 AM

[CFA12F-02] Increasing the Q-Factor-Product and Efficiency of Raman Silicon Nanocavity Lasers Fabricated by Photolithography
[Presentation Style] Onsite
*Yuji Ota[1], Makoto Okano[2], Yasushi Takahashi[1] (1. Osaka Prefecure Univ. (Japan), 2. National Inst. of Indus. Sci. and Tech. (Japan))
11:30 AM - 11:45 AM

[CFA12F-03] Multi-Wavelength Operation of Non-Isometric Electro-Optic Digital-to-Analog Converters
[Presentation Style] Onsite
*Kohei Ikeda[1,2], Shota Kita[1,2], Guanwei Cong[3], Kengo Nozaki[1,2], Yuriko Maegami[3], Morifumi Ohno[3], Noritsugu Yamamoto[3], Koji Yamada[3], Akihiko Shinya[1,2], Masaya Notomi[1,2] (1. NTT Nanophotonics Center, Nippon Telegraph and Telephone Corp. (Japan), 2. NTT Basic Research Labs., Nippon Telegraph and Telephone Corp. (Japan), 3. National Institute of Advanced Industrial Science and Technology (AIST) (Japan))
11:45 AM - 12:00 PM

11:00 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 107&108)

[CFA12F-01 (Invited(P))] Programmable Waveguides on 2D Coupled Silicon Ring Resonator Array [Presentation Style] Onsite

*Ryotaro Konoike[1], Kazuhiro Ikeda[1] (1. AIST (Japan))

[Presentation Style] Onsite

We propose and demonstrate dynamic formation of programmable waveguides on 2D coupled silicon ring resonator array with the size of 5×5. We successfully formed straight and bend waveguides with identical transmission spectra.

11:30 AM - 11:45 AM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 107&108)

[CFA12F-02] Increasing the Q-Factor-Product and Efficiency of Raman Silicon Nanocavity Lasers Fabricated by Photolithography [Presentation Style] Onsite

*Yuji Ota[1], Makoto Okano[2], Yasushi Takahashi[1] (1. Osaka Prefecure Univ. (Japan), 2. National Inst. of Indus. Sci. and Tech. (Japan))

[Presentation Style] Onsite

By optimizing a thermal treatment, the quality-factor-product and energy efficiency of a Raman silicon nanocavity laser fabricated by CMOS-compatible processes are improved by factors of 2.4 and 15, respectively, compared to the previously reported values.

11:45 AM - 12:00 PM (Fri. Aug 5, 2022 11:00 AM - 12:00 PM Room 107&108)

[CFA12F-03] Multi-Wavelength Operation of Non-Isometric Electro-Optic Digital-to-Analog Converters [Presentation Style] Onsite

*Kohei Ikeda[1,2], Shota Kita[1,2], Guanwei Cong[3], Kengo Nozaki[1,2], Yuriko Maegami[3], Morifumi Ohno[3], Noritsugu Yamamoto[3], Koji Yamada[3], Akihiko Shinya[1,2], Masaya Notomi[1,2] (1. NTT Nanophotonics Center, Nippon Telegraph and Telephone Corp. (Japan), 2. NTT Basic Research Labs., Nippon Telegraph and Telephone Corp. (Japan), 3. National Institute of Advanced Industrial Science and Technology (AIST) (Japan))

[Presentation Style] Onsite

We demonstrate a circuits-topology-based electro-optic digital-to-analog converter with a non-isometric reference for broader multi-wavelength operation. By tuning the input wavelengths properly, we could obtain more similar waveforms for different wavelengths than the isometric one.

Oral Session | CLEO-PR2022 | Interferometric Sensing

Interferometric Sensing

Session Chairs: Hideaki Haneishi (Chiba Univ.), Young L. Kim (Purdue Univ.)

Fri. Aug 5, 2022 9:15 AM - 10:15 AM Room 104&105 (1F)

[CFA17G-02] An instance hole measurement using a low-coherence interferometer with a high repetition rate during laser-welding process

[Presentation Style] Onsite

*Neisei HAYASHI[1], Takuma FUJITA[2], Takahiro DEGUCHI[2], Ryo NOMURA[2], Hiroshi HASEGAWA[2], Takeshi MAKINO[3], Takahiro HASHIMOTO[3], Hideaki FURUKAWA[3], Naoya WADA[3], Katsuhiro ISHII[1] （1. GPI (Japan), 2. Nadex Products Co., Ltd. Laser R&D Center (Japan), 3. NICT (Japan)）

9:15 AM - 9:30 AM

[CFA17G-03] Accuracy Improvement for Polarization Grating Based Circular Dichroism Measurements

[Presentation Style] Onsite

*Yi Chen[1], Yu-Cheng Liang[2], Chun-Ta Wang[2], Shie-Chang Jeng[3], Chao-Kuei Lee[2] （1. College of Photonics, National Yang Ming Chiao Tung Univ. (Taiwan), 2. Department of Photonics, National Sun Yet-Sen Univ. (Taiwan), 3. Institute of Imaging and Biomedical Photonics, National Yang Ming Chiao Tung Univ. (Taiwan)）

9:30 AM - 9:45 AM

[CFA17G-04] Out-of-the-laboratory transfer of an optical sensor: inspection of dielectric thin films on industrial rough aluminum

[Presentation Style] Online

*Yannic Toschke[1], Bjoern Bourdon[1], Mirco Imlau[1] （1. Osnabrueck University (Germany)）

9:45 AM - 10:00 AM

[CFA17G-05] Elongated fiber abrupt-tapered interferometers for High sensitivity strain sensors

[Presentation Style] Online

Haimiao Zhou[1], Ya-Pei Peng[2,3], Lina Suo[1], Cheng-Kai Yao[4], Xinhe Lu[3], *Nan-Kuang Chen[1] （1. Liaocheng Univ. (China), 2. Shenzhen Tech. Univ. (China), 3. NK Photonics Ltd. (China), 4. National Taipei Univ. of Tech. (China)）

10:00 AM - 10:15 AM

9:15 AM - 9:30 AM (Fri. Aug 5, 2022 9:15 AM - 10:15 AM Room 104&105)

[CFA17G-02] An instance hole measurement using a low-coherence interferometer with a high repetition rate during laser-welding process
[Presentation Style] Onsite

*Neisei HAYASHI[1], Takuma FUJITA[2], Takahiro DEGUCHI[2], Ryo NOMURA[2], Hiroshi HASEGAWA[2], Takeshi MAKINO[3], Takahiro HASHIMOTO[3], Hideaki FURUKAWA[3], Naoya WADA[3], Katsuhiro ISHII[1] (1. GPI (Japan), 2. Nadex Products Co., Ltd. Laser R&D Center (Japan), 3. NICT (Japan))

[Presentation Style] Onsite

The shape of an instance hole (keyhole) created via a high-power laser was measured using a low-coherence interferometer with a 10-MHz repetition rate, a 10-um absolute spatial resolution and a 5-mm measurement range.

9:30 AM - 9:45 AM (Fri. Aug 5, 2022 9:15 AM - 10:15 AM Room 104&105)

[CFA17G-03] Accuracy Improvement for Polarization Grating Based Circular Dichroism Measurements
[Presentation Style] Onsite

*Yi Chen[1], Yu-Cheng Liang[2], Chun-Ta Wang[2], Shie-Chang Jeng[3], Chao-Kuei Lee[2] (1. College of Photonics, National Yang Ming Chiao Tung Univ. (Taiwan), 2. Department of Photonics, National Sun Yet-Sen Univ. (Taiwan), 3. Institute of Imaging and Biomedical Photonics, National Yang Ming Chiao Tung Univ. (Taiwan))

[Presentation Style] Onsite

In this work, by using a liquid crystal polarization grating, the error is effectively decreased from 34.4% to 0.1% for improving the accuracy in the circular dichroism measurement system. Meanwhile, the role of the residue is presented and discussed.

9:45 AM - 10:00 AM (Fri. Aug 5, 2022 9:15 AM - 10:15 AM Room 104&105)

[CFA17G-04] Out-of-the-laboratory transfer of an optical sensor: inspection of dielectric thin films on industrial rough aluminum
[Presentation Style] Online

*Yannic Toschke[1], Bjoern Bourdon[1], Mirco Imlau[1] (1. Osnabrueck University (Germany))

[Presentation Style] Online

We demonstrate a novel interference based optical sensor for the inspection of trivalent chromium conversion coatings on cold-rolled aluminum. The focus is placed on an out-of-the-laboratory, open-source prototype employing the emerging field of 3D-printing.

10:00 AM - 10:15 AM (Fri. Aug 5, 2022 9:15 AM - 10:15 AM Room 104&105)

[CFA17G-05] Elongated fiber abrupt-tapered interferometers for High sensitivity strain sensors

[Presentation Style] Online

Haimiao Zhou[1], Ya-Pei Peng[2,3], Lina Suo[1], Cheng-Kai Yao[4], Xinhe Lu[3], *Nan-Kuang Chen[1] （1. Liaocheng Univ. (China), 2. Shenzhen Tech. Univ. (China), 3. NK Photonics Ltd. (China), 4. National Taipei Univ. of Tech. (China)）

[Presentation Style] Online

We demonstrate high sensitivity fiber strain sensors based on an elongated abrupt taper. The measured best strain sensitivity was 118.77 pm/ με and the coefficient of determination R^2 of linear fitting exhibits high linearity.

Spectroscopy Sensors and Systems

Session Chairs: Hideaki Haneishi (Chiba Univ.), Norimichi Tsumura (Chiba Univ.)

Fri. Aug 5, 2022 11:00 AM - 11:45 AM Room 104&105 (1F)

[CFA17H-01] Differential Measurement of NH_3 and CO_2 in Gas Mixture with Photoacoustic Spectroscopy Technique using Supercontinuum Laser

[Presentation Style] Onsite

*Mohammad Zaid[1], Saran Kumar[1], Esther Blesso Vidhya[1], Tiju Thomas[1], Nilesh J. Vasa[1] (1. Indian Institute of Technology Madras (India))

11:00 AM - 11:15 AM

[CFA17H-02] Analysis of spectral coverage and resolution performance in spectral focusing CARS spectroscopy

[Presentation Style] Online

*Laura Monroy[1], Josh Magnus[2], Miguel González-Herráez[1], Fernando Bernabé Naranjo[1], Khanh Kieu[2] (1. Univ. of Alcala (Spain), 2. Univ. of Arizona (United States of America))

11:15 AM - 11:30 AM

[CFA17H-03] Broadband Photoacoustic Spectroscopy Technique in 2 μ m Wavelength Range for Sensing of Moisture and Carbon dioxide

[Presentation Style] Onsite

*Saran Kumar Krishnamoorthy[1], Ester Blesso Vidhya[1], Ramya Selvaraj[2], Satyanarayanan S[1], Nilesh J [1] (1. IIT Madras (India), 2. NIT Raipur (India))

11:30 AM - 11:45 AM

11:00 AM - 11:15 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Room 104&105)

[CFA17H-01] Differential Measurement of NH_3 and CO_2 in Gas Mixture with Photoacoustic Spectroscopy Technique using Supercontinuum Laser

[Presentation Style] Onsite

*Mohammad Zaid[1], Saran Kumar[1], Esther Blesso Vidhya[1], Tiju Thomas[1], Nilesh J. Vasa[1] (1. Indian Institute of Technology Madras (India))

[Presentation Style] Onsite

Detection of NH_3 and CO_2 using photoacoustic spectroscopy is developed. For 1525 nm filter, cell resonance is observed at 830 Hz with intensity of 1.85 mV/A, Q-factor of 9.22 and NH_3 LDL of 7 ppb.

11:15 AM - 11:30 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Room 104&105)

[CFA17H-02] Analysis of spectral coverage and resolution performance in spectral focusing CARS spectroscopy

[Presentation Style] Online

*Laura Monroy[1], Josh Magnus[2], Miguel González-Herráez[1], Fernando Bernabé Naranjo[1], Khanh Kieu[2] (1. Univ. of Alcala (Spain), 2. Univ. of Arizona (United States of America))

[Presentation Style] Online

An open-code simulation tool for spectral focusing Coherent Anti-Stokes Raman Scattering (SF-CARS) spectroscopy has been developed for the analysis of spectral coverage and resolution performance. The main limitation has been found due to high-order dispersion
and nonlinearities in laser source.

11:30 AM - 11:45 AM (Fri. Aug 5, 2022 11:00 AM - 11:45 AM Room 104&105)

[CFA17H-03] Broadband Photoacoustic Spectroscopy Technique in 2 μm Wavelength Range for Sensing of Moisture and Carbon dioxide

[Presentation Style] Onsite

*Saran Kumar Krishnamoorthy[1], Ester Blesso Vidhya[1], Ramya Selvaraj[2], Satyanarayanan S[1], Nilesh J [1] (1. IIT Madras (India), 2. NIT Raipur (India))

[Presentation Style] Onsite

Dual-wavelength, broadband photoacoustic technique is demonstrated for measurement of multiple gas species using a supercontinuum laser source. H_2O vapor and CO_2 measurements are demonstrated near 1920 and 2000 nm.

Ultrafast and Highly Nonlinear Metrology

Session Chair: Kazumichi Yoshii (Tokushima Univ.)

Fri. Aug 5, 2022 1:45 PM - 3:00 PM Room 204 (2F)

[CFP6I-01 (Invited)] Precision time-domain spectroscopy of infrared waves
[Presentation Style] Online

Philip Jacob[1,2], Alexander Weigel[1,3], Wolfgang Schweinberger[1,2,3], Theresa Buberl[1,2], Maximilian Högner[1], Patrik Karandušovský[3], Christina Hofer[1,2,3], Michael Trubetskov[1], Marinus Huber[1], Ferenc Krausz[1,2,3], *Ioachim Pupeza[1,2] （1. Max Planck Institute of Quantum Optics (Germany), 2. Ludwig-Maximilian-Universität München (Germany), 3. Center for Molecular Fingerprinting (Hungary)）

1:45 PM - 2:15 PM

[CFP6I-02] Engineering of nonlinear optical processes by arbitrarily manipulating the relevant optical phases
[Presentation Style] Onsite

*Weiyong Liu[1], Chiaki Ohae[1,2], Souma Tahara[1], Jian Zheng[1], Masaru Suzuki[1,2], Kaoru Minoshima[1,2], Masayuki Katsuragawa[1,2] （1. Graduate School of Informatics and Engineering, University of Electro-Communications (Japan), 2. Institute for Advanced Science, University of Electro-Communications (Japan)）

2:15 PM - 2:30 PM

[CFP6I-03] Common Path Frequency Domain Optical Correlation System for Ultrafast Optical Waveform Analysis
[Presentation Style] Onsite

*Kaito Fukushi[1], Tatsutoshi Shioda[1] （1. Saitama Univ. (Japan)）

2:30 PM - 2:45 PM

[CFP6I-04] "150 GHz Single Shot Ultrafast Imaging Spectroscopy based on Femtosecond Laser
[Presentation Style] Online

*Dae Hee Kim[1], Ji-Won Hahm[1], In-Jae Lee[1], Geon-Ho Lee[1], Seung-Woo Kim[1], Young-Jin Kim[1] （1. KAIST, Daejeon, Korea (Korea)）

2:45 PM - 3:00 PM

1:45 PM - 2:15 PM (Fri. Aug 5, 2022 1:45 PM - 3:00 PM Room 204)

[CFP6I-01 (Invited)] Precision time-domain spectroscopy of infrared waves

[Presentation Style] Online

Philip Jacob[1,2], Alexander Weigel[1,3], Wolfgang Schweinberger[1,2,3], Theresa Buberl[1,2], Maximilian Högner[1], Patrik Karandušovský[3], Christina Hofer[1,2,3], Michael Trubetskov[1], Marinus Huber[1], Ferenc Krausz[1,2,3], *Ioachim Pupeza[1,2] (1. Max Planck Institute of Quantum Optics (Germany), 2. Ludwig-Maximilian-Universität München (Germany), 3. Center for Molecular Fingerprinting (Hungary))

[Presentation Style] Online

We demonstrate rapid electro-optic sampling of broadband mid-infrared waveforms using a dual-oscillator setup employing a narrowband, waveform-stable calibration signal obtained by intra-pulse difference frequency mixing. Sub-attosecond waveform jitter is obtained for 1-s integration time.

2:15 PM - 2:30 PM (Fri. Aug 5, 2022 1:45 PM - 3:00 PM Room 204)

[CFP6I-02] Engineering of nonlinear optical processes by arbitrarily manipulating the relevant optical phases

[Presentation Style] Onsite

*Weiyong Liu[1], Chiaki Ohae[1,2], Souma Tahara[1], Jian Zheng[1], Masaru Suzuki[1,2], Kaoru Minoshima[1,2], Masayuki Katsuragawa[1,2] (1. Graduate School of Informatics and Engineering, University of Electro-Communications (Japan), 2. Institute for Advanced Science, University of Electro-Communications (Japan))

[Presentation Style] Onsite

We report a typical experimental demonstration of how widely nonlinear optical processes can be engineered by arbitrarily manipulating the relevant optical fields, including the phase of nonlinear polarization as a function of interaction length.

2:30 PM - 2:45 PM (Fri. Aug 5, 2022 1:45 PM - 3:00 PM Room 204)

[CFP6I-03] Common Path Frequency Domain Optical Correlation System for Ultrafast Optical Waveform Analysis

[Presentation Style] Onsite

*Kaito Fukushi[1], Tatsutoshi Shioda[1] (1. Saitama Univ. (Japan))

[Presentation Style] Onsite

We propose a principle for single-shot ultrafast optical waveform measurement using frequency domain optical correlation, which can observe irreversible signals with femto-second sampling and nano-second time range. The principle was confirmed in simulation and experiment.

2:45 PM - 3:00 PM (Fri. Aug 5, 2022 1:45 PM - 3:00 PM Room 204)

[CFP6I-04] "150 GHz Single Shot Ultrafast Imaging Spectroscopy based on Femtosecond Laser [Presentation Style] Online

*Dae Hee Kim[1], Ji-Won Hahm[1], In-Jae Lee[1], Geon-Ho Lee[1], Seung-Woo Kim[1], Young-Jin Kim[1] （1. KAIST, Daejeon, Korea (Korea)）

[Presentation Style] Online

In this investigation, we propose a single-shot ultrafast imaging spectroscopy over 150 GHz based on femtosecond laser. Furthermore, we introduce an application of a phase spectroscopy for ultra-high resolution by utilizing nano-structure with proposed system.

Applied Metrology and Sensing

Session Chair: Tatsutoshi Shioda (Saitama Univ.)

Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204 (2F)

[CFP6J-01] Tomography of light in space, time, spectrum, and polarization

[Presentation Style] Online

*Martin Ploschner[1], Marcos Maestre Morote[1], Daniel Dahl[1], Mickael Mounaix[1], Greta Light[2], Aleksandar Rakic[1], Joel Carpenter[1] (1. The University of Queensland (Australia), 2. II-VI Incorporated (United States of America))

3:30 PM - 3:45 PM

[CFP6J-02] Phase-Modulated Optical Interferometer with Time-Domain Analysis and its Application to Dynamic Displacement Measurement of Soft Tissue

[Presentation Style] Online

*Yuki Noda[1], Sora Matsumoto[1], Mikiya Fujimori[1], Yosuke Tanaka[1] (1. Tokyo University of Agriculture and Technology (Japan))

3:45 PM - 4:00 PM

[CFP6J-03] Development of Multi-Foci Raman Spectrophotometer for High-Throughput Biochemical Screening

[Presentation Style] Onsite

*Hao-Xiang Liao[1], Kazuki Bando[1], Menglu Li[1,2], Katsumasa Fujita[1,2,3] (1. Department of Applied physics Graduate School of Engineering, Osaka University (Japan), 2. Advanced Photonics and Biosensing Open Innovation Laboratory, AIST-Osaka University (Japan), 3. Transdimensional Life Imaging Division, Institute for Open and Transdisciplinary Research Initiatives, Osaka University (Japan))

4:00 PM - 4:15 PM

[CFP6J-04] Scatterometry using deep learning for analysis of oil including phosphor

[Presentation Style] Onsite

*Tetsuya Hoshino[1], Shintaro Narioka[1], Sadao Aoki[1], Masahide Itoh[1], Masami Kobayashi[2] (1. Inst. of Applied Physics., University of Tsukuba (Japan), 2. Inst. of Materials Science., University of Tsukuba (Japan))

4:15 PM - 4:30 PM

[CFP6J-05] ULTRA-STABLE, CONTINUOUS-WAVE UV LIGHT SOURCE FOR PRECISION THERMOMETRY

[Presentation Style] Onsite

*sara pourjamal[1], Thomas Lindvall[1], thomas fordell[1] (1. National Metrology Institute VTT MIKES (Finland))

4:30 PM - 4:45 PM

3:30 PM - 3:45 PM (Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204)

[CFP6J-01] Tomography of light in space, time, spectrum, and polarization
[Presentation Style] Online

*Martin Ploschner[1], Marcos Maestre Morote[1], Daniel Dahl[1], Mickael Mounaix[1], Greta Light[2], Aleksandar Rakic[1], Joel Carpenter[1] (1. The University of Queensland (Australia), 2. II-VI Incorporated (United States of America))

[Presentation Style] Online

We present a technique for complete characterization of light in space, time, spectrum, and polarization using a spatial light modulator to display projective holograms and a single-mode fiber to route the projected light to photodiode/spectrometer.

3:45 PM - 4:00 PM (Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204)

[CFP6J-02] Phase-Modulated Optical Interferometer with Time-Domain Analysis and its Application to Dynamic Displacement Measurement of Soft Tissue
[Presentation Style] Online

*Yuki Noda[1], Sora Matsumoto[1], Mikiya Fujimori[1], Yosuke Tanaka[1] (1. Tokyo University of Agriculture and Technology (Japan))

[Presentation Style] Online

We developed a phase-modulated optical interferometer based on time-domain analysis using a laser diode with a wavelength of 1.3 μm. Feasibility to measure the vibration of biological soft tissues was assessed by using gelatin sample.

4:00 PM - 4:15 PM (Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204)

[CFP6J-03] Development of Multi-Foci Raman Spectrophotometer for High-Throughput Biochemical Screening
[Presentation Style] Onsite

*Hao-Xiang Liao[1], Kazuki Bando[1], Menglu Li[1,2], Katsumasa Fujita[1,2,3] (1. Department of Applied physics Graduate School of Engineering, Osaka University (Japan), 2. Advanced Photonics and Biosensing Open Innovation Laboratory, AIST-Osaka University (Japan), 3. Transdimensional Life Imaging Division, Institute for Open and Transdisciplinary Research Initiatives, Osaka University (Japan))

[Presentation Style] Onsite

We developed a Raman spectrophotometer with multi-foci for high-throughput screening that produces 96 focal spots on analytes in 96 well-plate and collects their Raman spectra simultaneously, which enables fast discrimination and monitoring of 96 samples.

4:15 PM - 4:30 PM (Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204)

[CFP6J-04] Scatterometry using deep learning for analysis of oil including phosphor

[Presentation Style] Onsite

*Tetsuya Hoshino[1], Shintaro Narioka[1], Sadao Aoki[1], Masahide Itoh[1], Masami Kobayashi[2] (1. Inst. of Applied Physics., University of Tsukuba (Japan), 2. Inst. of Materials Science., University of Tsukuba (Japan))

[Presentation Style] Onsite

Deep learning was introduced to the scatterometry of isolated particles. We applied this method to oil droplets containing phosphors and analyzed the relationship between the amount of phosphor and the emission intensity.

4:30 PM - 4:45 PM (Fri. Aug 5, 2022 3:30 PM - 4:45 PM Room 204)

[CFP6J-05] ULTRA-STABLE, CONTINUOUS-WAVE UV LIGHT SOURCE FOR PRECISION THERMOMETRY

[Presentation Style] Onsite

*sara pourjamal[1], Thomas Lindvall[1], thomas fordell[1] (1. National Metrology Institute VTT MIKES (Finland))

[Presentation Style] Onsite

An ultra-stable light source and optical detection set-up for high-precision measurements of ^{114}Cd absorption lines is presented. The experimental setup for ultraviolet light at 326.2 nm is described with an aim toward primary thermometry.

Photonic Crystal Waveguide Devices

Session Chair: Masato Takiguchi (NTT Basic Research Labs.)

Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall (2F)

[CFP8I-01] Low-cost photonic crystal spectrometer using up-conversion

[Presentation Style] Onsite

*Ryo Sugano[1], Shengji Jin[1], Joceyln Hofs[1], Koki Yube[1], Keigo Nagashima[1], Takumasa Kodama[1], Takasumi Tanabe[1] (1. Keio Univ. (Japan))

1:30 PM - 1:45 PM

[CFP8I-02] Design of Si Photonic Crystal Waveguide for High Performing Slow Light Devices

[Presentation Style] Onsite

*Keisuke Hirotani[1], Rikuto Taira[1], Ryo Shiratori[1], Toshihiko Baba[1] (1. Yokohama National Univ. (Japan))

1:45 PM - 2:00 PM

[CFP8I-03] Transmission via Sharp Bends in Glide-symmetric Photonic-Crystal Waveguides

[Presentation Style] Onsite

*Wei Dai[1], Taiki Yoda[2], Yuto Moritake[1,4], Masaya Notomi[1,2,3] (1. Tokyo Institute of Tech. (Japan), 2. NTT Basic Res. Lab. (Japan), 3. NTT Nanophotonic Center (Japan), 4. JST PRESTO (Japan))

2:00 PM - 2:15 PM

[CFP8I-04] Beam Trajectory Bending and Meandering by Distorted Photonic Crystal

[Presentation Style] Onsite

Misaki Honda[1], Kanji Nanjyo[1], Jinpei Hashizume[1], Hitoshi Kitagawa[1], *Kyoko Kitamura[1,2] (1. Kyoto Inst. of Tech. (Japan), 2. JST PRESTO (Japan))

2:15 PM - 2:30 PM

[CFP8I-05] Coherent Backscattering in Triangular Lattice Photonic Crystals

[Presentation Style] Online

*Tomoya Kuribara[1,2], Yuto Moritake[1,3], Masaya Notomi[1,2,4] (1. Department of Physics, Tokyo Tech (Japan), 2. NTT-BRL, NTT Corp. (Japan), 3. JST (Japan), 4. Nanophotonics Center, NTT Corp. (Japan))

2:30 PM - 2:45 PM

[CFP8I-06] Novel dual-mode photonic crystal waveguide for stable resonant excitation of quantum dots with high β-factor

[Presentation Style] Online

*Xiaoyan Zhou[1,2], Peter Lodahl[2], Leonardo Midolo[2] (1. Tianjin Univ. (China), 2. Niels Bohr Inst. (Denmark))

2:45 PM - 3:00 PM

1:30 PM - 1:45 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-01] Low-cost photonic crystal spectrometer using up-conversion [Presentation Style] Onsite

*Ryo Sugano[1], Shengji Jin[1], Joceyln Hofs[1], Koki Yube[1], Keigo Nagashima[1], Takumasa Kodama[1], Takasumi Tanabe[1] (1. Keio Univ. (Japan))

[Presentation Style] Onsite

We used up-conversion to capture the localized light of a photonic crystal spectrometer with an inexpensive CMOS camera. We employed this data to detect a single wavelength using deep learning.

1:45 PM - 2:00 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-02] Design of Si Photonic Crystal Waveguide for High Performing Slow Light Devices [Presentation Style] Onsite

*Keisuke Hirotani[1], Rikuto Taira[1], Ryo Shiratori[1], Toshihiko Baba[1] (1. Yokohama National Univ. (Japan))

[Presentation Style] Onsite

We optimized SiO_2-cladded Si photonic crystal waveguide for low-dispersion slow light with $n_g \approx 20$ at full C-band with efficient transition structures. We also investigated air-cladded waveguide that expands the FOV for LiDAR applications.

2:00 PM - 2:15 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-03] Transmission via Sharp Bends in Glide-symmetric Photonic-Crystal Waveguides [Presentation Style] Onsite

*Wei Dai[1], Taiki Yoda[2], Yuto Moritake[1,4], Masaya Notomi[1,2,3] (1. Tokyo Institute of Tech. (Japan), 2. NTT Basic Res. Lab. (Japan), 3. NTT Nanophotonic Center (Japan), 4. JST PRESTO (Japan))

[Presentation Style] Onsite

We demonstrate that the guided light modes travelling through sharp bends in glide-symmetric photonic crystal waveguides experience abrupt change in transmission near the band degeneracy and explore the possible origin of this phenomenon.

2:15 PM - 2:30 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-04] Beam Trajectory Bending and Meandering by Distorted Photonic Crystal [Presentation Style] Onsite

Misaki Honda[1], Kanji Nanjyo[1], Jinpei Hashizume[1], Hitoshi Kitagawa[1], *Kyoko Kitamura[1,2] (1. Kyoto Inst. of Tech. (Japan), 2. JST PRESTO (Japan))
[Presentation Style] Onsite
We demonstrate distorted photonic crystals (DPCs) that are capable of on-chip beam trajectory bending and meandering, even when a homogeneous refractive index is maintained.

2:30 PM - 2:45 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-05] Coherent Backscattering in Triangular Lattice Photonic Crystals
[Presentation Style] Online

*Tomoya Kuribara[1,2], Yuto Moritake[1,3], Masaya Notomi[1,2,4] (1. Department of Physics, Tokyo Tech (Japan), 2. NTT-BRL, NTT Corp. (Japan), 3. JST (Japan), 4. Nanophotonics Center, NTT Corp. (Japan))
[Presentation Style] Online
We numerically demonstrated that the suppression of coherent backscattering near the Dirac point in a triangular lattice photonic crystal occurs over a wide frequency range. Furthermore, we clarify the effects of intervalley scattering and trigonal warping on the suppression.

2:45 PM - 3:00 PM (Fri. Aug 5, 2022 1:30 PM - 3:00 PM Small Hall)

[CFP8I-06] Novel dual-mode photonic crystal waveguide for stable resonant excitation of quantum dots with high β-factor
[Presentation Style] Online

*Xiaoyan Zhou[1,2], Peter Lodahl[2], Leonardo Midolo[2] (1. Tianjin Univ. (China), 2. Niels Bohr Inst. (Denmark))
[Presentation Style] Online
We propose a novel dual-mode photonic-crystal waveguide that realizes direct in-plane resonant excitation of the QDs, which exhibits a single-photon collection efficiency β>0.95 and impurity ε<5×10^{-3} over a broad spectral and spatial range.

Nano Laser, Optical Trapping, and Chiral Photonics

Session Chair: Kyoko KITAMURA (Kyoto Institute of Technology)

Fri. Aug 5, 2022 3:30 PM - 5:00 PM Small Hall (2F)

[CFP8J-01] Lasing oscillation from vertically standing hollow-core GaN nanowire on sapphire substrate

[Presentation Style] Onsite

*Masato Takiguchi[1,2], Sylvain Sergent[1,2], Benjamin Damilano[3], Stéphane Vézian[3], Sébastien Chenot[3], Nicole Yazigi[3], Taiki Yoda[1,2], Tai Tsuchizawa[1,4], Hisashi Sumikura[1,2], Akihiko Shinya[1,2], Masaya Notomi[1,2] （1. NTT Nanophotonics Center (Japan), 2. NTT Basic Research Labs (Japan), 3. CNRS-CRHEA (France), 4. NTT Device Technology Labs (Japan)）

3:30 PM - 3:45 PM

[CFP8J-02] Plasma Induced Surface Nanostructure on Semiconductors for The Application of Random Laser

[Presentation Style] Onsite

*Quan Shi[1], Hedeki Fujiwara[2], Ryusei Osaka[2], Shin Kajita[3], Ryo Yasuhara[1], Noriyasu Ohno[4], Hiyori Uehara[1] （1. National Inst. for Fusion Sci. (Japan), 2. Faculty of Eng., Hokkai-Gakuen Univ. (Japan), 3. Graduate School of Frontier Sci., The Univ. of Tokyo (Japan), 4. Graduate School of Eng., Nagoya Univ. (Japan)）

3:45 PM - 4:00 PM

[CFP8J-03] Direct trapping of micro particles with a 2μ m Tm-doped fiber laser

[Presentation Style] Online

*Roukuya Mamuti[1], Takao Fuji[1], Tetsuhiro Kudo[1] （1. Toyota Technological Inst. (Japan)）

4:00 PM - 4:15 PM

[CFP8J-04] Optical trapping and manipulation of phase-change material nanoparticles

[Presentation Style] Onsite

*Ryo Kakuta[1], Christophe Pin[1], Keiji Sasaki[1] （1. Hokkaido Univ. (Japan)）

4:15 PM - 4:30 PM

[CFP8J-05] Robust Angular Anisotropy of Circularly Polarized Luminescence from Chiral Twisted Bipolar Conjugated Polymer Microspheres

[Presentation Style] Onsite

*Yohei Yamamoto[1], Osamu Oki[1], Hiroshi Yamagishi[1], Chidambar Kulkarni[2], Stefan C. J. Meskers[2], E. W. Meijer[2], Zhan-Hong Lin[3], Jer-Shing Huang[3] （1. Univ. Tsukuba (Japan), 2. Eindhoven Univ. Tech. (Netherlands), 3. Leibniz Inst. Photonics Tech. (Germany)）

4:30 PM - 4:45 PM

[CFP8J-06] Transport of Circularly Polarized Light in Three-Dimensional Chiral Photonic Crystals

[Presentation Style] Onsite

*Shun Takahashi[1], Takeyoshi Tajiri[2], Yasuhiko Arakawa[3], Satoshi Iwamoto[4,5], Willem L. Vos[6] （1. Kyoto Inst. of Tech. (Japan), 2. Dep. of Communication Eng. and Info., The Univ. of Electro-Communications (Japan), 3. Inst. for Nano Quantum Info. Electronics, The Univ. of Tokyo (Japan), 4. Res. Center for Advanced Sci. and Tech., The Univ. of Tokyo (Japan), 5. Inst. of Indus. Sci., The Univ. of Tokyo (Japan), 6. COPS, MESA+ Inst. for Nanotech., Univ. of Twente

(Netherlands))
4:45 PM - 5:00 PM

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

[CFP8J-01] Lasing oscillation from vertically standing hollow-core GaN nanowire on sapphire substrate
[Presentation Style] Onsite

*Masato Takiguchi[1,2], Sylvain Sergent[1,2], Benjamin Damilano[3], Stéphane Vézian[3], Sébastien Chenot[3], Nicole Yazigi[3], Taiki Yoda[1,2], Tai Tsuchizawa[1,4], Hisashi Sumikura[1,2], Akihiko Shinya[1,2], Masaya Notomi[1,2] （1. NTT Nanophotonics Center (Japan), 2. NTT Basic Research Labs (Japan), 3. CNRS-CRHEA (France), 4. NTT Device Technology Labs (Japan)）

[Presentation Style] Onsite

We demonstrate lasing oscillation from a vertically standing hollow-core GaN nanowire fabricated on sapphire substrate by sublimation method. This unique laser has a potential to generate a vector light beam and are promising for future monolithic on-chip devices.

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

[CFP8J-02] Plasma Induced Surface Nanostructure on Semiconductors for The Application of Random Laser
[Presentation Style] Onsite

*Quan Shi[1], Hedeki Fujiwara[2], Ryusei Osaka[2], Shin Kajita[3], Ryo Yasuhara[1], Noriyasu Ohno[4], Hiyori Uehara[1] （1. National Inst. for Fusion Sci. (Japan), 2. Faculty of Eng., Hokkai-Gakuen Univ. (Japan), 3. Graduate School of Frontier Sci., The Univ. of Tokyo (Japan), 4. Graduate School of Eng., Nagoya Univ. (Japan)）

[Presentation Style] Onsite

Unique surface nanostructures were formed on semiconductors over a large area by Ar plasma irradiation with RF sample bias. As an application of these wavelength ordered size structure, we have demonstrated a random laser emission at UV region.

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

[CFP8J-03] Direct trapping of micro particles with a 2 μ m Tm-doped fiber laser
[Presentation Style] Online

*Roukuya Mamuti[1], Takao Fuji[1], Tetsuhiro Kudo[1] （1. Toyota Technological Inst. (Japan)）

[Presentation Style] Online

We report on opto-thermophoretic trapping of micro/nanoparticles with a 2 μm Tm-doped fiber laser. The infrared continuous-wave laser is directly and strongly absorbed by water solution, and the particles are migrated along the temperature gradient.

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

[CFP8J-04] Optical trapping and manipulation of phase-change material nanoparticles
[Presentation Style] Onsite

*Ryo Kakuta[1], Christophe Pin[1], Keiji Sasaki[1] (1. Hokkaido Univ. (Japan))

[Presentation Style] Onsite

In this study, we performed optical trapping of VO_2 nanoparticles. Because of the temperature-dependent nonlinear change of the VO_2 refractive index, VO_2 particles are stably trapped on a circular orbit around the laser focus.

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

[CFP8J-05] Robust Angular Anisotropy of Circularly Polarized Luminescence from Chiral Twisted Bipolar Conjugated Polymer Microspheres
[Presentation Style] Onsite

*Yohei Yamamoto[1], Osamu Oki[1], Hiroshi Yamagishi[1], Chidambar Kulkarni[2], Stefan C. J. Meskers[2], E. W. Meijer[2], Zhan-Hong Lin[3], Jer-Shing Huang[3] (1. Univ. Tsukuba (Japan), 2. Eindhoven Univ. Tech. (Netherlands), 3. Leibniz Inst. Photonics Tech. (Germany))

[Presentation Style] Onsite

We present that conjugated polymer bearing chiral side chains self-assemble into solid microspheres with a twisted bipolar interior. The single microsphere exhibits distinct angularly anisotropic CPL with g_{lum} up to ~ 0.5 in the equatorial plane, which is 2.5-fold greater than that along the polar axis.

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

[CFP8J-06] Transport of Circularly Polarized Light in Three-Dimensional Chiral Photonic Crystals
[Presentation Style] Onsite

*Shun Takahashi[1], Takeyoshi Tajiri[2], Yasuhiko Arakawa[3], Satoshi Iwamoto[4,5], Willem L. Vos[6] (1. Kyoto Inst. of Tech. (Japan), 2. Dep. of Communication Eng. and Info., The Univ. of Electro-Communications (Japan), 3. Inst. for Nano Quantum Info. Electronics, The Univ. of Tokyo (Japan), 4. Res. Center for Advanced Sci. and Tech., The Univ. of Tokyo (Japan), 5. Inst. of Indus. Sci., The Univ. of Tokyo (Japan), 6. COPS, MESA+ Inst. for Nanotech., Univ. of Twente (Netherlands))

[Presentation Style] Onsite

Circular dichroism in layer-by-layer chiral photonic crystals is numerically studied. Stop gaps for circular polarization in the stacking direction can be modified by tuning the in-plane period, which is new compared to one-dimensional Bragg structures.