

OFC 2023 Postdeadline Abstracts

Room 6C

16:30 -- 18:15

Th4A • Postdeadline Paper Session I

Presider: Nicolas Fontaine; Nokia Bell Labs, USA

Th4A.1 • 16:30

High-Performance O-Band QD DFB Laser for Uncooled Operation, Sergei Poltavtsev¹, Vladimir Mikhrin¹, Alexey Kovsh², Artem Zhabotinskii¹, Alexey Gubenko¹; ¹*Innolume GmbH, Germany*; ²*Alfalume, USA*. High-power O-band Quantum Dot Distributed-Feedback Laser for pluggable DR4/DR8 optical transceivers and Remote Laser Modules is presented. It exhibits PCE as high as 20% up to 105°C and CW power exceeding 300mW at 85°C.

Th4A.2 • 16:45

Thin-Film BTO-Based Modulators Enabling 200 Gb/s Data Rates With sub 1 v_{pp} Drive Signal, Felix Eltes¹, Weijia Li², Essam Berikaa², Md Samiul Alam², Santiago Bernal², Cyriel Minkenberg¹, David Plant², Stefan Abel¹; ¹*Lumiphase AG, Switzerland*; ²*Dept. of Electrical and Computer Engineering, McGill Univ., Canada*. We demonstrate BTO-enhanced silicon photonics enabling compact, low-loss modulator PICs delivering net PAM4 data rates below HD-FEC threshold of 200 Gb/s in a driver-less setup with linear Rx DSP, at 9 fJ/bit electrical power dissipation.

Th4A.3 • 17:00

280 Gbit/s PAM-4 Ge/Si Electro-Absorption Modulator With 3-dB Bandwidth Beyond 110 GHz, Xiao Hu^{1,2}, Dingyi Wu¹, Daigao Chen^{1,2}, Ye Liu¹, Hongguang Zhang¹, Yang Liu¹, Jia Liu¹, Min Liu¹, Lu Xu¹, Lei Wang^{1,2}, Xi Xiao^{1,2}, Shaohua Yu^{1,2}; ¹*NOEIC, China*; ²*CICT, China*. We developed a Ge/Si electro-absorption modulator with a record-high 3-dB bandwidth beyond 110 GHz. 224, 240 and 280 Gbit/s PAM-4 eye diagrams with the TDECQ of 1.79, 2.35 and 3.33 dB are experimentally obtained, respectively.

Th4A.4 • 17:15

Randomly Coupled 19-Core Multi-Core Fiber With Standard Cladding Diameter, Georg Rademacher¹, Menno van den Hout², Ruben S. Luis¹, Benjamin J. Puttnam¹, Giammarco Di Sciullo³, Tetsuya Hayashi⁴, Ayumi Inoue⁴, Takuji Nagashima⁴, Simon Gross⁵, Andrew Ross-Adams⁵, Michael Withford⁵, Jun Sakaguchi¹, Cristian Antonelli³, Chigo M. Okonkwo², Hideaki Furukawa¹; ¹*National Inst of Information & Comm Tech, Japan*; ²*Eindhoven Univ. of Technology, Netherlands*; ³*Univ. of L'Aquila, Italy*; ⁴*Sumitomo Electric Industries, Ltd., Japan*; ⁵*Macquarie Univ., Australia*. We developed a randomly-coupled 19-core fiber with standard 125- μ m cladding diameter with spatial mode dispersion of 10.8 ps/

OFC 2023 Postdeadline Abstracts

√km, enabling a data rate of 1.7 Pb/s, the highest reported amongst optical fibers with standard cladding diameter.

Th4A.5 • 17:30

Zero-Offset Frequency Locking of Lasers at Ultra-Low Optical Powers, Rasmus Larsson¹, Kovendhan Vijayan¹, Peter A. Andrekson¹; ¹*Chalmers Univ. of Technology, Sweden*. We demonstrate a novel digital dither-OPLL for homodyne optical carrier locking below -80 dBm optical power. The locking performance is characterized and verified with pump recovery in a phase-sensitive parametric amplifier.

Th4A.6 • 17:45

Transparent Relay and Switching of THz-Wave Signals in 285-GHz Band Using Photonic Technology, Pham Tien Dat¹, Yuya Yamaguchi¹, Keizo Inagaki¹, Shingo Takano², Shotaro Hirata², Junichiro Ichikawa², Ryo Shimizu², Isao Morohashi¹, Yuki Yoshida¹, Atsushi Kanno^{1,3}, Naokatsu Yamamoto¹, Tetsuya Kawanishi^{1,4}, Kouichi Akahane¹; ¹*NICT, Japan*; ²*Sumitomo Osaka Cement Co., Ltd., Japan*; ³*Nagoya Inst. of Technology, Japan*; ⁴*Waseda Univ., Japan*. A novel system for transparent relaying and switching of terahertz (THz)-wave signals is demonstrated using a low-loss optical modulator and ultra-fast tunable laser. A 32-Gb/s OFDM signal was transmitted over a switchable fiber–THz–fiber–THz system in the 285-GHz band.

Th4A.7 • 18:00

Withdrawn

Th4A.8 • 18:00

Real-Time 50-Gbit/s Spatially Multiplexed Quantum Random Number Generator Based on Vacuum Fluctuation, Ken Tanizawa¹, Kentaro Kato¹, Fumio Futami¹; ¹*Tamagawa Univ., Japan*. We demonstrate four-channel parallel high-speed random number generation using a quantum entropy source based on vacuum fluctuations and a real-time FPGA random number extractor. A record-high aggregated generation rate of 50 Gb/s is achieved.

Room 6D

16:30 -- 18:30

Th4B • Postdeadline Paper Session III

Presider: Fotini Karinou; Microsoft Research Ltd, UK

Th4B.1 • 16:30

OFC 2023 Postdeadline Abstracts

Net 1.6 Tbps O-Band Coherent Transmission Over 10 km Using a TFLN IQM and DFB Lasers for Carrier and LO, Essam Berikaa¹, Md Samiul Alam¹, Santiago Bernal¹, Weijia Li¹, Benjamin Krüger², Fabio Pittala², David Plant¹; ¹*McGill Univ., Canada*; ²*Keysight, Germany*. We report the first 1.6 Tbps, O-band, 10 km coherent transmission system using DFB lasers for both carrier and LO, and a TFLN IQ modulator, operating at 167 Gbaud DP-64QAM under the 25% SD-FEC threshold.

Th4B.2 • 16:45

Optical Amplification-Free 310/256 Gbaud OOK, 197/145 Gbaud PAM4, and 160/116 Gbaud PAM6 EML/DML-Based Data Center Links, Oskars Ozolins^{1,2}, Armands Ostrovskis³, Toms Salgals³, Benjamin Krüger⁴, Fabio Pittala⁴, Mahdieh Joharifar², Richard Schatz², Di Che⁵, Yasuhiro Matsui⁶, Thomas Dippon⁴, Michael Koenigsmann⁴, Yuchuan Fan¹, Marek Chacinski⁷, Urban Westergren², Lu Zhang⁸, Haik Mardoyan⁹, Sandis Spolitis³, Sergei Popov², Xianbin Yu¹⁰, Markus Gruen⁴, Vjačeslavs Bobrovs³, Hadrien Louchet⁴, Xiaodan Pang^{2,1}; ¹*RISE Research Inst.s of Sweden AB, Sweden*; ²*KTH Royal Inst. of Technology, Sweden*; ³*Riga Technical Univ., Latvia*; ⁴*Keysight Technologies GmbH, Germany*; ⁵*Nokia Bell Labs, USA*; ⁶*Coherent, USA*; ⁷*Coherent, Sweden*; ⁸*Zhejiang Univ., China*; ⁹*Nokia Bell Labs, France*; ¹⁰*Zhejiang Lab, China*. We demonstrate a record 310/256 Gbaud OOK, 197/145 Gbaud PAM4, and 160/116 Gbaud PAM6 EML/DML-based IM/DD links without any optical amplification with performance below the 6.25% overhead HD-FEC threshold after 100-m/6-km SMF, respectively.

Th4B.3 • 17:00

First Demonstration of Erbium-Doped Waveguide Amplifier Enabled Multi-Tb/s (16×1.6T) Coherent Transmission, Di Che¹, Stefano Grillanda¹, Yang Liu², Zheru Qiu², Xinru Ji², Gregory Raybon¹, Xi Chen¹, Kwangwoong Kim¹, Tobias Kippenberg², Andrea Blanco-Redondo¹; ¹*Nokia Bell Labs, USA*; ²*Inst. of Physics, Swiss Federal Inst. of Technology Lausanne (EPFL), Switzerland*. We demonstrate the first EDWA-enabled Terabit-class coherent optical communication with 1.6-Tb/s net bit rate per channel and 16-channel WDM transmission over 81-km fiber, proving the potential of such on-chip amplification for future coherent applications.

Th4B.4 • 17:15

9.6-THz Single Fibre Amplifier O-Band Coherent DWDM Transmission, Daniel J. Elson¹, Yuta Wakayama¹, Vitaly Mikhailov², Jiawei Luo², Noboru Yoshikane¹, Daryl Inniss², Takehiro Tsuritani¹; ¹*KDDI R&D Laboratories, Japan*; ²*OFS Laboratories, USA*. We demonstrate C+L-band-class wideband coherent transmission using simple backward-pumped Bismuth-doped fibre amplifiers in O-band.

OFC 2023 Postdeadline Abstracts

Achievable information rates over 40.9 and 36.8 Tb/s for 45 and 135 km, respectively, were measured including transmission near zero dispersion.

Th4B.5 • 17:30

273.6 Tb/s Transmission Over 1001 km of 15-Mode Fiber Using 16-QAM C-Band Signals, Menno van den Hout^{1,2}, Giammarco Di Sciullo^{1,3}, Georg Rademacher¹, Ruben S. Luis¹, Benjamin J. Puttnam¹, Nicolas K. Fontaine⁴, Roland Ryf⁴, Haoshuo Chen⁴, Mikael Mazur⁴, David Neilson⁴, Pierre Sillard⁵, Frank Achten⁶, Jun Sakaguchi¹, Cristian Antonelli³, Chigo M. Okonkwo², Hideaki Furukawa¹; ¹*NICT, Japan*; ²*Eindhoven Univ. of Technology, Netherlands*; ³*Univ. of L'Aquila and CNIT, Italy*; ⁴*Nokia Bell Labs, USA*; ⁵*Prysmian Group, France*; ⁶*Prysmian Group, Netherlands*. We transmit 15×184×24.5 GBd PDM-16-QAM signals, spanning the full C-band, over 1001 km of 15-mode fiber. The resulting net data rate of 273.6 Tb/s is the highest reported in long-distance multi-mode fiber transmission.

Th4B.6 • 17:45

103-ch. 132-Gbaud PS-QAM Signal Inline-Amplified Transmission With 14.1-THz Bandwidth Lumped PPLN-Based OPAs Over 400-km G.652.D SMF, Takayuki Kobayashi¹, Shimpei Shimizu¹, Masanori Nakamura¹, Takushi Kazama^{1,2}, Masashi Abe², Takeshi Umeki¹, Akira Kawai¹, Fukutaro Hamaoka¹, Munehiko Nagatani^{1,2}, Hiroshi Yamazaki^{1,2}, Yutaka Miyamoto¹; ¹*NTT Network Innovation Laboratories, Japan*; ²*NTT Device Technology Laboratories, Japan*. We demonstrate 14.1-THz-bandwidth WDM transmission using PPLN-based optical parametric inline amplifier. Capacities of 93.4-Tb/s over 160 km and 70.4-Tb/s over 400 km with 80-km G.652.D fiber spans are achieved using 132-Gbaud PCS-QAM signals.

Room 6E

16:30 -- 18:30

Th4C • Postdeadline Paper Session II

Presider: Elaine Wong; Univ. of Melbourne, Australia

Th4C.1 • 16:30

OFC 2023 Postdeadline Abstracts

1-Tb/s and 800-Gb/s Real-Time Transmission at 138 GBd Over a Deployed ROADM Network With Live Traffic, Thomas Richter¹, Steven Searcy¹, Philippe Jennevé², Dimitrios Giannakopoulos², Bill Owens³, Miquel A. Mestre², Ahmed Awadalla², Sorin Tibuleac¹; ¹*ADVA Optical Networking, USA*; ²*Cisco Systems Inc, USA*; ³*NYSERNet, USA*. We demonstrate real-time transmission using a single-carrier coherent pluggable at 138-GBd in a deployed network. We show 800 Gb/s over a record 2220 km and over 1422 km with 24 WSSs, and a record 1 Tb/s over 869 km

Th4C.2 • 16:45

Demonstration of Composable-ML-Assisted Autonomous Lightpath Configuration Over a Field-Deployed SDM Network With 7-Core Fibers, Hanyu Gao¹, Xiaoliang Chen¹, Wenbang Zheng¹, Chen Yingyu¹, Yongguang Xiao¹, Zhaohui Li¹; ¹*Sun Yat-sen Univ., China*. This paper demonstrates the first field trial of autonomous lightpath configuration over an SDM network using 7-core fibers. With a composable-ML-based configuration algorithm, ~10-second lightpath provisioning and automated failover are achieved while desirable QoT is secured.

Th4C.3 • 17:00

Colorless and Directionless ROADM for Meshed Coupled-Core Multicore Fiber Networks, Ruben S. Luis¹, Gaimmarco Di Sciullo², Georg Rademacher¹, Benjamin J. Puttnam¹, Andrea Marotta², Robert Emmerich³, Nicolas Braig-Christophersen³, Ralf Stolte⁴, Fabio Graziosi², Antonio Mecozzi², Colja Schubert³, Tetsuya Hayashi⁵, Takuji Nagashima⁵, Cristian Antonelli², Hideaki Furukawa¹; ¹*Photonic Network Laboratory, NICT, Japan*; ²*Univ. of L'Aquila, Italy*; ³*Heinrich-Hertz-Inst., Fraunhofer Inst. for Telecommunications, Germany*; ⁴*Finisar Australia, Australia*; ⁵*Optical Communications Laboratory, Sumitomo Electric Industries, Ltd., Japan*. We demonstrate the first meshed spatial-super-channel switching SDM network using field-deployed coupled-core multicore fibers with a 3 line-side, colorless, directionless ROADM. We evaluate 19 network scenarios including add&drop, bypass and grooming with 2 Tb/s granularity.

Th4C.4 • 17:15

First Real-Time Demonstration of 200G TFDMA Coherent PON Using Ultra-Simple ONUs, Zhenping Xing¹, Kuo Zhang¹, Xi Chen¹, Qiguang Feng¹, Keshuang Zheng¹, Yijia Zhao¹, Zhen Dong¹, Ji Zhou², Tao Gui¹, Zhicheng Ye¹, Liangchuan Li¹; ¹*Huawei Technologies, China*; ²*Department of Electronic Engineering, Jinan Univ., China*. We demonstrate the first real-time TFDMA coherent PON system with single-DAC and single-ADC ONUs, which can support up to 256 end users, and peak line rates of 100/200 Gb/s in the upstream/downstream, respectively.

OFC 2023 Postdeadline Abstracts

Th4C.5 • 17:30

Photonics-Assisted 320 GHz THz-Band 50 Gbit/s Signal Outdoor Wireless Communication Over 850 Meters, Weiping Li¹, Jianjun Yu¹, Bowen Zhu¹, Jiao Zhang², Min Zhu², Feng Zhao³, Tangyao Xie⁴, Kaihui Wang¹, Yi Wei¹, Xiongwei Yang¹, Bingchang Hua², Mingzheng Lei², Yuancheng Cai², Wen Zhou¹, Jianguo Yu⁴; ¹*Fudan Univ., China*; ²*Purple Mountain Laboratories, China*; ³*Xi'an Univ. of Posts and Telecommunications, China*; ⁴*Beijing Univ. of Posts and Telecommunications, China*. We have experimentally demonstrated, for the first time, a single-channel 50 Gbit/s net rate THz-band transmission over an 850 m wireless link, which also creates the longest wireless distance and largest distance-rate product for a photonic THz-wireless transmission in the world.

Th4C.6 • 17:45

203.6Tb/s CPRI-Equivalent Rate 1024-QAM DA-RoF Fronthaul With Comb-Based WDM and SDM Superchannel, Yixiao Zhu¹, Chenbo Zhang², Jingjing Lin², Yicheng Xu¹, Qunbi Zhuge¹, Weiwei Hu², Zhangyuan Chen², Weisheng Hu¹, Xiaopeng Xie²; ¹*Shanghai Jiao Tong Univ., China*; ²*Peking Univ., China*. We demonstrate 203.6Tb/s CPRI-equivalent-rate 1024-QAM self-homodyne fronthaul using digital-analog radio-over-fiber and comb-based SDM and WDM superchannel from a single laser source. We further present new records from 309.4Tb/s CPRI-equivalent-rate with 256-QAM to 81.6Tb/s with 1048576-QAM.