2008 OFC/NFOEC Postdeadline Paper Abstracts

Session	Room	Category
Postdeadline Session A	**Room 6B**	**6—Digital Transmission Systems** **7—Transmission Subsystems and Network Elements**
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Room 6B
6:00 p.m.–7:48 p.m.
Postdeadline Session A
Herbert F. Haunstein; Univ. Erlangen-Nürnberg, Germany, Presider

▶ **Category 6—Digital Transmission Systems**

PDP1 • 6:00 p.m.
8x114 Gb/s, 25-GHz-Spaced, PolMux-RZ-8PSK Transmission over 640 km of SSMF Employing Digital Coherent Detection and EDFA-Only Amplification, *Xiang Zhou[1], Jianjun Yu[2], Dayou Qian[2], Ting Wang[2], Guodong Zhang[1], Peter Magill[1]; [1]AT&T Lab, USA, [2]NEC Lab, America, Inc., USA.* Employing PolMux-RZ-8PSK modulation format and coherent detection, we demonstrate 8x114Gb/s DWDM transmission over 640km of SSMF on a 25GHz grid with record spectral efficiency of 4.2bit/s/Hz, with no optical dispersion compensation or Raman amplification.

PDP2 • 6:12 p.m.
10x121.9-Gb/s PDM-OFDM Transmission with 2-b/s/Hz Spectral Efficiency over 1,000 km of SSMF, *Sander L. Jansen, Itsuro Morita, Hideaki Tanaka; KDDI R&D Labs Inc., Japan.* PDM-OFDM transmission of 10x121.9-Gb/s (112.6-Gb/s without OFDM overhead) at 50-GHz channel spacing is demonstrated over 1,000-km SSMF without any inline dispersion compensation. 8-QAM subcarrier modulation allows transmission of 121.9 Gb/s within a 22.8-GHz optical bandwidth.

PDP3 • 6:24 p.m.
Transmission of 16.4Tbit/s Capacity over 2,550km Using PDM QPSK Modulation Format and Coherent Receiver, *Gabriel Charlet[1], Jeremie Renaudier[1], Haik Mardoyan[1], Patrice Tran[1], Oriol Bertran Pardo[1], Frederic Verluise[2], Mohand Achouche[3], Aurélien Boutin[2], Fabrice Blache[3], Jean-Yves Dupuy[3], Sebastien Bigo[1]; [1]Alcatel-Lucent, France, [2]Kylia, France, [3]Alcatel-Thales III-V Lab, France.* A record capacity×distance product of 41.8Petabit/s.km is demonstrated. 164 channels are modulated at 100Gbit/s with PDM-QPSK format, packed with 2bit/s/Hz information spectral density, and recovered by off-line processing in a coherent receiver after 2550km distance.

PDP4 • 6:36 p.m.
40 Gb/s Transmission Using Polarization Division Multiplexing (PDM) RZ-DBPSK with Automatic Polarization Tracking, *Jin-Xing Cai, Oleg V. Sinkin, Carl R. Davidson, Dmitri G. Foursa, Alan J. Lucero, Morten Nissov, Alexei N. Pilipetskii, Will W. Patterson, Neal S. Bergano; Tyco Telecommunications, USA.* Automatic polarization tracking receiver was demonstrated for 40Gb/s PDM-RZ-DBPSK signal in a circulating loop. 2Tb/s was transmitted (Q>12.6dB) over 5,200km with 150km repeater spacing and 60% SE. Time-varying polarization effects were included in all measurements.

PDP5 • 6:48 p.m.
Spectrally Bright and Broad Fiber-Based Heralded Single-Photon Source, *Elizabeth A. Goldschmidt[1,2], Matthew D. Eisaman[1,2], Jingyun Fan[1,2], Sergey V. Polyakov[1,2], Alan Migdall[1,2]; [1]NIST, USA, [2]Joint Quantum Inst., USA.* We report the development of a spectrally bright and broad heralded single-photon source based on spontaneous four-wave-mixing in a single-mode fiber, measuring the second-order correlation function, $g^{(2)}(0)$, far below unity over a broad spectral range.

▶ **Category 7—Transmission Subsystems and Network Elements**

PDP6 • 7:00 p.m.
Demodulation of 640-Gbit/s Polarization-Multiplexed OTDM QPSK Signals Using a Digital Coherent Receiver, *Chao Zhang, Yojiro Mori, Koji Igarashi, Kazuro Kikuchi; Dept. of Frontier Informatics, Univ. of Tokyo, Japan.* Using a digital coherent receiver, we demodulate a 640-Gbit/s QPSK signal polarization-multiplexed and 16-fold time-division-multiplexed. In this receiver, an LO pulsed at the 10-GHz base-clock frequency demultiplexes the 160-Gsymbol/s QPSK signal into 10-Gsymbol/s tributaries.

PDP7 • 7:12 p.m.
107 Gb/s Coherent Optical OFDM Reception Using Orthogonal Band Multiplexing, *Qi Yang, Yiran Ma, William Shieh; Dept. of Electrical and Electronic Engineering, Univ. of Melbourne, Australia.* We show the first 107 Gb/s coherent optical OFDM (CO-OFDM) reception using multiple orthogonal bands. The demonstrated system employs 2x2 MIMO-OFDM signal processing and achieves high spectral efficiency with direct-conversion at both transmitter and receiver.

PDP8 • 7:24 p.m.
Novel No-Guard-Interval PDM CO-OFDM Transmission in 4.1 Tb/s (50 x 88.8-Gb/s) DWDM Link over 800 km SMF Including 50-GHz Spaced ROADM Nodes, *Eiichi Yamada[1], Akihide Sano[1], Hiroji Masuda[1], Takayuki Kobayashi[1], Eiji Yoshida[1], Yutaka Miyamoto[1], Yoshinori Hibino[1], Koichi Ishihara[1], Yasushi Takatori[1], Kazuyasu Okada[1], Kazuo Hagimoto[1], Takashi Yamada[2], Hiroshi Yamazaki[2]; [1]NTT Network Innovation Labs, Japan, [2]NTT Photonics Labs, Japan.* We demonstrated spectrally efficient (1.65-b/s/Hz) DWDM transmission of 88.8 Gb/s polarization division multiplexed coherent OFDM signals without guard interval. The record 18-concatenated 50-GHz-spaced ROADM transmission and high DGD tolerance over 120 ps were experimentally confirmed.

PDP9 • 7:36 p.m.
Performance of a 46-Gbps Dual-Polarization QPSK Transceiver in a High-PMD Fiber Transmission Experiment, *Lynn E. Nelson[1], Sheryl L. Woodward[1], Mark D. Feuer[1], Xiang Zhou[1], Peter D. Magill[1], Sik Foo[2], David Hanson[2], Doug McGhan[2], Han Sun[2], Michael Moyer[2], Maurice O'Sullivan[2]; [1]AT&T Labs – Res., USA, [2]Nortel, Canada.* A coherent dual-polarization-QPSK transceiver with real-time decoding is demonstrated over 50-ps mean DGD fiber with near-Maxwellian statistics.

Eighty-channel transmission across 800-km TrueWave-RS fiber plus high-PMD fiber is achieved, with instantaneous DGD as high as 127ps.

Room 6C
6:00 p.m.–7:36 p.m.
Postdeadline Session B
Magnus Karlsson; Chalmers Univ., Sweden, Presider

▶ **Category 1—Fibers and Optical Propagation Effects**

PDP10 • 6:00 p.m.
Ultra-Low Bending Loss Single-Mode Fiber for FTTH, *Ming-Jun Li, Pushkar Tandon, Dana C. Bookbinder, Scott R. Bickham, Mark A. McDermott, Robert B. Desorcie, Daniel A. Nolan, Jeff J. Johnson, Kevin A. Lewis, Jeff J. Englebert; Corning Inc., USA.* A new ultra-low bending loss standard compliant single-mode fiber with ring comprising nanometer sized features is designed and manufactured. Bending loss less than 0.1 dB/turn at a bend radius of 5 mm is demonstrated.

PDP11 • 6:12 p.m.
High Resolution Measurement of Nearly Dispersionless Fiber by Localized Four Photon Mixing, *Eugene Myslivets[1], Nikola Alic[1], Tetsuya Nakanishi[2], Toshiaki Okuno[2], Masaaki Hirano[2], Masashi Onishi[2], Stojan Radic[1]; [1]Univ. of California at San Diego, USA, [2]Sumitomo Electric Industries, Ltd., Japan.* New dispersion measurement for nearly dispersionless fiber is reported. Meter-scale dispersion retrieval from highly-nonlinear fiber was demonstrated for the first time. The sensitivity was improved by two orders of magnitude with respect to conventional methods.

▶ **Category 3—Signal Measurement Distortion Compensation Devices and Sensors**

PDP12 • 6:24 p.m.
All-Optical Phase-Sensitive Waveform Sampling at 40 GSymbol/s, *Mathias Westlund[1,2], Mats Sköld[1], Peter A. Andrekson[1,2]; [1]Chalmers Univ. of Technology, Sweden, [2]PicoSolve Inc., Sweden.* We demonstrate a novel, high-resolution all-optical phase-sensitive sampling method using separate lasers for signal, sampling and mixing. A 40 GBaud DPSK signal was asynchronously sampled and visualized as a constellation diagram including transitions (625 ksamples).

PDP13 • 6:36 p.m.
Measurement of the Performance of 16-States MLSE Digital Equalizer with Different Optical Modulation Formats, *Theodor Kupfer, Claus Dorschky, Mihai Ene, Stefan Langenbach; CoreOpticsGmbH, Germany.* We report the first implementation of a digital equalizer using 16-states Maximum Likelihood Sequence Estimation (MLSE). We show measured performance improvements versus a 4-states MLSE, for un-chirped NRZ and for Optical Duobinary (ODB) modulation formats.

▶ **Category 4—Switching Wavelength-Selective Filtering and Routing Devices**

PDP14 • 6:48 p.m.
Maximally Confined High-Speed Second-Order Silicon Microdisk Switches, *Michael R. Watts, Douglas C. Trotter, Ralph W. Young; Sandia Natl. Labs, USA.* We demonstrate the first high-speed second-order silicon microdisk bandpass switch. The switch, constructed of a pair of 3μm radii active microdisks possesses ~40GHz flat-top passbands, a 4.2THz free-spectral-range, and a 2.4ns switching time.

▶ Category 2—Amplifiers and Lasers: Fiber or Waveguide

PDP15 • 7:00 p.m.
Distributed Feedback Silicon Evanescent Laser, *Alexander W. Fang, Erica Lively, Ying-Hao Kuo, Di Liang, John Bowers; Univ. of California at Santa Barbara, USA.* We report an electrically pumped distributed feedback silicon evanescent laser. The laser operates continuous wave at 1600nm. The laser threshold is 25mA with a 5.4mW maximum output power and 50°C maximum operating temperature.

PDP16 • 7:12 p.m.
1-to-40 Multicasting and Amplification of 40Gbps Channels in Wideband Parametric Amplifier, *Camille Bres, Nikola Alic, Evgeny Myslivets, Stojan Radic; Univ. of California at San Diego, USA.* We report the first experimental demonstration of all-optical wavelength multicasting of OC-768 NRZ data using a pump modulated parametric amplifier. The performance of 40-fold multicasting with excellent signal integrity retention is described.

PDP17 • 7:24 p.m.
Planar Waveguide Integrated EDFA, *Maxim Bolshtyansky[1], Holden Cheng[1], Paul Colbourne[2], Zi-Wen Dong[1], Dave Dougherty[1], Kao-Yang Huang[1], Gonzalo Wills[2], Gregory Cowle[1]; [1]JDSU, USA, [2]JDSU, Canada.* A Planar Waveguide EDFA is demonstrated. Optical components such as isolators, WDMs, detectors, splitters and other components are integrated into or side-mounted on single PLC chip. New, traditionally unavailable components give an advantage to PLC-EDFA.

Room 6D
6:00 p.m.–7:36 p.m.
Postdeadline Session C
Paul A. Morton; Morton Photonics, USA, Presider

▶ Category 5—Optoelectronic Devices

PDP18 • 6:00 p.m.
10-Channel x 40Gb/s per Channel DQPSK Monolithically Integrated InP-Based Transmitter PIC, *Scott Corzine, Pete Evans, Masaki Kato, Gang He, Matt Fisher, Maura Raburn, Andrew Dentai, Ilya Lyubomirsky, Radha Nagarajan, Mark Missey, Vikrant Lal, Arnold Chen, John Thomson, Wayne Williams, Prashant Chavarkar, Steven Nguyen, Damien Lambert, Tim Butrie, Mike Reffle, Rick Schneider, Mehrdad Ziari, Chuck Joyner, Steve Grubb, Fred Kish, Dave Welch; Infinera Corp., USA.* We report here the first demonstration of a large-scale monolithically integrated InP based 10 channel x 40Gb/s per channel transmitter photonic integrated circuit (PIC) employing differential quadrature phase-shift key (DQPSK) modulation.

PDP19 • 6:12 p.m.
Monolithic 80-Gb/s Dual-Polarization On-Off-Keying Modulator in InP, *Christopher R. Doerr, Liming Zhang; Alcatel-Lucent, USA.* We demonstrate a compact dual-polarization on-off-keying modulator at 80 Gb/s. It monolithically integrates a polarization splitter, two polarization-independent electro-absorption modulators, and a polarization combiner. It requires no critical processing steps.

PDP20 • 6:24 p.m.
Monolithic InP 16-QAM Modulator, *Christopher R. Doerr, Peter J. Winzer, Liming Zhang, Lawrence Buhl, Nicholas J. Sauer; Alcatel-Lucent, USA.* We propose a novel optical 16-quadrature amplitude modulation (QAM) modulator and demonstrate it at 43 Gb/s. The modulator is monolithic in InP and is only 3.1 mm long.

PDP21 • 6:36 p.m.
Uncooled CWDM 25-Gbps EA/DFB Lasers for Cost-Effective 100-Gbps Ethernet Transceiver over 10-km SMF Transmission, *Shigeki Makino[1], Hiroaki Hayashi[1], Kazunori Shinoda[1], Takeshi Kitatani[1], Takashi Shiota[1], Shigehisa Tanaka[1], Masahiro Aoki[1], Kazuhiko Naoe[2], Noriko Sasada[2], Shunya Yamauchi[2], Masato Shishikura[2], Tadashi Hatano[2], Naofumi Morohashi[2], Hiroaki Inoue[2]; [1]Hitachi Ltd., Japan, [2]Opnext Japan, Inc., Japan.* Uncooled 1300-nm range 4-channel 25-Gbps EA/DFB lasers that support CWDM scheme for 100-Gbps Ethernet has been realized. A wide temperature ranged 12-km transmission with over 9.6-dB dynamic extinction ratio was demonstrated for the first time.

PDP22 • 6:48 p.m.
640 Gbit/s Data Transmission and Clock Recovery Using an Ultra-Fast Periodically Poled Lithium Niobate Device, *Leif K. Oxenløwe[1], Fausto Gomez Agis[2], Cedric Ware[2], Sunao Kurimura[3], Hans C. H. Mulvad[1], Michael Galili[1], K. Kitamura[3], H. Nakajima[4], J. Ichikawa[5], Didier Erasme[2], Anders T. Clausen[1], Palle Jeppesen[1]; [1]DTU Fotonik, Technical Univ. of Denmark, Denmark, [2]Inst. TELECOM, France, [3]Natl. Inst. for Materials Science (NIMS), Japan, [4]Graduate School of Science and Technology, Waseda Univ., Japan, [5]New Technology Res. Labs, Sumitomo Osaka Cement Co. Ltd., Japan.* We present the first demonstration using periodically-poled Lithium Niobate for signal processing at 640 Gbit/s. Clock recovery is performed successfully with no pattern dependence and less than 1 dB penalty after 50 km fiber transmission.

PDP23 • 7:00 p.m.
High-Speed InP DQPSK Receiver, *Christopher R. Doerr, Liming Zhang, Lawrence L. Buhl, Jeffrey H. Sinsky, Alan H. Gnauck, Peter J. Winzer, Andrew L. Adamiecki, Nicholas J. Sauer; Alcatel-Lucent, USA.* We realized a packaged, monolithic InP DQPSK receiver photonic integrated circuit (PIC) and demonstrated it at speeds up to 107 Gb/s. We demonstrate low polarization dependence at 86 Gb/s and preliminary 80-Gb/s PIC-to-PIC DQPSK transmission.

▶ Category 8—Optical Processing and Analog Subsystems

PDP24 • 7:12 p.m.
Delay-Asymmetric Nonlinear Loop Mirror, *Mable P. Fok, Chester Shu; Chinese Univ. of Hong Kong, Hong Kong.* We present a delay-asymmetric nonlinear loop mirror based on four-wave mixing and group-velocity dispersion. The device is used for demodulation of DPSK signals at variable bit-rates. Widely opened eye diagrams and error-free detection are obtained.

PDP25 • 7:24 p.m.
Highly-Nonlinear Silicon Photonic Slot Waveguide, *Christian Koos[1], Phillipp Vorreau[1], Pieter Dumon[2], Roel Baets[2], Bweh Esembeson[3], Ivan Biaggio[3], Tsuyoshi Michinobu[4], François Diederich[4], Wolfgang Freude[1], Jürg Leuthold[1]; [1]Inst. of High-Frequency and Quantum Electronics, Univ. of Karlsruhe, Germany, [2]Photonics Res. Group, Ghent Univ., Belgium, [3]Dept. of Physics, Lehigh Univ., USA, [4]Lab of Organic Chemistry, Dept. of Chemistry and Applied Biosciences, ETH Zurich, Switzerland.* A silicon photonics slot waveguide with a record nonlinearity of 104 000 W-1km-1 at 1.5 μm is reported. We demonstrate demultiplexing of 130 Gbit/s signals to 10 Gbit/s using FWM in a 6 mm-long device.

Room 6E
6:00 p.m.–8:00 p.m.
Postdeadline Session D
Glenn Wellbrock; Verizon, USA, Presider

Category 10—Access Solutions, Demonstrations and Non-Telecom Applications

PDP26 • 6:00 p.m.
500-ps Response AC-Coupled Burst-Mode Transmitter Using Baseline-Wander Common-Mode-Rejection Technique for 10-Gbit/s-Class PON Systems, *Hirotaka Nakamura, Shunji Kimura, Kazutaka Hara, Naoto Yoshimoto, Makoto Tsubokawa, Makoto Nakamura, Kazuyoshi Nishimura, Akira Okada, Yusuke Ohtomo; NTT Corp., Japan.* We have first developed a 500-ps response ac-coupled burst-mode transmitter at 10.3125 Gbit/s based on our baseline-wander common-mode-rejection technique. A 33-dB loss budget was achieved by using burst-mode our APD receiver for 10G-EPON systems.

PDP27 • 6:12 p.m.
Duplex, Fully-Asynchronous, 10Gbps x 8-User DPSK-OCDMA Field Trial Using a Multi-Port En/Decoder and SSFBG En/Decoders, *Nobuyuki Kataoka[1], Naoya Wada[1], Xu Wang[2], Gabriella Cincotti[3], Akira Sakamoto[4], Yoshihiro Terada[4], Tetsuya Miyazaki[1], Ken-ichi Kitayama[5]; [1]NICT, Japan, [2]Heriot Watt Univ., UK, [3]Univ. of Roma Tre, Italy, [4]Fujikura Ltd., Japan, [5]Osaka Univ., Japan.* We present field trial of duplex, fully-asynchronous, 10-Gbps, 8-user DPSK-OCDMA system. A combination of single multi-port en/decoder at central office and SSFBG en/decoder at each ONU can enable cost-effective configuration.

PDP28 • 6:24 p.m.
42.8 Gb/s Chirp-Managed Signal Transmission over 100 m Graded-Index Plastic Optical Fiber, *Jianjun Yu; NEC Labs America, USA.* High-speed transmission at 42.8 Gb/s over 100 m graded-index plastic optical fiber using a low-cost chirp-managed directly modulated laser has been demonstrated for the first time.

PDP29 • 6:36 p.m.
480Mbps Ultra-Wideband Radio-over-Fibre Transmission Using a 1310/1550nm Reflective Electro-Absorption Transducer and Off-the-Shelf Components, *David Smith[1], Anna Borghesani[1], David Moodie[1], Manoj Thakur[2], Terence Quinlan[2], Sandra E. M. Dudley[2], Memhet Toycan[2], Carlos Bock[2], Stuart Walker[2], Moshe Ran[3], Yossef Ben-Ezra[3]; [1]CIP Technologies, UK, [2]Univ. of Essex, UK, [3]Holon Inst. of Technology, Israel.* We report the first experimental demonstration of a combined UWB-wireless/optical transmission system using a reflective electro-absorption transducer and off-the-shelf components. 480Mbps date was transmitted over a 1 km fibre span using the 3.1-3.628 GHz band.

PDP30 • 6:48 p.m.
18 Gchips/s Electronically-Processed OCDMA Spread Spectrum for Access Networks, *Jose B. Rosas-Fernandez, Jonathan Ingham, Richard Penty, Ian White; Dept. of Engineering, Cambridge Univ., UK.* We demonstrate for the first time coding/decoding for OCDMA networks using electronic transversal filters at 18Gchips/s—a ten-fold improvement over previous demonstrations. The chip rate allows users at Gb/s rates in access applications.

PDP31 • 7:00 p.m.
First Demonstration of TDM and CDM Coexisting Passive Optical Network toward Next Generation Access Network, *Hideaki Tamai[1], Masahiro Sarashina[1], Hideyuki Iwamura[1], Masayuki Kashima[1], Gyaneshwar C. Gupta[1], Takashi Ushikubo[1], Takeshi Kamijoh[1], Philippe Chanclou[2], Naveena*

Genay[2], Bernard Landousies[2], Andrzej Mosek[3], Micha Gredziak[3]; [1]Oki Electric Industory. Co., Ltd., Japan, [2]France Telecom, France, [3]Telekomunikacja Polska, Poland. World-first coexistence trial of TDM and CDM giga-bit passive optical networks was successfully demonstrated. Very shallow isolation of 7dB between G- and CDM-PON at OLT and ONU was verified on the enhancement band of G.984.5.

▶ **NFOEC B—Network Technologies**

PDP32 • 7:12 p.m.
Tunable 2.5Gb/s Receiver for Wavelength-Agile DWDM-PON, *Robert Murano, Wayne F. Sharfin, Michael J. L. Cahill; Aegis Lightwave, USA.* We demonstrate a low-cost, tunable receiver based on semiconductor thin film filters. A bit-error ratio of 10^{-10} is demonstrated at a received optical power of -18 dBm in a three-channel, 2.488 Gb/s, DWDM test system.

▶ **Category 9—Networks**

PDP33 • 7:24 p.m.
1 x 4 All-Optical Packet Switch at 160 Gb/s Employing Optical Processing of Scalable In-Band Address Labels, *Nicola Calabretta, Hyun-Do Jung, Javier Herrera, Eduward Tangdiongga, Ton Koonen, Harm Dorren; Eindhoven Univ. of Technology, Netherlands.* We demonstrate for the first time a 1x4 all-optical packet switch that that utilizes a highly scalable and asynchronous header processor. Error-free operation at 160 Gb/s while wavelength routing over 20 nm is demonstrated.

PDP34 • 7:36 p.m.
Demonstration of Application Layer Service Provisioning Integrated on Full-Duplex Optical Burst Switching Network Test-Bed, *Georgios Zervas[1], Yixuan Qin[1], Reza Nejabati[1], Dimitra Simeonidou[1], Aldo Campi[2], Walter Cerroni[2], Franco Callegati[2]; [1]Univ. of Essex, UK, [2]Univ. of Bologna, Italy.* This paper presents an application-aware asynchronous SIP-enabled optical burst switched network demonstrator. Seamless, one-step application session and data layer connection establishment is being demonstrated by publishing, discovering and reserving resources utilising integrated JIT-SIP OBS protocols.

PDP35 • 7:48 p.m.
Wavelength-Based Sub-Carrier Multiplexing and Grooming for Optical Networks Bandwidth Virtualization, *Wei Wei, Lei Zong, Dayou Qian; NEC Labs America, USA.* We demonstrate, for the first time, a novel optical network architecture based on orthogonal frequency division multiple access (OFDMA) over WDM via experiments, and its benefits including cost-reduction and service transparency through analysis and simulation.