Track 7: Micro-, Nano-, and Quantum Photonics: Science and Applications London Hall, 2F

13:30-15:30 • November 05, 2023 • Sunday
Micro- and Nano- Science and Applications I
Presider: Fangwei Ye, Shanghai Jiao Tong University, China

13:30-14:15 • ACPPOEM-1009-29 *Tutorial*
Dreams about Dreams: Topology with Spatiotemporally Sculptured Light
Qiwen Zhan
University of Shanghai for Science and Technology, China
With the rapid advances in laser technology, optical fields with various topological features have attracted increasing attentions. In this talk I will review recently developed techniques that allows us to directly sculpt optical fields in the spatial and spatiotemporal domains. These spatiotemporal sculpturing techniques are employed to produce optical fields with various topological features. Wavepackets with these complicated topological structures exhibit many unique properties and may find important applications when interact with matters, opening tremendous potential opportunities for sculptured complex spatiotemporal wavepackets.

14:15-14:45 • ACPPOEM-0727-23 *Invited*
Single molecule detection and imaging via nanoscale optical-field and light-matter interaction control
Zhiyuan Li, Yang Haiyao
South China University of Technology, China
In this talk we report our route toward single-molecule detection and imaging, one of the ultimate goals of molecular sciences and optical sciences, via nanoscale optical-field and light-matter interaction control. Raman scattering carries many key characteristic information in molecular structure, but its weak signal intensity hinders Raman scattering for practical spectroscopic applications. Based on a simple additive concept, we built an optical nanocavity composed of gold nanoparticles sitting on silicon wafers coated with gold film and covered with a 2 nm layer of SO2, screened rhodamine B and the two-dimensional material WS2 as matched molecule and adsorbed surfaces. Due to the synergistic electromagnetic and chemical enhancement mechanisms, Raman spectroscopy can be observed at a minimum concentration of 10-18 M rhodamine B (12 molecules, 5 mm×5 mm) and with a maximum Raman signal enhancement factor reaching 16 orders of magnitude, thus enabling to detect and localize unambiguously the Raman signal of single molecule. Microscopy is a kind of technology to observe molecules more visually. Scanning near-field optical microscopy (SNOM) offers a way to break down the diffraction limit of conventional optical microscopy and reach a fine spatial resolution down to ~10 nm, but suffers from low transmission efficiency of optical signal power. We designed and 3D printed a polymer-core/gold-shell spiral-grating conical nanostructured tip on the end facet of single-mode optical fiber. Numerical simulations and optical measurements for this deliberately designed and fabricated high-resolution, high throughput, and high contrast SNOM tip show it has 10% transmission efficiency, ~5 nm spatial resolution of optical imaging, 20 dB signal-to-noise ratio, 7000 pixels per second fast scanning speed, and 50 nm bandwidth around 785 nm. This tip thus enables to transport Ti:Sapphire femtosecond signal and offers the prospect to build a high temporal-spatial resolution optical microscopy and spectroscopy instrument.

14:45-15:00 • ACPPOEM-0727-16
InSb All-Dielectric Metasurface for Enhancing photodetection in Mid-Infrared Silicon Photonics
Shengyi Wang, Hao Luo, Qiu Wang, Hua Ge, Bowen Jia
Wuhan University of Technology, China
A InSb all-dielectric metasurface is proposed based on Kerker effect. Simulation results shows that metasurface exhibit a near perfect absorption in the 5.0-5.5 μm range, which is important for mid-infrared detection.

15:00-15:15 • ACPPOEM-0731-153
Ultrafast Pulse Management with Hyperbolic Metamaterials
Jingyi Wu, Jack Kingsley-Smith, Anton Yu. Bykov, Alexey V. Krasavin, Francisco J. Rodríguez-Fortuño, Anatoly V. Zayats
King's College London, United Kingdom
Understanding interaction of ultrafast optical pulses with materials is important for the development of new approaches for pulse management and, vice versa, for tailoring optical processes enabled by laser pulses. Here, we investigate the interaction and modification of ultrashort optical pulses with anisotropic metamaterials in hyperbolic and epsilon-near-zero dispersion regimes. Considering a broad range of pulse lengths from 8 fs to 180 fs, we demonstrate how the changes of the spectral and wavevector content of the pulse due to the interaction with metamaterial influence its spatial and temporal shape. The developed model provides opportunities to investigate the details of interaction of ultrashort pulses with complex media in a wide range of pulse durations and shapes.

15:15-15:30 • ACPPOEM-0719-1
Mode Multiplexer Based on Multiplane Light Conversion Using a Monolayer Metasurface
Mian Wu, Lin Wu, Jin Tao
State Key Laboratory of Optical Communication Technologies and Networks, China Information Communication Technologies Group Corporation (CICT), Wuhan, China
We propose a mode-division multiplexer based on multiplane light conversion (MPLC) using a monolayer-structured metasurface and a reflective half-wave plate (HWP). Our design releases the need for strict phase plate alignment in the MPLC

experiments.

15:30-16:00 Coffee Break

16:00-18:00 • November 05, 2023 • Sunday
Nonlinear and Quantum Optics
Presider: Jing Xu, Huazhong University Of Science And Technology, China

16:00-16:30 • ACPPOEM-1009-31 *Invited*
Thouless pumping in linear and nonlinear moire potentials
Fangwei Ye
Shanghai Jiao Tong University, China
In certain periodic systems, the propagation direction and distance of a wave packet across the lattice are determined solely by a global property of the system called "topology," irrespective of the local details of the system at the specific location. This phenomenon, initially discovered by physicist David Thouless in 1983, is known as "Thouless pumping" or "topological transport". Thouless pumping has been verified in various physical systems. Due to the presence of nonlinearity in many physical systems, a natural question arises: how does nonlinearity affect topological transport?
In our study, we have investigated the Thouless pumping in dynamic moiré lattices, in both linear and nonlinear conditions. In linear condition, we have created (2+1)D photonic moiré lattices, and achieved the directed propagation of localized bulk states, whose propagation direction and speed being determined by the twisting angle of the underlying moiré lattices. in nonlinear condition, we found that under the influence of nonlinearity, solitons become the carriers of topological transport. A soliton, which is a localized wave packet, can undergo directed spatial motion under the protection of topology. Moreover, through the nonlinear degrees of freedom, the distance of spatial transport can undergo discrete changes, and the direction of transport can also be reoriented. This is because nonlinearity not only creates solitons but also couples different energy bands in the system, leading to Rabi oscillations of solitons between different bands (different bands correspond to different Chern numbers).

16:30-17:00 • ACPPOEM-1009-35 *Invited*
Brillouin-Kerr soliton and optomechanical optical microcombs in chip-based microresonators
Xiaoshun Jiang
Nanjing University, China
We demonstrate a Brillouin-Kerr soliton microcomb through exciting the Kerr frequency comb using the generated Brillouin laser in the same cavity. This enables us to access the soliton states with a blue-detuned pump. Due to the ultra-narrow linewidth and the low-noise properties of the generated Brillouin laser, the observed soliton microcomb exhibits narrow-linewidth comb lines and stable repetition rate. Also, we achieve a new kind of microcomb using a cavity optomechanical system with giant oscillation amplitude. We observe both optical and microwave frequency combs in a microresonator, which feature a flat OFC with 938 comb lines and a repetition rate as low as 50.22 MHz, as well as a flat microwave frequency comb with 867 comb lines.

17:00-17:15 • ACPPOEM-0801-103
Characterizing Kerr Optical Frequency Combs Using Quantum Interference
Jin Guo[1], Yunru Fan[1], Yong Geng[1], Guang-Wei Deng[1], Hai-Zhi Song[1,2], You Wang[1,2], Li-Xing You[3], Zhen Wang[3], Heng Zhou[1], Kun Qiu[1], Guang-Can Guo[1,4], Qiang Zhou[1,4]
1.University of Electronic Science and Technology of China, China; 2.Southwest Institute of Technical Physics, China; 3.Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Science, China; 4.University of Science and Technology of China, China
For the first time, we characterize the properties of Kerr optical frequency combs using quantum optics. The temporal FWHM of single soliton state is obtained as 109.8±6.5 fs within the Fourier transform limit.

17:15-17:30 • ACPPOEM-0728-5
Relieving the Limit of Photon-pairs Generation Rate in Microresonators
Nuo Chen[1], Zijie Wang[1], Hanghang Li[1], Zhuang Fan[1], Yunru Fan[2], Qiang Zhou[2], Xinliang Zhang[1], Jing Xu[1]
1.Huazhong University of Science and Technology, China; 2.University of Electronic Science and Technology of China, China
Photon-pairs generation rate (PGR) based on spontaneous nonlinear processes in microresonators is found to be limited set by the quality (Q) factors of the cavity resonances.

17:30-17:45 • ACPPOEM-0801-123
Gallium Nitride Microring based Quantum Light Source
Hong Zeng[1], Zhao-Qin He[2], Yun-Ru Fan[1], Jin-Peng Wu[1], Guang-Wei Deng[1], You Wang[1,3], Hai-Zhi Song[1,3], Zhen Wang[4], Li-Xing You[4], Chang-Zheng Sun[2], Yi Luo[2], Guang-Can Guo[1,5], Qiang Zhou[1,5]
1.University of Electronic Science and Technology of China, China; 2.Tsinghua University, China; 3.Southwest Institute of Technical Physics, China; 4.Chinese Academy of Sciences, China; 5.University of Science and Technology of China, China
We demonstrate the generation of multi-wavelength nonclassical photon pairs at telecom-band on a gallium nitride microring chip via spontaneous four-wave mixing process. Nonclassical properties of our source are characterized by HBT measurement and two-photon interference.

17:45-18:00 • ACPPOEM-0801-128
Multi-wavelength Quantum Light Source with Dual Pumps
Jin-Peng Wu[1], Yun-Ru Fan[1], Hong Zeng[1], Hao Li[2], You Wang[1,3], Guang-Wei Deng[1], Li-Xing You[2], Zhen Wang[2], Hai-Zhi Song[1,3], Guang-Can Guo[1,4], Qiang Zhou[1,4]
1.University of Electronic Science and Technology of China, China; 2.Chinese Academy of Sciences, China; 3.Southwest Institute of Technical Physics, China; 4.University of Science and Technology of China, China
We demonstrate a multi-wavelength quantum light source utilizing dual pumps and realize the generation of 25-pair correlated photons in a silicon nitride micro-ring resonator. The properties of correlation and energy-time entanglement are investigated in experiments.

17:30-20:00 Welcome Reception

08:30-09:45 • November 06, 2023 • Monday
Scattering and Absorption of Light Nanophotonic Structures
Presider: Yang Li, *Tsinghua University, China*

08:30-09:00 • ACPPOEM-0812-3 *Invited*
Some Wave Illuminations from Geometric Shadows
Wei Liu
National University of Defense Technology, China
How to orientate an arbitrary opaque object toward the sun to cast the largest or smallest geometric shadow? We have managed to partially solve an analogous problem in wave optics.

09:00-09:30 • ACPPOEM-1009-33 *Invited*
Manipulate light wavefront by photonic crystal slabs in momentum space
Lei Shi
Fudan University, China
In this talk, I will show that, based on the principles of fourier optics, photonic crystal slabs could be used to manipulate wavefront spatially and temporally. I will give four examples. The first one is using photonic crystal slabs to generate optical vortices with phase singularities. The second one is realization large polarization depended beam shift. The third one is design photonic crystal slabs as a ultrathin reciprocal lens to realize upright real image. The last one is using photonic crystal slabs to realize spatial temporal vortices with transverse angular momentum.

09:30-09:45 • ACPPOEM-0728-1
Quantum Imaging with a Nonlinear Metasurface Photon-pair Source
Jihua Zhang, Jinliang Ren, Jinyong Ma, Andrey Sukhorukov
ARC Centre of Excellence for Transformative Meta-Optical Systems (TMOS), Department of Electronic Materials Engineering, Research School of Physics, Australian National University, Australia
We propose a novel quantum imaging technique that combines ghost and scanning imaging protocol to capture two-dimensional images using only a one-dimensional detector array, enabled by strong spatial correlations and tunable emission angle of entangled photon pairs emitted from an ultrathin nonlinear metasurface.

09:45-10:30 Coffee Break

10:30-12:15 • November 06, 2023 • Monday
Micro- and Nano- Science and Applications II
Presider: Wei Liu, National University of Defense Technology, China

10:30-11:00 • ACPPOEM-0731-62 *Invited*
Optics at the Deep Nanoscale: Fundamentals and Opportunities
Xuewen Chen
Huazhong University of Science and Technology, China
Recent progress in nanotechnology has allowed structuring materials at the deep nanoscale. We will discuss the fundmentals, concerning the correct characterization of the nonlocal and quantum effects, and outline the unique opportunities.

11:00-11:30 • ACPPOEM-0811-4 *Invited*
Low-loss zero-index metawaveguide
Yang Li
Tsinghua University, China
We demonstrated a one-dimensional metawaveguide with zero refractive index along the propagation direction, featuring zero index with propagation loss around 10 dB/mm at 1550 nm.

11:30-11:45 • ACPPOEM-0815-114
On-chip Spatial Hilbert Transformer based on Fourier optics and metasurface
Yuhan Ma, Shaonan Zheng, Qize Zhong, Yuan Dong, Yang Qiu, Xingyan Zhao, Ting Hu
Shanghai University, China
Here we propose a metasystem for implementing the spatial Hilbert transform based on Fourier optics and metasurface with a ultracompact footprint and a high accuracy of 98.9%.

11:45-12:15 • ACPPOEM-1009-32 *Invited*
Topological lasers with a non-Hermitian bulk and gain-assisted hyperbolic metamaterials
Zhitong Li[1], Qing Gu[2,3]
1.State Key Laboratory of Information Photonics and Optical Communications, School of Science, Beijing University of Posts and Telecommunications, China;2.Department of Electrical and Computer Engineering, North Carolina State University, United States;3.Department of Physics, North Carolina State University, United States
In this talk, we will discuss edge-mode lasing from a non-Hermitian topological bulk. Our 1D coupled microlaser array is equivalent to a 2D non-Hermitian Chern insulator with precise mapping. Besides, a perovskite hyperbolic metasurface is discussed.

12:00-13:30 Lunch Break

13:30-15:30 • November 06, 2023 • Monday
Quantum Networks and Communications
Presider: Xuewen Chen, Huazhong University Of Science And Technology, China

13:30-14:15 • ACPPOEM-1009-30 *Tutorial*
Quantum network based on solid state quantum memory
Chuangfeng Li
University of Science and Technology of China, China
Quantum networks are the extension and improvement of classical networks, and the use of quantum networks can achieve secure information storage and transmission, efficient information processing and high-precision remote sensing. Quantum memory is the core device for building quantum networks and realizing long-range quantum communication. Due to the advantages of stable performance and easy micro and nano processing of rare-earth ion doped crystals, solid-state quantum memories based on rare-earth ion-doped crystals have received wide attention in recent years. This report will introduce the recent progress of our research group in building quantum networks based on solid-state quantum memory, including the enhancement of quantum storage capacity, the realization of integrated solid-state quantum memory using direct laser writing technology, the realization of 1-hour coherent optical storage and the realization of multi-mode quantum repeater.

14:15-14:30 • ACPPOEM-0729-13
Core and Wavelength Allocation for Joint Optimization in Quantum Access Networks
Weiwen Kong[1], Yongmei Sun[2], Jianjun Tang[1], Tianqi Dou[1], Yaoxian Gao[2], Zhenhua Li[1], Qi Zhao[1], Yuheng Xie[1], Na Chen[1]
1.China Telecom Research Institute, China; 2.Beijing University of Posts and Telecommunications, China
In this paper, we investigate measures to simultaneously improve the performance of classical and quantum key distribution systems in quantum access networks. First, we construct a multicore-fiber-based quantum access network architecture that supports simultaneous access to classical and quantum signals, and establish theoretical models of noise on classical and quantum channels. Secondly, a jointly optimized core wavelength allocation (JOCWA) scheme is proposed, which is applicable to multi-core fibers with any number of cores. Finally, simulation results show that the JOCWA scheme can improve the optical signal-to-noise ratio of the classical system by at least 20 dB, and can extend the secure transmission distance by about 35% compared with the benchmark scheme.

14:30-14:45 • ACPPOEM-0730-8
Continuous-Variable Quantum Key Distribution with Practical Unbalanced Heterodyne Detection
Jiale Mi, Yiming Bian, Lu Fan, Yichen Zhang, Song Yu
Beijing University of Posts and Telecommunications, China
We report a continuous-variable quantum key distribution protocol with unbalanced heterodyne detection considering practical imperfection factors, where a higher secret key rate is achieved compared with the balanced protocols.

14:45-15:00 • ACPPOEM-0731-22
Synergistic Resource Allocation in Space Division Multiplexed Data Center Optical Networks Secured with Quantum Key Distribution
Xueqin Ren, Yongmei Sun, Chuan Xie, Dengqi Liu
The State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, China
In this article, we propose two novel core prioritization and crosstalk aware (CP-XT-Aware) algorithms, including CP-XT-Aware with wavelength grouping (CPWG-XT-Aware) and CP-XT-Aware with wavelength reservation (CPWR-XT-Aware), aiming to realize the synergistic transmission of classical and quantum signals in quantum key distribution (QKD)-enabled optical data center networks based on wavelength-division-multiplexing and space-division-multiplexing. For comparison, we introduce the core and wavelength random allocation without XT-Aware, called the CWRA. Analytical simulations show that the both proposed algorithms can simultaneously improve the average secure key rate and reduce blocking probabil-

ities under dynamic traffic scenarios in different network topologies, compared to the CWRA. Particularly, the CPWG-XT-Aware performs exceptionally well in QKD under the low traffic load, while the CPWR-XT-Aware excels under the high traffic load.

15:00-15:15 • ACPPOEM-0801-135
Quantum teleportation from photon to matter at telecom band
Jinyu Liao[1], Si Shen[1], Hao Li[2], Zhen Wang[2], You Wang[1, 3], Guangwei Deng[1,4], Haizhi Song[1,3], Lixing You[2], Yunru Fan[1], Guangcan Guo[1,4], Zhou Qiang[1,4]
1.University of Electronic Science and Technology of China, China; 2.Chinese Academy of Sciences, China; 3.Southwest Institute of Technical Physics, China; 4.University of Science and Technology of China, China
We experimentally demonstrate quantum teleportation from a telecom photonic time-bin qubit to a solid-state quantum memory at telecom band. The demonstration is compatible with fiber communication infrastructure, which is important for future quantum networks.

15:15-15:30 • ACPPOEM-0801-116
Experimental Demonstration Advantage of Photonic Finite Automata
Yuan-Yuan Zhao, Keren Li, Chao Li, Shenggen Zheng, Zhixue He
Peng Cheng Laboratory, China
Finite automata have abundant applications such as finding reachability and so on. This work presents the first experimental implementation of the two-way quantum finite automaton with the optical platform and demonstrates its potential quantum advantages.

15:30-18:00 Coffee Break & Poster Session

18:30-21:00 Banquet and Awards Ceremony

08:30-10:00 • November 07, 2023 • Tuesday
Excitons and Optical microresonators
Presider: Yi Xu, Guangdong University Of Technology, China

08:30-09:00 • ACPPOEM-0811-7 *Invited*
Spinoptronics in optical microcavities
Feng Li
Xi'an Jiaotong University, China
Fabry-Perrot (FP) microcavities with metal or DBR (distributed Bragg reflector)-coated mirrors provide an excellent platform for investigating the collective behavior of confined 2-dimensional photons and polaritons. The TE-TM mode splitting in such cavities acts as an effective magnetic field, leading to photonic spin-orbit (SO) coupling effect that the pseudospin of cavity photons changes anisotropically with their momenta. Such mechanism has led to interesting observations including optical spin-Hall effect, magnetic-monopole-like half solitons, spinor condensate with half-quantum circulation, and polaritonic topological insulators. We report the direct measurement of the Berry curvature and quantum metric of the photonic modes of a FP cavity containing an anisotropic organic microcrystal (Perylene). Photonic spin-orbit-coupling induced by the cavity together with the anisotropy of the material results in the action of an effective gauge field on photons, which includes an effect of emergent optical activity (OA). The photonic gauge field makes emerge geometrically non-trivial bands containing two gapped Dirac cones with opposite topological charges. The same cavity structure with a DPAVBi microcrystal allows the observation of Voigt exceptional point at which the quantum metric is demonstrated to be divergent. We also predict that in fully confined systems the eigenstates of the second excited manifold under TE-TM splitting are degenerate skyrmions which can be manipulated by the non-Hermitian properties, and meanwhile, derive the general rules for the eigenstates of all excited manifolds under TE-TM splitting.

09:00-09:30 • ACPPOEM-0806-1 *Invited*
Interaction between plasmonic nanocavity and two-dimensional excitons
Xiulai Xu
Peking University, China
We demonstrate a strong coupling of MoS_2 excitons and bowtie nanocavity with low exciton number and a coupling of single localized defect excitons in 2D layer with chiral plasmonic nanocavity.

09:30-09:45 • ACPPOEM-0815-80
Self-hybridized Exciton-Polaritons in Perovskite Nanostructured Arrays
Yuan Zhang[1], Feng Ye[1], Jiayao Huang[1], Hongyan Fu[2], Qian Li[1]
1.School of Electronic and Computer Engineering Peking University Shenzhen, China; 2.Tsinghua Shenzhen International Graduate School Tsinghua University Shenzhen, China
We explore enhanced exciton-polaritons through symmetry-protected quasi-bound states in the continuum within self-hybridized perovskite metasurfaces, achieving a significant Rabi splitting of 249.6 meV via tailoring the geometric size of nano-rods.

09:45-10:00 • ACPPOEM-0812-6
Taming Brillouin optomechanics using supermode microresonators
Min Wang[1], Zhi-Gang Hu[1], Chenghao Lao[2], Wenjing Liu[2], Qi-Fan Yang[2], Bei-Bei Li[1]
1.Institute of Physics CAS, China; 2.Peking University, China
We have designed and fabricated a supermode microresonstor to enhance Brillouin optomechanical coupling, and realized both phonon lasing and optomechanical strong coupling. This system exhibits a single-photon optomechanical coupling rate as high as 12.5 kHz.

10:00-10:30 Coffee Break

10:30-11:15 • November 07, 2023 • Tuesday
Emerging Materials, Devices and Their Applications
Presider: Feng Li, Xi'an Jiaotong University, China

10:30-10:45 • ACPPOEM-0721-11
The Advantages of Dual-layer Broadband Filter Spectrometers in Improving Ill-conditioned Spectrum Reconstruction Processes
Ding Zhao, Jie Bao
Tsinghua University, China
We propose a design scheme of a dual-layer broadband filter spectrometer based on quantum dot and silicon films, and verify the advantages of this dual-layer filter structure in improving the ill-conditioned spectrum reconstruction processes.

10:45-11:00 • ACPPOEM-0729-9
Silicon-based Mode (de)multiplexer beyond Single Communication Band Limit
Siwei Liu[1,2], Xin Fu[1,2], Hongliang Chen[1,2], Guangchen Su[1,2], Yujie Huo[1,2], Chuang Cheng[1,2], Jiaqi Niu[1,2], Lin Yang[1,2]
1.State Key Laboratory of Integrated Optoelectronics, Institute of Semiconductors, University of Chinese Academy of Sciences, China; 2.College of Materials Science and Opto-Electronic Technology, University of Chinese Academy of Sciences, China
We propose a dual-band mode (de)multiplexer supporting four TM modes. For all the mode channels, the insertion losses are within 0.74 dB and the crosstalk is below -18.8 dB across the entire O-band and C-band.

11:00-11:15 • ACPPOEM-0731-46
Microwave sensing and localization with solid-state spins
XiangDong Chen
University of Science and Technology of China, China
The nitrogen vacancy (NV) color center in diamond is studied as a nanoscale magnetic sensor in high frequency microwave regime. A high spatial resolution radio ranging and localizaton with the diamond quantum sensor is demontrated.

12:00-13:30 Lunch Break

13:30-15:00 • November 07, 2023 • Tuesday
Topological and Integrated Photonics
Presider: Jihua Zhang, Australian National University, Australia

13:30-14:00 • ACPPOEM-1009-34 *Invited*
Mid-Infrared Photodetection Based on Topological Semimetals
Dong Sun
Peking University, China

14:00-14:15 • ACPPOEM-0726-4
Single-mode Topological Valley-Hall Laser via Spatially Distributed Injection
Xiao-Tian Cheng, Ling-Fang Wang, Dai-Bao Hou, Jia-Wang Yu, Chen-Hui Li, Xing Lin, Feng Liu, Chao-Yuan Jin
Zhejiang University, China
We report a single-mode topological valley-Hall laser with larger than 31 dB side-mode suppression ratio (SMSR) through active intensity modulation of the pump beam. Single whisper gallery mode lasing is achieved despite multiple modes resonance in the topological bandgap using spatial optical injection.

14:15-14:30 • ACPPOEM-0728-23
Scattering losses minimization in silicon nitride photonic integrated circuits for near-IR and telecom bandwidth
Kirill Buzaverov[1,2], Aleksandr Baburin[1,2], Evgeny Sergeev[1], Sergey Avdeev[1], Evgeniy Lotkov[1], Sergey Bukatin[1], Ilya Stepanov[1], Arseniy Belyaev[1], Aleksey Kramarenko[1], Danil Kushnev[1], Alina Melekhina[1], Ilya Ryzhikov[1,3], Ilya Rodionov[1,2]
1.FMN Laboratory, Bauman Moscow State Technical University, Russia; 2.Dukhov Research Institute of Automatics (VNIIA), Russia; 3.Institute for Theoretical and Applied Electromagnetics RAS, Russia
In this work, we show possible ways and give guidelines for silicon nitride photonic integrated circuits fabrication process

Track 7

optimization, suitable for near-IR and telecom bandwidth. Most attention is focused on minimization of scattering losses originating from e-beam lithography and dry etching of silicon nitride.

14:30-14:45 • ACPPOEM-0728-31
Silicon Nitride High Confinement Thermally- and E/O Tuned Photonic Integrated Platfrom
Aleksandr Baburin[1,2], Kirill Buzaverov[1], Evgeniy Lotkov[1], Sergey Avdeev[1], Evgeny Sergeev[1], Sergey Bukatin[1], Ali Amiraslanov[1], Arseniy Belyaev[1], Ilya Ryzhikov[1], Ilya Rodionov[1]
1.FMN Laboratory, Bauman Moscow State Technical University, Russia;2.Dukhov Research Institute of Automatics (VNIIA), Russia;
In this work we present developed silicon nitride high confinement thermally-, E/O tuned platform, that shows propagation losses lower than 0.05 dB/cm for 1550 nm wavelength and lower than 0.30 dB/cm for 935 nm wavelength.

14:45-15:00 • ACPPOEM-0813-7
End-to-End Design of Diffractive Optical Elements Fabricated by Direct Laser Writing Lithography
Yunpeng Xu
Tsinghua University, China
Based on differentiable models of fabrication and optics, we introduce an /end-to-end/ strategy for the optimization of diffractive optical elements (DOEs) fabricated via direct laser writing lithography, achieving enhanced performance and increased fabrication tolerance.