

Best Paper Award

13:30-15:30 • 5 • November • Sunday

Best Paper Award I

Presider: Gangxiang Shen, Soochow University, China

13:30-13:45 • ACPPOEM-0726-22

Photoacoustic fiberscope for cerebral oxygenation imaging based on optical ultrasound detectionXiaoxuan Zhong¹; Yizhi Liang¹; Long Jin

Jinan University, China

We developed a photoacoustic fiberscope based on optical ultrasound sensor. This new imaging modality was used for cerebral oxygenation imaging on freely moving mice for neuroscience study and intensive care of sepsis for medicine study.

13:45-14:00 • ACPPOEM-0727-2

400 Gb/s DWDM Field Trial over a Record Distance of 3820 km G.654.E Fiber Link with 107 GBaud Transceivers and C-band EDFAsChengliang Zhang¹; Anxu Zhang¹; Zhiwen Fan²; Kai Lv¹; Lipeng Feng¹; Yuyang Liu¹; Xiaoli Huo¹; Junjie Li¹; Jitao Gao²; Yudi Fu²; Chen Duan²; Songtao Chen²; Bin Zhang²; Qi Yang³; Deming Liu³

1. China Telecom Research Institute, State Key Laboratory of Optical Fiber and Cable Manufacture Technology, China; 2. Fiberhome Telecommunication Technologies Co., LTD, China; 3. School of Optical and Electronic Information, Huazhong University of Science and Technology, China

A real-time 40×400 Gb/s dense wavelength division multiplexing (DWDM) ultra-long-distance transmission is demonstrated over a field-deployed G.654.E fiber link using 107 GBaud transponders. The transmission distance reaches 3820 km, refreshing the industry record of 400 Gb/s DWDM optical transmission systems.

14:00-14:15 • ACPPOEM-0731-104

Exceptionally Efficient Second-Harmonic Generation in a Double-Layer Thin-Film Lithium Niobate WaveguideYuan Li¹; Lutong Cai¹; Lin Zhang

Tianjin Key Laboratory of Integrated Opto-electronics Technologies and Devices, School of Precision Instruments and Opto-electronics Engineering, Tianjin University, China

We demonstrate highly efficient second-harmonic generation in thin-film lithium niobate waveguides. Due to the significantly enhanced modal overlap integral in polarization-reversed double layers, an unprecedentedly high conversion efficiency of up to 9700% W⁻¹cm⁻² is achieved.

14:15-14:30 • ACPPOEM-0731-109

Measurement of chromatic dispersion in hollow core fibers using optical frequency combMeng Ding¹; Daniel Dousek²; Ailing Zhong²; Matej Komanec²; Ian Davidson¹; Gregory Jasion¹; Francesco Poletti¹; Radan Slavik¹

1. University of Southampton, United Kingdom; 2. Czech Technical University in Prague, Czech Republic

We present a novel method for accurate and fast measurement of signal time delay over a broad wavelength range. This enables accurate measurement of chromatic dispersion. We demonstrate this method on characterizing hollow core fibers.

14:30-14:45 • ACPPOEM-0731-146

Impact of WDM-Band Drop on S+C+L Multi-Band Optical Transmission SystemsXiaohui ZHAO¹; Salma Escobar-Landero²; Abel Lorences-Riesgo²; Dylan Le Gac²; Loig Godard²; Iosif Demirtzioglou²; Hartmut Hafermann²; Qiang Guo³; Romain Brenot²; Massimo Tornatore¹; Yann Frignac²; Gabriel Charlet²

1. Politecnico di Milano, Italy; 2. Huawei Technologies France - Paris Research Center, France; 3. Huawei Technologies CO., Ltd., China

We experimentally and numerically assess the impact of different WDM band drops on S+C+L multi-band systems. Our results highlight how ISRS induces a higher impact on the L-band transmission performance due to the S-band drop.

14:45-15:00 • ACPPOEM-0731-152

Side-amorphous-silicon-grating InGaAs/GaAs nano-ridge distributed feedback laser monolithically grown on 300 mm silicon substrateZhongtao Ouyang¹; Eslam Fahmy¹; Davide Colucci^{1,2}; Andualem Ali Yimam¹; Bernardette Kunert³; Dries Van Thourhout¹

1. Ghent University, Belgium; 2. Imec, Belgium; 3. imec, Belgium

A compact III-V semiconductor laser is regarded as a promising light source for the silicon photonic platform due to its unique advantages of low energy consumption and small footprint. However, the significant lattice mismatch between the III-V material and silicon is a fundamental challenge for the monolithic integration of III-V lasers on silicon substrates and requires specific integration solutions to confined relaxation defects outside the active device region. Here, a distributed feedback GaAs/InGaAs nano-ridge laser directly grown on silicon substrate by nano-ridge engineering is demonstrated. Under pulse pumping, the lasing was achieved with a cavity length as small as 50 μm. This laser establishes a novel route to realize a compact light source for the future high-density and massively scalable silicon photonic integrated circuits.

15:00-15:15 • ACPPOEM-0731-52

A Beam-scannable photonic THz-ISAC system based on Risley prisms

Zhidong Lyu¹; Lu Zhang¹; Hongqi Zhang¹; Zuomin Yang¹; Hang Yang¹; Changming Zhang²; Vjačeslavs Bobrovs³; Xiaodan Pang^{3,4,5}; Oskars Ozolins^{3,4,5}; Xianbin Yu²

1.Zhejiang University, China; 2.Zhejiang Lab, China; 3.Riga Technical University, Latvia; 4.KTH Royal Institute of Technology, Sweden; 5.RISE Research Institutes of Sweden, Sweden

We demonstrate a beam-scannable photonic terahertz-integrated sensing and communication (THz-ISAC) system using Risley prisms. 20 Gbps data rate and 1.5 cm resolution are simultaneously achieved at 300 GHz with 40 deg field of view (FoV).

15:15-15:30 • ACPPOEM-0731-6

Low Hardware-Complexity 100G Transceiver Using A Single DAC and Two ADCs

Abel Lorences-Riesgo; Yu Zhao; Yann Frignac; Gabriel Charlet

Huawei Technologies France, France

We demonstrate that dual-sideband modulation and intradyne detection, 100G transmission over 400 km with SNR margin of 3 dB. While minimizing the required number of components, this transceiver is still tolerant to PMD and SOP

15:30-15:45 Coffee Break

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Best Paper Award II

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15:45-16:00 • ACPPOEM-0731-60

Cascadable Integrated Optical Tweezers by Crossing MMI Waveguides

Xuedi Wang; Xin Tong; Weichao Cheng; Lin Zhang

Key Laboratory of Opto-electronics Information Technology of Ministry of Education, School of Precision Instruments and Opto-electronics Engineering, Tianjin University, China

We propose and experimentally demonstrate a crossing multimode-interference (MMI) device, which produces a strong optical force to trap microparticles. The trapping dynamics of microparticles are analyzed. Low-loss characteristic allows for cascading to improve capture efficiency.

16:00-16:15 • ACPPOEM-0801-100

Entanglement Networks with Fiber-Pigtailed Silicon Nitride Microring

Yun-Ru Fan¹; Jin-Peng Wu¹; Ri-Yao Song¹; Hao Yu¹; Hong Zeng¹; Guang-Wei Deng¹; Hai-Zhi Song^{1,2}; You wang^{1,2}; Li-Xing You³; Zhen Wang³; Guang-Can Guo^{1,4}; Qiang Zhou^{1,4}

1.University of Electronic Science and Technology of China, China; 2.Southwest Institute of Technical Physics, China; 3.Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Science, China; 4.University of Science and Technology of China, China

A fully connected entanglement network with four users is experimentally demonstrated by using multi-wavelength energy-time entanglement source with a fiber-pigtailed silicon nitride microring. The entanglement-based quantum key distributions among users are realized with improved performance.

16:15-16:30 • ACPPOEM-0801-134

10λ×3.26Tb/s CPRI-Equivalent Rate 1024-QAM DA-RoF Fronthaul in Single-Mode Fiber Using Coherent-Compliant DSP

Yixiao Zhu¹; Xiansong Fang²; Chenbo Zhang²; Lingjun Zhou²; Jiayu Zheng²; Yicheng Xu¹; Xiaopeng Xie²; Fan Zhang²; Qunbi Zhuge¹; Weisheng Hu¹

1.Shanghai Jiao Tong University, China; 2.Peking University, China

We experimentally demonstrate high-capacity coherent DA-RoF fronthaul leveraging pilot symbol- and BPS-based carrier phase recovery. Up to 4.42-Tb/s and 32.6-Tb/s CPRI-equivalent rates are achieved with single-carrier (256-QAM) and WDM (1024-QAM) transmission over 10-km SSMF, respectively.

16:30-16:45 • ACPPOEM-0801-61

Timing Recovery for 400G P2MP Optical Networks using Coherent Digital Subcarrier Multiplexing

Haide Wang¹; Jinyang Yang¹; Ji Zhou¹; Zhenping Xing²; Keshuang Zheng²; Liangchuan Li²; Weiping Liu¹; Changyuan Yu³; Zhao-hui Li⁴

1.Jinan University, China; 2.Huawei Technologies Co Ltd, China; 3.The Hong Kong Polytechnic University, China; 4.Sun Yat-sen University, China

Point-to-multi-point (P2MP) optical networks using coherent digital subcarrier multiplexing (DSCM) can offer a better match to the hub-and-spoke traffic pattern. To reduce the computational complexity of the digital signal processing at the leaf nodes, the hub-site chromatic dispersion (CD) pre-compensation can be adopted but the residual CD will affect the timing recovery (TR). In this paper, we present a CD-tolerant TR algorithm for 400Gb/s P2MP optical networks using coherent DSCM over 320 km transmission. The experimental results of the 400Gb/s P2MP optical networks show that the proposed leaf-node TR can tolerate a residual CD up to ~5600 ps/nm after hub-site CD pre-compensation. The timing phase can be maintained accurately by the proposed CD-tolerant TR algorithm under the timing errors of phase offset, frequency offset, and jitter. Moreover, TR for P2MP optical networks using coherent DSCM with lower baud rate subcarrier has more robustness against CD.

16:45–17:00 • ACPPOEM-0801-64

Experimental Demonstration of Traffic-driven Control Framework and Autonomous Connection Management for Flexible Transport NetworksQiaojun Hu¹; Wei Wang¹; Xiangkun Man²; Renji Zhang¹; Liyazhou Hu³; Yongli Zhao¹; Yajie Li¹; Guangquan Wang²; Yanxia Tan²; Jie Zhang¹*1. School of Electronics Engineering, Beijing University of Posts and Telecommunications, China; 2. Broadband Network Research Lab, China Unicom Research Institute, Beijing 100048, China, China; 3. Macau University of Science and Technology, China*

We design a traffic-driven control framework for managing massive optical connections and implement a prototype based on commercial equipment. Experiments demonstrate the framework's ability for enabling autonomous dynamic service provisioning.

17:00–17:15 • ACPPOEM-0812-7

Narrow Bandwidth Hundreds Picosecond Pulse Fiber Laser Based on Carbon Nanotubes Mode-lockerWeixi Li¹; Lilong Dai¹; Kaiquan Yan¹; Yuze Dai²; Chengbo Mou¹; Zhijun Yan²*1. Shanghai University, China; 2. Huazhong University of Science and Technology, China*

0.01 nm, 323 ps passively mode-locked erbium-doped fiber laser (EDFL) based on carbon nanotubes (CNTs) is established with a homemade fiber Bragg Grating (FBG) as the intra-cavity filter.

17:15–17:30 • ACPPOEM-0815-26

Ultraflexible organic solar cells for wearable power sources

Sixing Xiong

RIKEN, Japan

In recent years, wearable electronics have garnered significant attention due to their vast potential for application across diverse domains. The efficacy of these devices hinges on an efficient and reliable energy supply system for sustained operation. With the ongoing trend towards slimmer, lighter, and more pliable designs, wearable electronics require power sources that not only offer enhanced effectiveness but also possess comparable mechanical attributes. Among the solutions, ultra-flexible organic solar cells, boasting a thickness of less than 10 μm , emerge as a compelling option, capable of seamlessly integrating into irregular and stretchable substrates, such as human skin and textiles. This renders them among the most promising off-grid power supply candidates for wearable electronics. Notably, research has demonstrated the compatibility of organic solar cells with the human body. This presentation will delve into our advancements concerning the development of ultra-flexible solar cells and their role in energizing wearable electronics and sensors. We have successfully engineered organic solar cells with a mere 3 μm thickness, yielding a remarkable power conversion efficiency exceeding 15%, coupled with improved environmental stability. Leveraging a hot-melt adhesion process, these ultra-flexible solar cells can be affixed to human skin or textiles with precision. Moreover, we have seamlessly integrated these ultra-flexible solar cells with sensors, culminating in a self-powered system adept at monitoring biological signals.

17:30–17:45 • ACPPOEM-0815-83

Wavelength-selective 2×2 optical switch based on a $\text{Ge}_2\text{Sb}_2\text{Te}_5$ -assisted microring for the 2- μm wavelength bandWeixun Zhu¹; Xing Yang²; Huan Li¹; Liangjun Lu²; Linjie Zhou²; Daoxin Dai^{1,3}*1. State Key Laboratory for Modern Optical Instrumentation, Center for Optical & Electromagnetic Research, College of Optical Science and Engineering, International Research Center for Zhejiang University, Zijingang Campus, China; 2. State Key Laboratory of Advanced Optical Communication Systems and Networks, Shanghai Key Lab of Navigation and Location Services, Department of Electronic Engineering, Shanghai Jiao Tong University, China; 3. Ningbo Research Institute, Zhejiang University, China*We propose and demonstrate a wavelength-selective 2×2 silicon photonic switch using a $\text{Ge}_2\text{Sb}_2\text{Te}_5$ -assisted microring-resonator for the 2- μm wavelength-band, showing an extinction ratio of ~ 20 dB and a low excess loss of ~ 1 dB.

17:45–18:00 • ACPPOEM-0815-86

A Terahertz time-domain spectroscopy based on a high performance mode-locked fiber laserLiao Chen¹; Jingmeng Li¹; Rongwu Liu¹; Yufan Du¹; Chi Zhang¹; Xiaojun Wu²; Xinliang Zhang¹*1. Wuhan National Laboratory for Optoelectronics & School of Optical and Electronic Information, China; 2. School of Electronic and Information Engineering, China*

A terahertz time-domain spectroscopy based on a mode-locked fiber laser with 76 fs pulsewidth and 42 mW power, has demonstrated with 40 dB dynamic and 2.5 THz bandwidth, used to characterize terahertz filter and lactose.

17:30–20:00 Welcome Reception