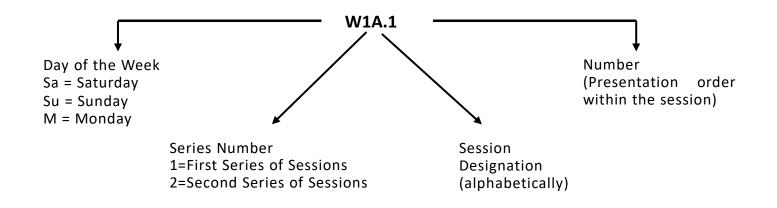
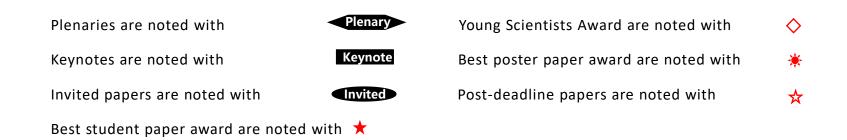
# **Explanation of Session Codes**



The first letter of the code designates the day of the week (T = Tuesday, W = Wednesday, Th = Thursday). The second element indicates the session series in that day (for instance, 1would denote the first parallel session in that day). The third element continues alphabetically through a series of parallel sessions. The lettering then restarts with each new series. The number on the end of the code (separated from the session code with a period) signals the position of the talk within the session (first, second, third, etc.). For example, a presentation coded W1A.1 indicates that this paper is being presented on Wednesday (W) in the first series of sessions (1), and is the first parallel session (A) in that series and the first paper (1) presented in that session.



			ICOCN 2	024—Agenda of Sessi	ions		
Fri.	14:0022:00	Registration (Harbin Victories Hotel)					
Jul. 26	18:00-21:00						
Sat. Jul. 27	9:0011:45	<b>Opening Ceremony &amp; Plenary Talks</b> (Hall 102, 1 <sup>st</sup> floor, Victories Hotel)					
	11:4513:30	Lunch Break					
		Room 301	Room 302	Room 303	Room 305	Room 306	Room 307
	13:3015:30	Fibers & Fiber Devices I	Measurement & imaging I	Optoelectronic Integration I	Optical Signal Processing I	Optical Networks I	Optical Transmission I
	15:3016:00	Tea Break & Poster Session I					
	16:0018:00	Fibers & Fiber Devices II	Measurement & Imaging II	Optoelectronic Integration II	Young Scientists Award	Ultrafast Photonics I	Optical Transmission II
	18:30-20:30	Conference Dinner					
Sun. Jul. 28	8:0010:00	Fibers & Fiber Devices III	Measurement & Imaging III	Optoelectronic Integration III	Quantum Photonics I	Optical Networks II	Optical Transmission III
	10:0010:30	Tea Break & Poster Session II					
	10:3012:00	Fibers & Fiber Devices IV	Measurement & Imaging IV	Optoelectronic Integration IV	Quantum Photonics II	Optical Networks III	Optical Transmission IV
	12:0013:30	Lunch Break					
	13:3015:30	Fibers & Fiber Devices V	Measurement & Imaging V	Optoelectronic Integration V	Optical Signal Processing II	Ultrafast Photonics II	Optical Transmission V
	15:3016:00	Tea Break & Poster Session III					
	16:0018:00	Fibers & Fiber Devices VI	Measurement & Imaging VI	Optoelectronic Integration VI	Optical Signal Processing III	Ultrafast Photonics III	Optical Transmission VI
	18:30-21:00	Conference Banquet & AwardsCeremony					
Mon. Jul. 29	8:0010:00	Fibers & Fiber Devices VII	Measurement & Imaging VII	2D-materials Photonics	Organic Optoelectronics I	Ultrafast Photonics IV	Optical Transmission VII
	10:0010:30	Tea Break & Poster Session IV					
	10:3012:00	Fibers & Fiber Devices VIII	Measurement & Imaging VIII	2D-materials Photonics	Organic Optoelectronics II	Optical Networks IV	Post-deadline papers
	12:0013:30	Lunch Break					
	13:3016:00	Fibers & Fiber Devices IX	Measurement & Imaging IX	Machine Learning	Optical Signal Processing IV	Ultrafast Photonics V	Optical Transmission VIII

ICOCN 2024 - Agenda of Soccion

(Plenary talk: 45 mins; Keynote: 30 mins; Invited talk: 20 mins; Others: 15 mins)

## 09:00-09:30 Opening Ceremony

## 09:30-11:45, Plenary Session

Presider: Perry Ping Shum, Southern University of Science and Technology, China

## T1A.1 • 09:30 Plenary



Saturday, 27 July

**Gold-fluid-glass: enhancing light-matter interactions with nanoparticles in photonic liquid crystal fiber microstructures,** Prof. Tomasz R. Woliński, *Warsaw University of Technology, Poland.* Photonic crystal fibers filled with liquid crystals (LCs) offer a high level of tunability due to significantly improved control of their spectral, polarizing, and guiding properties. Due to high electric field sensitivity and thermo-optic properties, they are still promising novel optical materials for developing modern photonic sensors and in-fiber telecommunication devices, providing interesting tunable properties. Recently, gold nanoparticles-doped nematic liquid crystals were found to significantly lower threshold voltage and speed up response times to a few milliseconds by interacting with liquid crystals in microstructured photonic liquid crystal fibers. In this work, the optical properties of the selected photonic microstructures doped with gold nanoparticles based on protocols are discussed. Starting from each works with elastical antical fibers with liquid crystals were found to fiber and the selected photonic microstructures doped with gold nanoparticles based on microstructures doped with gold nanoparticles based on the selected photonic microstructures doped with gold nanoparticles based on the selected photonic microstructures doped with gold nanoparticles based on the selected photonic microstructures doped with gold nanoparticles based on the selected photonic microstructures doped with gold nanoparticles based on the selected photonic microstructures doped with gold nanoparticles based on the selected photonic microstructures doped with gold nanoparticles based on the selected photonic microstructures doped with gold nanoparticles based on the selected photonic microstructures doped with gold nanoparticles based on the selected photonic microstructures doped with gold of liquid crystals in the field of liquid crystals in the field of liquid crystals were found to selected photonic microstructures doped w

various liquid crystal materials are discussed. Starting from early works with classical optical fibers with liquid crystals we present the latest achievements in the field of liquid crystal infiltrated photonic crystal fibers modified by using metallic (gold) nanoparticles. These properties are of the highest importance since they allow for improved operating parameters of perspective optofluidic photonic switching devices. It has been shown that the photonic liquid crystal microstructures doped by gold nanoparticles can provide promising tunable optical properties simultaneously enhancing temperature stability of the LC-system providing promising optical materials for realizing electro-optical modulation and switching as well tunable filter applications and sensing capabilities providing better transmission properties.

## T1A.2 • 10:15 Plenary



**Recent Advances in Optical Fiber Communication-Sensing-Integrated Networks (OFC-S-IN),** Yun-Jiang Rao, University of Electronic Science and Technology of China. In 2009, we proposed the concept of OFC-SIN, for the first time, which is verified by combining phase-sensitive optical time domain reflectometry ( $\Phi$ -OTDR), i.e. the base of optical fiber distributed acoustic sensing (DAS) technology, and Ethernet Passive Optical Network (EPON). Distributed intrusion detection and online fault location of branch fibers in EPON are realized simultaneously. Our work and other research2-5 indicates that the existing optical communication network infrastructure can be used as a powerful sensing grid based on ubiquitous optical fibers imbedded under cities to provide the security service for optical networks themselves and surrounding facilities.

## T1A.3 • 11:00 Plenary



**Next Generation Optical Transport Technologies for Computing Power Network**, Xiongyan Tang, *China Unicom Research Institute, China*. Computing power network has become the key information infrastructure in the digital economy era. This presentation will focus on all optical transport technologies for computing power network. Firstly, the background of the national "East Data, West Computing" project will be introduced, and the requirements of AI-driven computing infrastructure on transport networks will be discussed. Then this presentation will analyze the current status and development trend of some key optical technologies including C+L-band 400G/800Gbps transmission systems for data center interconnections , optical circuit switching for data center networking, and hollow core fibers for lower latency transmission. Finally, this presentation will give China Unicom's practice of building all-optical base for "East Data, West Computing" project.

11:45-13:30 Lunch Break

#### Room 301, Track 1

#### 13:30-15:30

Sa2A • Fibers & Fiber Devices I

Presider: Livang Shao, Southern University of Science and Technology, China

## Sa2A.1 • 13:30 Invited



**Research on Optical Fiber Mode Excitation** and Longitudinal Evolution Characterization, Li Pei; Beijing Jiaotong University. TFrom the comprehensive parameters and physical laws inside the optical fiber. This

work will comprehensively improving the accuracy and performance evaluation level of the optical fiber measurement.

## Su4A.2 • 13:50



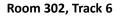
Ultra-sensitive all-fiber air pressure sensors based on the Optical Vernier Effect. Changyuan YU, The Hong Kong Polytechnic Universitv. China. Employing the multi-beam interference effect and Optical Vernier effect, all-fiber interference type

sensors based on different micro-structure fibers are fabricated for high-sensitivity air pressure measurement.

#### Sa2A.3 • 14:10 Invited



All fiber mode conversion and multiplexing devics, Yan-ge Liu; Nankai University.



13:30-15:30 Sa2B • Measurement & Imaging I Presider: Xiaobei Zhang, Shanghai University, China

#### Sa2B.1 • 13:30



Sa2B.3 • 14:10

Quartz Tuning Fork based Laser Spectroscopy Sensing, Yufei Ma; Harbin Institute of Technology. Photoacoustic spectroscopy (PAS) is identified as an advanced technique for trace sensing. A recent improvement of traditional PAS is quartz-enhanced photoacoustic spectroscopy (QEPAS). In this presentation, the latest research progress of QEPAS will be discussed.

#### Invited Sa2B.2 • 13:50

Super-resolution imaging in a lumen, Qing Yang; Zhejiang University.

Heterogeneous

**Optical Fibers for Sensing Applications, Fufei** 

Invited

Pang; Shanghai University.

Metal-Silica



#### 13:30-15:30

Sa2C • Optoelectronic Integration I Presider: Yong-Zhen Huang, Chinese Academy of Sciences, China

## Sa2C.1 • 13:30 Invited



High-performance photonic devices with multimode waveguide gratings, Daoxin Dai; Zhejiang University. We give a review for recent progresses of on-chip wavelength-

selective photonic devices based on multimode waveguide gratings by using silicon

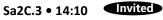
photonic waveguides and thin-film lithium-niobate photonic waveguides, particularly including multi-channel photonic filters for passive optical networks and dispersion controllers on the chip.

#### Sa2C.2 • 13:50



photonic integrated circuits, Linjie Zhou; Shanghai Jiao Tong University.

Low-loss phase change optical devices for





Integrated

**On-chip Optical Spectrometers with Sub-nm** Resolution, Lei Zhang; Beijing University of Posts and Telecommunications. We will demonstrate several types of integrated optical spectrometers on the silicon-on-insulator

platform with sub-nm resolution. These prototypes include high-finesse filter-based and computational spectrometers.

#### Room 305. Track 5

13:30-15:30 Sa2D • Optical Signal Processing I Presider: Hongwei Chen, Tsinghua University, China.

#### Invited Sa2D.1 • 13:30



Saturday, 27 July

Talbot processing for communication and microwave photonic applications, Jose Azana, Institut National de la Recherche Scientifique (INRS), Canada ; National de la Recherche Scientifique (INRS), Canada.

#### Room 306, Track 3

13:30-15:30 Sa2E • Optical Networks I Presider: Hui Yang, Beijing University of Posts and Telecommunications, China

## Sa2E.1 • 13:30 Invited

Optical Networks, Jie Zhang; Beijing

#### Room 307, Track 2

13:30-15:30 Sa2E • Optical Transmission I Presider: Hongyan Fu, Tsinghua University, China

#### Sa2F.1 • 13:30 Invited



Kalman Filter Based Equalization Algorithms for **Optical Fiber Communications,** Xiaoguang Zhang; Beijing University of Posts and Telecommunications.

#### Invited Sa2D.2 • 13:50



Integrated Microwave Photonic Sensor, Xiaoke Yi, Xiaoyi Tian, Yeming Chen and Liwei Li : The University of Svdnev. Australia.

#### Sa2E.2 • 13:50 Invited



**Experimental Demonstration of Hitless OCS-based DCN Reconfiguration to Steer** Multi-Class Traffic, Qian Lv, Zhihuang Ma and Zuging Zhu, University of Science and Technology of China, China. To realize hitless optical datacenter network reconfiguration

Research and Progress of F5G Advanced

University of Posts and Telecommunications.

for improving the specific QoS of multi-class traffic flows, we propose a novel topology engineering and traffic engineering scheme, and demonstrate its effectiveness experimentally in a real testbed.

#### Sa2F.2 • 13:50 Invited



Structured light communications and beyond, Jian Wang; Huazhong University of Science and Technology. In this talk, we will report recent advances in structured light communications and beyond. We first

introduce the basci concept and key technologies of structured light manipulation.

## Sa2D.3 • 14:10



Integrated microwave photonic devices based on sillicon nitride and lithuim niobate hybrid platform, Yonghui Tian; Lanzhou University.

#### Sa2E.3 • 14:10 Invited



Intra-Vehicle Optical Networks, Qin Liang and Gordon Ning Liu; Soochow University. Intelligent connected vehicles require high bandwidth due to the increased sensors and improved architectures. Optical

communications provide several advantages over copper cables in intra-vehicle networks, but face many challenges, especially the harsh operating environment.

#### Sa2F.3 • 14:10 Invited



10-mode transmission over 2320 km using **SDM technologies,** Lin Zhang; *Tianjin* University.

#### Room 301, Track 1

## Sa2A.4 • 14:30



Functional Optoelectronics Fibers Towards Intelligent Space, Guangming Tao; Huazhong University of Science and Technology.



#### Room 302, Track 6

## Sa2B.4 • 14:30 Invited

Intelligent optical fiber sensors for human health diagnosis, Qizhen Sun; Huazhong University of Science and Technology.

#### Room 303, Track 4

## Sa2C.4 • 14:30 Invited



mid-infrared Novel suspended nanomembrane silicon photonic integrated circuits for gas sensing, Zhenzhou Cheng; Tianiin University.

## Sa2A.5 • 14:50 Invited



Mid-infrared supercontinuum laser source based on fluorotellurite fibers, Guanshi Qin; University. We demonstrated Jilin 50-W-level mid-infrared supercontinuum laser source. ultrabroadband

supercontinuum generation from 600 to 5400 nm, and tunable Raman soliton generation from 2 to 4  $\mu$  m in newly-developed all-solid fluorotellurite fibers.

#### Su2B.5 • 14:50 Invited

Microbottle resonator based milli-Newton mechanical force sensor, Xiaobei Zhang; Shanghai University. We demonstrate a milli-Newton mechanical force sensor based on a whispering gallery mode microbottle resonator (MBR) with the maximum sensitivity of -10.48 pm/mN obtained, which shows great potential in biomedical and structural health monitoring.

## Sa2C.5• 14:50 Invited



Saturday, 27 July Simplified photonic reservoir computing systems, Niangiang Li; Soochow University.

## Sa2A.6 • 15:10 Invited



Composite glass and fiber devices, Guoping Dong; South China University of Technology.

#### Sa2B.6 • 15:10 Invited



Research on fiber-optic VOC gas sensing technology, Ya-nan Zhang; Northeastern University.

## Sa2C.6• 15:10 Invited



InP membrane optoelectronics for large-scale photonic circuits, Yi Wang; Eindhoven University of Technology, Netherlands.

15:30-16:00 Poster Session 1 & Coffee Break. 2F

#### Room 305, Track 5

## Room 306, Track 3

#### Sa2D.4 • 14:30 Invited



Microwave photonic cognitive system and the key technologies, Dan Zhu; Nanjing University of Aeronautics and Astronautics.



## Sa2E.4 • 14:30 Invited

Key Technologies in Dynamic Optical Satellite Networks, Yongli Zhao; Beijing University of Posts and Telecommunications. Room 307, Track 2

## Sa2F.4 • 14:30 Invited



Short-reach multimode optical fiber transmission, Jianping Li; Guangdong University of Technology.

## Sa2D.5 • 14:50 Invited



ResearchonOpticalCarrier-basedMicrowaveInterferenceSensingTechnologybasedonFiberRingResonator,LiHuazhongUniversityofScienceandTechnology.

## Sa2E.5 • 14:50 Invited

NBench: A Comprehensive SDN Controller Benchmarking Suite, Yikun Li, Baokang Zhao, Yuxiang Hu and Qin Xin, National University of Defense Technology. NBench introduces an innovative benchmarking suite for comprehensive SDN controller performance

assessment, enhancing evaluation capabilities beyond existing tools.

## Sa2F.5 • 14:50 Invited



Advanced ROPA Scheme for Unrepeatered 100G Transmission System, Wu Gaofeng, Gu Wenhua, Wang Lei, Gui Sang and Li Xianqing, Nanjing University of Science and Technology, China. This paper proposes the idea of applying bi-directional ROPA and multiple

dedicated fibers to pump RGU cooperatively. Combined with distributed Raman amplifier applications, it extends the transmission distance and capacity of unrepeatered 100Gb/s systems.

#### Sa2D.6 • 15:10 Invited



Research Progress on Microwave Photonic Radar Applications, Jianghai Wo; Jinan University.

#### Sa2E.6 • 15:10

Key Promising Technologies for Submarine Optical Network, Qiuyan Yao, Nan Feng, Da Qing, Hui Yang and Jie Zhang; *Beijing University of Posts and Telecommunications*. Aiming at the requirements of submarine optical networks, this paper analyzes the key promising technologies in terms of the space-division multiplexing, filterless architecture, low power consumption, and flexibility. The accordingly trends and challenges are addressed.

## Sa2F.6 • 15:10 Invited



**Experimental demonstration for ultrabroadband long-haul SDM transmission over weakly-coupled few-mode-multiple-core fibers,** Juhao Li; *Peking University.* We present recent progress for weakly-coupled SDM transmission

experiments. 5.27 Pb/s 7-core-10-mode transmission over 50 km fibers with up to 4X4 MIMO-DSP and 205.8Tb/s 7-core-2-mode transmission over 1170 km fibers with 2X2 MIMO-DSP are demonstrated.

#### 15:30-16:00 Poster Session 1 & Coffee Break

#### Poster Session 1 (Best Poster Paper Award, 15:30-16:00)

#### P1.1 🌞

Triple band microstrip antenna based on metamaterials for 5G and WLAN applications, Xuemei Zheng, Han Wu, Ziwei Zhao; Northeast Electric Power University, China. In this paper, a metamaterial-based tri-band antenna is proposed to address the current demand for miniaturization and versatility of wireless devices for 5G communications.

#### P1.2 🌞

A Magnetic Field Fiber Sensor Based on Side Hole Fiber Filled with Magnetic Fluid in Fiber Ring Laser Cavity, Weihao Lin, Yifan Ye, Jie Hu, Fang Zhao, Jinna Chen, Li-Yang Shao, Perry Ping Shum; *Southern University of Science and Technology, China.* We proposed a magnetic field sensor based on magnetic fluidic filled SHF inside fiber ring laser. Its sensitivity is 0. 4365 nm/mT. Thanks to the high SNR of the fiber laser, its SNR is 50 dB.

#### P1.3 🔆

Principal Modes and Anti-principal Modes of Curved Multimode Fibers, Jiawei Xu, Lele He, Xiaosheng Xiao; *Beijing University of Posts and Telecommunications, China.* We demonstrate that multimode fibers possess curved principal modes (CPMs) that resist fiber bending and anti-CPMs that are sensitivity to fiber bending. These modes are expected to be applied in fiber communication and sensing.

#### P1.4 🏾 🌞

**Experimental Demonstration of Short-reach C-Band 44. 112 Tbps Coherent Optical Transmission with S- and L-Band Dummy Channels Based on PS-4096-QAM,** Yutian Li, Feng Tian, Jianwei Zhou, Tianze Wu, Xiaolong Zhu, Qi Zhang, Qinghua Tian, Fu Wang, Zhipei Li and Xiangjun Xin; *Beijing University of Posts and Telecommunications, China.* We demonstrate a coherent transmission system covering S-, C-, + L-band over 20km standard single mode fiber (SSMF) based on PS-4096-QAM. The C-band throughput is measured to be overall 44. 112 Tb/s after transmission.

#### P1.5 🛛 🌞

Design of Flat and Spiral Phase Plates for Vortex Beam Generation for 3D Printing Purpose, Wanting Ji, Wanyu Wu, Yarou Chen, Ou Xu, Quandong Huang and Xinyong Dong; *Guangdong University of Technology, China.* We present a study of flat and spiral phase plates for vortex beam generation, which serves for 3D printing purposes. Vortex beams topological charges are determined by refractive index and height of the phase plates.

#### P1.6 🏾 🍀

A Brillouin amplified recirculating frequency shifter loop for generating high signal-to-noise ratio optical frequency comb, YYue Wang, Xiang Zhang, Yihan Wang, Yin Xu, Hualong Bao; *Soochow University, China*. We demonstrate a scheme for generating high signal-to-noise ratio optical frequency combs based on a Brillouin amplified recirculating frequency shifter loop. The SNR of the comb teeth is improved from 12 dB to 30 dB.

#### P1.7 🛛 🌞

Numerical Study of Helical Multicore Fiber Based Shape Sensing with Arbitrary Twist Distribution, Xingyuan Ju, Mengshi Zhu, Liang Zhang, Heming Wei, Fufei Pang; *Shanghai University, China*. A comprehensive numerical method is developed based on rotational minimum frames to analyze the helical multicore fiber with specific geometry for 3D shape sensing when arbitrary bending and twisting occur simultaneously.

#### P1.8 🔅

Bulk-structured Ti2AlC for mode-locked pulses generation in an all-normal dispersion fiber laser, Kang Zhang, Guoyu Li, Fei Xie, Li Li and Lili Liang; *Handan University, China*. A mode-locked Yb-doped fiber laser (YDFL) with a width of 26 ns based on MAX phase material Ti2AlC was constructed. This work suggests that Ti2AlC can serve as a novel mode-locker in YDFL.

#### P1.9 🔅

**Experimental Analysis of Correlation Properties in Transition States of Raman Random Fiber Laser,** Longqun Ni, Yifei Qi, Xingyu Bao, Zinan Wang; *University of Electronic Science and Technology of China, China.* The correlation properties of RRFL in transition states are experimentally investigated for the first time. The temporal correlation increases continuously, while the shape of spectral correlation region transitions from central-correlated square to sides-correlated cross.

#### P1.10 🛛 🌞

Designing mode conversion metasurface based on simulated annealing and genetic algorithms, Zhaodong Hao, Dengke Xing, Jianfei Liu; *Hebei University of Technology, China*. Metasurfaces can achieve directional control of light, and have numerous applications in the field of optics. We propose a design method for generating mode conversion metasurfaces based on simulated annealing and genetic algorithms.

#### P1.11 🏾 🏓

Numerical Analysis of Photonic Lanterns for the Fabrication via Pull-cone and 3D Printing, Wanyu Wu, Wanting Ji, Guanhua Wang, Ou Xu, Quandong Huang, Xinyong Dong; *Guangdong University of Technology, China*. We numerically analyze the forming of photonic lantern by using traditional pull-cone and 3D printing fabrication methodology. The results show that the 3D printed photonic lantern has better performance in mode conversion in the calculation.

#### P1.12 🔅

Inverse-design of random fiber laser with saddle-shaped spectrum, Yifei Qi, Xingyu Bao, Longqun Ni, Zhenyu Ye, Jing Zhang, Pan Wang, Runnan Guan and Zinan Wang; *University of Electronic Science and Technology of China, China*. Based on convolutional neural network and dual-energy-level NLSE model, we realize the inverse design of RFL, for the first time. And combined with the dual-cavity coupling structure, a broadband saddle-shaped spectrum is realized experimentally.

#### Poster Session 1 (Best Poster Paper Award Session) 15:30-16:00

#### P1.13 🔆

Multiparameter sensing via multiresonant analysis of tilted fiber Bragg grating, Meihui Zhang, Wenjun Zhou and Changyu Shen; *China Jiliang University, China*. We propose and experimentally demonstrate a multiparameter sensing method, based on multiresonant analysis of a tilted fiber Bragg grating (TFBG). With calibrated multiresonant properties, multiparameter sensing can be achieved via a single TFBG.

#### P1.14 🏾 🌻

**Coherent pulse compression ranging based on an acousto-optic frequency shifting loop,** Quanyang Zhang and Juanjuan Yan; *Beihang University, China.* A laser ranging system based on an acousto-optic frequency-shifting-loop is demonstrated using coherence pulse compression. Linearly frequency-modulated waveforms with a 10-GHz bandwidth are generated. Ranging with errors < 1mm over a 4-m range is achieved.

#### P1.15 🔆

An Integrated Optical Fiber Sensor for Simultaneous Measurement of Temperature and Salinity Based on Sagnac Loop and TFBG, Yuhui Liu, Weihao Lin, Xuming Zhang and Li-Yang Shao; Southern University of Science and Technology, China. We proposed a sensor for simultaneous measurement of temperature and salinity based on TFBG and Sagnac loop. The sensor has a temperature sensitivity of 1. 395 nm/°C and the sensitivity for salinity detection is 0. 004 nm/%.

#### P1.16 🏾 🍀

**MWNTs-COOH** assisted **STED-inspired** lithography for sub-50 nm nanowire fabrication, Fei Xie, Guoyu Li, Kang Zhang and Lili Liang;*Hebei University of Technology, China.* A novel photoresist based on acrylates and MWNTs-COOH enhanced STED lithography for fabricating 48-nm polymer nanowires.

#### P1.17 🔆

Molecularly imprinted polymer high performance differential sensing system for specific propofol concentration monitoring, Bowen Yang, Lili Liang, Fei Xie, Li Jin; Shanxi University & Handan University, China. We present a high performance differential sensing system based on a molecularly imprinted polymer (MIP) film of microfibre interferometer (MFI) combined with a fibre Bragg grating (FBG) for the detection of a specific isopropylphenol concentration.

#### P1.18 🔆

**High isolation antenna based on mirror symmetric electromagnetic metamaterials,** Xuemei Zheng and Tongchao Zhang;*Northeast Electric Power University, China.* A system integrated with multiple antenna elements suffers from the adverse effects of mutual coupling arising from the close proximity of the elements.

#### P1.19 🏾 🌹

Effects of Random Birefringence in Multimode Fibers on Nonlinear Beam Self-cleaning, Chaoyang Geng and Xiaosheng Xiao; Beijing University of Posts and Telecommunications, China. Based on a proposed theoretical model, the spatial beam self-cleaning in multimode fibers with random birefringence are analyzed, and the beam self-cleaning is found to resist the random birefringence at high input peak power.

#### P1.20 🏾 🇮

High-resolution spectroscopy based on interleaved Brillouin optical frequency comb, Yihan Wang, Xiang Zhang, Yin Xu, Shaozhuang Yao and Hualong Bao; *Soochow University, China.* We propose a high-resolution spectroscopy system based on an interleaved Brillouin optical frequency comb. The high spectral resolution is verified by measuring FBG transmission over a wide bandwidth of 12nm.

#### P1.21 🔆

Thin-film lithium niobate modulator formed by 3D electrodes on Mach-Zehnder interferometer, Xiaofeng Liu, Quandong Huang, Jiali Zhang, Zixin Chen, Bin Xiao, Jianping Li, Di Peng, Ou Xu and Yuwen Qin; *Guangdong University of Technology, China.* We propose a thin-film lithium niobate (TFLN) modulator based on 3D electrodes with a typical design of the modulator with a modulation arm length of 5 mm to achieve a bandwidth of 151 GHz.

#### P1.22 🔆

**L-band extended EDFA co-pumped by C-band laser,** Yongfang Zou, Manbing Lin, Zhikai Wu, Xinyong Dong; *Guangdong University of Technology, China*. A two-stage L-band extended erbium-doped fiber amplifier (LE-EDFA) with a 20 dB gain covering 1570-1622 nm and a minimum noise figure of 5.0 dB is demonstrated by employing a C-band laser as the co-pump.

#### P1.23 🏾 🗮

Sensing Bandwidth Enlargement with Orthogonal Codes and Mismatched Filters in Distributed Acoustic Sensing System, Anchi Wan, Yongxin Liang, Yingqing Wu, Shibo Zhang, Zhenyu Ye, Zinan Wang; University of Electronic Science and Technology of China, China. With orthogonal codes and corresponding mismatched filters, the multiplexing of sensing channels on the same spectrum is first achieved in distributed acoustic sensing (DAS) based on Rayleigh backscattering, doubling the sensing bandwidth.

#### P1.24 🔶 🔆

A lightweight and anti-interference method for intrusion events recognition with fiber optic DAS system, Bo Yang, Rui Tian, Hao Luo, Chao Cai, Bingying Chen, Shixiong Zhang, Yilin Gan, Chao Xiong, Zhijun Yan, Qizhen Sun; *State Grid Wuhan Electric Power Supply Company, China.* A lightweight and anti-interference method for intrusion events recognition with DAS system is proposed. The proposed model achieves the average accuracy of 98. 2% for seven events with the model size of 1. 77 M Flops.

#### Poster Session 1 (Best Poster Paper Award Session) 15:30-16:00

#### P1.25 🔆

Gain optimization of lithium niobate ridge waveguide amplifier, Yuqing Zhao, Ziming Dong, Guoqing Sun, Yaxin Wang, Lei Ding, Liqin Tang, Yigang Li; *Nankai University, China*. An erbium-doped lithium niobate waveguide amplifier covered with an erbium-doped aluminum oxide cladding is designed. Combine with the light field confinement factor and the effective mode area to optimize the mode field distribution and gain.

#### P1.26 🔶

A Simple and Generalizable Algorithm for Multimode Fiber Specklegram Based Deformation Sensor, Hongjian Xu, Lele He, Xiaosheng Xiao; *Beijing University of Posts and Telecommunications, China.* A K Nearest Neighbors based algorithm is proposed for multimode fiber specklegram based deformation sensor. This algorithm well balances the complexity and generalization of deformation detection, which is validated by experimental results.

#### P1.27 🛛 🌞

Waveguide amplifiers in SiN photonics heterogeneous integration with Er:Yb:TeO2 thin films, Ziming Dong, Yuqing Zhao, Guoqing Sun, Yaxin Wang, Lei Ding, Liqin Tang, Yigang Li; Nankai University, China. A heterogeneous optical amplifier is proposed in silicon nitride waveguide via integration with an erbium-ytterbium co-doped tellurium oxide layer. This work provides an efficient and innovative strategy to implement SiN-based integrated waveguide amplifiers.

#### P1.28 🔆

**On-Chip Implementation of Intelligent Signal Recognition in Fiber-Optic DAS,** Yiyu Liu, Yongxin Wu, Xiben Jiao, Huijuan Wu and Yunjiang Rao; *University of Electronic Science & Technology of China, China.* Proposed FPGA-based accelerator method for fiber-optic DAS signal recognition achieves 0. 398ms processing time per spatial node, with 97. 37% accuracy, using only 25W power—ideal for efficient, accurate safety monitoring.

#### P1.29 🔆

A phase modulation based and frequency stabilized optoelectronic oscillator using a self-phase locking loop, Shengyu Wang and Juanjuan Yan; *Beihang University, China.* A 10-GHz phase modulation based optoelectronic oscillator with a self-phase locking loop is demonstrated. The results show that the Allan deviation is reduced by 2 orders of magnitude with frequency fluctuations <7 kHz within 1h.

#### P1.30 🛛 🌞

Arbitrary guide mode multiplexer based on heterogeneous integrated directional couplers formed by multi-step photolithography, Kedi Peng, Jiaqi Ran, Jiali Zhang, Ou Xu, Xinyong Dong, Yuwen Qin, Quandong Huang; *Guangdong University of Technology, China.* We demonstrate a mode multiplexer based on heterogeneous integrated directional couplers formed by multi-step photolithography, which serves to manipulate arbitrary modes (the E11, E21 and E12 modes) from the few-mode waveguide.

#### P1.31 🔅

Cache-assisted Task Offloading and Resource Optimization

for LEO Network, Furong Chai, Qi Zhang, Xiangjun Xin, Yanxiang Wang, Yuanfeng Li, Meng Sun, Dandan Sun, Feng Tian, Qinghua Tian, Yongjun Wang, Leijing Yang, Fu Wang, Sitong Zhou; *Beijing University of Posts and Telecommunications, China*. We proposed a cache-assisted task offloading and resource allocation model and a deep reinforcement learning (DRL) based method for low-earth orbit (LEO) network. Our method takes obvious advantages in reducing delay and energy consumption.

#### P1.32 🛛 🌞

An Ultra-compact Four-channel Wavelength Demultiplexer by Inverse Design, Jiahao Li Li, Zhiyang Xie, Ying Qiu, Lin Wu, Ming Luo, Bowen Jia, Tianye Huang, Xiang Li; China Information and Communication Technologies Group Corporation, China. We demonstrate a 1×4 wavelength demultiplexer on standard silicon-on-insulator platform working in the O-band by using inverse design algorithm. The device exhibits high transmission efficiencies and low crosstalk characteristics for the four channels.

#### P1.33 🔅 🔅

High-performance optical fiber differential urea sensing system for trace urea concentration detection with enhanced sensitivity using liquid crystals, Li Jin, Lili Liang, Fei Xie, Bowen Yang; shanxi university & handan university, *China*. Highly sensitive urea concentration detection is essential for human health diagnosis. We propose a compact differential sensing system consisting of microfiber functionalized urease combined with stearic acid-doped 4-cyano-4'-pentylbiphenyl and fiber Bragg gratings for urea detection.

#### P1.34 🛛 🌞

Efficient On-Chip Waveguide Characterization Using Image Processing Algorithm in Optical Lithography, Quankeng Huang, Wenchao Jiang, Quandong Huang; *Guangdong University of Technology, China.* We demonstrate an image processing algorithm for fast measuring waveguide chip dimensions during the optical lithography processing as an assistant tool for adjusting the fabrication parameters and improving the yield rates of the photonic chips.

#### P1.35 🛛 🍀

**Power Optimization for S+C+L-band Transmission Using a Self-adaptive Differential Evolution Algorithm,** Zixuan Wei, Jing Zhang, Rui Wang, Jinjiang Li, Hong Lin, Shaohua Hu, Kun Qiu; *University of Electronic Science and Technology of China, China.* We propose a differential evolution algorithm-based technique, using uniform or non-uniform power optimizations, to mitigate the SRS impact on S+C+L-band transmission. The optimized GSNR flatness can be reduced from 4. 61 dB to 0. 45 dB.

#### P1.36 🛛 🌞

Frequency-tunable microwave based on Brillouin laser frequency comb, Xiaojie Luo, Zhexin Zhang, Jiaxuan Wang, Yin Xu, Hualong Bao; *Soochow University, China*. We obtain a frequency-tunable microwave in a stable state. The combination of four-wave mixing, stimulated Brillouin scattering, frequency shifting optical injection locking, and modulation sideband optical injection locking ensures high quality of the microwave signal.

#### Poster Session 1 (Best Poster Paper Award Session) 15:30-16:00

#### P1.37 🔅

Subwavelength grating coupler for mid-infrared light coupling to an ultra-thin silicon waveguide, Changguang Zou, Qiyue Lang, Rongxiang Guo, Yaru Wang, Jiaqi Wang, Junfeng Jiang, Kun Liu, Tiegen Liu, Zhenzhou Cheng; *Tianjin University, China.* We demonstrated a key silicon photonic component, namely, a focusing subwavelength grating coupler for mid-infrared light coupling. Specifically, the grating coupler shows an efficiency of -10 dB at a center wavelength of 3. 27  $\mu$ m.

#### P1.38

A Highly Efficient Unsupervised Recognition Method For Fiber-optic DAS With Spiking Convolutional Neuron Network (SCNN), Haibei Liao, Dengke Gan, Chenrui Xu, Huijuan Wu, Yunjiang Rao; University of Electronic Science & Technology of China, China. In this paper an efficient unsupervised spiking convolutional neural network (SCNN) is proposed for the first time to improve the event recognition performance and timeliness simultaneously in the fiber-optic distributed acoustic sensor (DAS).

#### P1.39

**Research on denoising of second harmonic signal in TDLAS based on BOA-VMD method,** Xiang Zhu, Huacai Chen, Lifu Liu, Qiang Wu, Yugang Zhao; *China Jiliang University, China.* This paper proposes and simulates a denoising method of TDLAS second harmonic signal based on butterfly optimization algorithm-variational mode decomposition method, which is used to improve the accuracy of system.

#### P1.40

**Prediction of tidal flat settlement based on array displacement meter and mamba model,** Chunying Xu, *Shantou University, China.* In this paper, an array displacement meter based on MEMS is used to monitor the settlement of tidal flat. Through experiment, the Mamba model has achieved good performance in the prediction of tidal flat settlement.

#### P1.41

Fiber Mach-Zehnder interferometer for simultaneous measurement of strain and temperature based on misaligned peanut-shape structure, Yalong Wei, Wenyan Xu, Xue Liu, Ju Zhou, Yujia Zhao, Bing Wu; University of Jinan, University of Jinan, China. This study explored the strain and temperature detection of peanut-shape fusion structures under different amounts of misalignment, the results showed that misaligned peanut-shape structures can significantly improve the strain sensitivity of the sensor.

#### P1.42

Efficient Fluorescence Coupling Integrated Fiber Magnetometer based on Nitrogen Vacancy Centers, Yuhao Li, Li Xia, Junchang Huang; *Huazhong University of Science and Technology, China*. Fibre optic probe with integrated nitrogen vacancy (NV) centre enhances magnetic field sensing capability. This all-fibre optic magnetometer system improves fluorescence collection and magnetic sensitivity to 3. 062% and 5. 3 nT/radix Hz, respectively.

#### P1.43

Three-dimensional vectorial magnetic field sensor based on magnetostrictive materials, Yan Zuo, Li Xia; *University of Jinan, China*. We use 3D printing technology to construct a three-dimensional sensor frame and combine the Terfenol-D with FBG grating to realize three-dimensional vector magnetic field sensing.

#### P1.44

**Axial Strain Monitoring System Based on Long Period Fiber Grating,** Jie Jiang, Li Li, Guoyu Li and Lili Liang; *Handan University, China.* The resonance-peak intensity of LPFG is sensitive to strain, so the strain-induced change in optical power is converted into a voltage signal and collected, which realizes the strain monitoring in the range of 0-1000με.

#### P1.45

Double-layer secrecy optical communication system incorporating chaotic encryption and signal covert transmission, Jiaxi Feng, Xinyi Li, Zhuolin Wen, Yuehua An, Xinyong Dong, Zhensen Gao; *Guangdong University of Technology, China.* A double-layer secrecy optical communication system incorporating chaotic encryption and signal covert transmission is proposed. 10Gb/s data is encrypted by the shared key and transmitted stealthily over the public signal, making it undetectable to eavesdroppers

#### P1.46

Tapered Single-mode Optical Fiber pH Sensor coated with Hydrogel working at the dispersion turning point, Xue Liu, Wenyan Xu, Yalong Wei, Ankang Chen, Jing Li, Dunyou Liang, Bing Wu, Yujia Zhao; *University of Jinan, China*. The study explored a pH sensor based on a tapered single-mode optical fiber coated with calcium alginate hydrogel operating at the dispersion turning point (DTP), and the results showed that the DTP can enhance sensitivity.

#### P1.47

Analysis of Influencing Factors in Quantum Neural Network for Solving Classification Problem, Jing Wang, Meng Zhang, Jun-Sen Lai and Fang Li; *University of Jinan, China*. Quantum Neural Network has been used for experimental validation to study the effects of encoding methods, ansatz types and optimizer variations on the accuracy of QNN training results.

#### P1.48

Study on the Kinetics of Manganese-Containing Sol on the Positive Electrode Surface of Zinc-Manganese Battery for Photovoltaic Charging, Xuetong Cao, Jie Xue, Long Qin and Xing Fan; *Chongqing university*. Enhancing the understanding of the reaction-diffusion kinetic behavior of the manganese-containing sol has guiding significance for improving the cycle performance of zinc-manganese dioxide battery and further enhancing the stable output of photovoltaic energy storage.

#### Room 301, Track 1

#### 16:00-18:00

Sa3A • Fibers & Fiber Devices II

Presider: Changyuan Yu, The Hong Kong Polytechnic University, China

## Sa3A.1 • 16:00 Invited



Non-degenerated vector field fiber --Concept, design and applications, Chongqing Wu; Beijing Jiaotong University.

## Sa3A.2 • 16:20 Invited



**Dispersion Compensating Fiber for OAM** Modes, Yang Yue and Wenpu Geng; Xi'an Jiaotong University. Optical fibers with concentric ring cores designed for extremely dispersive OAM modes are summarized. It details the properties of

OAM modes in double ring-core fibers and introduces PCFs and triple ring-core fibers with similar principles.

#### Room 302, Track 6

#### 16:00-18:00

Sa3B • Measurement & Imaging II Presider: Ya-nan Zhang, Northeastern University, China

#### Sa3B.1 • 16:00 Invited



Distributed fiber-optic sensing system using Rayleigh Brillouin and Raman scattering, Xinyu Fan; Shanghai Jiao Tong University. To achieve simultaneous measurement of dynamic and static parameters as well as complete separation of temperature and strain in distributed fiber-optic sensing systems, a method of

simultaneously using Rayleigh Brillouin and Raman

#### Sa3B.2 • 16:20 Invited

scattering is proposed.



Femtosecond laser directly-written in-fiber microstructural devices array for highperformance distributed sensing, Jun He; Shenzhen University.

#### Room 303, Track 4

#### 16:00-18:00

Sa3C • Optoelectronic Integration II Presider: Daoxin Dai, Zhejiang University, China

#### Sa3C.1 • 16:00 Invited



Hybrid-cavity semiconductor lasers with a microcavity, Yong-Zhen Huang; *Chinese* Academy of Sciences. Single mode and optical feedback insentivity hybrid-cavity semiconductor lasers, composed of a

(deformed) square microcavity and a Fabry-Perot cavity, will be reported. Mode coupling and mode competition between microcavity mode and coupling mode are discussed.

## Sa3C.2 • 16:20 Invited



50Gbit/s Directly Push-Pull Modulated 1310nm AlGaInAs-InGaAsP/InP DFB Laser, Xun Li; McMaster University, Canada. We successfully demonstrated the operation of 1310nm AlGaInAs-InGaAsP/InP distributed feedback

lasers under the direct push-pull modulation scheme with a 50Gbit/s binary NRZ signal.

## Sa3A.3 • 16:40 Invited



Single-crystal perovskite optical fiber, Lei Su; Queen Mary University of London, UK.

#### Sa3B.3 • 16:40 Invited



Chaos distributed optical fiber sensing, Mingjiang Zhang; Taiyuan University of technology. Chaos distributed fiber sensing has been reported with the significant advantage of decoupling between the spatial resolution and sensing range for achieving a larger

number of resolving points and ultra-high spatial resolution.

#### Sa3C.3 • 16:40 Invited



Multi-wavelength DFB Laser array based on **REC technique for optical I/O,** Xiangfei Chen; Nanjing University.

#### Room 305, Young Scientists Award

#### 16:00-18:00

Sa3D • Young Scientists Award Presider: Ping Shum, Southern University of Science and Technology, China

## Sa3D.1 • 16:00 Invited



Chaotic Feature Masking Against Attacks on Emitter Identification, Mingye Li, Zhi Chai, Xinran Huang, Yilin Qiu and Xuelin Yang, Shanghai Jiao Tong University, China. A security approach is proposed to mask the emitter identification attacks by generating

chaotic features. The success rate of attacks is <11%, and recognition accuracy >90% at 20 dB is verified for the authorized devices.

#### Sa3D.2 • 16:20 🔷

Key Enablers for Hardware-Efficient Neural Network Receiver in Short-Reach Optical Links, Zhaopeng Xu, Weisheng Hu and William Shieh, Peng Cheng Laboratory, China. This paper systematically studies hardware-efficient neural network-based equalization techniques for short-reach direct-detection optical systems. Transfer learning is applied to speed up training process, while pruning, multi-task learning and quantization are proposed for efficient equalization.

#### Sa3D.3 • 16:35 🚫

**Terabit Single-Ended Coherent Receiver Using a Partial 3×3 Coupler,** Yixiao Zhu, *Shanghai Jiao Tong University, China.* We propose a hardware-efficient single-ended coherent receiver structure using two arbitrary output tributaries of a 3×3 coupler. We experimentally demonstrate 1.008-Tb/s line rate (820-Gb/s net rate) PS-64-QAM signal reception after 80-km standard single-mode fiber transmission.

Room 306, Track 7

#### 16:00-18:00

Sa3E • Ultrafast Photonics I Presider: Pu Li, Guangdong University of Technology, China

#### Sa3E.1 • 16:00 Invited



Novel platform for octave spanning coherent light source from Ta2O5- based Nonlinear Waveguide and possible application therein, Chao-kuei Lee; *National Sun Yat-sen University.* In this talk, anomalous dispersion Tantalum Pentoxide

Ta2O5 based waveguide was designed for SCG due to its nature of two photon absorption free and high optical nonlinearity. Meanwhile, the high speed all optical modulation based on Ta2O5 waveguide will be introduced if possible.

#### Room 307, Track 2

16:00-18:00 Sa3F • Optical Transmission II Presider: Lin Zhang, Tianjin University, China

## Sa3F.1 • 16:00



**FSO Technologies for Cellular Mobile Communications,** Gihong Park and Hoon Kim, *Korea Advanced Institute of Science and Technology, Korea.* We delineate a few technical challenges of free-space optical communication technologies for cellular

mobile communications and propose potential solutions. They include direct incidence of sunlight into receiver, blockage of line-of-sight path, and accurate beam alignment.

## Sa3E.2 • 16:20 Invited



GHz harmonic mode-locked fiber laser using carbon nanotube, Chengbo Mou; Shanghai University.We demonstrated GHz harmonic mode-locked Er fiber laser using CNTs. Modulation depth induced pulse energy engineering will be discussed in addtion to

cavity nonlinearity, dispersion and optical spectral bandwidth.

## Sa3E.3 • 16:40 Invited



All-fiber second-harmonic generation and applications, Bigiang Jiang; Northwestern Polytechnical University.

## Sa3F.2 • 16:20 Invited



Integrated sensing and communication system based on OWC and LiDAR, Hongyan FU; *Tsinghua University.* We will review our recent research progress of the integrated sensing and communication system based on optical

wireless communication and high-speed LiDAR, with the focus on exploring and breaking through the key technologies.

#### Sa3F.3 • 16:40 Invited



High-speed free space chaotic optical communication based on vector light field manipulation, Ning Jiang; University of Electronic Science and Technology of China.

Room 301, Track 1

#### Sa3A.4 • 17:00 Invited



Al Optics scientist: Al for micro and nano Optics, Sheng Liang; Beijing Jiaotong University.



Room 302, Track 6

#### Sa3B.4 • 17:00 Invited

High precision UWFBG array sensing with linear phase modulation method, Feng Wang; Nanjing University. Room 303, Track 4

## Sa3C.4 • 17:00 Invited



High speed directly modulated SOA integrated with a DFB laser, Song Liang; Institute of Semiconductors, CAS. We report a 1.5  $\mu$  m InGaAlAs/InP high speed directly modulated SOA integrated with a DFB laser. Over 200mW optical power can be obtained. The SOA is

used for data modulation at up to 40Gb/s.

## Sa3A.5 • 17:20 Invited



Progressinfiberopticmicroandnanostructuresenablingtunablepolarizationcontrol,SlawomirErtman;WarsawUniversity ofTechnology,Poland.Tunablemicrostructuredopticalfibersallowingforcontrolofthepolarizationforfibersfibers

state of light will be presented. Less typical applications will also be discussed, including depolarization and attempts to further minimization by using 3D microprinting.



## Sa3B.5 • 17:20 Invited

Multi-parameter sensing based on backword and forward Brillouin scattering in optical fibers, Liang Wang; Huazhong University of Science and Technology.

## Sa3C.5 • 17:20 Invited



Silicon photonic integrated chip for wideband RF self-interference cancellation, Xiuyou Han; Dalian University of Technology. The RF self-interference is one of the key issues to be resolved for the application of In-band

full-duplex communications. We will present our recent work about silicon photonic integrated chip for wideband RF self-interference cancellation.

## Sa3A.6 • 17:40



Never before possible specialty optical fiber by 3D printing technology, Yanhua Luo; *Shanghai University.* 3D printing fiber technology is of great flexibility in structure and diversity in material, and has become

an emerging technology essential for specialty optical fibers and devices for photonic applications, e.g., Internet of Things.

## Sa3B.6 • 17:40 Invited



Specialty Fiber-based High Sensitivity Distributed Acoustic Sensing Technology, Huanhuan Liu; Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences.

## Sa3C.6 • 17:40 Invited



Parallel data transmission and dispersion compensation powered by soliton microcombs, Liangjun Lu; Shanghai Jiao Tong University.

18:00-20:00 Dinner Break

Room 305, Special 2 and YSA

Viewpoint Rotation Prediction based Resource-Efficient

Holographic Type Communication in EON enabled 6G

RAN, Xin Wang, Chengyuan Zhang, Yafei Wang and

Xuehua Li. Beijing Information Science and Technology

University, China. Viewpoint rotation prediction based

resource-efficient holographic type communication is

investigated in EON enabled 6G RAN. CensNet enhanced

PPO is used for feature extraction based DU-CU

deployment and RSA, with 40.1% joint objective

Room 306, Track 7

## Sa3E.4 • 17:00

Pulse generation based on soliton area theorem in fiber lasers, Luming Zhao; Huazhong University of Science and Technology. Determined by the soliton area theorem, we numerically obtained a mode-locked pulse with nanosecond pulse duration in a fiber laser by introducing giant anomalous dispersion.

#### Sa3E.5 • 17:20 🕇

Numerical and experimental investigations of versatile soliton moleculars in an all-polarization-maintaining figure-9 fiber laser, Huiting Tang, Zirui Yuan, Ni Feng and Renlai Zhou; Harbin Engineering University. Soliton molecules evolution is numerically and experimentally investigated in an all-polarization- maintaining figure-9 fiber laser, soliton molecules in different bound states can be regulated by changing the small signal gain or/and the waveplate angle.

#### Sa3E.6 • 17:35 🔺

Real-time observation of multimode-soliton explosion in a spatiotemporal mode-locked laser, Xinge Liu, Chaoyang Geng, Lili Kong and Xiaosheng Xiao, BUPT, China. Multimode-soliton explosion is experimentally observed in a spatiotemporal mode-locked multimode fiber laser.

#### Sa3E.7 • 17:50 🔺

**Observation of Switchable Polarization Temporal Kerr** Cavity Solitons, Hongbo Zheng, Tianye Huang, Xiang Li, Jing Zhang, Zhichao Wu and Perry Ping Shum; China University of Geosciences, Ching, In this paper, we study a nonlinear ring resonator consisting of single-mode and polarization-maintaining fibers and report the first direct experimental observations of switchable polari zation temporal cavity solitons in a monochromatically driven resonator.

Room 307, Track 2

#### Sa3F.4 • 17:00 Invited



Underwater Optical Wireless Communication Based on Multi-hop Transmission, Yang Qiu, Southwest Minzu University. Underwater optical wireless communication (UOWC) offers attractive advantages in security, data rates, and transmission latency. However, its

limitation in communication-range greatly hinters its application, and this report mainly discusses multi-hop routing technology suitable for UOWC.

#### Sa3F.5 • 17:20 Invited



Adaptive Transceiver Design for High-capacity Multi-modal Free-space Optical **Communications,** Zhouyi Hu; Beijing Jiaotong University. In this invited talk, we review our recent progress in implementing highcapacity mode-division multiplexed free-

space optical communication systems. Besides turbulence, the relatively high inter-mode crosstalk from a commercial multiplexer/demultiplexer has been taken into account.

## Sa3F.6 • 17:40 Invited



Coupling Regimes in Optical Systems with Essential Retardation, Mikhail Rybin and Alexev Dmitriev. ITMO University. Russia. We review recent reports describing different coupling regimes strong and weak coupling and regimes of PT-symmetry and EP in clusters

of nanoparticles. The nature of the by free-space coupling is in essential retardation effects.

## Sa3D.5 • 17:05 🔷

reduction than benchmark.

Sa3D.4 • 16:50 🛇

Designing complex integrated reconstructive spectrometers using inverse approach, Ang Li and Shilong Pan, Nanjing University of Aeronautics and Astronautics. China. A novel inverse design method for integrated reconstructive spectrometer is proposed. This method can lead to optimized and controllable performance of the spectrometer. It is validated on an integrated reconstructive spectrometer consisting of novel components.

#### Sa3D.6 • 17:20 🔿

Co-generated Brillouin lasers in a graphene overmodal microresonator for multispecies gas detection, Teng Tan, Ning An, Yiwei Li, Hao Zhang, Yupei Liang and Baicheng Yao, University of Electronic Science and Technology of Ching, Ching, Stimulated Brillouin lasers are generated in an over-modal graphene microsphere resonator.

## Sa3D.7 • 17:35 🔷

Ultrafast pulse-stimulated four-wave mixing in dissipative ring fiber cavity, Jingmin Liu, Beihang Universitv. China. We proposed ultrafast pulse-stimulated four-wave mixing in a dissipative ring fiber laser.

#### Room 301, Track 1

08:00-10:00 Su1A • Fibers & Fiber Devices III Presider: Yunqi Liu, Shanghai University, China

#### Su1A.1• 8:00 ★

A High-performance Circular Polarizer, Sha Li, Jianxiang Wen, Beibei Xing and Hao Shi; *Harbin Engineering University, China.* Soliton molecules evolution is numerically and experimentally investigated in an all-polarization-maintaining figure-9 fiber laser, soliton molecules in different bound states can be regulated by changing the small signal gain or/and the waveplate angle.

#### Su1A.2• 8:15 ★

An automatic multiplexing circular polarimetric instrument for high-sensitive pathological diagnosis of ischemic stroke, Wenlin Luan, Shengwen Han, Mengting Wang, Hengkai Zhang, Quancheng Cheng, Chunhua Chen and Xia Yu; *Beihang University, China*. We developed a rapid, automatic, and sensitive technique based on polarimetry for brain sections' disease screening.

#### Su1A.3• 8:30 ★

Laser Performance of DBR Fiber Lasers Packaged, Yuxia Zheng, Jianxiang Wen, Yongtao Chen, Zhaoyu Chen, Yanhua Luo, Fufei Pang and Tingyun Wang; *Shanghai University*, *China*. We constructed a distributed Bragg reflector (DBR) single-frequency fiber laser (SFFL).

#### Su1A.4• 8:45 ★

**Optical Fiber Characterization of Reconstructed Water Oxidation Electrocatalysts,** Tiansheng Huang, Li-Peng Sun and Bai-Ou Guan; *Jinan University, China.* This paper shows an optical fiber characterization technique for revealing in-situ reconstruction process of electrocatalysts. Experimental measurement of evolution route of cobalt species in a metal-organic framework during electrocatalytic water oxidation are presented. Room 302, Track 6

#### 08:00-10:00

Su1B • Measurement & Imaging III

Presider: Huanhuan Liu, Chinese Academy of Sciences, China

#### Su1B.1• 8:00 ★

All-fiber coaxial focus multimode beam probe for optical coherence tomography, Ziyi Huang, Chenyang Su, Dejun Liu, Yalong Tai, Longhui Huang, Weijia Bao, Yiping Wang and Changrui Liao; *Shenzhen University*, *China*. We propose an all-fiber coaxial focus multimode beam probe for high resolution OCT imaging applications. It is demonstrated that the proposed OCT probe can profile the layer-by-layer structure of a translucent tape, revealing more details.

#### Su1B.2• 8:15 ★

**Multimode Fiber Imaging Based on Hydrogel Fiber,** Lele He, Mengchao Cao, Lili Gui, Jingjing Guo and Xiaosheng Xiao; *Beijing University of Posts and Telecommunications*, *China.* We demonstrate multimode fiber imaging based on hydrogel fibers, which are suitable for biomedical applications due to their biocompatibility and environmental friendliness.

#### Su1B.3• 8:30 ★

A Flexible Pressure Sensor based on Chirped Fiber Bragg Grating Array for Vital Signs Monitoring, Chang Liu, Ziqi Liu, Juanli Li, Haoen Cai and Zhengyong Liu, *Sun Yat-sen University, China.* A chirped Fabry-Perot interferometric (CFPI) sensor based on two chirped 50-µm fiber Bragg gratings is proposed in this paper.

#### Su1B.4• 8:45 ★

Fast algorithm in distributed curvature sensing based on OFDR and helical weak gratings fiber bundle, Aoyan Zhang, Yihong Xiao, Junfan Chen, Minghui Niu, Linqi Cheng, Jialong Li, Kunpeng Feng, Defeng Zou, Hong Dang, Jinna Chen and Perry Ping Shum; Southern University of Science and Technology, China. In this study, distributed curvature sensing based on helical weak gratings fiber bundle and OFDR is proposed. The influence of the weak gratings fiber bundle and cross-correlation algorithm in the demodulation are demonstrated. Room 303, Track 4

#### 08:00-10:00

Su1C • Optoelectronic Integration III Presider: Linjie Zhou, Shanghai Jiao Tong University, China

## Su1C.1• 8:00 Invited



**SPR enhanced on-chip self-contained optical sensors,** Qin Chen; *Jinan University.* In situ photoelectric sensing was obtained based on ultra-narrow-band plasmonic hot electron photodetection. Due to the unity integration

of both optical sensing and photoelectric transducing functions in a same metal-semiconductor nanojunction, self-contained operation was achieved.

## Su1C.2• 8:20 Invited



Silicon waveguide devices for short-wave mid-infrared optical frequency combs, Guijun Hu, Weicheng Chen; Jilin University. In this talk, we report our recent advances in the development of various short-wave

mid-infrared devices, namely, waveguides, grating couplers, and micro-ring resonators, and carried out research on on-chip supercontinuum and Kerr frequency combs.

## Su1C.3• 8:40 Invited



Hybrid Integrated Two-dimensional Material Optoelectronic Devices on Silicon, Junjia Wang; Southeast University.

#### Room 305, Track 9

08:00-10:00 Su1D • Quantum Photonics I Presider: Xiaolong Su, Shanxi University, China

## Su1D.1 • 08:00



**Single-photon computational LiDAR,** Feihu Xu; *University of Science and Technology of China.* Single-photon light detection and ranging (LiDAR) presents single-photon sensitivity and picosecond time resolution,

which facilitates the fundamentally new capabilities to image over long ranges or see object around corners. I will primarily address our recent efforts in the development of the advanced single-photon LiDAR techniques and algorithms to realize long-range 3D imaging and non-line-of-sight (NLOS) sensing and imaging.

## Su1D.2 • 08:20 Invited



Continuous-variable entanglement-assisted quntum communication through fiber channels, Xiaolong Su; Shanxi University. We experimentally demonstrate continuous-

variable entanglement-assisted quatnum communication and randomness certification through fiber channels.

## Su1D.3 • 08:40 Invited



#### Reconstructive photon-counting spectrometer and its application on high dimensional imaging, Wei Zhang; *Tsinghua University.* We developed reconstructive photon-counting spectrometers based on hybrid integration of superconducting

nanowire single photon detectors and on-chip photonic structures. An image scheme obtaining 3D spatial and 1D spectral information was demonstrated based on this device. Room 306, Track 3

**08:00-10:00 Su1E • Optical Networks II** *Presider: Zuqing Zhu, University of Science and Technology of China, China* 

## Su1E.1 • 08:00 Invited



High-efficient Computing Power Scheduling Based on Deep-Q-Network for Metro Optical Network, Hui Yang; *Beijing University of Posts and Telecommunications*. This invited paper proposes an intelligient computing power scheduling approach based on

deep-Q-Network designing in metro optical network, which enhances the resource utilization by over 35%, and achieves strong robustness.

## Su1E.2 • 08:20 Invited

Meeting the Challenges of Machine Learning-aided Optical Network Automation, Xiaoliang Chen; Sun Yat-sen University.

Su1E.3 • 08:40 Invited

Power Control with Online Gain Optimization for Multi-band Optical Networks, Xiaoxuan Gao, Rentao Gu and Lin Bai; Beijing University of Posts and Telecommunications. We briefly even inver-

cations. We briefly overview power management technologies in multi-band

optical networks and proposed a power control method with online gain optimization. Experimental results show the effectiveness of proposed method in both power equalization and transmission optimization.

#### Room 307, Track 2

#### 08:00-10:00

**W1F** • Optical Transmission III Presider: Xiaoguang Zhang, Beijing University of Posts and Telecommunications, China

## Su1F.1 • 08:00 Invited



Superposed 3D-256CAP constellation design based on geometric shaping 3D-16QAM, Boce He, Jie Ma, Jianfei Liu, Jia Lu, Xiangye Zeng and Mingming Luo, *Hebei University of Technology, China*. A novel 3D-GS-16QAM constellation structure is designed by

geometric shaping. Moreover, a scheme of 3D-256CAP superposed constellation is proposed. Simulation results show that the superposed 3D-256CAP outperforms other traditional constellation structures.

#### Su1F.2 • 08:20 Invited



Measuring and on-line monitoring of inter-core crosstalk in multi-core fiber, Tianwai Bo; Beijing Institute of Technology.

## Su1F.3 • 08:40 Invited



Long-haul Transmission using Coupled-Core Multicore Fiber, Lin Ma; Shanghai Jiao Tong University.



Room 301, Track 1

#### Su1A.5 • 09:00 🕇

Sensing characteristics of long period fiber grating written in graded index fiber by CO2 laser, Hang Su, Yunqi Liu, Yuehui Ma and Chengbo Mou; *Shanghai University*, *China*. We present a long period fiber grating, which can measure temperature, curvature, refractive index, torsion, and the corresponding sensitivities are 500. 71 pm/°C, -16. 53 nm/m-1, -2776. 19 nm/RIU, and -193. 65 pm/(rad/m), respectively.

#### Su1A.6 • 09:15 🕇

**Two-photon polymerization 3D-printing for fabricating tall structures on optical fiber tips,** Monika Halendy, Sławomir Ertman, Jan Pindor and Tomasz Woliński; *Warsaw University of Technology, Poland.* The research provides insights into fabricating tall structures directly on optical fiber tips via two-photon polymerization 3D printing.

#### Su1A.7 • 09:30 ★

Liquid Level Measurement by Using Waist-enlarged Fusion Taper in No-core Fiber, Shiwei Liu, Yudong Wang, Wenzhao Liu and Hongyan Fu; *Xiamen University, China*. A liquid level measurement approach by using waist-enlarged fusion tapers structure modal interferometer with no-core fiber is proposed and experimentally demonstrated. The experimental results show a sensitivity of up to 0. 093 nm/mm.

#### Su1A.8 • 09:45 ★

**Refractive index SPR sensor based on side-polished capillary fiber and PDMS,** Shuowen Chen, Jierui Li, Yuxin Luo, Yequan Guo, Xuhao Ji, Yifan Qin, Shuyi Chen, Yu Zhang and Zhihai Liu; *Harbin Engineering Universit, China.* This paper introduces a novel surface plasmon resonance (SPR) sensor based on side-polished capillary fiber and polydimethylsiloxane (PDMS), which achieves an ultra-high sensitivity of 5889 nm/RIU in the refractive index detection range of 1. 333-1. 373. Room 302, Track 6

#### Su1B.5 • 09:00 🗡

Focusing characteristics of polarimetric mixed eccentric phase modulated linearly polarized hyperbolic cosine-Gaussian beams, Haozhe Xu, Liqiu Wang, Yueyang Chen, Xiaoqiang Gai and Peijin Wei; *No. 715 Institute, China.* A polarization-mixed eccentric eccentric phase modulated hyperbolic cosine-Gaussian vortex beam is designed.

#### Su1B.6 • 09:15 🕇

Forward Brillouin Sensor With High Spatial Recognition and Multiplexing Positioning Capabilities For Flow and Bubble Detection, Li Tianfu, Chen Chao, Zhang Gaoyu, Lei Yanyang, Xiong Zhang and Dong Yongkang; *Harbin Institute of Technology, China*. A novel optical fiber sensor for flow and bubble detection based on forward Brillouin sensing (FBS) is proposed, which has the most advanced spatial recognition of FBS and for the first time sub-centimeter positioning capability.

#### Su1B.7 • 09:30 🕇

**Real-Time Human Sleep Conditions Monitoring with Optical Fiber Interferometer Based on A Novel Machine Learning Method,** Qing Wang, Ke Li, Xiang Wang, Jing Zhou and Changyuan Yu; *The Hong Kong Polytechnic University, China.* Optical fiber sensor with fiber interferometer can obtain human vital signs signals more accurately and effectively.

#### Su1B.8 • 09:45 ★

Research on Effective Separation Method of Multi-Molecule Composite Absorption Spectrum Based on Modulation Technology, Xiangyu Zhong, Qing Shi, Buqiang Zhang, Yulu Zhang, Xiaoying Liu, Gui Meng, Huiwen Niu, Wenbo Shao and Jianfa Zhou; *Beijing Research Institute of Telemetry, China*. This article proposes a multi molecule composite absorption spectroscopy separation method to achieve simulation verification of three gas simultaneous measurement methods. The results show that the concentration error of the gas is less than 3%. Room 303, Track 4

## Su1C.4 • 09:00 Invited



**Hybrid Photonic Integrated Circuits for Optical Communication and Sensing,** Ruijun Wang; *Sun Yat-sen University.* We present our recent work on the development of hybrid photonic integrated circuits. The hybrid integration approach enables

on-chip photonic systems for next-generation optical communication. It also provides a route to realize advanced semiconductor lasers for spectroscopic sensing applications.

## Su1C.5 • 09:20 Invited



Intracavity MEMS-based metasurfaces for fast switching of OAM and Gaussian beams in a fiber laser, Lili Gui, *Beijing University of Posts and Telecommunications, China.* We demonstrate a reconfigurable fiber laser with an intracavity electrically actuated

MEMS-based optical metasurface for efficient and fast switching between fundamental Gaussian and vortex modes at  $\sim$  1030 nm.

#### Su1C.6 • 09:40 Invited



Integrated topological photonic devices and chips for optical communications, Lu Sun; *Shanghai Jiao Tong University.* In this talk, we will present our recent works on integrated topological photonic devices and

chips for robust and high-speed optical communications, which reveals the possibility and advantages of using topological photonics in on-chip optical signal processing.

Room 305, Track 9

#### Su1D.4 • 09:00 Invited



Fractal superconducting nanowire singlephoton detectors and their applications, Xiaolong Hu; Tianjin University. I will present the concept and origin, research and development in the past 10 years, and their

applications and impacts of the fractal SNSPDs.

#### Room 306, Track 3

## Su1E.4 • 09:00



Clock Distribution-enabled Picoseconds Time Synchronization for Optical Switching Networks, Xuwei Xue; Beijing University of Posts and Telecommunications.

#### Room 307, Track 2

#### Su1F.4 • 09:00 Invited



Theoretical Framework for Phase Recovery in Coherent Optical Communications, Xinwei Du; BNU-HKBU United International College. This study presents an analytical solution for phase and frequency estimation under Wiener noise

using ML/MAP, achieving CRLB/BCRLB. It extends to MPSK and MAPSK signals, enabling optimal estimation by eliminating modulated phases.

#### Su1D.5 • 09:20 Invited



Quantum manipulation of single neutral atom arrays and their strong coupling to an optical cavity, Gang Li; Shanxi University.

#### Su1E.5 • 09:20 Invited

Synergistic Service Provisioning with End-to-End Quantum Key Distribution over Classical Optical Networks, Xiaosong Yu; University Beijing of Posts and Telecommunications.

#### Su1F.5 • 09:20



WDM-SDM-PDM Self-Homodyne Coherent **Optical Transmission system,** Feng Tian; Beijing University of Posts and Telecommunications. We demonstrate an experimental of self-homodyne coherent transmission over a 22.5 km 7-core fiber, with

wavelength division multiplexing (WDM) channels in the S/C/L band.

# Sunday, 28 July

## Su1D.6 • 09:40 Invited

Recent Advances in High-Speed Quantum Key Distributions, Dawei Wang; Sun Yat-sen Universitv. High-speed quantum communications necessitate dedicated efforts in quantum state preparation and

measurement. We briefly review recent advances in this field and present our work toward achieving high-speed quantum key distribution.

#### Su1E.6 • 09:40

An Efficient and Trustworthy Sharing Scheme for Multi-domain Optical Resources Based on Blockchain. Chen Zhang, Hui Yang, Cui Zhang, Jun Li, Qiuyan Yao and Jie Zhang, China. This paper proposes an efficient and trustworthy sharing scheme for multi-domain optical resources based on blockchain to ensure the security and efficiency of resource exchange. Simulation results show our model significantly improves TPS.

#### Su1F.6 • 09:40

Key Technologies for the Next Generation Coherent Passive Optical Network, Qiuyan Yao, Nan Feng, Daging Meng, Hui Yang and Jie Zhang, China. This paper provides analyzed and summarized the key technologies in terms of the next generation downstream simplified coherent passive optical network (PON), upstream burst coherent PON, and the flexible data rate PONs.

10:00-10:30 Poster Session 2 & Tea Break

#### P2.1

A GSST functionalized microring resonant cavity for photonic memory, Jianwu Yu, Yinping Miao, *Tianjin University of Technology, China*. We propose a novel nonvolatile photonic on-chip memory, and demonstrate a 9-level coded memory based on a GSST sandwich slot ring resonator.

#### P2.2

Flexible Fiber Bragg Grating Array for Robotic Finger Tactile Sensing, Bo Dong, Zongyu Chen, Yulong Wang and Wobin Huang, *Shenzhen Technology University, China*. A flexible Fiber Bragg grating array for robotic finger tactile sensing is presented. The sensor can be attached on a robotic finger for discriminately monitoring the normal force, left force, right force and temperature.

#### P2.3

Weighted Blind Phase Search Algorithm for a PS-QAM Coherent Optical Communication System, Ya Zhou, Qi Zhang, Qihan Zhao, Yun Wang, Gang Xin, Xinyu Yuan, Yi Zhao, Feng Tian, Fu Wang, Qinghua Tian and Yongjun Wang, Shenzhen Technology University, China. Weighted BPS is proposed for carrier phase recovery of a PS-16QAM coherent optical communication system. The simulation results indicate that compared with traditional BPS, W-BPS obtains a 0. 13dB SNR enhancement.

#### P2.4

Positioning Approach in Fiber Vibration Sensing System Based on Time-Frequency Features, Zhenshi Sun, Hao Guo, Deyu Sun and Siyuan Li, *Nanyang Institute of Technology, China.* A positioning approach utilizing the dual Mach-Zehnder interferometer-based fiber vibration sensing system was proposed, involving the extraction of time-frequency features from the sensing signal. And a mean positioning error less than ±10 m is achieved.

#### P2.5

A Subset Quadratic Mapping PS-TCM Scheme Based on Huffman Coding, Qingdong Gong, Jinkun Jiang, Qi Zhang, Ran Gao, Xiangjun Xin, Xinyu Yuan, Qihan Zhao, Yi Zhao, Feng Tian, Qinghua Tian, Yongjun Wang, Fu Wang, *Beijing University of Posts and Telecommunications (BUPT), China*. A subset quadratic mapping PS-TCM scheme based on Huffman coding is proposed to increase transmission capacity. Simulation results show that compared to CCDM-shaped PS-TCM-16QAM and uniform TCM16QAM signals, Huffman-coding PS-TCM-12QAM signals can improve BER performance.

#### P2.6

**Optimization control of imaging parameters for low light level cameras and research on data fusion with LiDAR,** Hao Sun, Yunxu Sun, Wei Liu, *Beijing University of Posts and Telecommunications (BUPT), China.* The imaging parameters of the low-light camera are optimized by planning in advance. Through the data fusion of low-light camera and LiDAR, the vehicle has the ability of long-distance and high-precision of object identification.

#### P2.7

**FPGA-Based Multi-Pulse Laser Ranging System,** Lei Zhang, Qihao Huang, Tingting Lang, Yanqing Qiu, *Beijing University of Posts and Telecommunications (BUPT), China.* This paper designs an FPGA-based laser ranging system that achieves high-precision distance measurement of 2 km with a ranging error of less than 20 cm by utilizing wavelet transform and multi-pulse stacking.

#### P2.8

Ultrathin silicon loop mirror reflector for 2D PtSe2-on-waveguide optical absorption enhancement, Guoxian Wu, Jiaqi Wang, Xu Li, Yingqi Xu, Hui Zhang, Zhijian Mao, Penghao Ding, Yu Du, Youfu Geng, Xuejin Li, Zhenzhou Cheng, Shenzhen University, China. We proposed an ultrathin silicon loop mirror reflector for enhancing the PtSe2-on-waveguide optical absorption. Simulations show that the absorption coefficient of the device is 4. 9 times that of a conventional 220 nm-thick silicon strip waveguide.

#### P2.9

**GN-Based Optimization of the Geometric Shaping Constellations for the Non-Linear Fiber Channel,** Jiaxin Gong, Qi Zhang, Xiangjun Xin, Xinyu Yuan, Qihan Zhao, Yun Wang, Zhiqi Huang, Yi Zhao, Feng Tian, Qinghua Tian, Yongjun Wang, Lan Rao, Leijing Yang, *Beijing University of Posts and Telecommunications (BUPT), China.* A geometric shaping optimization scheme based on the Gaussian noise (GN) model incorporating selfphase modulation (SPM) correction is proposed. The simulation results show that the GS-64QAM obtains 0. 38dB OSNR gain at the BER of HD-FEC.

## P2.10

Genetic algorithm assisted power allocation in TFDMA passive optical networks, Jin Wang, Fan Yang, Huan Li, Zimin Hu, Feng Qin, Chaoer Wang, Mengjie Xu, Wanke Chen, State Grid Hangzhou Power Supply Company Information& telecommunication Branch(Data Center), China. We propose and demonstrate a power allocation scheme assisted by genetic algorithm in TFDMA passive optical networks. The overall performance is significantly improved considering different data rate requirements at ONUs.

## P2.11

Investigation of brightness, chromaticity, and color gamut by using different wavelengths of blue light excitation on quantum dot color conversion layers for the development of next-generation micro-LED displays, Bing-Han Wu, Chun-Yu Chang, I-Yun Hsieh, Kuan-An Chen, Hidek Kuroda, Hung-Chen Kou, Chih-Jung Chen, Chun-Yu Li, National Yunlin University of Science and Technology, China. This research focuses on exploring the conversion of brightness in green and red quantum dot color converters (QDCCs).

#### P2.12

**Pre-Calculated Space-Ground Multi-Dimensional Structure** (P-SGMDS): Disaster-Resilient Survivability Design in Terrestrial-Satellite Optical Networks (TSON), Xin Li, Yu Liu, Feiyang Ruan, Daixuan Li, Lu Zhang, Jingjie Xin, Shanguo Huang, Beijing University of Posts and Telecommunications, China. A pre-calculated space-ground multi-dimensional structure (P-SGMDS) is designed for the disaster-resilient survivability in terrestrial-satellite optical networks (TSON).

#### P2.13

Silicon On-chip Computational Spectrometer With 32-channel Meta-structures, Zeruihong She, Lei Zhang, Hongren Tan, Kai Wang, Tianyue Zhang, *BUPT, China.* We report an on-chip integrated spectrometer with 32 channels. It consists of a waveguide filter consisting of 32 silicon meta-structure arrays with unique transmission spectra, with a resolution of 100pm in the 1525-1565nm wavelength range.

#### P2.14

**Design of machine vision crystal detection system,** Di Zhao, Bin Mao, Yang Ning, Jingfan Wang, Luqi Huang, *Shaanxi Institute of Metrology Science, China*. In order to reduce the influence of human eye observation error in flat crystal detection, the plane equal thickness interferometer was upgraded, and the machine vision detection system was established.

## P2.15

High-speed optical signal identification scheme based on multidimensional fractal, Hanyu Zhang, Qi Zhang, Zhiqi Huang, Qihan Zhao, Gang Xin, Yun Wang, Yi Zhao, Feng Tian, Fu Wang, Qinghua Tian, Yongjun Wang, *Beijing University of Posts and Telecommunications, China.* In this paper, a high-speed optical signal identification scheme based on multidimensional fractals. Results demonstrate that the proposed scheme achieves 100% MFI accuracy at optical signal-to-noise ratio (OSNR) ≥18 dB.

#### P2.16

High-speed optical signal identification scheme based on multidimensional fractal, Zheng Duan, Chenyu You, Shan Yin, Xueyu Fan, Kaiwen Liu, Shanguo Huang, *Beijing University of Posts and Telecommunications, China.* In this paper, a high-speed optical signal identification scheme based on multidimensional fractals. Results demonstrate that the proposed scheme achieves 100% MFI accuracy at optical signal-to-noise ratio (OSNR) ≥18 dB.

#### P2.17

A Greenhouse Gas Emissions-aware RSA Scheme Combined with Deep Deterministic Policy Gradient in Optical Networks, Jiajun Guan, Zhihao Cai, Changrui Liao, *Beijing* University of Posts and Telecommunications, China. This paper proposes a greenhouse gas emissions-aware RSA scheme combined with deep deterministic policy gradient in EONs. The results show that the proposed scheme reduces the GHG emissions and blocking rate.

#### P2.18

Time Domain Demodulation Algorithm for Current Transformers Based on Saganc Interferometer, Xiaodong Yin, Yuzhuo Chen, Feng Zhou, Junchang Huang, Haoliang Hu, Yi Zhao, Li Xia, *Beijing University of Posts and Telecommunications, China.* Based on the characteristics of optical couplers, a time domain demodulation algorithm for Sagnac Interferometer current transformers is proposed, which can reduce external interference and is insensitive to the polarization state of the input light.

#### P2.19

Pricing Strategy for Computing Tasks in Computing Power Networks: A Non-cooperative Sequential Game Strategy, Jiaxing Guo, Jing Zhu, Wanping Wu, Yahui Wang, Yingbo Fan, Yajie Li, Yongli Zhao, Jie Zhang, *Beijing University of Posts and Telecommunications, China.* We propose a game theory-based dynamic pricing strategy for computing tasks in CPN. Simulation results show the strategy improves network revenue by 12% and achieves the balance of computing resource provisioning among different data centers.

P2.20

Impact of Waist Diameter on Glucose Sensing with MZI-Based Nonadiabatic Tapered Micro/Nanofibers, Bo Cai, Ju Zhou, Jie Gao, Jie Shi, Feng Peng, Xiaojun Cui, *University of Jinan, China.* This study explored the use of nonadiabatic tapered micro/nano optical fibers (NATOFs) with varying diameters for glucose detection, and the results revealed that decreases in waist diameter substantially enhanced sensor sensitivity.

#### P2.21

**Inverse Design of Compact Silicon Dual-mode Demultiplexer and Power Splitter,** Yi Xu, Enge Zhang, Lei Zhang, Enge Zhang and Lei Zhang, *Beijing University of Posts and Telecommunications (BUPT), China*. We inverse-designed and demonstrated a silicon dual-mode demultiplexer and a power splitter with footprints < 5. 4 × 5. 4 µm2, measured excess losses < 1. 1 dB and inter-mode crosstalk < -13. 2 dB at 1550 nm.

#### P2.22

An Integrated System for Gesture Recognition and Visible Light Communication Based on LSTM, Zehua Xu, Haoyu Huang and Hongyan Fu, *Tsinghua University, China*. This research equips VLC systems with LSTM-based gesture recognition, enabling efficient optical communication and simultaneous gesture interaction.

#### P2.23

**Research on pH sensor based on micro-nano fiber modified with calcium alginate hydrogel,** Yang Yang, Zhijun Wang, Binbin Luo, Xue Zou, Shenghui Shi and Mingfu Zhao, *Chongqing University of Technology, China.* We presented a novel pH sensor based on micro-nano fiber modified with calcium alginate hydrogel. The sensor showed a high sensitivity of -1. 57 nm/pH in solution with pH range of 2-9 and fast response.

#### P2.24

**Research on High-impedance Characteristics of Coplanar Waveguide Electrodes in Photodiodes,** Fuyao Liu, Xiaofeng Duan, Tonghui Li, Xiaowei Yang, Yongqing Huang, Kai Liu, *Beijing University of Posts and Telecommunications, China.* A new method for designing high-impedance electrodes has been proposed.

#### P2.25

A Machine Vision Method for Washbasin Cutting, Zhinan Zhao, Qihao Huang, Tingting Lang, Yanqing Qiu, *China Jiliang University, China*. This paper presents a machine vision method for automated basin cutting. It quickly acquires contours, addresses occlusions, and achieves high automation using a Surface Fitting Algorithm. It reduces manual involvement and meets industrial demands effectively.

#### P2.26

High spatial resolution phase-sensitive optical time-domain reflectometer based on scattering-enhanced optical fiber, Hongying Zhang, Jiaming Xing, Hongwei Li, *Harbin University* of Science and Technology, China. We propose a DAS with 10-cm spatial resolution. Such a high resolution is achieved by employing an enhanced backscattering fiber of 50 discrete reflectors with average scattering enhancement of 13 dB as a sensing element.

#### P2.27

**OSNR Equalization for Extended Bands Based on Online-trained Model,** Han Li, Wu Liu, Zhiyi Zhong, Tianqian Zhang, Ming Luo, *China Information Communication, China.* Utilizing online training for ML models, we demonstrate channel equalization over 160 km L-band link with 3-span amplification, approaching the target OSNR with 10 sets of initial data and 25 rounds of iterative training.

#### P2.28

**Temperature monitoring and electrical fault warning methods of three-core submarine cables,** Yining Zhang, Xiaohui Tang, Meng Xia, Xuexin Du, Xin He, Yu Han, Hongwei Li, *CSG EHV Electric Power Research Institute, China.* Simulations of temperature distribution during single-phase short circuits and leakage faults revealed that variations and rise rates in optical fiber temperature can effectively detect and assess XLPE severity in submarine cables.

#### P2.29

Micro-spectrometer with a Beam Splitting Network with Distributed All-pass Micro-ring Resonators, Hongren Tan, Kai Wang, Zeruihong She, Tianyue Zhang, Lei Zhang, *Beijing University of Posts and Telecommunications, China.* We propose a spectrometer based on all-pass micro-ring structure. The spectrometer has 32 channels in the C-band, and the resolution is 200 pm in the C-band, and can continue to improve resolution through optimization.

#### P2.30

A Machine Learning-Based Indoor Visible Light Positioning System, Zhe Bing, Zhenliang Dong, Xing Wang, Yanzhe Sun, Ting Yang, Ping Wang, *China Coal Energy Research Institute Co., China.* An indoor visible light three-dimensional positioning system with the improved particle swarm optimization (IPSO)-extreme learning machine (ELM) network is proposed in this work, which is optimized by the kernel principal component analysis (KPCA).

#### P2.31

A Machine Learning Approach for Laboratory Safety Monitoring under Extreme Conditions, Meiyong Xu, Zhenni Han, Anlu Wan, Shitong Meng, Qian Zhang, Song Chen, Jian Wan, Kaimin Wang, *Beijing University of Posts and Telecommunications, China*. Safety monitoring in laboratories is significant, especially under extreme conditions. In this regard, we proposed a safety monitoring scheme based on machine learning methods. This scheme involves image reconstruction and classification, achieving satisfactory results.

#### P2.32

**Fabrication of high-speed photodiode with monolithic integrated InP microlens,** Xiaowei Yang, Xiaofeng Duan, Kai Liu, Yongqing Huang, *Beijing University of Posts and Telecommunications, China.* Back-illumination high-speed photodiode with monolithic integrated InP microlens was designed and fabricated. The performance of the integrated devices was tested experimentally.

#### P2.33

Assessment of the Definition Variation Rule for Three-dimensional Light Field Displays, Kaixin Shi, Xunbo Yu, Jinhong He, *Beijing University of Posts and Telecommuni*-

*cations, China.* By using the voxel model and the viewpoint analysis method, the definition variation rule at different depths for 3D LFDs is obtained and analyzed, and corresponding measurement method to quantify the display definition is proposed.

#### P2.34

Low Complexity Blind Phase Search for Coherent Optical Communication, Wenna Pang, Fei Wang, Qi Zhang, Ran Gao, Zhipei Li, Chenchen Wang, Yi Cui, Qi Xu, Xinyu Yuan, Huan Chang, Xiangjun Xin, *Beijing University of Posts and Telecommunications, China.* In this paper, a phase noise estimation method is proposed. Comparing with original blind phase search, the complexity of the proposed method can be reduced by half under similar BER performance.

#### P2.35

Sensitivity Enhancement of Fiber-optic Curvature Sensor, Fang Lin, Xiaotong Yang, Shuai Wang, Jiuru Yang, *Heilongjiang University, China.* We report a fiber-optic curvature sensor by the tapering splicing based on the seven-core-fiber Mach-Zehnder interferometer. ~200% improvement of curvature sensitivity is obtained and the maximum reaches -30.647 nm/m-1 with d of 41. 44 µm.

#### P2.36

A fiber optic temperature and strain sensor based on few-mode fiber grating, Chengchen Liu and Changqing Huang, *China Jiliang University, China*. The paper proposes a few-mode fiber grating dual-parameter sensor to eliminate cross-sensitivity.

#### P2.37

Multicore fiber-tip nanoforce probes with temperature compensation, Cong Xiong, Caoyuan Wang, Wei Ji and Limin Xiao, *Fudan University, China*. An ultracompact and highly sensitive multicore fiber-tip nanoforce sensor with temperature compensation is demonstrated.

Sunday, 28

#### P2.38

**Regional Resilient Routing Algorithm for LEO Satellite Network,** Hongjing Tang, Qi Zhang, Yuanfeng Li, Xiangjun Xin, Weiying Feng, Wensheng Yu, Furong Chai, Meng Sun, Fu Wang, Yongjun Wang and Qinghua Tian, *Beijing University of Posts and Telecommunications, China.* A hierarchical deep reinforcement learning-based regional resilient satellite routing algorithm is proposed. The simulation result shows the proposed method improves the communication success rate of the network in the event of regional damage.

#### P2.39

P2.40

**Embedded Flexible Shape Cable for Marine Exploit Applications,** Tao Tan, Quan Chai, Ye Tian, Shan Shi and Jianzhong Zhang, *Harbin Engineering University, China*. An embedded flexible shape cable has been first proposed based on fiber optic shape sensors and the verification of real-time shape measurement has been achieved, which helps improve the security of marine resource exploitation.

**Carboxyl-free** synthesis of red InP/ZnSe/ZnSeS/ZnS quantum dots with narrow full width at half maximum, Chun Deng, Peiqing Cai and Zugang Liu, *China Jiliang University, China.* Carboxyl-free zinc, low-cost and low-toxicity phosphorus-sourced tris(dimethylamino) phosphine synthesis of red InP quantum dots with narrow full width at half maximum.

#### P2.41

Modulation format recognition based on statistical and amplitude features, Zhiqi Huang, Qi Zhang, Yun Wang, Bailiang Jiang, Feng Tian, Fu Wang, Qinghua Tian, Yongjun Wang, Xiangjun Xin, *Beijing University of Posts and Telecommunications, China.* A modulation format recognition scheme based on statistical and amplitude features is proposed. Simulation results show that the scheme effectively improves the identification performance of modulation formats in high-speed optical fiber communication.

#### P2.42

The influence of medical fiber bending on laser spot distribution of out terminals, Min Li, Jinghao Pan, Sanfei Wang, Jiayi Qu, Jiabao Qi, Jie Huang, *Zhejiang Institute of Medical Device Testing, China*. In this paper, the influence of medical fiber bending on laser spot distribution of out terminals were studied. The result shows that the bending radius increases, the spot uniformity becomes better, the spot size becomes larger.

#### P2.43

Harnessing the potential of advanced visual large models to enhance the detection of optoelectronic imaging signals, Dunyou Liang, Xin Chang, Feng Peng, Bing Wu, Xiaojun Cui, Xin Zuo, Jianchao Ma, Guoyu Zhang, *University of Jinan*, *China*. This research aims to harness the potential of advanced visual large models to enhance optoelectronic imaging signal detection. Through thorough experiments, it demonstrates the possibilities to effectively optimize the performance of optoelectronic imaging.

#### P2.44

Numerical simulations of spatial coherence factors for interferometric multimode speckles, Wenjun Zhou and Yihang Lu, *China Jiliang University, China*. We present numerical simulation results of polarization, wavefront, and modal content effects on spatial coherence factors of a multimode speckle interferometry system, with a static reference light path and multiple dynamic sample light paths.

#### P2.45

Vortex Fiber Laser Based on Twisted High Concentration Doped Active Fiber, Yinghui Lu, Jianxiang Wen, Ying Cao, Yan Wu, Fufei Pang, Yanhua Luo, Tingyun Wang, *Shanghai University, China*. We demonstrated a linear-cavity vortex laser by twisting a homemade highly doped active fiber, which can generate stable vortex beams and the output power of the laser can reach up to 22. 5 mW.

#### P2.46

Novel meandering coplanar waveguide electrodes for enhancing the bandwidth of avalanche photodiode, Tonghui Li, Yu Li, Ke Li, Kai Liu, Yongqing Huang, Xiaofeng Duan, *Beijing University of Posts and Telecommunications, China.* This paper proposes a novel meandering coplanar waveguide electrode to enhance the bandwidth of avalanche photodiodes (APDs). Simulation results indicate that the bandwidth of APD with the proposed electrode can increase by 113%.

#### P2.47

A Hybrid Ant Colony Optimization and Tabu Search Algorithm for Routing Optimization in LEO Satellite Networks, Yifan Xu, Yuanfeng Li, Qi Zhang, Sun, Feng, Li, Zhao, Chai, Tian, Wang, Tian, Yang, Wang, Beijing University of Posts and Telecommunications, China. To optimize routing costs and communication delays in LEO satellite networks, a hybrid ACO and tabu search algorithm is proposed.

#### P2.48

**Experimental Verification of Optical Stealth Communication Based on Super-continuum Spectrum**, Jiaqi Zhao, Tao Pu, Jilin Zheng, Hua Zhou, Jin Li, Han Zhou, Xiaolong Zhao, Shuya Liu, Xianshuai Meng and Shilin Chen, *Army Engineering University of PLA, China*. An optical stealth method based on super-continuum spectrum hiding in ASE is proposed.

#### P2.49

L-band Extended Fiber Amplifier Based on Bismuth-erbium Co-doped Fiber, Zhikai Wu, Yongfang Zou, Xinyong Dong, *Guangdong University of Technology, China*. A high gain L-band extended fiber amplifier based on bismuth-erbium co-doped fiber with 63 nm gain bandwidth over 20 dB is investigated. The 3-dB bandwidth is 35 nm. The maximum gain is 52.84 dB.

#### Room 301, Track 1

#### 10:30-12:00 Su2A • Fibers & Fiber Devices IV Presider: Limin Xiao, Fudan University, Nankai University, China

#### Su2A.1 • 10:30 Invited



Gap Phase-shifted Fiber Bragg Grating and Its Application, Yuanhong Yang, Liangya Du and Lin Lu, *Beihang University, China*. A gap phase shifted fiber Bragg grating(g-FBG) is proposed and demonstrated. Furthermore, a reflection g-FBG is put forward and

investigated. The g-FBG can be implemented easily and used in sensing with better sensitivity and resolution.

## Su2A.2 • 10:50 Invited



Long-Period Fiber Gratings Inscribed in the Multicore Fibers, Yunqi Liu; Shanghai University. We demonstrate the fabrication of long-period gratings (LPFGs) in Multicore Fibers by using focused carbon dioxide laser.

The mode coupling among different cores and sensing characteristics of the LPFGs were investigated experimentally.

#### Room 302, Track 6

#### 10:30-12:00

Su2B • Measurement & Imaging IV Presider: Chunliu Zhao, China Jiliang University, China

## Sa2B.1 • 10:30 Invited

Fiber-optic sensing system for hydrogen storage tank monitoring, Guofeng Yan; *Zhejiang Lab.* A novel fiber-optic sensing network based on the sattering enhaced fiber was designed and established. Assisted with Al algorithm, the hydrogen storage tank monitoring was carried out. The exprimental results will be presented.

## Sa2B.2 • 10:50 Invited



Fiber optic sensing empowered intelligent interventional devices, Yuming Dong; *Chinese Academy of Sciences*.

#### Room 303, Track 4

10:30-12:00 Su2C • Optoelectronic Integration IV Presider: Zhenzhou Cheng, Tianjin University, China

## Su2C.1 • 10:30 Invited



Hybrid-integration thin-film lithium niobate acousto-optic modulator for microwave-to-optical conversion, Lei Wan; Ningxia University. Highly efficient acousto-optic modulation plays a vital role in the microwave-to-optical conversion. Herein,

we demonstrate a hybrid thin-film lithium niobate (TFLN) racetrack microring acousto-optic modulator implemented with low-loss chalcogenide (ChG) waveguide.

## Su2C.2 • 10:50 Invited



Efficient optimization algorithms for integrated photonic devices with isotropic and anisotropic materials, Xin Fu; *Chinese Academy of Sciences*. We present optimization algorithms for efficient device design dealing with anisotropic

and isotropic materials as well as recent progress in a variety of ultra-compact functional integrated devices on SOI and LNOI platforms.

## Su2A.3• 11:10 Invited



**Optical manipulation and metrology in hollow-core fibers,** Shangran Xie; *Beijing Institute of Technology.* 

## Su2B.3 • 11:10 Invited



High refractive index localized surface plasmon resonance sensor based on hollow core fiber filled with gold nanowires, Ailing Zhang, Zhiyang Wang and Pengxia Sui, *Tianjin* University of Technology, China. Optical fiber sensors based on different structure of

photonic crystal fiber(PCF)/hollow core fiber (HCF) and gold film/particles are proposed for the detection of analyte with high refractive index (RI) sensitivity.

## Su2C.3 • 11:10 🛛 🕇

Efficient training of large-scale optical neural network based on evolutionary algorithm, Zhiwei Yang, Yihang Lai, Tian Zhang, Jian Dai and Kun Xu; *Beijing university of posts* and telecommunications, China. We introduce a novel learning strategy combined with covariance matrix adaptation evolution strategy for training subspace optical neural networks to accelerate calculation based on a typical MNIST dataset classification task.

Sunday, 28 July

#### Room 305, Track 9

#### 10:30-12:00

**Su2D** • Quantum Photonics II Presider: Feihu Xu, University of Science and Technology of China, China

## Su2D.1 • 10:30 Keynote



DimensionalEvolutions:EssentialUnderstandingoftheElectron-statesArchitectures,XiaominRenandRen;BeijingUniversityofPostsandTelecommunications.Startingfrom 2012, aand

novel understanding of the continuous dimensional evolutions of the electron-states architectures based on the dimensional similarity functions has been on its long journey of exploration. Now, presented is a well-shaped one.

#### Room 306, Track 3

## 10:30-12:00

Su2E • Optical Networks III Presider: Gordon Ning Liu, Soochow University, China

## Su2E.1 • 10:30 Invited

Optical Switching for Intelligent Computing Networks, Ning Deng; Great Bay University. Optical switching plays an increasingly important role in modern optical communication systems. This talk will address optical switching technologies from current

generation F5G to next generation F6G telecom networks, as well as for emerging AI computing applications.

A Dynamic Computing Power Scheduling Scheme for the

EDWC Project in China, Zhixiang Hong, Xiao Lin, Guiping

Wu, Jia Zhang, Jun Li, Zhen Chen, Weigiang Sun and

Zhilan Lou, Fuzhou University, China. In this paper, we

conduct the cost analysis of the EDWC project. Studies

show the current transmission cost is too high. We

present a scheme to schedule the computing jobs based

#### Room 307, Track 2

10:30-12:00 Su2F • Optical Transmission IV Presider: Jianfei Liu, Hebei University of Technology, China

#### Su2F.1 • 10:30 Invited



Hardware-Efficient and Reliable Coherent DSCM Systems Enabled by Single-Pilot-Tone Based Polarization Demultiplexing, Fan Li; Sun Yat-sen University.

## Su2D.2 • 11:00 Invited



Distributed quantum computing over 7 km, Xiao Liu, University of Science and Technology of China. We demonstrate nonlocal quantum gates between two nodes spatially separated by 7.0 km using stationary qubits based on multiplexed

quantum memories, flying qubits at telecom wavelengths, and active feedforward control based on field-deployed fibers.

#### Su2D.3 • 11:20

A Detection Method for Quantum Key Distribution Networks Against DoS Attacks, Yixuan Li, Xiaosong Yu, Yuhang Liu and Yongli Zhao, *China*. For quantum key distribution networks (QKDNs), we propose a method for detecting DoS attacks and analyzes its detection effectiveness. Simulation results indicate that our detection method performs well in terms of the detection success rate.



Su2E.3 • 11:10

on the price fluctuation.

#### Su2E.2 • 10:50 Invited

Key technologies for next-generation ultra-high-speed PON systems, Tao Yang; Beijing University of Posts and Telecommunications.

## Su2F.2 • 10:50 Invited



Simplified coherent system for next-generation passive access network, Jing Zhang; University of Electronic Science and Technology of China. We propose a block reversal Alamouti coding scheme that can effectively tolerate large polarization mode disperison in the

single-carrier simplified coherent system with only one single-polarization coherent receiver. This scheme can be used for next-generation passive optical network.

## Su2F.3 • 11:10 Invited



**Sequence selection in single-span fiber links,** Xiang Li; *China University of Geoscience (Wuhan).* Advanced sequence selection scheme is proposed in single-span transmission system to improve both the linear and

nonlinear performance.

Room 301, Track 1

#### Su2A.4 • 11:30 Invited



Fluorotellurite glass fibers and their applications, Zhixu Jia; *Jilin University*. We developed an intensity-based microfiber sensor for noninvasive monitoring of the arterial pulse waveform in real time with

high accuracy, which conducted with miniaturized integrated circuit system and analyzed cardiovascular parameters in interactive terminal.

#### Room 302, Track 6

Room 303, Track 4

#### Su2B.4 • 11:30

Sleep Efficiency Monitoring Based on Fiber MZI Sensor Mattress, Yi Liu, Tianjiao Min, Liufeng Zhu, Wei Xu, Xinge Feng, Yifei Feng and Ying He, University of Shanghai for Science and Technology, China. We used the mattress embedded with a Mach-Zehener interferometer(MZI) fiber optic sensor to collect the physiological signals during sleep, extracted the sleep features after filtering the original signals to calculate the sleep efficiency.

#### Su2C.4 • 11:25 🕇

High-resolution spatial speckle reconstructive spectrometer based on random reflection, Zhipeng Guo, Long Zhang and Daoxin Dai, *Zhejiang University, China*. An ultra-compact reconstructive spectrometer with high-performance utilizing random reflection is proposed. Experimentally, the spectrometer has a resolution of 0.02 nm within the range of 50 nm and its footprint is 220  $\mu$  m2.

#### Su2A.5 • 11:50

Research on Automatic Identification of FBGs Being Forced Lateraly in Series with 3 FBGs, Bangquan Liao, Chunbo Ji, Shuyi Huang, Mengting Yao and Yansong Qiao, *Tiangong University, China*. We choose three FBGs with different Bragg wavelengths, and connect them by series form, let them being forced laterally, record the change of the Bragg wavelengths and identify the FBG automatically.

#### Su2B.5 • 11:45

High Sensitivity Fiber Extrinsic Fabry-Pérot Interferometer Sensor based on PMMA Film for NH3 Detection, Feng Zhu, Yingying He, Yi Huang, Chuanlu Deng, Xiaoxiao Xu, Zhengjie Xu and Tingyun Wang, Shanghai University, China. A fiber extrinsic Fabry-Pérot interferometer sensor configured by the end-face of single-mode fiber and the polymethyl methacrylate film in a capillary is investigated. The sensor achieves a sensitivity of 500 pm/ppm for NH3 concentration experimentally.

#### Su2C.5 • 11:40 ★

**Spin Hall Effect of Electromagnetic Wave Based on Hyperbolic Metasurface,** Weiyan Li, Zhaoqi Jiang, Wenjia Li, Zheng Zhu and Jinhui Shi, *Harbin Engineering University, China.* In this work, a hyperbolic metasurface is proposed to investigate the spin Hall effect of electromagnetic wave based on the dispersion relation control and the unidirectional propagation phenomenon has been numerically realized.

#### Su2C.6 • 11:55 ★

**Coherently controlled absorption of few-layered electromagnetic metamaterials,** Hongrui Zhang, Hang Yu, Botian Sun, Bo Lv, Yuxiang Li and Jinhui Shi; *Harbin Engineering University, China.* A kind of few-layered electromagnetic metamaterial has been designed to generate coherent perfect absorption phenomena in the terahertz band and the absorption can vary in the range of 0-1 according to the phase difference.

12:00-13:30 Lunch Break

Room 305, Track 9

Room 306, Track 3

Room 307, Track 2

#### Su2D.4 • 11:40

Noise Interference Impact Degree-Aware Routing in Quantum Key Distribution Networks, Minyu Liu, Xiaosong Yu, Yuhang Liu and Yongli Zhao, *Beijing University of Posts and Telecommunications, China.* We introduce a noise interference impact degree (NIID), which quantifies the extent to which noise interference affects the network layer. The results demonstrate the feasibility of our scheme in significantly reducing the service blocking rate.

#### Su2E.4 • 11:25

**Digital Twin of All Optical AND Logic Gate Based on Deep Learning,** Ruoting Liu, Xin Li, Feiyang Ruan, Jingjie Xin, Shubo Qi and Shanguo Huang, *Beijing University of Posts and Telecommunications, China.* This paper uses the bidirectional LSTM algorithm combined with attention mechanism to achieve digital twinning of all optical logic AND gates. Simulation experiments showed that this method can replace physical analysis methods.

#### Su2F.4 • 11:30 ★

Fast RSOP tracking in optical domain by a polarization demultiplexing device in coherent optical communication systems, Chong Wang, Ding Li, Linan Shan, Wanxin Zhao, Guanghao Yao, Yan Zhang, Peng Sun, Nan Cui, Lixia Xi, Hu Zhang, Xianfeng Tang, Xiaosheng Xiao and Xiaoguang Zhang; *Beijing University of Posts and Telecommunications, China.* By constructing a reset-free polarization controller controlled by an optimized tracking algorithm in FPGA, we demonstrate up to 50 krad/s RSOP tracking in optical domain for coherent optical communication systems without MIMO algorithm.

#### Su2E.5 • 11:40

Llama-Log: Optical Network Log Parsing with Fine-Tuned Large Language Model, Xiangbin Li, Yue Pang, Yanli Liu, Yahang Huan, Min Zhang and Danshi Wang, *Beijing University of Posts and Telecommunications, China*. This study proposes a method that involves fine-tuning the open-source large language model Llama2 for the task of parsing optical network logs. Through comparative experiments, we have validated the effectiveness of this method.

#### Su2F.5 • 11:50 ★

**Spectrally Efficient Faster-Than-Nyquist Dual-Band Transmission Enabled by Inter-Subcarrier Crosstalk Cancellation**, Lina Man, Yixiao Zhu, Ziheng Zhang, Guangying Yang, Yikun Zhang, Qunbi Zhuge and Weisheng Hu; *Shanghai Jiao Tong University, China*. We propose and experimentally demonstrate an inter-subcarrier crosstalk cancellation algorithm for faster-than-Nyquist transmission. At 20% HD-FEC threshold, the achievable faster-than-Nyquist rate improves from 0. 875 to 0. 8 for 16-QAM and from 0. 75 to 0. 6 for QPSK.

#### Room 301, Track 1

#### 13:30-15:30

#### Su3A •Fibers & Fiber Devices V

Presider: Weiqing Gao, Hefei University of Technology, China

## Su3A.1 • 13:30 Invited



The rising performance of low-quantumdefect fiber lasers, Pu Zhou, Jiangming Xu, Jun Ye, Yang Zhang, Xiaoya Ma, Yidong Guo, Yue Tao, Can Li, Tianfu Yao, Liangjin Huang, Jinyong Leng and Zhiyong Pan; *National* 

University of Defense Technology.

## Su3A.2 • 13:50 Invited



Visible-wavelength fiber lasers from cotinuous-wave to ultrashort pulse generation, Zhengqian Luo; *Xiamen University*. Different from the conventional visible laser generation by nonlinear frequency conversion of

near-infrared laser, this talk will introduce the recent progress on visible laser direct generation from rare-earth fiber lasers.

## Su3A.3 • 14:10 Invited



Recent progress in spatiotemporal mode-locked multimode fiber lasers, Xiaosheng Xiao; Beijing University of Posts and Telecommunications. Spatiotemporal mode-locking (STML), simultaneously locking

of multiple transverse and longitudinal modes, in multimode fiber cavities are ideal for investigating high-dimensional nonlinear dynamics. In this talk, recent progress and future outlook of STML will be presented. Room 302, Track 6

#### 13:30-15:30

Su3B • Measurement & Imaging V Presider: Guofeng Yan, Zhejiang Lab, China

## Su3B.1 • 13:30 Invited



CNC/PVA-SA based plasmonic tilted fiber Bragg grating calcium ion sensor, Xijie Feng, Ziqiao Ren, Yunjie Cao, Wenbo Sui, Fuxiang Wang, Jun Wu, Jun Zhou, Fanli Zhang, Wenjun Zhou, Changyu Shen; China Jiliang University. A plasmonic tilted fiber Bragg

grating (TFBG)-based sensor for the detection of calcium ions (Ca2+) was proposed and demonstrated experimentally. A stable hydrogel material was synthesized by utilizing hydrogen bond recombination between cellulose nanocrystals (CNC) and polyvinyl alcohol (PVA).

## Su3B.2 • 13:50 Invited



Single fiber imaging under disturbing by info-selecting network, Jun Zheng, Yunxu Sun and Wei Liu, Harbin Institute of Technology, China. MMF transmission is susceptible to environmental disturbances. In deep learning, to address this, selecting a

network that can perform high-quality imaging in that conformation by obtaining the information of conformation in advance.

## Su3B.3 • 14:10 Invited



**Optical fiber humidity sensors based on online fabricated FBGs with PI coating,** Chunliu Zhao; *China Jiliang University*. Room 303, Track 4

13:30-15:30 Su3C • Optoelectronic Integration V Presider: Lei Wan, Ningxia University, China

## Su3C.1 • 13:30 Invited



Multimode optical switch with high flexibility and low power-consumption, Xibin Wang; Jilin University.

## Su3C.2 • 13:50 Invited



Coherent receiver based on silicon photonics for distributed acoustic sensing, Bigeng Chen; *Zhejiang Lab.* A coherent receiver consisting of a 90  $^{\circ}$  optical hybrid and two balanced photodetectors based on silicon photonics

platform is demonstrated and successfully applied for p  $\epsilon$  -level distributed acoustic sensing.

## Su3C.3 • 14:10 Invited



AlGaAsOI photonics integration platform for ultra-efficient chip-scale nonlinear applications, Weiqiang Xie; Shanghai Jiao Tong University. AlGaAs-on-insulator has been emerging as a promising platform for

integrated nonlinear photonics. Here, we present our recent work on the development of low-loss AlGaAsOI nanowaveguides and ultrahigh-Q microresonators and show several demonstrations of ultra-efficient chip-scale nonlinear applications.

#### Room 305, Track 5

#### 13:30-15:30 Su3D • Optical Signal Processing II Presider: Yonghui Tian, Lanzhou University, China.

## Su3D.1 • 13:30 Invited



Optical neural networks for intelligence Hongwei applications, Chen; Tsinghua University.

## Su3D.2 • 13:50 Invited



General Spatial Photonic Ising Machines with Optoelectronic Co-optimization based on Smoothed Analysis Theory. Wenija Zhang: Shanghai Jiao Tong University.

#### Room 306, Track 7

#### 13:30-15:30 Su3E • Ultrafast Photonics II Presider: Chengbo Mou, Shanghai University, China

#### Su3E.1 • 13:30 Invited



A parallel ultrafast optical random bit generator based on a chaotic microcomb, Pu Li; Guanadong University of Technology. Random bit generators are critical for information security. Speed and scalability

are key challenges faced by random bit generation. We propose a massively parallel scheme for random bit generation based on a single micro-ring resonator.

## Su3E.2 • 13:50 Invited



Numerical simulation of mid-infrared supercontinuum generation based on cascaded all-soft-glass fiber structure, Weiging Gao; Hefei University of Technology. Supercontinuum generation is simulated in a cascaded all-soft-glass fiber structure. The 30 dB

bandwidth reaches 20.87 µm from 1.44 to 22.31 µm. The mechanism of supercontinuum broadening process has also been analyzed.

#### Su3D.3 • 14:10 Invited



Integrated polarization-diverse narrowlinewidth soliton frequency microcombs, Wenting Wang; Xiong'an Institute of Innovation.



## Su3E.3 • 14:10

Nonlinear conversion from single frequency laser to frequency comb by stimulated Raman scattering, Yan Feng; University of Chinese Academy of Sciences.

#### Su3F.3 • 14:10 Invited



Research on Deep Learning based on Wavefront Sensor-Less Adaptive Optics, Qinghua Tian, Beijing University of Posts and Telecommunications, China.

Room 307, Track 2

13:30-15:30 Su3F • Optical Transmission V Presider: Meng Xiang, Guangdong University of Technology, China

#### Su3F.1 • 13:30 Invited



An Overview of Fiber Nonlinear Impairments in Optical Communications: Estimation and Mitigation, Lixia Xi; Beijing University of Posts and Telecommunications. Fiber Kerr nonlinearity is a significant factor limiting the transmission capacity of optical fiber

communication systems. In this talk, we will give an overview of nonlinear interference noise (NLIN) assessment and mitigation technology for fiber nonlinearity.

#### Su3F.2 • 13:50



AI enabled optical access network and Intelligent optical signal processing, Junwen Zhang; Fudan University.

#### Room 301, Track 1

## Su3A.4 • 14:30



Random laser Hall effect and its regulation, Zhijia Hu; Anhui University. The photonic Hall effect and photonic magnetoresistance are observed in the random laser system. It is found that the magnetoinduced lateral

diffusion of photons can reduce the intensity fluctuation disorder of random laser.

#### Su3A.5 • 14:50 Invited



Spectral shaping fiber random laser and applications, Weili Zhang; University of *electronic science and technology of China.* We have proposed a smart filter that utilize wavefront shaping of a SLM-MMF-SMF structure, which was intoduced into fiber

random lasers to realize spectral-shaping output. This talk will intoduced the realized lasers and related applications.

#### Su3A.6 • 15:10 Invited



High-order-mode Multi-wavelength Random Fiber Laser based on Brillouin and Rayleigh scattering in few mode fibers. Yichun Li, Zepeng Zhong, Zizhou Wei, Mengshi Zhu, Heming Wei, Xianglong Zeng, Jianxiang Wen, Fufei Pang, Tingyun Wang and Liang Zhang; Shanghai

University. We demonstrated a multi-wavelength random fiber laser with high-order optical mode emission by utilizing stimulated Brillouin scattering gain and distributed Rayleigh scattering in few mode fibers.

## Room 302, Track 6

## Su3B.4 • 14:30



Smart laparoscopic grasper integrated with fiber Bragg grating based tactile sensor for minimally invasive surgery, Zhengyong Liu; Sun Yat-sen University. In this talk, I will introduce a smart laparoscopic grasper with fiber Bragg grating based tactile sensor,

particularly for minimally invasive surgery. Recent results of grasping force measurement and laparoscopic training will be introduced.

## Su3B.5 • 14:50 Invited



## Optical microfiber long period grating sensors, Li-Peng Sun; Jinan University. In this talk, we report our recent advances in the microfiber long-period grating sensor, including the high sensitivity and ultrafast responses by

engineering waveguide and interfacial structures, and explore its application in real-time pattern analysis.

#### Invited Su3B.6 • 15:10



Surface wave spectral combs excited with tilted fiber Bragg grating for biosensing, Zhihong Li; Wenzhou University. This talk will introduce the excitation of fiber-optic surface

wave spectral combs with tilted fiber Bragg grating and its application for in situ decoupling bulk and surface characteristics of K+ ions transmembrane process.

#### Room 303, Track 4

#### Su3C.4 • 14:30 Invited



On-chip multi-band optical manipulation and high-speed modulation devices, Li Shen; Huazhong University of Science and Technoloav.

## Su3C.5 • 14:50 Invited



**High-dimensional** optical fiber communications by integrated photonic processors, Yeyu Tong; Hong Kong University of Science and Technology (Guanazhou).

#### Su3C.6 • 15:10

Random Bit Generation Based on Phase Modulation and Dispersive Component, Anran Li, Ning Jiang, and Dispersive Component, Anran Li, Ning Jiang, Meizhi Che, Huanhuan Xiong, Qiang Zhang, Yingjun Fang, Bo Xu and Kun Qiu, *China*. A wideband chaotic microcomb generation scheme based on phase modulation and dispersive components is proposed to generate high-speed parallel random bits. Over 150 comb teeth are generated and the rate of one channel reaches 100Gbits/s.

Broadband Chaotic Microcomb Parallel High-speed

# Sunday, 28

#### 15:30-16:00 Poster Session 3 & Coffee Break

#### Room 305, Track 5

# Invited



High Q factor Fano resonances on dielectric metasurfaces with Si, GaAs and GaN units, Zixuan Ling, Yusen Wang and Zonghai Hu; Beijing University of Posts and Telecommunications. By activating the

permittivity degree of freedom, we have designed an all-dielectric device based on permittivity-asymmetric rectangular blocks on meta-surfaces, yielding multiple Fano resonances with ultrahigh Q factor in the near-infrared regime.

## Su3D.5 • 14:50 Invited



Optoelectronic oscillator for high-resolution magnetic field and voltage measurement, Muguang Wang; *Beijing Jiaotong University*. Microwave photonics is considered an effective way to improve the interrogation

speed and resolution of fiber-optic sensing. A review of our recent works on optoelectronic oscillator-based magnetic field and voltage measurement is presented.

#### Su3D.6 • 15:10 Invited



A DFS and AOA simultaneous measurement scheme with co-frequency self-interference signal cancellation, Jianxin Ma; *Beijing University of Posts and Telecommunications.* A photonic method based on a

DPol-DPMZM for simultaneous measurement of DFS and AOA radar signals without directional ambiguity is reported. The co-frequency self-interference can be cancelled out at the same time. It is expected to be used in modern electronic warfare systems.



#### Room 306, Track 7

## Su3E.4 • 14:30 Invited

Su3E.5 • 14:50

Ultrafast fiber laser with its mid-infrared nonlinear frequency conversion, Peiguang Yan; Shenzhen University.

#### Room 307, Track 2

## Su3F.4 • 14:30 Invited



The structure and performance of Bismuth doped fiber amplifiers for O+E band application, Jingjing Zheng; *Beijing Jiaotong University*. Bismuth-doped fiber has the ability to cover the OE band, thus become an important device

to support the expansion of this band. This report introduces our recent work in design and experiment of BDFAs.

#### Su3F.5 • 14:50 Invited



**CD-Aware Non-Orthogonal DFT Precoding for C-Band IM/DD Multicarrier Transmissions,** Junwei Zhang, *Sun Yat-sen University, China*. A CD-aware non-orthogonal DFT precoding (CDA-NODFTP) scheme is experimentally demonstrated for C-band 90-Gb/s IM/DD

multicarrier systems over a 50-km dispersion-uncompensated link. The CDA-NODFTP with adaptive spectral compression outperforms conventional DFTP, NODFTP, and the non-precoding schemes.

#### Su3E.6 • 15:10 Invited

High-power Mid-infrared ultrafast fiber lasers, Chunyu Guo; Shenzhen University.

Enhancement of linear and nonlinear

thermo-optic effects by epsilon-near-zero

conditions, Qian Li; Peking University

Shenzhen Graduate School.

## Su3F.6 • 15:10 Invited



Orthogonal offset carrier-assisted differential detection of polarization multiplexed asymmetric twin-SSB signals, Jiahao Huo; University of Science and Technology Beijing.

15:30-16:00 Poster Session 3 & Coffee Break

#### P3.1

**LED Strip Quality Detection Based on OpenCV,** Hao Liu, Qihao Huang, Honglin Liu, Tingting Lang, *China Jiliang University, China*. An image processing algorithm for real-time examination of LED light strips is proposed, which enables quick detection of blind LED beads in strips. It is successfully used in production line to replace manual inspections.

#### P3.2

Measurement Method of Laser Linewidth Based on Short-Delayed Self-Heterodyne Michelson Interferometer, Shaojie Li, Zhewen Ding, Xiangliang Zheng, Lin Yin, Chunlian Zhan, Chunliu Zhao, *China Jiliang University, China*. We incorporated Faraday rotating mirrors into the traditional setup, combining the short-delay self-heterodyne method with a Michelson interferometer. The advantage of this method is the avoidance of 1/f noise and the influence of polarized light.

#### P3.3

Linearly Polarized Mode Demultiplexing Hybrid based on Multi-Plane Light Conversion, Jie Xiang, Jianping Li, Yuwen Qin, *Guangdong University of Technology, China*. We propose a multi-plane light conversion based linearly-polarized mode de-multiplexing hybrid (MDH) with multiple functions to simplify the optical front-end for coherent detection multiple mode channels simultaneously as desired in large-capacity mode-division-multiplexing (MDM) communication systems.

#### P3.4

Directional antenna UAVs networking algorithm based on on-demand-weighted clustering, Ruoqi Zheng, Qi Zhang, Xiangjun Xin, Tonggang Zhao, Furong Chai, Feng Tian, Fu Wang, Qinghua Tian, Leijing Yang, Yuanfeng Li, Meng Sun, Yongjun Wang, *Beijing University of Posts and Telecommunications, China.* The directional antenna UAV networking algorithm based on on-demand weighted clustering is proposed to solve the time-varying topology problem of UAVs. Results show that the obtained clusters are more stable and have better dynamic adaptability.

#### P3.5

**Research on a method of flow noise suppression for optical fiber hydrophone towed array,** Liqiu Wang, Haozhe Xu, Yingsong Huang, Hanfeng Xu, *715 Institute of CSSC, China.* A flexible suspension scheme for optical fiber hydrophone towed array is proposed to reduce flow noise. By establishing a simulation model, the characteristics of three suspended structure were analyzed, and the effect was verified in the experiment.

#### P3.6

Online learning Raman Scattering Coefficient for C+L Band Transmission Based on WOA algorithm, Zanshan Zhao, Weiguang Xing, Guanjun Gao, Weiming Gan, Chun Zhang, Peng Liu, Haoyu Wang, *Chinese Academy of Sciences, China*. We propose a method of online learning Raman scattering coefficient for C+L band transmission. The results show that Raman scattering coefficient obtained by the proposed method is more accurate than triangle estimation.

#### P3.7

**Optimized DenseNet for Efficient FBG Event Classification in Fiber Optic Sensors,** Chunying Xu, Jingqi Fang, Xinjie Wu, Yu Zhou, Jianrong Chen, Chuliang Wei, *Shantou University, China.* This study uses a lightweight DenseNet for FBG event recognition, achieving high accuracy and efficiency for real-time monitoring.

#### P3.8

Fault Diagnosis for Power Backbone Networks based on Graph-Gated Knowledge Graph, Chunying Wang, Zhilei Wang, Lijie Wu, Yan Liu, Huifang Liu, Ruijie Zhu, State Grid Henan Electric Power Information & Telecommunication Company, China. We propose a fault diagnosis method for backbone transmission networks based on graph-gated knowledge graph. Simulation results show that it can effectively improve the fault diagnosis accuracy.

#### P3.9

**Key Secure Technologies for Optical Satellite Network,** Guan Wang, Nan Feng, Youjian Zhao, *Tsinghua University, China.* For the space information network, different attacks bring serious security issues. In order to overcome these shortcomings, this paper summarizes the key security technologies and corresponding challenges for optical satellite networks.

#### P3.10

Identification of Soft Failure in Laser Frequency Stability for Coherent Point-to-multipoint Passive Optical Networks, Feng Qin, Chaoer Wang, Huan Li, Zimin Hu, Mengjie Xu, Wanke Chen, *State Grid Zhejiang Electric Power Co. Ltd. China.* We propose a DSP based scheme aided by machine learning for soft failure detection in laser frequency stability. Simulation results show that the accuracy of identifying abnormal ONUs and estimating frequency drift reaches 99. 63%.

## P3.11

**Broadband achromatic terahertz metalens,** Panxiang Jin, Qihao Huang, Tingting Lang, Yanqing Qiu, *China Jiliang University, China.* This article presents the design of an achromatic terahertz metalens that operates within the frequency range of 0. 8 THz to 1. 2 THz. Simulation results verify that the proposed superlens can effectively eliminate chromatic aberration.

#### P3.12

Mechanism and Optimal Working Conditions of Photoelectric Frequency Down-conversion Based on Photodetectors, Mingxi Yang, Yongqing Huang, Jihong Ye, Xuejie Wang, Shuhu Tan, Xiaomin Ren, *Beijing University of Posts and Telecommunications, China.* Generation mechanism of photoelectric mixing is explained based on the electron mobility model. A systematic study is carried out to select the optimal frequency down-conversion operating conditions, which can further enhance the intermediate frequency output.

#### P3.13

#### Cost-efficient reliable deployment for TDM-PON based 5G RAN in power distribution network, Jing Jiang, State Grid Economic and technological research institute, China. The power distribution network (PDN) protection based on optical and wireless access network has high requirements for reliable and cost-efficient deployment. A cost-efficient reliable deployment scheme is proposed for TDM-PON based 5G RAN in PDN.

#### P3.14

Weighted BIRCH Algorithm for Probabilistic Shaping 64QAM Coherent Optical Communication System, Lingzhi Zou, Qi Zhang, Qihan Zhao, Yun Wang, Gang Xin, Zhiqi Huang, Xinyu Yuan, Feng Tian, Qinghua Tian, Fu Wang, Yongjun Wang, Beijing University of Posts and Telecommunications, China. The Weighted BIRCH algorithm is proposed to mitigate the fiber nonlinearity for PS-64QAM signals. Experimental results demonstrate that compared with the traditional BIRC.

Routing, Modulation Level and Spectrum Assignment **Considering Energy Consumption in C+L-bands Optical** Network, Kaiwen Liu, Chenyu You, Shan Yin, Xiaodong Liu, Mengru Cai, Shanguo Huang, Beijing University of Posts and Telecommunications, China. We establish network energy consumption model, propose routing, modulation level, spectrum assignment algorithm considering energy consumption based on DDPG.

#### P3.16

P3.15

**Research on the Cascaded KP4 and Zipper Codes Based** on Optimized Sliding Window Decoder, Qianhui Guo, Feng Tian, Ze Dong, Qi Zhang, Ran Gao, Biao Luo, Qinghua Tian, Fu Wang, Beijing University of Posts and Telecommunications, China. We propose a novel structure of cascaded KP4 and zipper codes. By optimizing the hard-decision decoder of zipper codes and the interleaver length, the pre-FEC BER threshold of error-free transmission is 0. 7E-2.

#### P3.17

Advanced Bragg Grating Vector Wind Speed Sensor Applied in the Power Industry, Shaohua Chen, Yunhu Liu and Yuan Liu, China University of Petroleum, China. A new wind speed sensor using Bragg grating fiber optics has been developed and tested both in simulations and experiments. It exhibits high sensitivity, with 8. 3×10<sup>(-4)</sup>  $\mu\epsilon/m/s$  from 15 to 30 m/s.

#### P3.18

A Spectral-Efficient Coherent RoF Link for 5G Millimeter-Wave Transmission, Zhuoxuan Chen, Huixing Zhang, Aijun Wen, Wei Zeng, Xidian University, China, A spectral-efficient radio over fiber (RoF) link transmitting two millimeter-wave vector signals at the same frequency is proposed and verified by simulations.

#### P3.19

InP-Based HEMT with Dual  $\delta$  -doped Layers Achieving Fmax of 1. 43 THz, Tianlin Ma, Xiaofeng Duan, Tonghui Li, Xiaole Gong, Kai Liu, Yongqing Huang, Beijing University of Posts and Telecommunications, China. We designed a dual \delta -doped InP based HEMT with a maximum oscillation frequency of 1, 43 THz for THz applications. We simulated and analyzed the device's DC and RF characteristics.

#### P3.20

Secure Coherent Optical Communication System Based on Dual-Loop Electro-Optic Feedback Phase Encryption. Xinvi Li, Jiaxi Feng, Zhuolin Wen, Yuehua An, Xinyong Dong, Zhensen Gao, Guangdong University of Technology, China. We propose and demonstrate a novel security-enhanced coherent optical communication system based on dual-loop electro-optic feedback phase encryption, thereby successfully transmitting a 56Gb/s quadrature phase shift keying(QPSK) signal over a distance of 100 km.

#### P3.21

On-demand scheduling of computing power resources based on deterministic delay guarantees, Yunyu Zhang, Hui Yang, Qiuyan Yao, Jie Zhang, Beijing University of Posts and Telecommunications, China. We propose a scheme that combine service delay requirements with computing resource deployment for on-demand scheduling. Simulation results demonstrate that the proposed scheme can reduce blocking ratio and provide deterministic delay for each domain.

#### P3.22

High performance photodiodes based on p-Si/ZnO/copper phthalocyanine double heterojunctions, Xiaoyue Xu, Yiming Wang, Wenli Lv, Sunan Xu, Lei Sun, Yingquan Peng, China Jiliang University, China. Photodiode based on double heterojunction of "p-Si/n-ZnO/CuPc" was fabricated. Compared with traditional p-Si/n-ZnO based single junction device, the double heterojunction device exhibits much higher performance, a high photoresponsivity of 6600 mA/W was achieved.

#### P3.23

**Enhancement of Manhole Low-light Images Based on Retinex** and EnlightenGAN, Qiang Liu, Guo Cheng, Xiang Zhu, Zhu Chen, Huacai Chen, China Jiliang University, China. This paper presents a manhole image enhancement technique, establishing a low-light image enhancement network based on the Retinex theory and the EnlightenGAN model. This method effectively improves the illumination and contrast of manhole images.

#### P3.24

Enhanced Device Performance of FAPbBr3-based Inverted Light-Emitting Diodes with Sulfobetaine, Wanru Yuan, Qianmin Dong, Junije Si and Zugang Liu, China Jiliang University, China. SFB10 additive is introduced to passivate the defects on the FAPbBr3 crystal. The inverted perovskite LED exhibits enhanced device performance with a peak EQE of 10. 89% and T50 lifetime of 3. 6 min at 3600 cd/m.

#### P3.25

A calibration method for linear displacement sensors based on operating temperature, Jingfan Wang, Bin Mao, Hui Liu, Di Zhao, Luqi Huang, Fei Feng, Wei Zhou, *Shaanxi Institute of Metrology Science, China.* To study the metrology traceability method of linear displacement sensors at operating temperature, a calibration device and method for linear displacement sensors at operating temperature without damaging the traceability conditions was proposed.

#### P3.26

The design and optimization of focal shift in focusing grating mirrors, Qian Wang, Junjing Huang, Xiaofeng Duan, Kai Liu, Yongqing Huang, *Beijing University of Posts and Telecommunications, China*. The focal shift of the focusing grating mirrors is studied by RCWA and finite-difference time-domain algorithm. The correlation with Fresnel number is analyzed and a new FNg parameter is proposed to optimize the focal shift.

#### P3.27

Multi-dimensional Resource Measurement Modeling Based on Entropy Weight Method in Computing Power Optical Networks, Huiying Sang, Lijie Wu, Chunying Wang, Zhichao Yang, Kai Li, Xiaojie Hou, Zhicun Sun, Yan Liu, Ruijie Zhu, *Zhengzhou University, China*. A multi-dimensional resource measurement model based on entropy weight method is proposed

#### P3.28

A Multi-Agent Routing Algorithm with Trajectory Prediction for Highly Dynamic UAV Networks, Ziyi Zhao, Qi Zhang, Yuanfeng Li, Xiangjun Xin, Jianxin Ma, Meng Sun, Yi Zhao, Furong Chai, Feng Tian, Fu Wang, Qinghua Tian, Yongjun Wang, *Beijing University of Posts and Telecommunications, China.* To address the routing problems in high-dynamic UAV networks, a multi-agent routing algorithm with trajectory prediction is proposed. Simulations show the proposed algorithm can achieve better performance on the end-to-end delay and packet delivery ratio.

#### P3.29

High-performance 1×2 optical switch based on Ge2Sb2Se4Te1-assisted racetrack micro-ring, Xuanyi Chen, Yinping Miao, *Tianjin University of Technology, China*. A high-performance nonvolatile 1×2 optical switch based on the periodic structure Ge2Sb2Se4Te1(GSST)-assisted racetrack micro-ring is proposed. The proposed on-chip optical switch is crucial to developing nonvolatile Si-GSST hybrid optical switches and realizing reconfigurable photonic systems.

#### P3.30

Cadmium sulfide coated micro-nano fiber optic sensor for ammonia gas sensing, Yutong Sun, Yong Zhao and Yanan Zhang, Northeastern University, China. Cadmium sulfide coated micro-nano fiber optic sensor has been developed for measuring trace amounts of ammonia gas. Cadmium sulfide is obtained by chemical precipitation method and is dripped onto the surface of the tapered fiber.

#### P3.31

Security-enhanced chaotic optical communication based on external electro-optical encryption structure, Zhuolin Wen, Biao Su, Xinyi Li, Jiaxi Feng, Yuehua An, Xinyong Dong, Zhensen Gao, *Guangdong University of Technology, China*. We propose a chaotic optical secure communication system based on laser mutual injection. The introduced external electro-optical encryption structure conceals system delay and effectively improves the security of the chaotic optical communication system.

#### P3.32

Simultaneous temperature and refractive index measurements based on ellipsoidal extrinsic Fabry-Perot interferometer, Gongye Li, Shenghui Shi, Binbin Luo, Xue Zou, Na Fangi, *Chongqing university of technology, China*. A novel ellipsoidal extrinsic Fabry-Perot interferometer-based sensor is experimentally demonstrated. Experimental results show the sensor has a sensitivity of 77. 01 dB/RIU for RI ranging at 1. 3350-1. 3660, while the temperature sensitivity is 225 pm/°C from 30-60°C.

#### P3.33

Intensive Tasks Offloading Decision Algorithms in Satellite Edge Computing Systems, Yanxiang Wang, Furong Chai, Qi Zhang, Yuanfeng Li, Meng Sun, Dandan Sun, Feng Tian, Fu Wang, Yongjun Wang, Qinghua Tian, Leijing Yang, *Beijing University of Posts and Telecommunications, China.* To address the offloading allocation problem for intensive tasks in Satellite Edge Computing (SEC) systems, a Sequence-to-Sequence (Seq2Seq) and Deep Reinforcement Learning (DRL) based decision generation algorithm, enhancing resource allocation efficiency in SEC systems.

#### P3.34

Shape Sensing Using In-Fiber Thermally Diffused Coupler and Fiber Bragg Gratings, Qi Xia, Hongye Wang, Xiaotong Zhang, Lingzhi Meng, Libo Yuan, Tingting Yuan, Harbin Engineering University, China. A multi-core optical fiber shape sensor based on inscribing fiber Bragg gratings core-by-core was proposed. A coupler was fabricated utilizing thermal diffusion technology to facilitate single -channel measurement of multi-core fiber Bragg gratings.

#### P3.35

**Dual silicon microring resonators for carbon dioxide gas sensing,** Hui Zhang, Jiaqi Wang, Penghao Ding, Zihao Ou, Yingqi Xu, Guoxian Wu, Zhijian Mao, Xu Li, Yu Du, Youfu Geng, Xuejin Li, Zhenzhou Cheng, *Shenzhen University, China.* We proposed dual microring resonators with SiO2 and polyhexamethylene biguanide hydrochloride claddings for CO2 sensing with temperature compensation, achieving a simulated sensitivity of 3. 6 pm/ppm. Then we fabricated dual microrings and conducted the temperature-response measurements.

#### P3.36

**Application of Dynamic Metasurface Holography in AR/VR,** Zhibao Huang, Qihao Huang, Tingting Lang, Fanghao Li, *China Jiliang University, China.* This paper introduces the principles and current state of AR/VR, focusing on the advantages of metasurface holography in AR/VR applications. It summarizes the strengths and weaknesses and explores prospects.

#### P3.37

Intent-driven Routing Algorithm based on LSTM in Power Backbone Networks, Lijie Wu, Jingfeng Wang, Yan Liu, Chunying Wang, Huifang Liu, Ruijie Zhu, State Grid Henan Electric Power Information & Telecommunication Company, China. We propose a routing method combining Long Short-Term Memory Neural Network with Conditional Random Fields to achieve intention translation in power backbone networks. Simulation results show that it can improve the accuracy of translation.

#### P3.38

Failure Prediction based on Deep Neural Networks in Power Backbone Networks, Fajia Ji, Hailong Wu, Lei Sheng, Lei Wang, Liang Jin, Chunying Wang, Lijie Wu, Yan Liu, Ruijie Zhui, *State Grid Henan Electric Power Information & Telecommunication Compan, China.* A deep neural network based network fault prediction method is proposed.

## P3.39

End-to-End Learning of Noise Shaping for OAM Mode Division Multiplexing Transmission, Zhaohui Cheng, Ran Gao, Qi Xu, Fei Wang, Yi Cui, Chenchen Wang, Zhen Xu, Xiangjun Xin, *Beijing Institute of Technology, China*. In this paper, an end-to-end noise shaping (E2E-NS) strategy based on autoencoder (AE) is proposed for orbital angular momentum (OAM) mode division multiplexing (MDM) optical fiber communication system.

#### P3.40

Interference Cancellation and Iterative Multi-User Detection for Satellite OTFS-NOMA Networks, Meng Sun, Qi Zhang, Xiangjun Xin, Furong Chai, Yuanfeng Li, Yanxiang Wang, Yi Zhao, Feng Tian, Qinghua Tian, Yongjun Wang, *BUPT, China*. An iterative multiuser detection based on channel matched filtering and interference cancellation is proposed for satellite-terrestrial OTFS-NOMA systems. Simulation results demonstrate that our algorithm effectively mitigates inter-user and inter-symbol interference, accurately detecting all superposed signals.

#### P3.41

A multi-domain protection for reliable slicing in 5G/B5G RAN enabled power distribution network, Jing Jiang, State Grid Economic and technological research institute, China. The reliable slicing in 5G/B5G RAN enabled power distribution network needs the multi-domain protection in both aspects of data transport and function processing. This paper mainly discusses the efficient reliable slicing issue.

#### P3.42

Nonlinear FMCW Laser Ranging System Based on Sinusoidal Frequency Modulation, Leifu Zhou, Qihao Huang, Tingting Lang and Yanqing Qiu, *China Jiliang University, China*. This paper introduces a sinusoidal modulation-based nonlinear FMCW laser ranging system. It utilizes on-chip interferometer IQ demodulation to calculate the frequency information of the laser signal, correcting its nonlinearity. This achieves high-precision, long-distance laser ranging.

#### P3.43

**Research and Discussion on Digital Twin Architecture of 5G Bearer Network,** Yu Wang, Xiao Cui, Jian Zhu and Bingli Guo, *China Academy of Information and Communications Technology, China.* This paper mainly proposes the architecture of digital twin for 5G bearer network, and the deployment strategy of digital twin technology in 5G bearer network is also discussed.

#### P3.44

Ultra-narrow band tunable metasurface filter based on phase change material Ge2Sb2Te5, Xingzhe Shi, Yuncheng University, China. We designed an ultra-narrow band metasurface filter using phase-change material Ge2Sb2Te5 for temperature tuning. Results show that a narrow linewidth of 14. 8 nm at 3.5  $\mu$ m is achieved.

#### P3.45

Research on Vibration Event Classification in  $\Phi$ -OTDR Systems Using MFCC Feature Extraction and Improved Swin Transformer, Yi Shi, Zichong Lin, Jiewei Chen, Xuwei Kang, Qiren Yan, Chuliang Wei, Shantou University, China. In this paper, an event recognition method based on MFCC and improved Swin Transformer is proposed for  $\Phi$ -OTDR event classification of ground-buried sensing fibers.

#### P3.46

**OOK and ACO-OFDM hybrid system for IM/DD Visible Light Communication**, Zhiyu Xiao, Lei Jing, Zhengrong Tong, Kun Yang, Jianping Yu and Ze Li, *Tianjin University of Technology*, *China*. A hybrid modulation VLC system utilizing OOK and ACO-OFDM is designed, incorporating a reconstruction method to eliminate the need for additional DC bias. Additionally, the two signals can be demodulated independently, to accommodate various receivers.

#### P3.47

Design and Performance Analysis of Silica-based Thermo-optical Switches Operating at O-band and C-band, Shuojian Zhang, Zikang Xu, Guocai Song, Jiahui Yu, Jiasheng Zhao, Junqiang Zhu and Jianjun He, *Zhejiang University*, *China*. We design, optimize and fabricate two thermo-optical switches on chip based on planar lightwave circuit (PLC), operating at O-band and C-band respectively. High extinction ratios and low driving voltages are achieved for both devices.

#### P3.48

Micro-type propeller on water for motion control using light sensors, Yujia Jiang, Jie Xue and Xing Fan, *Chongqing university, China.* Water is the source of life and an essential resource for human survival and development. Herein, we have developed a light-controllable fiber-based micropropeller that can move on the water surface.

#### Room 301, Track 1

#### 16:00-18:00

#### Su4A • Fibers & Fiber Devices VI

Presider: Lei Su, Queen Mary University of London, UK

## Sa4A.1 • 16:00



All-fiber multifunction-integrated devices for sensing, Fei Xu; Nanjing University. Here all-fiber will show some we multifunction-integrated devices developed in our labs and their applications in imaging,

lasing and sensing will also be discussed.

## Su4A.2 • 16:20 Invited



Al-driven intelligent distributed fiber sensing system and industrial applications, Livang Shao, Southern University of Science and Technology, China.

#### Su4A.3 • 16:40



Recent progress on new-band fiber **amplifier**, Jiangxiang Wen. Shanghai University, China.

Room 302, Track 6

#### 16:00-18:00

Su4B • Measurement & Imaging VI Presider: Changyu Shen, China Jiliang University,

China

## 

## **Optical fiber SPR sensor for biosensing based** on multi-layers and 2D materials, Kun Liu; Tianjin University. Optical fiber SPR sensors are widely used in biosensing field because

of their high sensitivity. It is of great significance to construct multi-layer sensing structures based on 2D nanomaterials to improve the performance of sensors.

## Su4B.2 • 16:20 Invited



## Fiber optical borehole seismometer and its application in earthquake monitoring, Guoheng Qi, Wenzhu Huang and Guoheng Qi,Wenzhu Huang, and Wentao Zhang; Chinese Academy of Sciences. This paper reports the recent progresses of fiber optic borehole seismometer and its applications in earthquake monitoring. The earthquake events, solid tides, and temperature change are recorded by the borehole seismometer.

## Su4B.3 • 16:40 Invited



All-fiber vector magnetic field sensing technology, Shengli Pu; University of Shanghai for Science and Technology. This report focuses on the combination of optical fiber sensing structure fabricated by fiber

micro-nano processing technology and magnetic fluid to realize all-fiber magnetic field sensing.

Room 303, Track 4

16:00-18:00 Su4C • Optoelectronic Integration VI Presider: Xibin Wang, Jilin University, China

#### Su4C.1 • 16:00 Invited



Research on Ultra-Narrow Bandgap Infrared Photodetectors for Deep Space Exploration, Qing Li; Hanazhou Institute for Advanced Study.

## Su4C.2 • 16:20 Invited

platform, reveling good performance.



On-chip etchless and rewritable photonic devices enabled by low-loss phase change material, Yin Xu; Soochow University. We develop an etchless and rewritable photonic device platform based on the nonvolatile and low-loss phase change material. Mode converters, tunable

Sunday, 28 July directional coupler, tunable filter have been studied in such

# Su4C.3 • 16:40

Design of High-Power Heterogeneously Integrated III-V-on-Silicon Distributed Feedback Lasers. Qing Ge. Jun Wang, Shuaicheng Liu, Hao Zhai, Yongging Huang and Xiaomin Ren, Beijing University of Posts and Telecommunications, China. We designed high-power heterogeneously integrated distributed feedback lasers. The ratio of the output power at both sides of lasers is dramatically increased from 1.0 to 9.2 by optimizing the phase-shift position and duty cycle.

# ICOCN 2024—Sunday, 28 July

### Room 305, Track 5

#### 16:00-18:00

Su4D • Optical Signal Processing III

Presider: Wenting Wang, Xiona'an Institute of Innovation, China.

### Su4D.1 • 16:00 Invited



Unraveling spectral-temporal dynamics in optical frequency combs using temporal imaging, Bowen Li; University of Electronic Science and Technology of China. Optical temporal imaging enables ultrafast optical

signal characterization in temporal and spectral domains. It is applied to unravel various dynamics in optical frequency combs, resulting in deeper understandings of comb physics and stimulating system innovations.

### Su4D.2 • 16:20



Sunday, 28 July

Performance Improvement of Optical Fiber Sensing based on Random Number Code. Baoguan Jin; Taiyuan University of

Technology. Distributed optical fiber sensing combined with random number coding technology break the constraints of key parameters. such as spatial resolution, signal-to-noise ratio, sensing distance, and can realize the improvement of system performance.

#### Invited Su4D.3 • 16:40



Enhancing optical metrology performance by using microwave photonics, Wei Zhang; Qilu University of Technology (Shandong Academy of Sciences). Microwave photonic technology is used to enhance the

performance of optical measurement by transferring the optical response into the microwave frequency domain and thus to overcome some of the potential limitations imposed in optical domain.

Room 306, Track 7

#### 16:00-18:00

Su4E • Ultrafast Photonics III Presider: Shumin Zhang, Hebei Normal University, China

#### Su4E.1 • 16:00 Invited



On-chip wavelength conversion for hybrid multiplexing signals, Shiming Gao; Zhejiang University. The all-optical wavelength conversion is presented and experimentally demonstrated for hybrid wavelength- and mode-division multiplexing signals by using an on-chip dispersion-engineered multimode nonlinear silicon

### Su4E.2 • 16:20 Invited

waveguide with mode conversion devices.



#### Efficient Second Harmonic Generation of Quasi-Bound States in the Continuum in Lithium Niobate Thin Film Enhanced by Bloch Surface Waves, Heyuan Guan; Jinan Nonlinear University. optics

applications in communications, biomedicine, and materials with conversion efficiency as a key metric. Composite grating waveguides in Bragg mirrors use a combination of Bloch surface waves and bound states in the continuum to improve efficiency.

#### Su4E.3 • 16:40 Invited

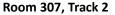


Nonlinear photonics based on integrated Chalcogenide glass devices, Bin Zhang; Sun Yat-sen University.

#### Su4F.3 • 16:40



On the mitigation of MPI for high-speed IMDD transmissions. Meng Xiang: Guangdong University of Technology.



16:00-18:00 Su4F • Optical Transmission VI Presider: Junwen Zhang, Fudan University, China

#### Su4F.1 • 16:00 Invited



Explorations on secure communication using laser chaos, Longsheng Wang; Taiyuan University of Technology.

## Su4F.2 • 16:20 Invited



drives

Optical communication system based on integrated architecture, Zhenming Yu; Beijing University of Posts and Telecommunications.

## ICOCN 2024—Sunday, 28 July

Room 301, Track 1

Room 302, Track 6

Room 303, Track 4

### Su4A.4 • 17:00



Low loss FIFO devices of weakly coupled MCFs and strongly coupled MCFs, Limin Xiao; Fudan University.

### Su4A.5• 17:20 Invited



Graphere/MoS2 film based optical fiber microcavity relative humidity sensor, Bo Dong, Senpeng Zhang, Zhuojun Wang and Wobin Huang, Shenzhen Technology University, China. 2-D material film is a good candidate for moisture-sensitive

material, especially for the Graphere/MoS2 film. Here, we show our recent research achievement in optical fiber microcavity relative humidity sensor fabricated by laser 3D printing.

### Su4A.6 • 17:40 Invited



Multimode converter based on ring-core fiber in MDM system, Hu Zhang; *Beijing University of Posts and Telecommunications*. Mode converters, which can convert fundamental mode to the higher order

modes, are key components in MDM system. We will present several multimode converters and review the recent progresses of mode converters in MDM systems. The difficulties encountered by multimode converters are also discussed.



Multi-channel Acoustic Detection with Polarization Hole Burning Effect in Multi-Wavelength Erbium-Doped Fiber Laser, Jiajun Tian; Harbin Institute of Technology, Shenzhen. A multipoint acoustic detection system by a multi-wavelength Erbium-doped fiber laser using polarization hole burning effect with Fabry-Perot interferometers was proposed. It exhibits multi-channel detection and effectively enhancing sensitivity by 13 dB.

## Su4B.5 • 17:20 Invited

Effective Utilization of Local Fiber Coating Materials for Enhanced Sensitivity, Bing Sun; Nanjing University of Posts and Telecommunications. During our empirical examinations pertaining to the process of optical fiber polishing, we have achieved that a substantial portion of this modal interference

phenomenon occurs within the residual coating layer.

#### Su4B.6 • 17:40

A Digital Emergency Communication Method for Coal Mining Accident Based on Distributed Acoustic Sensor, Yazhuo Li, Jiaqi Ma, Xinying Zhao, Hongren Li, Shuai Tong, Ningmu Zou, Xuping Zhang, Fei Xiong, Yixin Zhang and Huanhuan Liu, Nanjing University, China. Reliable emergency communication after coal mining accidents can ensure carrying out effective rescue work and reducing casualties. This paper presents a digital emergency communication method for coal mining accident based on distributed acoustic sensor.

#### Su4C.4 • 16:55

**High-Speed Wideband Swept DFB Laser Array Based on REC Technique,** Yuan Lv, Pan Dai, Yaqiang Fan, Jingxuan Zhang and Haolin Xia, *Nanjing University, China*. A wide-band fast-sweeping tunable laser array has been designed and fabricated based on reconstruction-equivalent-chirp technique. The continuous wavelength tuning range of the array is greater than 50 nm with a sweep speed of 5 kHz.

#### Su4C.5 • 17:10

Silicon Integrated Computational Spectrometer With Cascaded Add-drop Micro-ring Resonators, Kai Wang, Zeruihong She, Hongren Tan, Lei Zhang and Tianyue Zhang, *Beijing University of Posts and Telecommunications, China.* A computational spectrometer based on parallel micro-ring resonators is proposed, which can achieve the desired performance with fewer components. The spectrometer can achieve resolution of 0.1 nm while occupying an area of less than 1.5mm2.

#### Su4C.6 • 17:25

Fiber Bragg Grating Sensing System Utilizing Fast and Wideband REC-DFB Laser Array, Yaqiang Fan, Pan Dai, Yuan Lv, Haolin Xia and Jingxuan Zhang, *Nanjing University, China*. We present a novel FBG sensing system with a DFB laser array using REC technique, achieving stable high-speed sweeping and real-time demodulation of physical parameters, ensuring superior stability and cost-effectiveness for wide applications.

#### Su4C.7 • 17:40

**Experimental and Theoretical Analysis of Deep Residual Time-Delay Reservoir Computing based on Clipping Algorithm,** Changdi Zhou and Nianqiang Li, *Soochow University, China.* In this work, we introduce and validate both experimentally and numerically a novel post-processing technique termed the clipping algorithm, utilized on high-performance deep residual time-delay reservoir computing.

## ICOCN 2024—Sunday, 28 July

Room 305, Track 5

#### Room 306, Track 7

Room 307, Track 2

#### Su4D.4 • 17:00

Microwave photonic radar with flexible tuning multiband LFM signal generation, Jie Yu, Zheng Wang, Haoyan Xu, Xukai Ji, Feifei Yin, Yitang Dai and Kun Xu, *Beijing University of Posts and Telecommunications, China.* A tunable multiband LFM microwave photonic radar generates signals in three bands with adjustable center frequencies, achieving target detection with less than 2. 5 cm distance error and 3. 9 cm range resolution.

#### Su4D.5 • 17:15

The small deformation assessment of the integrated fiber optic by the speckle field changes using Siamese neural network, Anton Bryansky, Georgii Grigorev, Andrei Velichko, Xingyu Wei and Jian Xiong, Harbin Institute of Technology, China. In this work the Siamese neural network was designed for assessment of the integrated fiber optic sensor deformation. The accuracy of the trained network with three different sets of hyperparameters ranged from 77% to 82. 8%.

### Su4D.6 • 17:30

Simultaneous generation of optical frequency comb and microwave frequency comb utilizing a directly modulated laser, Xiaohong Lan, Yang Jiang, Jing Xu, Shuangyi Linghu, Qiong Zhang, Jinjian Feng, Qianyou Long, Yunkun Luo, Hui Zhang and Tingyi Jiang, *Guizhou University, China.* We proposed a low-cost scheme for OFC and MFC generation.

#### Su4D.7 • 17:45

Simultaneous Chromatic and Modal Dispersion Measurement for 10-mode Fibers Using a Modified Microwave Photonic Technique, Bingyi Zhao, Xiaochuan Liu, Huihui Wang, Zhiqun Yang, Yaping Liu and Zhanhua Huang, *BUPT, China*. Simultaneous chromatic and modal dispersion measurement for 10-mode fibers is realized using a modified microwave-photonic technique.



**Light field manipulation and its applications based on ultrahigh-Q optical microcavities**, Lei Shi; *Huazhong University of Science and Technology*.

## Su4E.5 • 17:20 Invited



Mode transformation of multipole beams with orbital angular momentum, Zhenjun Yang, Zhuoyue Sun, Duo Deng and Shumin Zhang; *Hebei Normal University*. The transmission characteristics of a quadrupole beams with a novel orbital angular

momentum is investigated. The rotational mode transformation of this beam during transmission in strongly nonlocal nonlinear materials is analyzed and illustrated.

### Su4F.4 • 17:00 Invited



Study the impact of polarization effects on the transmission system through normalized ACF, Nan Cui; *Beijing University of Posts and Telecommunications.* 

#### Su4F.5 • 17:20 Invited



High-speed optical transmission with integrated vibration sensing based on multicore fiber, Xueyang Li; Peng Cheng Laboratory.

#### Su4E.6 • 17:40 Invited



Ultralow - noise single - frequency laser and frequency comb generation in a stabilized Brillouin cavity, Hualong Bao, Soochow University, China.

#### Su4F.6 • 17:40

A Research Report on Processes in the Field of Optical Communication Device, Song Qin, Suzhou Delphi Laser Co., Ltd.

18:00-21:00 Dinner Break

#### Room 301, Track 1

#### 08:00-10:00

M1A • Fibers & Fiber Devices VII Presider: Cong Zhang, Guangdong University of Technology, China

### M1A.1 • 08:00 Invited



Fiber-optic biosensor for trace amount sample detection, Yang Ran; Jinan University.

### M1A.2 • 08:20 Invited



Fiber-membrane composite devices for acoustic wave sensing, Wenjun Ni; South-Central Minzu University.

Invited M1A.3 • 08:40



High-precision fiber optic sensing and concrete structure health monitoring applications, Shun Wang; Guangdong University of Technology.

#### Room 302, Track 6

#### 08:00-10:00 M1B • Measurement & Imaging VII Presider: Ailing Zhang, Tianjin University of Technology, China

#### M1B.1 • 08:00 Invited



Milli-Hz low-frequency DAS instrument and its applicaitons based on communication optical cable, Pengbai Xu; Guangdong University of Technology. This speech introduces the Milli-Hz low-frequency DAS

instrument developed by our group and its applications on the monitoring of seismic waves, ocean surface gravity waves, and ship activities, etc.

#### M1B.2 • 08:20 Invited



Wavefront-splitting interferometers for refractive index sensing. Rende Ma: Qufu Normal University. Optical refractive index sensors have a wide range of applications in detecting physical, chemical, or biological quantities. In order to obtain high test accuracy of these quantities, it is necessary to reduce the detection limit of optical refractive index sensor. Based on wavefront-splitting interferometers, we developed several refractive index sensors.

#### M1B.3 • 08:40



### Microcavity laser for sensitive biosensing, Xi Yang; University of Electronic Science and Technology of China. Microcavity lasers have attracted great interest due to their strong light intensity, threshold behavior, and narrow linewidths, facilitating a wide variety

of applications in ultrasensitive, disposable, and fast biosensing.

#### Room 303, Special 3

08:00-10:00 M1C • 2D-materials Photonics Presider: Hongtao Lin, Zhejiang University, China

#### Keynote M1C.1 • 08:00



" Smart " the Infrared photodetectors . Weida Hu, Chinese Academy of Sciences, China.

### M1C.2 • 08:20 Invited



domain-defined Ferroelectric in-memory sensing and computing, Bobo Tian; East China Normal University.

### M1C.3 • 12:00 Invited



### High Performance Optoelectronic Devices Based on Compound Semiconductor Heterostructures,

Jiang Wu, University of Electronic Science and Technology of China, China. This talk primarily discusses the design and fabrication of optoelectronic devices based on compound

semiconductor heterostructures. Special emphasis is given to the design and manufacture of high-temperature mid-wave infrared detectors, and the fabrication of high-power vertical-cavity surface-emitting lasers, etc.

#### Room 305, Special 1

#### 08:00-10:00 M1D • Organic Optoelectronics I Presider: Zugang Liu, China Jiliang University, China

### M1D.1 • 08:00 Invited



**Cluster Light-Emitting Diodes,** Hui Xu; *Heilongjiang University.* In recent years, electroluminescent clusters and light-emitting diodes developed rapidly, since cluster emitters integrate the advantages of high

luminescent efficiencies from their organic ligands and outstanding rigidity and stabilities from the metallic cores. Through ligand, host and device engineering, the external quantum efficiencies of cluster light-emitting diodes (CLED) already reached the state-of-the-art value of 30%.

#### M1D.2 • 08:20 Invited



Non-Fused Ring Electron Acceptors for Sustainable and Low-cost Optoelectronics, Aung Ko Ko Kyaw; Southern University of Science and Technology.

#### Room 306, Track 7

08:00-10:00 M1E • Ultrafast Photonics IV Presider: Zhixu Jia, Jilin University, China

### M1E.1 • 08:00 Invited

**Recent advances of all-fiber Mamyshev oscillator,** Shumin Zhang; *Hebei Normal University.* This presentation focuses on the self-starting characteristics, suppressing subpulses characteristics, high energy pulse

generation, wide spectrum pulse generation, multi-pulse characteristics, time domain instability, and transient processes including pulse creation and extinction in the Mamyshev oscillator.

## M1E.2 • 08:20 Invited



### Controllable output fiber lasers based on pump modulation, Zuxing Zhang; Nanjing University of Posts and Telecommunications. We propose and demonstrate fiber lasers with controllable output based on pump

modulation, including controllable pulse generation and annihilation, continuously switchable Q-switching and mode-locking, etc.

### M1D.3 •8:40 Invited



Monday, 29 July

# ZIF-8 thin films synthesized via chemical

vapor deposition technique and its application for gas sensing, Jin Wang, Bo Wei, Shakespear Takudzwa Samu, Min Deng, Mingxiang Zhou and Yunqing Lu; Nanjing University of Posts and Telecommunications

#### M1E.3 • 08:40 Invited

**High performance swept lasers and the applications,** Dongmei Huang; *The Hong Kong Polytechnic University.* 

#### M1F.3 • 08:40

Impact of analogue-to-digital converters on multi-channel digital nonlinearity compensation in 200 Gbits/s/ $\lambda$  polarization-multiplexed QAM transmission systems,

Yunfan Zhang, Tiegen Liu, Cenqin Jin, Zheng Liu, Ji Qi, Tongyang Xu, Mingming Tan, Jian Zhao and Tianhua Xu, *Tianjin University, China*. In this paper, the impact of analog-to-digital converter parameters, i. e. resolution bits and sampling rates, on the performance of multi-channel digital nonlinearity compensation has been investigated in high-capacity long-haul optical fiber communication systems.

Room 307, Track 2

# 08:00-10:00

**M1F** • Optical Transmission VII Presider: Nan Cui, Beijing University of Posts and Telecommunications, China

#### M1F.1 • 08:00



**Research on OAM multiplexing system based on atmospheric turbulence channel,** Shengyan Li, Rong Ma, Dongfang Wu, Xinning Lu, Yijiong Zhang, Wei Song, Jian Wan and Kaimin Wang; *University of Shanghai for Science and* 

*Technology.* Orbital angular momentum is widely applied to multiplexing communication systems. However, there are few reports on those systems based on the non-Kolmogorov turbulence. We conducted research on this topic and optimized the bit error rate.

#### M3F.2 • 08:20



Mapping-VariedModulationwithLabelingOptimizationforSecureTransmissioninMode-Division-MultiplexedFiber-OpticSystems, Yi Lei;Hefei University of Technology.

Room 301, Track 1

Room 302, Track 6

## M1A.4 • 9:00



Ultra sensitive fiber sensing based on signal processing assited Vernier effect, Xiaohui Fang; Guangzhou University.

### M1B.4• 09:00 Invited



Advanced fiber-optic sensors for structural health monitoring, Qi Zhang; Shanghai University.

### M1B.5• 09:20 Invited



Special Fiber Bragg Gratings Written by Femtosecond laser and their Applications, Ruohui Wang: Northwest University.

### A generalized form of the modified Siegert relationship for accurate blood flow monitoring, Wenjun Zhou; China Jiliang University. We derive a more general form of the modified Siegert relationship with

independent homodyne and heterodyne coherence parameters, and show that it can accurately recover blood flow in the presence of static and dynamic lights.

### M1A.6• 09:40

Invited



Microfiber sensor for noninvasive arterial waveform pulse monitoring and cardiovascular diseases assessment, Lili Liang; Handan University. We developed an intensity-based microfiber sensor for

noninvasive monitoring of the arterial pulse waveform in real time with high accuracy, which conducted with miniaturized integrated circuit system and analyzed cardiovascular parameters in interactive terminal.

#### Invited M1B.6 • 09:40



Single-pixel imaging based on metasurface fuzzy coding, Yan Shi; China Jiliang University. Single-pixel imaging (SPI) has become increasingly prominent in the field of optical research. We provides a new mask

generation mode for high-speed spatial light modulation based on the fuzzy coding of metasurfaces for SPI.

#### M1C.6• 09:40



**Two-dimensional Halide Optoelectronic Devices,** Lin Wang, Nanjing Tech University, China. We are focused on the interfacial growth and optoelectronic properties of two-dimensional metal ultrathin halides and their heterostructures, showing unique

optoelectronic properties such as robust CPL, reliable memory and ultrasensitive photo-detectivity etc.

#### Invited M1C.4 • 09:00



Blackbody-sensitive infrared 2D materials and applications, Zhen Wang; Chinese Academy of Sciences. Two-dimensional (2D) materials, characterized by their atomic thinness and remarkable electrical, optical, and magnetic properties, have garnered significant attention for their potential to revolutionize current optoelectronic device architectures and extend more applications. Among these materials, narrow-bandgap 2D materials such as noble metal dichalcogenides (e.g., PtTe2, PtSe2), black phosphorus (BP), and tellurium (Te) have been extensively studied.

Room 303, Special 3

#### Invited M1C.5• 09:20



Dual-function optical modulation and detection with 2D Materials in integrated photonics, Lan Li; Westlake University.

10:00-10:30 Poster Session 4 & Tea Break

Room 306, Track 7

Room 305, Special 1

M1D.4 • 09:00 Invited



**Flexible Energy Devices for Optoelectronic** Electronic Systems, Xing Fan, Long Qin and Xiaofei Wei, Chongging University, China. We have prepared a series of flexible all-solid photovoltaic fabrics and energy

storage fabrics, which can power for optoelectronic electronic systems with a high degree of structural flexibility.

#### M1D.5 • 09:20 Invited



Hybrid Semiconductor Luminescent Materials and Devices, Xuyong Yang; Shanghai University.





nonlinear frequency conversion, Junging Zhao; Shenzhen Technology University.

#### M1E.5 • 09:20 Invited



Observation of Bound Noise-Like Pulses in an Yb-Doped Fiber Laser, Xingliang Li, Mengmeng Han, Huijie Li and Shumin Zhang, Hebei Normal University, China, Dynamically bound noise-like pulses have been produced directly from a mode-locked Yb-doped fiber laser. This demonstration enriches the variety of pulse

dynamic patterns. The numerical predictions are consistent with the experimental observations.

### M1E.6 • 09:40

flexible Spectral high power superfluorescent fiber sources and its applications, Jiangming Xu: National University of Defense Technology.

Room 307, Track 2

#### M1F.4 • 08:55

Accurate and Efficient Fiber Channel Modeling for **Complex-value Based Conditional Generative Adversarial** Network, Yuxi Zheng, Yongjun Wang, Haifeng Yang, Lu Han, Xingyuan Huang and Yueying Zhao, Beijing University of Posts and Telecommunications, China. This paper presents the construction of a fibre channel model using a complex-valued conditional generation adversarial network. The 120 Gb/s 16 QAM signal is used to verify, and demonstrate an NMSE improvement of 41. 98%.

#### M1F.5 • 09:10

Cladding-Pumped 4-LP Erbium-Doped Fiber Amplifier with Low Modal Gain Variation, Yuanpeng Ding, Lu Dai and Lei Shen, YOFC, China. We report a cladding-pumped 4-LP erbium-doped fiber amplifier for mode division multiplexed transmission. Eventually, an average gain of 22. 16 dB with a low DMG of less than 2.5 dB over the whole C-band were obtained.

#### M1F.6 • 09:25

Experimental Demonstration of Power over Fiber for Power Grid Application, Zemian Zeng, Changna Chen, Xiaosheng Lin, Wei Chen, Jianping Li and Yuwen Qin, Guangdong Power Grid Co, Lid, China. We experimentally demonstrate the single mode fiber based power over fiber system with 10W optical power and 155 Mb/s data rate transmitted simultaneously over 1 km, which shows the potential for power grid application.

### M1F.7 • 09:40

Experimental Demonstration on modified CAZAC Matrix-based precoding for OFDM/QNSC, Mengwen Pan, Jing Yan, Ying Wu, Shuang Wei, Yuang Li, Mingrui Zhang, Yongli Zhao, Yajie Li and Jie Zhang, Beijing University of Posts and Telecommunications, China. This paper proposes a modified CAZAC Matrix-based precoding scheme for OFDM/QNSC system. Experimental results verify that our scheme achieves a ~1. 2dB PAPR reduction and ~2dB BER improvement compared to original CAZAC matrix.

Invited



M1D.6 • 09:40

Interface Optimization and Defect **Regulation towards High-Efficiency Cd-Free** Cu(In, Ga)Se2 Solar Cells, Wei Liu; Nankai University. This work combined experiments with simulation to optimise the band alignment between different functional

lavers. Furthermore. the mechanism of Zn diffusion-induced defects was revealed through DFT calculations. which facilitates the efficiencv enhancement of Cd-free CIGS solar cells to 18.0%.

10:00-10:30 Poster Session 4 & Tea Break

Poster Session 4 (10:00-10:30)

#### P4.1

A Few-shot Learning Equalizer Applied to Optical Communication System, Yueying Zhao, Yongjun Wang, Xingyuan Huang, Lu Han, Qi Zhang, Yuxi Zheng, Beijing University of Posts and Telecommunications, China. We propose a fully connected neural network equalizer based on few-shot learning in coherent optical fiber communication systems. The results show that the equalizer we constructed can achieve significant equalization effect with fewer eigenvalues.

#### P4.2

Non-invasive Cardiac Poincare Analysis Based on Fiber Interferometer, Wenye Sun, Chunliang Wang, Xinxin Lin, Wei Xu, The Second Affiliated Hospital of Soochow University, China. In this paper, a fiber Mach-Zehnder interferometerbased non-invasive cardiac Poincare analysis system is established and discussed, which shows it has great potential in future cardiovascular disease diagnosis.

#### P4.3

**Research on single tube packaging technology for high-power blue semiconductor lasers,** Gao Xiang, Yang Wenxin, Tao Chunyan, Hao Mingming, *China electronic product reliability and environmental testing research institude, China*. A study was conducted on high-power blue semiconductor lasers packaged with AIN and SiC heat sinks of different materials through a combination of simulation and experiment.

#### P4.4

**ZUC-256 high throughput FPGA implementation,** Yi Wei, Hanxiao Ma, Kaijie Guo, Sheping Shi, *Beijing University of Posts and Telecommunications, China.* The ZUC-256 algorithm is a stream encryption algorithm. In this paper, we have successfully achieved a throughput of 13. 33 Gbit/s on FPGA. Our experiment has provided more possibilities for physical layer encryption.

#### P4.5

**Dynamic refractive index sensing of water-ice phase transition with a single fiber grating,** Yan Zhou, Wenjun Zhou, Changyu Shen, Ruipin Chen, *Zhejiang Sci-Tech University, China.* We present that a multiresonant fiber grating is capable to monitor fully dynamic refractive index changes of ~ 0. 03 during a water-ice phase transition, where temperature and strain effects are eliminated with differential shifts of multiresonances.

#### P4.6

Focusing characteristics of polarimetric mixed eccentric phase modulated linearly polarized hyperbolic cosine-Gaussian beams, Haozhe Xu, Liqiu Wang, Yueyang Chen, Xiaoqiang Gai, Peijin Wei; *No. 715 Institute, China.* A polarization-mixed eccentric eccentric phase modulated hyperbolic cosine-Gaussian vortex beam is designed. the effects of eccentricity parameter, polarization parameter, phase turning parameter and beam parameter on beam focusing characteristics are discussed in detail by Matlab simulation calculation.

### P4.7

The Design and Simulation of High-order OAM Mode Couplers, Heng Guo, Lina Xiang, Zhifeng Wang, Mengshi Zhu, Liang Zhang, Heming Wei, Fufei Pang, *Shanghai University, China*. We propose a fiber coupler that supports 7-order orbital angular momentum (OAM) modes with adjustable coupling efficiency. The launched fundamental mode LPO1 couples to the higher order modes (OAM7, 1), coupling efficiencies excess 90%.

#### P4.8

Temperature response analysis of intelligent OPPC cable core based on finite element simulation, Wenping Xie, Ming Nie, Yongchun Liang, Xiaoyu Luo, Yu Han, Hongwei Li and Xiaohui Tang, *Electric Power Research Institute of Guangdong Power Grid Co. Ltd., China.* This study investigates OPPC cable temperature characteristics to enhance transmission capacity, ensure thermal stability.

#### P4.9

**Research on Refractive Index Sensor Based on Intensity Detection of Core-offset Mach-Zehnder Interferometer,**Li Li, Jie Jiang, Lili Liang, Kang Zhang, Guoyu Li, *Handan University, China.* Based on intensity detection, core-offset MZI formed by GF3 fiber is used for refractive index sensing. The RI sensitivity is 146. 8dB/RIU in the range of 1. 36-1. 43. The sensor has potential application value in environmental parameter detection.

#### P4.10

CNN Based Equalizer in NFDM System with B-Modulation,

Zimu Li, Yongjun Wang, Lu Han, Xingyuan Huang, Shuo Liu, Xiying Ding, Qi Zhang, *Beijing University of Posts and Telecommunications, China.* A CNN-based equalization scheme is proposed, and experimentally verified in 14. 4Gbps-16QAM NFDM optical communication system with 1600 km. The result shows that at LOP=-7. 1dBm, the BER decreases by ~50. 7%.

### P4.11

Multi-Objective Routing Based on Beluga Whale Optimization in Computing Power Optical Networks, Zhichao Yang, Chunying Wang, Lijie Wu, Huiying Sang, Kai Li, Xiaojie Hou, Zhichun Sun, Yan Liu, Ruijie Zhu, Zhengzhou University, China. We propose an improved multi-objective routing method based on Beluga whale optimization in computing power optical networks. Simulation results show that it can decrease delay, improve resource utilization and routing success rate.

#### P4.12

A Precision Fiber Optic Microseismic Monitoring System for Underground Coal Mines, Binxin Hu, Yunhao Gao and Siqi Li, *Qilu University of Technology, China.* This paper presents a novel precision FBG microseismic system. The system achieves a bandwidth of 1 Hz to 320 Hz and 86. 5 dB dynamic range. It has potential for safety monitoring of coal mines.

### P4.13

#### **Research on strawberry fruit detection based on YOLOv7,** Guo Cheng, Qiang Liu, Xiang Zhu, Zhu Chen, Huacai Chen, *China Jiliang University, China.* Strawberries is a popular fruit, and reliable detection is critical for modern agriculture. The article utilizes YOLOv7 for fruit detection and ripeness assessment, demonstrating promising outcomes, indicative of enhanced agricultural efficiency and sustainability.

#### P4.14

Strain and temperature discrimination measurement sensor using SMF-FMF-PMF fiber structure built in Sagnac loop, Huichao Chen, Changqing Huang, Chengchen Liu, *China Jiliang University, China*. A segment of few mode fibre (FMF) is sandwiched between single mode fibre (SMF) and polarization maintaining fiber (PMF), misaligned fusion splicing of FMF and SMF, proposed SMF-FMF-PMF fiber configuration is constructed a Sagnac loop.

#### P4.15

Inverse design of continuous domain bound state all-dielectric metasurface based on deep learning, Hanxiang Yu, Yuping Liu, Sicen Dong, Yuqing Wang, *Harbin Engineering University, China*. A deep learning-based reverse design method for metasurface structures is proposed, which can quickly and effectively deal with the relationship between continuous parameter structure and electromagnetic response, and realize the accurate prediction of structure parameters.

### P4.16

Multi-mode multiplexing reservoir computing based on a WRC-FPLD with optical feedback, Chunxia Hu, Dianzuo Yue, Chongqing colloge of electronic engineering, China. We proposed and numerically investigated a multi-mode multiplexing parallel task processing reservoir computing system. The simulated results show that the best parallel processing performance (NMSE=0. 029) can be achieved under some optimized operation parameters.

#### P4.17

Phase noise measurment of mode-locked lasers without dispersion management, Mengcheng Zhang, Xingcan Yan, Shaozhuang Yao, Yin Xu, Hualong Bao, *Soochow University, China*. We propose a method for precise measurement of repetition-rate phase noise of mode-locked lasers based on dual-wavelength delayed self-heterodyne technology assisted by MZI-based repetition-rate multiplier and optical injection locking. Dispersion management is not required.

#### P4.18

Fast and Accurate Mapping Method for OPGW Tower Based on M-OTDR, Ruofan Wang, Hongren Li, Xinying Zhao, Shuai Tong, Ningmu Zou, Xuping Zhang, Huanhuan Liu, Fei Xiong, Yixin Zhang, NanJing University, China. This paper presents M-OTDR that integrates vibration, temperature, and strain to effectively position tension and tangent towers on transmission lines. Field tests demonstrate that the proposed tower localization method could guarantee speedy and accurate position.

#### P4.19

Simultaneous Measurement of Temperature and Strain Based on Few Modes Tilted Fiber Bragg Grating, Yonglin Huang, Wenxin Yang, Bocheng Shao, *Nanjing University of Posts and Telecommunications, China.* By studying the different wavelength shift sensitivities of LP01 and LP12 modes in few modes tilted fiber Bragg gratings at different temperatures and strains, simultaneous measurement of temperature and strain can be achieved.

#### P4.20

Terahertz Beam-steering Leaky-wave Antennas Applied to Photonic Integrated Transmitter Chips, Ting Fang, Xiaofeng Duan, Xiaowei Yang, *Beijing University of Posts and Telecommunications, China.* This paper presents a periodic grounded coplanar waveguide leaky-wave antenna for beam steering in terahertz communication, aimed at low-loss integration with a microlens-backed photodetector for terahertz beam-steering photonic integrated transmitter chips.

#### P4.21

**Reflective curvature sensor based on hole-assisted three-core fiber,** Peng Ye, Jing Yang, Chunying Guan, Binbing Li, Shan Gao, Yan Liu, Bo Liu, Yao Bai, Yulin Zheng, *Harbin Engineering University, China.* We demonstrate a reflection curvature sensor based on a hole-assisted three-core fiber (HATCF). HATCF face is covered with femtosecond laser micromachined gold film. The bending direction and curvature are identified by monitoring the resonance peak.

#### P4.22

PVP modified optical fiber SPR refractive index sensor for sensitivity enhancement, Lingling Li, Huayan Wu, Liting Liang, Hao Liu, Hao Ke, Hua Tu, Ai Zhou, *Wuhan University of Technology, China*. Facing the issue of the low detection sensitivity for RI sensing of surface plasmon resonance (SPR) sensor to achieve biosensing, active research about PVP-modified optical fiber SPR refractive index sensor for sensitivity enhancement is performed.

### P4.23

Vacuum quenching optimization on blade-coated perovskite films in air for perovskite solar cells, Wenjun Han, Xin Yao, Zugang Liu, *China Jiliang University, China.* By optimizing the preparation process of perovskite films based on vacuum quench-assisted crystallographic printing, I successfully prepared large-area, high-quality perovskite films and devices under optimal pumping conditions.

#### P4.24

Joint Optimization of Coding and Shaping for Coherent Optical Communication Systems, Chenye Wang, Xue Zhao, Jiahao Zhou, Rui Wang, Taowei Jin, Jing Zhang, Shaohua Hu, Kun Qiu, University of Electronic Science and Technology of China, China. We use differential evolution algorithm to jointly optimize the parameters of forward error correction and probabilistic shaping in coherent optical communication systems. 56-GBaud simulation shows a net data rate gain of 36 Gbit/s.

#### Poster Session 4 (10:00-10:30)

#### P4.25

#### UTC-PD optoelectronic mixer designment and mixer array, Jihong Ye, Mingxi Yang, Xuejie Wang, Shuhu Tan, Yongqing Huang, Beijing University of Posts and telecommunication, China. We propose an optoelectronic mixing array for millimeter wave (MMW) and Terahertz (THz) system which achieves conversion loss of 8. 9 dB and 10. 5 dB at LO frequency of 60GHz and 100GHz.

#### P4.26

High precision frequency source abnormaly monitor using Kolmogrov-Arnold Networks, Sibo Gui, Junchao Wang, Chuwen Tang, Jianye Zhao, Peking University, China. We propose a neural network approach based on the Kolmogorov-Arnold Representation Theorem for real-time monitoring of anomalies in high-precision frequency sources. Experimental evidence demonstrates that this method achieves high predictive accuracy and maintains interpretability.

#### P4.27

#### An Enhanced Polar-LDPC Concatenated Protection Scheme Utilizing Optimized Critical Sets, Hou Chen, Zhu Hongjun, Han Yunlong, Zhang Meiling, Hu Guijun, Jilin University, *Ching.* A polar-LDPC concatenated protection scheme is introduced, which utilizes the optimized critical sets to effectively protect the error set information bits, thus enhancing the overall protection scheme.

#### P4.28

Vector Bending Sensor Based on 3D Printed Seven Core Fiber, Yang Cao, Yanhua Luo, Wei Chen, Jianxiang Wen, Yanhua Dong, Tingyun Wang, Zhigiang Song, Xiaolei Zhang, Jiasheng Ni, Jiaying Wang, Gang-Ding Peng, Yushi Chu, Jianzhong Zhang, Shanghai University, China. A vector bending sensor is proposed based on 3D printed seven core fiber (SCF). The sensor has two sensing elements, namely fiber Bragg grating (FBG) and Mach-Zehnder interferometer (MZI), which exhibit different responses to bending.

#### P4.29

Large bandwidth thin film lithium niobate modulator with periodic dual-capacitance structured electrodes, Hu Shuling, Zhou Xiang, Qi Binzhi, Sun Chuangi, Beihang University, China. We propose a thin film lithium niobate modulator with periodic dual-capacitance structured electrodes, achieving a large bandwidth of 192GHz and a low voltage length product of 1.7 V·cm, playing a key role in many fields.

#### P4.30

CvcleGAN-based Data Augmentation for Enhancing Classification Accuracy in **Φ-OTDR Systems**, Yi Shi, Xuwei Kang, Zichong Lin, Qiren Yan, Zhixiang Wei, Chuliang Wei, Shantou University, China. This paper proposes a CycleGAN-based data augmentation method to enhance classification accuracy in  $\Phi$ -OTDR systems. Experiments demonstrate improved This performance. data augmentation method retaining original features as a new solution for  $\Phi$ -OTDR data challenges.

#### P4.31

DRL-based Impairment-aware Resource Allocation Algorithm in C+L Band Elastic Optical Networks, Dan Yan, Nan Feng, Zhigun Gu, Xiaobo Zuo, Shihao Fan, Jijun Zhao, Hebei University of Engineering, China. We propose an impairment-aware resource allocation algorithm for C+L-band elastic optical networks based on deep reinforcement learning (DRL). Simulation results show that the proposed algorithm effectively reduces the blocking probability by over 10.9%.

#### P4.32

A Resource Orchestration Scheme for Data Synchronization of Distributed Machine Learning in Optical Networks. Zhizhi Li, Chenyu You, Xiaodong Liu, Xueyu Fan, Shan Yin, Shanguo Huang, School of electronic engineering, China. We propose a resource orchestration scheme based on heterogeneous network applied to data synchronization in optical network nodes. The simulation results show that this scheme can reduce the total communication delay.

#### P4.33

Mushroom-mesa modified uni-traveling carrier photodiodes, Xiaole Gong, Tonghui Li, Tianlin Ma, Kai Liu, Yongging Huang, Xiaofeng Duan, Beijing University of Posts and Telecommunications, China. A novel mushroom-mesa modified uni-traveling carrier photodiode is proposed, achieving high-speed, high-RF output power, and low capacitance performance. Its 3dB bandwidth reaches 143 GHz. The proposed structure can be applied for terahertz wave generation.

#### P4.34

Routing and Computing-Spectrum Resource Collaborative Allocation in Computing Power Optical Networks, Kai Li, Yan Liu, Chunying Wang, Lijie Wu, Zhichao Yang, Huiying Sang, Zhichun Sun, Xiaojie Hou, Ruijie Zhu, Zhengzhou University, China. We propose a RCSA computing power routing strategy to solve the computing-spectrum allocation problem in computing power optical networks. Simulation results indicate that it can achieve high user satisfaction and resource utilization.

#### P4.35

Collaborative Virtual Datacenter Embedding over Disaggregated Datacenters Connected by Multimode Fibers, Haibin Huang, Lidong Tian, China Mobile Research Institute, China. We present a collaborative virtual datacenter provisioning mechanism for disaggregated datacenters connected by multimode fibers. The simulation results show that the performances of blocking probability and spectrum utilization are efficiently improved.

P4.36 AN-D2NN: Classification of Modes with Amplitude Nonlinear Diffractive Deep Neural Network, Wenbo Zhang, Zhemg Lee, Guanju Peng, Yi Cheng, Jin Liu, Zongze Li, *Tianjin* University, China. This study introduces an amplitudenonlinear diffractive deep neural network (AN-D2NN), which enhances LP mode classification accuracy. A three-layer AN-D2NN demonstrates superiority optimized by reinforcement learning. Experimental results confirm exceptional performance with 98.7% accuracy.

#### Poster Session 4 (10:00-10:30)

#### P4.37

Research on Salinity Detection Sensors Based on Scanning Tapered and Fixed Point Taper Micro/Nanofiber, Ju Zhou, Bo Cai, Jie Gao, Xiaojun Cui, Jie Shi, University of Jinan, China. This study explored the use of scanning taper and fixed-point taper for salt concentration detection, and the results indicated that the scanning taper with a diameter of 1. 4 micrometers exhibited higher sensitivity.

#### P4.38

Chaotic 2D Cellular Automata Aided DNA Dynamic Encoding Encryption Scheme for Secure CO-OFDM-PON, Yun Wang, Qi Zhang, Ran Gao, Zhiqi Huang, Xinyu Yuan, Qihan Zhao, Yi Zhao, Feng Tian, Fu Wang, Qinghua Tian, Yongjun Wang, Xiangjun Xin, *BUPT, China*. A 2D cellular automata aided deoxyribonucleic acid (DNA) encoding encryption scheme for OFDM-PON is proposed. The simulation results performed on a CO-OFDM system verify that the scheme greatly enhances the security performance of the system.

#### P4.39

**Overlapped Signal Event Recognition with Neural Network Approach,** Yi Shi, Qiren Yan, Xuwei Kang, Zichong Lin, Zhixiang Wei, *Shantou University, China*. A CNN for recognizing overlapped data collected under real-world conditions. We enhance the data features using the MFCC. Model achieve an average single-event recognition accuracy of 77. 5% and three types of mixed events reaches 82%.

### P4.40

Monday, 29 July

Characterization of Phase Shift in UTC Photodiode and MUTC Photodiode, Xiaowen Dong, Kai Liu, Yongqing Huang, Xiaofeng Duan, Xiaomin Ren, *BUPT, China*. The characterizations of phase-shift for UTC-PD and MUTC-PD are studied with changing light intensity and bias voltage. The extreme values of electron transit-time are proved to determine extreme points of phase change and AM-to-PM null points.

### P4.41

Real time time-frequency transmission system based on multi-core optical fibers, Xuanzhi Gan, Feng Tian, Tianze Wu, Jing Zhang, Jianwei Zhou, Qihang Yu, Zhuojun Jiang, Qi Zhang, Qinghua Tian, *BUPT, China*. We propose a high-precision multi-core fiber time-frequency synchronization scheme based on FPGA. The experimental results shows that time synchronization accuracy is  $\pm$  31. 71ps, time stability is 1. 0413ps/s, and transmission frequency stability is 3. 3076×10-16/s. 0

### P4.42

All fiber acousto-optic filter with a single acoustic transducer for gain equalization, Ruyuan Liu, Chenxi Zhang, Yuting Zhang, Feng Gao, Jingjun Xu, *Nankai University, China*. All fiber acousto-optic filter (AOTF) could be used to flatten the gain difference of the ASE in an EDFA.

#### P4.43

The research focuses on the development of a measurement method for liquid film on fuel rods based on reflective optical fiber sensor, Yidong Wan, Decao Wu, Binbin Luo, Fudan Chen, Mao Kuang, Jinzhong Li, *Chongqing University of Technology, China.* We presented a novel sensor for liquid film thickness on fuel rods based on reflective fiber sensing. It can withstand the temperature of 350 °C, measure range is 1. 5mm, and accuracy can reach the micron level.

#### P4.44

**Two-way time comparison based on the phase-derived method,** Mingfeng Xiao, Xiuyuan Sun, Zhongyang Xu, Shilong Pan, *Nanjing University of Aeronautics and Astronautics, China.* This paper proposes a two-way time comparison method. Time difference between two sites are measured based on the phase-derived method. Clock errors between two Rubidium clocks are measured with a precision around 25 ps.

#### P4.45

Design and Investigation of Electrode for Terahertz Band Photodetector, Likang Gong, Yongqing Huang, Xiaodong Xie, Xuejie Wang, Xiaofeng Duan, Kai Liu, *Beijing University of Posts and Telecommunications, China.* A new photodetector electrode for terahertz band is designed in this paper based on inductance peaking and arc processing. After connecting the electrode, the bandwidth of MUTC-PD increased by 51% from 217. 6GHz to 328. 2GHz.

#### P4.46

Research on Submarine Cable Anchor Damage Monitoring Technology Based on a hybrid Brillouin and Rayleigh Distributed Sensing System, Yining Zhang, Xiaohui Tang, Meng Xia, Yilong Huang, Zhenjin Cen, Yu Han, Hongwei Li and Yongkang Dong, CSG EHV Electric Power Research Institute, China.Submarine cables are vital for global communication and energy but vulnerable to damage. This study developed a hybrid Brillouin and Rayleigh sensing system for monitoring cable anchor damage, achieving high sensitivity and spatial resolution.

#### P4.47

Femtosecond Laser inscribed Bragg gratings in Planar Lightwave Circuit with Low Polarization-Dependent Loss, Jiajun Guan, Zhihao Cai and Changrui Liao, *Shenzhen University*, *China*. This paper investigates the influence of femtosecond laser polarization on the performance of Bragg gratings inscribed in a planar lightwave circuit. After optimization, a Bragg grating is prepared with low polarization-dependent loss.

#### P4.48

**Research on Image Recognition and Classification of Weld Defects Based on Neural Networks,** Shenghua Zhou, Xianghua Fang, Qinyu Liu and Liuxin Ye, *China Jiliang University, China.* The algorithm of median filter as well as bottom cap transform is used for defect identification. The improved training accuracy and test accuracy are 96.24% and 90%, which can meet industrial production requirements.

#### Room 301. Track 1

#### 10:30-12:00 M2A • Fibers & Fiber Devices VIII Presider: Wenjun Zhou, China Jiliang University, China

#### Invited M2A.1 • 10:30



Tunable acousto-optic Mach-Zhender interferometer and its application in dual wavelength fiber laser, Feng Gao; Nankai University. We developed tunable AO-MZI and dual wavelength laser based on the structure, which could be either of tunable

center wavelength and spectral spacing or swithcable wavelength according to the configuration.

#### M2A.2 • 10:50 Invited



Scintillating Composites and Fibers for Radiation Detection, Shichao Lv; South China University of Technology. Various scintillating composites and fibers with interesting properties were discovered for gamma and neutron detection. Prototype

devices were built to display their potential applications in radiation detection for special environments.

#### Invited M2A.3 • 11:10



all-fiber Reconfigurable 2 Ц m high-order-mode light-source generation, Quandong Huang; Guangdong University of Technology.

#### M2B.3 • 11:10 Invited

An intelligent optical fiber device integrating sensing, storage, and computing functions, Yu Zhang: Harbin Engineering University. We implement the all-fiber platform integrating sensing, memory and computing, which is expected to improve the network scale,

response speed and reliability of the sensor network.

### Room 302, Track 6

#### 10:30-12:00

M2B • Measurement & Imaging VIII Presider: Wenjun Ni, South-Central Minzu University,

Invited

### China



Four-sided recessed fiber-optic magnetic field sensor based on surface plasmon resonance, Zhenyu Zhang and Yinping Miao; Tianjin University of Technology. A

four-sided recessed structure is applied to the optical fiber surface to reduce

evanescent wave energy loss between the metal layer and the equivalent fiber core caused by excessive distance.

#### Invited M2B.2 • 10:50

Enhanced distributed strain sensing by optical frequency domain reflectometry with modified cross-correlation, Weilin Xie and Yi Dong; Beijing Institute of Technology.

### Room 303, Special 3

#### 10:30-12:00 M2C • 2D-materials Photonics Presider: Weida Hu, Chinese Academy of Sciences,

China

#### Keynote M2C.1 • 10:30



Bioinspired in-sensor computing for artificial vision, Yang Chai; The Hong Kong Polytechnic University. In this talk. I will describe our team's efforts towards bioinspired in-sensor computing for artificial vision. I will talk about the framework of the in-sensor computing

and demonstrate a few vision sensors for different scenarios, including visual adaptation, motion perception, as well as event-driven vision sensors for spiking neural network.

#### Invited M2C.2 • 11:00



Reconfigurable photonic devices based on 2D materials and phase change materials, Hongtao Lin, Zhejiang University, China.

### M2C.3 • 11:20 Invited

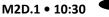


Photoelectric/radiation detection materials and devices based on solution processing, Liang Shen, Jilin University, China. Photodetectors made of organic, perovskite, and quantum dot materials have the advantages of simple process, low cost, and t, and have the potential to meet national eds.

light weight, and have the potential to meet national strategic needs.

#### Room 305, Special 1

10:30-12:00 M2D • Organic Optoelectronics II Presider: Hui Xu, Heilongjiang University, China





InP based QDs and QLEDs and PeLEDs, Zugang Liu; China Jiliang University. Room 306, Track 3

10:30-12:00 M2E • Optical Networks IV Presider: Ruan Lihua, Peng Cheng Laboratory, China

#### M2E.1 • 10:30 Invited



**RL-based Bandwidth Decision in Optical Access Networks: When to Exploit a Decision with Confidence,** Lihua Ruan and Elaine Wong, *Peng Cheng Laboratory.* 

## M2D.2 • 10:50 Invited



**Optoelectronic films for organic transistors in sensing applications,** Zhigang Yin; *Chongqing University.* 

#### M2E.2 • 10:50

**MEO-Supervised Traffic Grooming Routing Method for Regional Congestion in LEO Satellite Optical Network,** Sentian Yin, Hui Yang, Qiuyan Yao, Jun Li, Cui Zhang, Zhe Niu, Bingda Wu, Chen Zhang and Jie Zhang, *Beijing University of Posts and Telecommunications, China.* We propose a MEO-LEO cooperation routing method (MLCR) for regional congestion in the LEO satellite optical network. Simulation results show MLCR can result in less number of routing calculations, transmission delay, and packet drop rate.

### M2D.3 • 11:10 Invited



Monday, 29 July

High-Resolution Patterning of Fluorescent Films by Femtosecond Laser Writing, Yue-Feng Liu; Jilin University. We present a femtosecond laser writing technology, which not only enables the programmable

fabrication of high-resolution full-color fluorescent film arrays and arbitrary micropatterns, but also guarantees the preservation of the photophysical properties.

### M2E.3 • 11:05

**Fiber Mapping using Neural Networks for Physical-Layer Secure Key Distribution,** Yuhao Zhong, Xinran Huang, Zhi Chai, Mingye Li and Xuelin Yang, *Shanghai Jiao Tong University, China.* Neural networks are applied for fiber mapping in unidirectional physical-layer key distribution, where the bi-directional long short-term memory increases the key generation rate from 12. 28 to 13. 68 Gbps. Room 307, PDP

### 10:30-12:00 M2F • Post-deadline papers

Presider: **Shun Wang**, Guangdong University of Technology, China

#### M2F.1 • 10:30 📩

#### Intelligent Service-Oriented Graph Representation-

Assisted High-Efficiency Fine Grain Grooming for OSU-Based OTN, Tiankuo Yu, Hui Yang, Qiuyan Yao, Jie Zhang, Mohamed Cheriet and Hui Pan, *BUPT, China*, This paper proposes an efficient fine-grained grooming scheme based on graph representation to meet the demands of multi-granularity computing power requests. Simulation results demonstrate a significant reduction in cumulative latency and high resource utilization.

#### M2F.2 • 10:45 🛠

**Ultrafast Integrated Automatic Polarization Controller Based on Silicon Photonics,** Gengqi Yao, Weiqin Wang, Ziwen Zhou, Yifan Zeng, Siqi Yan and Ming Tang, *BUPT, China*.We realized a silicon automatic polarization controller with a tracking speed up to 105 krad/s, which is the fastest integrated polarization controller to date, through a novel thermal tuning scheme and an advanced control algorithm.

#### M2F.3 • 11:00 ☆

6-mode SDM transmission over 960 km with a reach extension of 5 times enabled by a 6M-EDFA, Tao Xu, Yanze Wang, Minghao Liu, Yaping Liu, Zhiqun Yang, Wenhao Li, Wei Li, Cheng Du, Zhanhua Huang and Lin Zhang, *Tianjin University, China*. We present 6-mode transmission over 960 km, 5 times longer than before, enabled by an in-line 6-mode Er-doped fiber amplifier. A Gaussian-like Er-doping profile is proposed to reduce the differential modal gain to 1.15 dB.

Room 301, Track 1

#### M2A.4 • 11:30 Invited



Light-Emitting Microfibers from Lotus Root for Eco-Friendly Optical Waveguides, Xianguang Yang; Jinan University. Here, we introduce biocompatible and flexible microfibers from lotus silk as

microenvironmental monitors that exhibit waveguiding of intrinsic fluorescence as well as of coupled light.

#### M2A.5 • 11:50

**HRV Related to Mental Fatigue Obtained Based on MZI-BCG Cushion**, Liufeng Zhu, *University of Shanghai for Science and Technology, China*. We used a fiber-optic sensor cushion based on Mach-Zehnder interferometer (MZI) to collect BCG signals under mental fatigue, and analyzed the relationship between HRV and mental fatigue.

### Room 302, Track 6

#### M2B.4 • 11:30

Simultaneous Improvement for Vibration Sensing and Communication in Multicore Fibers Enabled by a Kalman Filter Algorithm, Zongcheng Zhang, *Tianjin University*. We demonstrate a polarization-based vibration sensing technique using multicore fibers. Benefiting from the tracking capability of the utilized Kalman filter algorithm, the vibration localization accuracy and the signal transmission stability are both improved significantly.

#### M2B.5 • 11:50

High sensitivity magnetic field sensor composed of magnetic field stretching material Terfenol-D and FPI, Chao Jiang, Zihao Guo and Simei Sun, *Hubei Normal University, China*. A highly sensitive magnetic field sensor using Terfenol-D and FPI is proposed. FPI is composed of SMF, capillary, and PVA film. Then, FPI is then pasted onto the Terfenol-D end face to form MF sensor.

#### Room 303, Special 3

### M2C.4 • 11:40 Invited



**2D** material-based photodetectors and light emitting device, He Tian, *Tsinghua University*, *China*.2D materials are expected to achieve various new device applications. This report mainly introduces three research progress: (1) To further break through the bottleneck of gate

length transistors below 1 nanometer, my research team use the ultra-thin single atomic layer thickness and excellent conductivity of graphene thin film as the gate, and control the vertical MoS2 channel switch through the graphene lateral electric field to achieve an equivalent physical gate length of 0.34 nm [Nature 2022]. (2) 2D heterojunctions are built based on graphene and 2D perovskite with long-term stability [Joule 2018]. And MoS2/BP/WSe2 heterojunction shows the high responsitivity and low dark current [APL 2022]. (3) Graphene light-emitting device is built based laser-scribed system with tunable light emission wavelength [Nature Communications 2015].

Room 305, Special 1

M2D.4 • 11:30 Invited



High performance metal oxide thin film transistors and their advanced applications, Jun Li; *Shanahai University*.

#### M2D.5 • 11:50 Invited

TBD, Shaocong Hou; Wuhan University.

### Room 306, Track 3

Room 307, PDP

### M2E.4 • 11:20

Joint Optimization of Working and Protection Paths for RSA in Mixed-grid Optical Networks, Yaping Li, Zhijun Zhang, Congying Zhang, Yuhang Liu, Xiaosong Yu and Yongli Zhao, *State Grid Xinjiang Electric Power Company Limited Urumqi, China*. The joint optimization of working and protection paths routing and spectrum allocation (JOWP-RSA) algorithm is proposed to select the allocation strategy with the lowest spectrum occupancy and the highest spectrum availability in mixed-grid optical networks.

#### M2E.5 • 11:35

**Space-Time Coordinated Scheduling Approach in Computing Power Optical Networks,** Guiping Wu, Xiao Lin, Huihuang Lin, Zhixiang Hong, Jia Zhang, Jun Li, Zhen Chen, Weiqiang Sun and Zhilan Lou, *Fuzhou University, China. In this paper, an STC-SnF approach is presented to schedule bulk data transfers across the CPON. Studies show it can ensure the coordinated space-time relation of bandwidth fragments and hence benefit the SnF scheduling process.* 

#### M2E.6 • 11:50

Low congestion-based routing algorithm in optical network on chip, Junji Feng, Daqing Meng, Qiuyan Yao, Hui Yang and Jie Zhang, *BUPT, China*. In this paper, we propose a congestion avoiding routing algorithm for ONoC based on mesh topology. The simulation results verify the reliability of the algorithm by analyzing end to end delay, memory usage and loss.

## M2F.4 • 11:15 🛠

Enhancing Data Collection in Wide-Area Internet of Things A Comprehensive Low-Overhead Approach, Anyi Li, Bin Zhang, Wei Peng, Yuwei Xu, Baokang Zhao and Qin Xin, *National University of Defense Technology, China.* We developed a Low-Overhead and Enhancing Data Collection approach for wide-area IoT, reducing packet size by 50.2% on average compared to the original MQTT protocol, enhancing data transmission efficiency.

### M2F.5 • 11:30 🛠

Demonstration of Photonic Sub-THz ISAC System with Real-Time 251.03-Gbps Communication Rate and Offline 2.5-cm Sensing Resolution, Mingzheng Lei, Zhidong Lyu, Qingzhi Zhou, Junhao Zhang, Hao Li, Bingchang Hua, Yuancheng Cai, Jiao Zhang, Junjie Ding, Xingyu Chen, Lu Zhang, Jianjun Yu and Min Zhu, *Purple Mountain Laboratories, China.* We present a photonic sub-THz integrated sensing and communication system. The demonstrated system achieves a real-time line rate of 251.03 Gbps and an offline sensing resolution of 2.5 cm.

12:00-13:30 Lunch Break

#### Room 301, Track 1

13:30-16:00 M3A • Fibers & Fiber Devices IX Presider: Feng Gao, Nankai University, China

### M3A.1 • 13:30 Invited



Hollow-Core Fiber Fusion Splicing Technology with Low Loss and Low Backreflection, Cong Zhang; Guangdong University of Technology. We will briefly review our works about hollow-core fiber

(HCF) splicing, including HCF to single-mode fiber and HCF-to-itself. A new technique to suppress the high insertion loss in HCF angle-cleaving splicing also will be presented.

#### Invited M3A.2 • 13:50



Ultra-broadband fiber amplifiers based on multicomponent glass fibers, Jing Ren; Harbin Engineering University. We will talk about recent progress in achieving broadband near-infrared optical signal amplification via home-made multicompo-

nent glasses and fibers.

#### M3A.3 • 14:10

**BP** Neural Network Assisted Optical Fiber Sensor for High-Precision Demodulation of Salinity and Temperature, Kunyang He, Liangliang Cheng, Lirong Ren and Ya-Nan Zhang, Northeastern University, China. In this paper, an optical fiber sensor based on SPR-MZI hybrid effect is proposed to detect the temperature and salinity of sea water, and the signals are analyzed by BP neural network.

Room 302, Track 6

#### 13:30-16:00

M3B • Measurement & Imaging IX Presider: Pengbai Xu, Guangdong University of Technology, China

#### Invited M3B.1• 13:30



Wide-range high-precision thickness and group refractive index measurement based on differential white light interferometry, Yunlong Zhu, Xu Lu, Yumeng Ma, Zhuoran Li, Junyi Lang, Yonggui Yuan and Jun Yang: Harbin Engineering University. We have

improved the optical design and developed a series of demodulation algorithms for differential white light interferometry.

#### Invited M3B.2 • 13:50



Compact vector bending sensor based on hole-assisted optical fiber, Jing Yang, Peng Ye, Shan Gao, Ping Li, Zheng Zhu, Jinhui Shi and Chunying Guan, Harbin Engineering University, *China.* Two compact, highly sensitive and easy to fabricate vector bending sensors based on

single eccentric hole-assisted dual-core fiber and hole-assisted three-core fiber are demonstrated.

#### M3B.3• 14:10

High-spatial-resolution and high-speed distributed **vibration sensing based on φ-OFDR,** Hongwei Li, Zhang Xiong, Yanyang Lei, Tianfu Li, Yanda Qu and Yongkang Dong, Harbin Institute of Technology, China. We demonstrate a high-spatial-resolution and high-speed phase-sensitive optical frequency domain reflectometry system for dynamic measurements based on a distributed feedback laser utilizing an improved iteration algorithm for linear frequency modulation.

Room 303, Special 2

13:30-16:00 M3C • Machine Learning Presider: Jian Zhao, Tianjin University, China

#### M3C.1 • 13:30 Invited



Improvement of performance by deep learning in OFDR distributed optical fiber sensing systems, Chen Zhu; Zhejiang Lab.

#### M3C.2 • 13:50



Perturbation-based Nonlinearity Compensation for Optical Fiber Transmission using BiLSTM, Mingyu Chang, Jian Zhao and Yuqing Yang; Tianjin University. A perturbation-based nonlinearity compensation algorithm using BiLSTM is proposed and verified that the

computational complexity is reduced by 66% compared with the traditional ANN.

### M3C.3 • 14:10 Invited



Multi source separation and target detection in Fiber-optic Distributed Acoustic Sensor, Huijuan Wu; University of Electronic Science and Technology of China.

### M3C.4 • 14:30

sed on Optical Y Modulation Format Recognition Scheme Based on Reinforement Learning in Coherent Communication System, Fangxu Yang, Qinghua Tian, Yiqun Pan, Xiangjun Xin, Feng Tian, Leijing Yang, Fu Wang, Sitong Pan, Xiangjun Xin, Feng Tian, Leijing Yang, Fu Wang, Sitong Zhou, Yongjun Wang and Qi Zhang, *BUPT, China*. This paper proposes a modulation format recognition scheme based on reinforcement learning. Its effectiveness is validated in a 32Gbaud 1000km transmission experiment. It can achieve recognition of five high-order modulation formats under low OSNR conditions.

### Room 305. Track 5

13:30-16:00 Th3D • Optical Signal Processing IV Presider: Pei Zhou, Soochow University, China.

### M3D.1 • 13:30 Invited



The Ultra-high-Q Microring Resonator and Its Applications, Yuan Yu; Huazhong University of Science and Technology. I will

introduce our advances in high-Q microring resonators and their applications in microwave photonics, including microwave photonic filters and optoelectronic oscillators.

### M3D.2 • 13:50 Invited



**Photonics-Enabled** Wideband and High-Sensitivity Microwave Phase Noise Analyzer. Pei Zhou: Soochow University.

#### M3D.3 • 14:10

Adaptive microwave signal generation based on the photonic real-time Fourier transformation feedback, Rongtian Jiang, Dan Zhu, Zhantao Zhao, Jiewen Ding and Shilong Pan, Nanjing University of Aeronautics and Astronautics, China. Adaptive microwave signal generation based on the photonic Fourier transform feedback is proposed and experimentally demonstrated. Adaptive microwave signals centered at 5-7 GHz are successfully generated in real time in the experiments.

#### M3D.4 • 14:25

Broadband Wavelength Conversion for Mode-Division-Multiplexing Signals in a Width-Modulated Quasi-Phase-Matching Multimode Silicon Waveguide, Yi Zhao, Chenjing Zhang and Shiming Gao, Zhejiang University, China. A broadband wavelength conversion for mode-division-multiplexing signals is proposed in a multimode silicon waveguide by satisfying the quasi-phase matching through waveguide width modulation. A bandwidth >100 nm is predicted for TEO and TE1 modes.

Room 305, Track 7

#### 13:30-16:00 Th3E • Ultrafast Photonics V Presider: Hualong Bao, Soochow University, China

### M3E.1 • 13:30



Vortex laser and its applications in the ocean, Bo Guo; Harbin Engineering University.

#### M3E.2 • 13:50 Invited

Real-time comprehensive control over soliton molecules, Guoging Pu; Shanghai Jiao Tong University. We propose a real-time feedback scheme governed by a two-step optimization algorithm for comprehensively molecular multi-dimensional controlling soliton properties, including inter-soliton separations and relative intensities of soliton molecules, in a mode-locked fiber laser.

### M3E.3 • 14:10 Invited



Programmable manipulation on ultrashort pulses and ranging applications, Yiyang Luo; Chongging University.

#### M3E.4 • 14:30

A novel optical cavity soliton information encoder based on pump pulse width modulation in a nonlinear fiber resonator. Duanduan Wu. Ninabo University. China. An novel optical cavity soliton (CS) information encoder is theoretically designed in a nonlinear-fiber-resonator.

#### Room 307, Track 2

#### 13:30-16:00 Th3F • Optical Transmission VIII Presider: Kaimin Wang, University of Shanghai for Science and Technology, China

#### M3F.1 • 13:30 Invited



AI Assisted Photonics Terahertz Communication Technology towards 6G, Wen Zhou; Fudan University. Nonlinear effects mitigation is essential for 6G terahertz wireless communication. This article proposes model driven and complex neural network terahertz

digital coherent receiver modules, respectively, which effectively improve receiver sensitivity and suppress over-fitting effect.

#### Invited M3F.2 • 13:50



Low complexity DSP design and hardware implementation in high-speed optical communication, Kaihui Wang; Fudan

#### M3F.3 • 14:10

Low-Latency Frequency Division Multiplexing Using Entropy Loading for Multi-Point-to-Point Passive Optical Networks, Cheng Li, Wenxuan Mo, Ji Zhou, Haide Wang, Weiping Liu and Changyuan Yu, Hong Kong *Polytechnic University, China.* We experimentally demonstrate a low-latency frequency division multiplexing using entropy loading for multipoint-topoint passive optical networks.

#### M3F.4 • 14:25

Multiphoton-Polymerization 3D Printing of PDMS Optical Waveguide Device, Yuxin Wang, Changrui Liao, Dejun Liu, Weijia Bao and Yiping Wang, Shenzhen University, China. In this paper, we demonstrate the fabrication of polydimethylsiloxane (PDMS) straight waveguides and micro-ring whispering gallery mode (WGM) resonators using multiphoton polymerization 3D printing technology. We also investigates their transmission spectra.

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#### Room 301, Track 1

#### Room 302, Track 6

Room 303, Special 2

#### M3A.4 • 14:25

High pressure-sensitive and stable fiber Fabry-Perot interferometer with nano-diaphragm assembled by H-O catalysis bonding, Xiaotong Li, Xinpu Zhang, Zeliu Li, Yisong Wang, Jiamai Ren and Fenglin Zhang, Dalian University of Technology, China. In paper, a nano-film fiber Fabry-Perot interferometer assembled by hydrogen-oxygen catalytic bonding is presented and demonstrated.

#### M3A.5 • 14:40

Single-polarization Hollow Core Antiresonant Fiber With Nested Cladding Tubes, Xiaotian Yao, Qiang Liu, Guangrong Sun, Shuhui Wei, Xinrui Li, Wei Liu, Jingwei Lv and Chao Liu, Northeast Petroleum University, China. A SP HC-ARF made of six nested cladding tubes is designed. Through adopting different cladding structure along two orthogonal directions, v-polarized fundamental mode (FM) has lower transmission loss and the x-polarized FM has larger loss.

#### M3A.6 • 14:55

High pressure-sensitive and stable fiber Fabry-Perot interferometer with nano-diaphragm assembled by H-O catalysis bonding, Xiaotong Li, Xinpu Zhang, Zeliu Li, Yisong Wang, Jiamai Ren and Fenglin Zhang, Dalian University of Technology, China. In paper, a nano-film fiber Fabry-Perot interferometer assembled by hydrogen-oxygen catalytic bonding is presented and demonstrated.

#### M3B.4 • 14:30

A high response bandwidth DAS system based on optical loop modulation, Yanyang Lei, Jinglin Sui, Zhang Xiong, Tianfu Li and Yongkang Dong, Harbin Institute of Technology, China. We propose a scheme to generate sequential pulses based on the optical loop structure for improving the response bandwidth of DAS system, with the advantage of reducing the performance requirements of microwave sources and modulators.

#### M3B.5 • 14:45

Intensity-interrogated hot-wire anemometer based on cobalt-doped fiber Bragg grating, Langzhe Du, Yuhan Tang, Pengbai Xu, Jun Yang and Xinyong Dong, Guangdong University of Technology, China.An intensity-interrogated hot-wire anemometer based on cobalt-doped fiber Bragg grating is proposed. Experimental results show sensitivity of -648.23 nW/(m/s) at airflow velocity of 0.1 m/s and a measurement range of 0-8 m/s.

#### M3C.5 • 14:45

Performance Assessment of Deep Learning based Channel Modeling for Fiber Optic Communication System, Yang Ji, Zhongva Li, Huayuan Qin, Chengxi Wang, Jianyang Shi, Ziwei Li, Chao Shen, Nan Chi and Junwen Zhang, Fudan University, China. We compare and study three data-driven channel modeling methods based on deep learning in fiber optic communication systems.

#### M3C.6 • 15:00

Frequency-domain Optimization of Signal Waveform Shaper in High-speed Optical Communication Systems considering ADC Quantization Noise, Zheng Liu, Tiegen Liu, Yunfan Zhang, Ji Qi, Fengyuan Tian, Jian Zhao and Tianhua Xu, Tianjin University, China. We built an end-to-end learning complex deep neural network and used a differentiable quantization function.

#### M3C.7 • 15:15

Nonlinear Impairment Mitigation Based on Full-Link Physically Interpretable E2E Optimization Framework for over 300-Gbps IM/DD Transmission, Huayuan Qin, Zhongya Li, Yang Ji, Guoqiang Li, Boyu Dong, Sizhe Xing, Jianyang Shi, Ziwei Li, Chao Shen, Nan Chi and Junwen Zhang, Fudan University, China. We propose a full-link physically interpretable E2E optimization framework and deploy it in IM/DD fiber optic transmission system.

#### M3C.8 • 15:30

A SnF Scheduling Method for HFL over Edge Computing Power Optical Network, Jia Zhang, Xiao Lin, Zhixiang Hong, Guiping Wu, Jun Li, Zhen Chen, Weigiang Sun and Zhilan Lou, Fuzhou University, China. A SnF scheduling method is

Lou, *Fuzhou University, China*. A SnF scheduling method is presented to schedule data transfers in the HFL aggregation process across the ECPON. M3C.9 • 15:45 CNN-GRU Fiber Nonlinear Compensation Scheme Based on Multi-Label Classification, Chang Ding, Tian Qiu, Xu Wang, Shuhao Rao, Yihuan Su, Xueyuan Ao, Qingyu He, Ming Luo and Fengguang Luo, *Huazhong University of* Ming Luo and Fengguang Luo, Huazhong University of Science and Technology, China. We propose a CNN-GRU fiber nonlinear compensation scheme based on multi-label classification, which improves Q-factor performance compared with classification and regression schemes.

#### Room 305, Track 5

#### M3D.5 • 14:40

Linearized microwave photonic image-reject mixer based on polarization multiplexing, Zhao Zhang, Dan Zhu, Jiewen Ding, Xianqin Ke, Yu Sun and Shilong Pan, *Nanjing University of Aeronautics and Astronautics, China.* A linearized microwave photonic image-reject mixer based on polarization multiplexing is proposed and experimentally demonstrated. The 27-dB image-reject ratio for 1-GHz bandwidth and SFDR of 112 dB·Hz2/3 are achieved for 8-12 GHz working frequency range.

#### M3D.6 • 14:55

**Demonstration of Wavelength Selective Attenuator based on Second-order Micro-ring Resonator,** Tao Song, Xu Yang and Lei Zhang, *BUPT, China.* We report the implementation of a two-channel wavelength selective attenuator based on second-order micro-ring resonators (MRRs). We show continuous attenuation up to 15 dB for different channels with a spacing of 4 nm.

#### M3D.7 • 15:10

Parity-Time Symmetric Optoelectronic Oscillator Based on Four-Wave Mixing Effect in a Semiconductor Optical Amplifier, Jie Zhang, Zhaoying Wang, Jiaxin Zhou, Shuonan Duan, Wentao Dai and Chunfeng Ge, *Tianjin University, China.* Parity-time symmetric optoelectronic oscillator based on the four-wave mixing effect in a semiconductor optical amplifier is proposed.

#### M3D.8 • 15:25

An Enhanced Encoding Method for Photonic Spiking Neural Network Based on the VCSEL-SA, Yupeng Zhang and Nianqiang Li, Soochow University, China. We introduce an effective and biologically inspired encoding approach for a photonic spiking neural network (PSNN), utilizing vertical-cavity surface-emitting lasers with an embedded saturable absorber (VCSELs-SA), which can recognize spiking patterns and classify Iris dataset.

#### Room 306, Track 7

#### M3E.5 • 14:45

Numericalinvestigationof2μmallpolarization-maintaining mode-locked fiber laser, RenlaiZhou, Ni Feng, Zirui Yuan and Huiting Tang, HarbinEngineering University, China.We numerically investigatean all polarization-maintaining 2 μm figure-9 fiber laser.

#### M3E.6• 15:00

**Pulsating soliton with synchronized and unsynchronized resonant dispersive waves,** Mengmeng Han, Xingliang Li and Shumin Zhang, *Hebei Normal University, China*. A novel pulsating soliton state with synchronized and unsynchronized resonant dispersive waves in an ultrafast fiber laser is observed.

#### M3E.7 • 15:15

Structural soliton molecules in spatiotemporal mode-locking Yb-doped fiber laser, Huijie Li, Xingliang Li, Mengmeng Han and Shumin Zhang, *Hebei Normal University, China.* Structural soliton molecules (SMs), including (2+2) type SMs with equal and unequal intensity.

#### Room 307, Track 2

#### M3F.5 • 14:40

Secure Key Distribution Based on Dynamic Chaos Synchronization of Semiconductor Laser Networks, Meizhi Che, Ning Jiang, Anran Li, Huanhuan Xiong and Kun Qiu, University of Electronic Science and Technology of China, China. We numerically demonstrate a novel secure key distribution scheme based on dynamic chaos synchronization of semiconductor laser network systems.

#### M3F.6 • 14:55

Temporal Characteristics of Nonlinear Crosstalk in the Presence of Inter-Channel Stimulated Raman Scattering ,

Yichao Wang, Kehan He, Peiyun Ge, Jiale Duan and Lixia Xi, *BUPT, China.* We investigated the autocorrelation of nonlinear interference noise (NLIN) and the result shows that the temporal correlation of NLIN is significantly wavelength-dependent.

#### M3F.7 • 15:10

**Optoelectronic Pod Integrating FSO Communication and Scanning Based On Liquid Crystal Optical Phased Array,** Rusheng Zhuo, Dongmei Gu, Jieping Wu, Xiaoxian He, Xiangru Wang, Zixuan Wang and Kang Liu, *University of Electronic Science and Technology of China, China.* The unit cascaded 50mm caliber liquid crystal(LC) phased array, LC grating, LC wedge and other optical devices, combined with optimized control algorithm.

#### M3F.8 • 15:25

Nonlinear Compensation based on Bidirectional Temporal Convolutional Network in Underwater Visible Light Communication System, Yunkai Wang, Yuning Zhou, Zengyi Xu, Chi Nan, Li Yao, Jifan Cai, Zhilan Lu, Haoyu Zhang, Xianhao Lin, Fujie Li and Zhiteng Luo, *China*. In this work, we proposed a Bidirectional Temporal Convolutional network (BiTCN) model to process signal post-equalization in underwater visible light communication channel achieves a high data rate of 16. 2 Gbps.

#### M3F.9 • 15:40

**600-krad/s** Polarization Tracking for Self-Homodyne Coherent Transmission Systems Using a Thin Film Lithium Niobate Based Polarization Controller, Weibin Chen, Youxin Liu, Ao Cui, Kaixuan Chen, Liu Liu and Changjian Guo, *South China Normal University*, *China*. We demonstrate a thin-film lithium niobate dynamic polarization controller for ultra-fast polarization tracking.