Ballroom A

2:00 p.m.–4:00 p.m.
OTuA • Distortion Mitigation
Giuseppe Bordogna; Nortel Networks Ltd, Canada, Presider

OTuA1 • 2:00 p.m.
Transmission of 42.8Gbit/s Polarization Multiplexed NRZ-QPSK over 6400km of Standard Fiber with No Optical Dispersion Compensation, *Seb J. Savory, Giancarlo Gavioli, Robert I. Killey, Polina Bayvel; Univ. College London, UK.* We report the longest reach achieved for a 42.8Gbit/s system on standard fiber with no optical dispersion compensation. Using a digital coherent receiver a record total dispersion of 107,424ps/nm was compensated with 1.2dB OSNR penalty.

OTuA2 • 2:15 p.m.
Electronic Post-Compensation for Nonlinear Phase Noise in a 1000-km 20-Gbit/s Optical QPSK Transmission System Using the Homodyne Receiver with Digital Signal Processing, *Kazuro Kikuchi, Marcos Fukase, Sang-Yuep Kim; RCAST, Univ. of Tokyo, Japan.* We demonstrate electronic post-compensation for nonlinear phase noise in a 1000-km 20-Gbit/s optical QPSK transmission system. Optimized phase shift proportional to intensity noise is given to the homodyne-detected electric field, leading to effective phase-noise reduction.

Ballroom B

2:00 p.m.–4:00 p.m.
OTuB • Optical Packet Switching Subsystems
Masashi Usami; KDDI R&D Labs, Japan, Presider

OTuB1 • 2:00 p.m. Invited
Optical Switching Technologies for Data Networking, *David T. Neilson; Bell Labs, Lucent Technologies, USA.* Optics provides high capacity links for data networking but wavelength circuit granularity results in increased complexity for packet networks. Approaches and technologies to provide optical switching to eliminate this limitation will be described.

Ballroom C

2:00 p.m.–4:00 p.m.
OTuC • Nonlinear Fibers I
Satoki Kawanishi; NTT, Japan, Presider

OTuC1 • 2:00 p.m. Tutorial
Highly Nonlinear Fibers and Their Applications, *Govind Agrawal; Univ. of Rochester, USA.* This tutorial focuses on highly nonlinear fibers, such as tapered, microstructured, and photonic-crystal fibers, with emphasis on their applications. Topics covered include ultrahigh Raman-induced frequency shifts, soliton fission, four-wave mixing, and supercontinuum generation.

Govind P. Agrawal is a Professor of Optics at the Institute of Optics of University of Rochester. His previous appointments were at Ecole Polytechnique, France, City University of New York, and Bell Laboratories, NJ. He is an author or coauthor of more than 300 research papers, multiple review articles, and seven books. The fourth edition of his well-known book *Nonlinear Fiber Optics* appeared in 2007. Dr. Agrawal is a Fellow of both the Optical society of America and IEEE. He served as an associate Editor of *JOSA B* from 1993 to 1998 and of *Optics Express* from 2001 to 2004.

Ballroom D

2:00 p.m.–4:00 p.m.
OTuD • Silicon Photonics I
Michael Wale; Bookham Technology, UK, Presider

OTuD1 • 2:00 p.m. Invited
CMOS Based Photonic Integration for Optical Interconnects, *Cary Gunn; Luxtera, USA.* No abstract available.

Ballroom E

2:00 p.m.–4:00 p.m.
OTuE • Network Architecture
Biswanath Mukherjee; Univ. of California at Davis, USA, Presider

OTuE1 • 2:00 p.m. Invited
Optics and the Challenge of Carrier Network Transformation, *Andreas Gladisch; T-Systems, Germany.* The transformation of network architecture towards a multi-service packet network is explained and the dependencies between new optical technologies and network architectures are discussed.

Room 304 A/B

2:00 p.m.–4:00 p.m.
OTuF • Pulsed Lasers
Jake Bromage; Univ. of Rochester, USA, Presider

OTuF1 • 2:00 p.m.
All-Fiber Passive Mode-Lockers Using Attachable Vertically Aligned Carbon Nanotube Film, *Yong-Won Song, Erik Einarsson, Shinji Yamashita, Shigeo Maruyama; Univ. of Tokyo, Japan.* We dramatically improve the preparation process and operation efficiency of carbon nanotube mode-lockers employing a transferable vertically aligned single-walled carbon nanotube film. All-fiber laser mode-locking is achieved utilizing the film attached to a D-shaped fiber.

OTuF2 • 2:15 p.m.
High-Energy Ultrashort Pulse Generation from a Fundamentally Mode-Locked Fiber Laser at 1.7 MHz, *Kok Hann Fong[1], Kazuro Kikuchi[1], Sze Y. Set[2]; [1]Univ. of Tokyo, Japan, [2]Alnair Labs Corp., Japan.* We propose and demonstrate a self-starting, fundamentally mode-locked fiber laser stabilized by a single-wall carbon nanotube saturable absorber, capable of generating 200-fs, 1-nJ pulses at a low repetition rate of 1.7 MHz.

Room 303 A

2:00 p.m.–4:00 p.m.
OTuG • Colorless ONU's
Glenn Wellbrock; Ciena Corp., USA, Presider

OTuG1 • 2:00 p.m.
A High-Performance PON System for Both Access and Local Networking Using Wavelength-Switchable Transceivers, *Jaegwan Kim[1], Chang-Joon Chae[2]; [1]Information and Communication Univ., Republic of Korea, [2]Victoria Res. Lab-Natl. ICT Australia Ltd., Univ. of Melbourne, Australia.* We propose a new PON architecture where both access and local networking services are enabled using wavelength-switchable transceivers. Simulation shows that available bandwidth is nearly doubled with fast wavelength switching and delay is drastically improved.

OTuG2 • 2:15 p.m.
Hybrid Dual-Fiber-Ring with Single-Fiber-Trees Dense Access Network Architecture Using RSOA-ONU, *Jose A. Lazaro[1], Reynaldo I. Martinez[2], Victor Polo[1], Cristina Arellano[1], Josep Prat[1]; [1]Univ. Politècnica de Catalunya (UPC), Spain, [2]Univ. Simón Bolívar, Venezuela.* Long-reach, high-density centralized-light access network using remote amplification and Reflective SOA for upstream remodulation in an user-single-fiber completely passive WDM-PON providing broadband to >1000 users distributed along large distances.

Room 303 B

2:00 p.m.–4:00 p.m.
NTuA • Networking Convergence for Multi-Haul Architectures
Thomas Wood; Lucent, USA, Presider

NTuA1 • 2:00 p.m.
43Gb/s Adaptive Polarization Mode Dispersion Compensator Field Trial, *Brian Heffner[1], Ted Schmidt[1], Ross Saunders[1], Rongqing Hui[2], Doug Richards[3], Gary Nicholl[4]; [1]StrataLight Communications, USA, [2]Univ. of Kansas, USA, [3]Sprint Nextel, USA, [4]Cisco Systems, Canada.* We describe long-term field measurements at 43Gb/s over a high-PMD link, using one receiver with adaptive PMD compensation and a second receiver without. The Q at both receivers is monitored and correlated with instantaneous DGD.

NTuA2 • 2:20 p.m.
DGD Estimation in Optical Systems of High Capacity, *Cieslak Agnaldo[1], João A. Brito Junior[2,3]; [1]Intelig Telecomunicações, Brazil, [2]Pontificial Catholic Univ. of Rio de Janeiro, Brazil, [3]Telemar, Brazil.* We show that short cable sections with low PMD used in the deployment of long links, the estimated probability of DGD overcomes certain maximum DGD value based on cabler data systematically overestimates PMD power penalties.

Room 303 C

2:00 p.m.–4:00 p.m.
NTuB • ASON/GMPLS
(Panel Discussion)

NTuB • 2:00 p.m.
ASON/GMPLS, *Monica Lazer; AT&T, USA.* This panel focuses on network applications for ASON/GMPLS from both vendor and carrier perspectives. Industry wide work is advancing standards and interoperability agreements in support of intelligent optical networks. Significant advances in standardization include: • ITU-T has completed recommendations on the Automatically Switched Optical Networks (ASON) architecture and requirements for signaling, routing, and neighbor discovery. • IETF has completed RFCs for GMPLS signaling covering SONET/SDH, Optical Transport Networks (OTN), and is working on routing protocols extensions. • Optical Internetworking Forum (OIF) has completed work on Interoperability Agreements (IAs) for UNI and E-NNI signaling, it has staged several world-wide interoperability events, and is working on updates to IAs. • TMF is completing work on extending the Multi-Technology Network Management (MTNM) interface for management of ASON networks.

Notes

Ballroom A

OTuA • Distortion Mitigation—Continued

OTuA3 • 2:30 p.m.
Electronic Dispersion Compensation in Bandwidth Limited 43 Gb/s PSBT Systems for 50 GHz Spaced DWDM Application, *Fred Buchali; Alcatel SEL AG, Germany.* We studied electronic dispersion compensation in bandwidth limited PSBT systems for 50GHz spaced DWDM. Transmitter optimization in conjunction with Viterbi equalization enables 43Gb/s data-transmission in 30GHz optical channels with 230ps/nm CD and 18ps DGD tolerance.

OTuA4 • 2:45 p.m. Invited
Orthogonal Frequency Division Multiplexing for Optical Dispersion Compensation, *Arthur J. Lowery, Jean Armstrong; Monash Univ., Australia.* Orthogonal Frequency Division Multiplexing offers an attractive method of electronically compensating for single-mode and multipath dispersion in optical links and optically-switched networks. This paper reviews recent progress in optical OFDM systems.

Ballroom B

OTuB • Optical Packet Switching Subsystems—Continued

OTuB2 • 2:30 p.m.
All-Optical Combinatorial Network Based on SOAs for Packet Contention Resolution in a 2 x 2 Photonic Node, *Mirco Scaffardi[1], Francesco Fresi[2], Gianluca Berrettini[1], Gianluca Meloni[1], Antonella Bogoni[2], Luca Potì[2]; [1]Scuola Superiore Sant'Anna, Italy, [2]CNIT, Italy.* A complex integrable all-optical combinatorial network based on Semiconductor Optical Amplifiers is demonstrated. As an application, contention detection and switching control in 2x2 photonic node is performed in a diverse priority self routing packet network.

OTuB3 • 2:45 p.m.
Optically-Addressable Packet Timeslot Interchanger Using a Quadruple Switch Array, *Olga Zouraraki[1], Dimitrios Petrantonakis[1], Konstantinos Yiannopoulos[2], Rui Meleiro[3,4], Lida Sadeghioon[5], Alistair Poustie[6], Graeme Maxwell[6], Emmanouel Varvarigos[2], Kyriakos Vlachos[2], Paulo Monteiro[3,4], Dimitra Simeonidou[5], Hercules Avramopoulos[1]; [1]Natl. Technical Univ. of Athens, Greece, [2]Univ. of Patras, Greece, [3]Univ. of Aveiro, Portugal, [4]Siemens Networks S.A, Portugal, [5]Univ. of Essex, UK, [6]Ctr. for Integrated Photonics, UK.* We propose and demonstrate a wavelength converter-based Time-Slot-Interchanger architecture consisting of cascaded programmable delay stages. It uses an integrated quadruple switch array of HMZI switches and operated error-free with 10 Gb/s NRZ packets.

Ballroom C

OTuC • Nonlinear Fibers I—Continued

Ballroom D

OTuD • Silicon Photonics I—Continued

OTuD2 • 2:30 p.m.
An Electrically Pumped Hybrid Silicon Evanescent Amplifier, *Hyundai Park[1], Alexander W. Fang[1], John E. Bowers[1], Richard Jones[2], Oded Cohen[3]; [1]Univ. of California at Santa Barbara, USA, [2]Intel, USA, [3]Intel, Israel.* A hybrid silicon evanescent amplifier utilizing a wafer bonded structure of a silicon waveguide and AlGaInAs quantum wells is demonstrated. Maximum chip gain obtained is 13dB with a 3dB output saturation power of 11dBm.

OTuD3 • 2:45 p.m.
Multilayer 3-D Photonics in Silicon, *Prakash Koonath[1,2], Bahram Jalali[1,2]; [1]Dept. of Electrical Engineering, USA, [2]Univ. of California, USA.* Three-dimensionally integrated devices have been realized in Silicon using SIMOX 3D sculpting. Devices are fabricated, for the first time, on three vertically-integrated silicon layers, paving the way towards ultra-dense opto-electronic structures in Silicon.

Ballroom E

OTuE • Network Architecture—Continued

OTuE2 • 2:30 p.m.
Blocking and Waveband Assignment in WDM Networks with Limited Reconfigurability, *Onur Turkcu, Suresh Subramaniam; ECE Dept., The George Washington Univ., USA.* In this paper, we show quantitatively the benefits of using Reconfigurable Optical Add-Drop Multiplexers (ROADMs) with limited tunable transponders in all-optical networks. We compare two transponder sharing models and two waveband assignment schemes.

OTuE3 • 2:45 p.m.
Delay Sensitive Smoothed Round Robin (DS2R2) Scheduler for Light-Trail and SLiT Networks, *Paresh Bafna[1], Ashwin A. Gumaste[1], Nasir Ghani[2]; [1]Indian Inst.of Technology, India, [2]Tennessee Technological Univ., USA.* We propose Delay Sensitive Smoothed Round Robin scheduling algorithm for provisioning services over light-trail and SLiT networks. Compliance to delay requirements for services such as PWE3, VoD, Voice and data and good efficiency are observed.

Room 304 A/B

OTuF • Pulsed Lasers—Continued

OTuF3 • 2:30 p.m.
A Mode-Hop-Free, Frequency-Tunable 40 GHz Mode-Locked Fiber Laser, *Masato Yoshida, Keisuke Kasai, Masataka Nakazawa; Tohoku Univ., RIEC, Japan.* We have successfully realized a mode-hop-free, frequency-tunable 40 GHz mode-locked fiber laser by installing an optical etalon in the cavity. By tuning the etalon peak frequency, the laser frequency was continuously tuned over 1 GHz.

OTuF4 • 2:45 p.m.
Third-Order Dispersion Role in Mode-Locked Regimes of Yb-Doped Fiber Lasers, *Yury Logvin[1], Vladimir P. Kalosha[2], Hanan Anis[1]; [1]School of Information Technology and Engineering, Univ. of Ottawa, Canada, [2]Dept. of Physics, Univ. of Ottawa, Canada.* Novel features in the stretched-pulse and similariton-cubicon regimes of Yb-doped fiber laser are found by means of numerical simulations when a photonic band-gap fiber with strong third-order dispersion is used for dispersion compensation.

Room 303 A

OTuG • Colorless ONU's—Continued

OTuG3 • 2:30 p.m.
WDM-PON Architecture with C-Band OLT, L-Band ONU, and U-Band Monitoring Based on FP-LDs Wavelength-Locked by a Single, Depolarized, CW Supercontinuum, *Ju Han Lee[1], Young-Geun Han[1], Sang Bae Lee[1], Chul Han Kim[2]; [1]Korea Institue of Science and Technology (KIST), Republic of Korea, [2]Univ. of Seoul, Republic of Korea.* We demonstrate a bidirectional WDM-PON based on a single, depolarized, 130-nm, CW supercontinuum. The architecture incorporating low-cost, wavelength-locked FP-LDs features the unique wavelength-band allocation of C-band for OLT, L-band for ONUs, and U-band for channel-monitoring.

OTuG4 • 2:45 p.m.
On the Influence of ONU-Gain on Transmission in Centrally Seeded-Light WDM-PONs, *Cristina Arellano[1], Josep Prat[1], Klaus-Dieter Langer[2]; [1]Univ. Politècnica de Catalunya (UPC), Spain, [2]Fraunhofer Inst. for Telecommunications, Heinrich-Hertz-Inst., Germany.* Gain influence on transmission in reflective-ONU is analyzed theoretically and experimentally. A general expression for the optical signal-to-crosstalk ratio is given. Experimental results with two types of reflective-ONU are in agreement with the theoretical approach.

Room 303 B

NTuA • Networking Convergence for Multi-Haul Architectures—Continued

NTuA3 • 2:40 p.m. Invited
Falling Boundaries from Metro to ULH Optical Transport Equipment, *Michel W. Chbat, Hans-Juergen Schmidtke; Siemens Communications, Inc., USA.* With increased price pressure and expanding requirements, metropolitan, regional, and LH/ULH transport equipment are rapidly collapsing toward universal platforms. Enabling technologies and impact of this convergence on optical network architecture and design will be reviewed.

Room 303 C

NTuB • ASON/GMPLS—Continued
(Panel Discussion)

Notes

Ballroom A

OTuA • Distortion Mitigation—Continued

OTuA5 • 3:15 p.m.
Adaptive PMD Compensation Using OFDM in Long-Haul 10Gb/s DWDM Systems, *Neda Cvijetic, Lei Xu, Ting Wang; NEC Labs America, USA.* In this paper, we show OFDM can adaptively compensate for large all-order PMD without requiring feedback. We demonstrate error-free transmission on a 1920km 40x10Gb/s DWDM link with 48ps mean DGD in presence of fiber nonlinearity.

OTuA6 • 3:30 p.m.
Electronic Dispersion Compensation Based on Optical Field Reconstruction with Orthogonal Differential Direct-Detection and Digital Signal Processing, *Xiang Liu, Xing Wei; Bell Labs, Lucent Technologies, USA.* We present a receiver-side electronic dispersion compensation scheme based on optical field reconstruction using orthogonal differential direct-detection and DSP. Dispersion compensations for 20-Gb/s DQPSK and 10-Gb/s OOK signals over 2000-km SSMF transmission are numerically demonstrated.

Ballroom B

OTuB • Optical Packet Switching Subsystems—Continued

OTuB4 • 3:00 p.m.
All-Optical Packet Switching by Pulsed-Pump Wavelength Exchange in a Highly Nonlinear Dispersion-Shifted Fiber, *Henry K. Y. Cheung[1], Rebecca W. L. Fung[1], C. H. Kwok[2], Kenneth K. Y. Wong[1]; [1]Univ. of Hong Kong, Hong Kong, [2]Chinese Univ. of Hong Kong, Hong Kong.* We demonstrate experimentally for the first time successful switching of packets based on wavelength exchange with two pulsed pumps located at the anomalous-dispersion region. Simultaneous packet switching between different wavelengths at same timeslot is achieved.

OTuB5 • 3:15 p.m.
Asynchronous All-Optical Circuit for Serial-to-Parallel Conversion of Label Bits of DPSK Packets, *Nicola Calabretta, Marco Presi, Giampiero Contestabile, Ernesto Ciaramella; Scuola Superiore Sant'Anna, Italy.* We present a novel asynchronous all-optical circuit for extraction and serial-to-parallel-conversion of label bits from DPSK packets. The circuit requires only two optical switches regardless the label bits number, is scalable, low-power consumption, and compact.

OTuB6 • 3:30 p.m.
Improved Label Property of Orthogonal ASK/DPSK Labeling by Using a 40 Gb/s Manchester Coded Payload, *Nan Chi, Dexiu Huang; Wuhan Natl. Lab for Optoelectronics, China.* We experimentally demonstrate an orthogonal ASK/DPSK labeling using a 40Gb/s Manchester coded payload and a 2.5Gb/s DPSK label. The extinction ration can be increased to 11dB resulting in 8 dB improvement for the label sensitivity.

Ballroom C

OTuC • Nonlinear Fibers I—Continued

OTuC2 • 3:00 p.m.
High Resolution Extraction of Fiber Propagation Parameters for Accurate Modeling of Slow Light Systems Based on Narrow Band Optical Parametric Amplification, *Evgeny Shumakher, Amnon Willinger, Roy Blit, David Dahan, Gadi Eisenstein; Technion, Israel.* The spatial distributions of fiber propagation parameters are estimated with a high spatial resolution using measured ASE spectra of narrow parametric gain. This allows accurate modeling of slow light propagation of high bit rate data.

OTuC3 • 3:15 p.m.
Effect of Draw-Induced Residual Elastic and Inelastic Strains on Brillouin Frequency Shift in Optical Fibers, *Weiwen Zou[1], Zuyuan He[1], Andrew D. Yablon[2], Kazuo Hotate[1]; [1]Univ. of Tokyo, Japan, [2]OFS Labs, USA.* The effect of draw-induced residual elastic and inelastic strains on Brillouin frequency shift (BFS) in optical fibers is investigated. It is found that the BFS is linearly proportional to the draw tension with -4.2 MHz/gram.

OTuC4 • 3:30 p.m.
Self-Trapping and Self-Frequency Shift of Solitons in Photonic Crystal Fiber, *Alexander Podlipensky, Przemyslaw Szarniak, Nicolas Joly, Chris Poulton, Philip St. J. Russell; Inst. of Optics, Information and Photonics (Max Planck Res. Group), Univ. of Erlangen-Nuremberg, Germany.* We demonstrate experimentally for the first time the self-trapping of solitons in highly nonlinear photonic crystal fiber. The trapping occurs at particular power and is driven by fission of high-order solitons and their self-frequency shift.

Ballroom D

OTuD • Silicon Photonics I—Continued

OTuD4 • 3:00 p.m. Tutorial
Recent Advances in Germanium Quantum Well Structures — A New Modulation Mechanism for Silicon-Compatible Optics, *David A. B. Miller; Stanford Univ., USA.* Silicon technology increasingly can implement both electronics and optics for communications. The recent discovery of strong electroabsorption in Ge quantum wells on silicon may fill a key gap, allowing a merged technology for many applications.

David A. B. Miller received the B.Sc. degree from St Andrews University, and, in 1979, the Ph.D. degree from Heriot-Watt University, both in physics. He was with Bell Laboratories from 1981 to 1996, as a department head from 1987, latterly of the Advanced Photonics Research Department. He is currently the W. M. Keck Professor of Electrical Engineering, the Director of the Solid State and Photonics Laboratory, and a Co-Director of the Stanford Photonics Research Center at Stanford University, Stanford, California, USA. His research interests include physics and devices in nanophotonics, nanometallics, and quantum-well optoelectronics, and fundamentals and applications of optics in information sensing, switching, and processing. He has published more than 250 scientific papers, holds 60 patents, is a Fellow of OSA, IEEE, APS, and the Royal Societies of Edinburgh and London, holds honorary degrees from the Vrije Universiteit Brussel and Heriot-Watt University, and has received numerous awards.

Ballroom E

OTuE • Network Architecture—Continued

OTuE4 • 3:00 p.m. Invited
HOPI Testbed, *Rick Summerhill; Internet 2, USA.* This talk focuses on some of the recent results from the Hybrid Optical and Packet infrastructure (HOPI) project of Internet2. The HOPI project examines hybrid networking: how to incorporate layer 1 through layer 3 network capabilities into a coherent network design. It examines two fundamental areas: dynamic provisioning of layer 1 services to support applications, and hybrid capabilities, the integration of layer 1 through layer 3 services.

OTuE5 • 3:30 p.m.
A Protocol for Efficient Tunable Laser Utilization to Support Incremental Upgrade in a WDM-PON, *Huan Song, Amitabha Banerjee, Biswanath Mukherjee; Univ. of California at Davis, USA.* We present a novel protocol to achieve better utilization of tunable lasers across different user groups in a WDM-PON. We demonstrate the protocol's advantage to support incremental upgrade of bandwidth with increasing user bandwidth request.

Room 304 A/B

OTuF • Pulsed Lasers—Continued

OTuF5 • 3:00 p.m. Invited
Advances in Femtosecond Fiber Lasers, *Jeff Nicholson; OFS Labs, USA.* Passively modelocked, femtosecond fiber lasers are discussed. Recent advances in mode-locking schemes and cavity designs are reviewed.

OTuF6 • 3:30 p.m.
Nonlinear Distortion Free Fiber-Based Chirped Pulse Amplification with Self-Phase Modulation up to 2Pi, *Guanghao Zhu, Joel Edingberg, Chris Xu; Cornell Univ., USA.* By using an electo-optic phase modulator to realize nonlinear phase pre-compensation, we demonstrate nonlinear distortion free fiber-based chirped pulse amplification with accumulated self-phase modulation up to 2.0 Pi radians.

Room 303 A

OTuG • Colorless ONU's—Continued

OTuG5 • 3:00 p.m. Invited
WDM-PON with Colorless ONUs, *Franck Payoux, Philippe Chanclou, Genay Naveena; France Telecom, France.* This paper describes the interest of operators for WDM PON and more particularly with colorless ONUs. Operator needs are presented and techniques to obtain color-less ONUs are reviewed.

OTuG6 • 3:30 p.m.
Wavelength Shifting for Colorless ONUs in Single-Fiber WDM-PONs, *Josep Prat, Mireia Omella, Victor Polo; Univ. Politecnica de Catalunya, Spain.* With the purpose of reducing the crosstalk caused by Rayleigh Backscattering in bidirectional centralized light systems, we propose a reflective ONU design that performs wavelength shifting by means of combined PM and SSB modulation.

Room 303 B

NTuA • Networking Convergence for Multi-Haul Architectures—Continued

NTuA4 • 3:20 p.m. Invited
Optimizing Transport Systems to Integrate TDM and Packet Services, *Steve Gringeri[1], Nablir N. Bitar[1], Roman Egorov[1], Bert Basch[1], Craig Suitor[2], Harry Peng[2]; [1]Verizon Labs, USA, [2]Nortel, Canada.* Transport elements must evolve to seamlessly integrate TDM and packet services into a single platform. This integration is best achieved using a hybrid switch that is capable of switching both TDM and packet flows.

Room 303 C

NTuB • ASON/GMPLS—Continued
(Panel Discussion)

Notes

Ballroom A

OTuA • Distortion Mitigation—Continued

OTuA7 • 3:45 p.m.
Performance Evaluation of Electronic Equalizers for Dynamic PMD Compensation in Systems with FEC, *Chongjin Xie[1], Sethumadhavan Chandrasekhar[1], Dieter Werner[2], Herbert Haunstein[3]; [1]Bell Labs, Lucent Technologies, USA, [2]Lucent Technologies, USA, [3]Univ. of Erlangen-Nürnberg, Germany.* Experimental investigations show that the dynamic performance of PMD compensation using electronic equalizers in systems with FEC is very different from the performance in the static case and in systems without FEC.

Ballroom B

OTuB • Optical Packet Switching Subsystems—Continued

OTuB7 • 3:45 p.m.
A 40 Gb/s Asynchronous Optical Packet Buffer Based on an SOA Gate Matrix for Contention Resolution, *John P. Mack, Henrik N. Poulsen, Emily F. Burmeister, John E. Bowers, Daniel J. Blumenthal; Univ. of California at Santa Barbara, USA.* We demonstrate a 40 Gb/s optical packet buffer with asynchronous and autonomous control for use in contention resolution. Layer-2 (packet recovery) measurements are presented with less than 1 dB power penalty up to 10 circulations.

Ballroom C

OTuC • Nonlinear Fibers I—Continued

OTuC5 • 3:45 p.m.
Fusion-Spliceable Bi_2O_3-Based Photonic Crystal Fiber, *Tatsuo Nagashima, Tomoharu Hasegawa, Seiki Ohara, Naoki Sugimoto; Asahi Glass Co., Ltd. Res. Ctr., Japan.* We fabricated Bi_2O_3-based photonic crystal fiber having the higher refractive index core. This fiber shows the fusion-spliciability to SiO_2-fiber, low loss (1.8 dB/m), high nonlinearity (780 $W^{-1}km^{-1}$) and small dispersion (-5 ps/nm/km) at 1550 nm.

Ballroom D

Ballroom E

OTuE • Network Architecture—Continued

OTuE6 • 3:45 p.m.
Improving Access Performance with an Integrated PON and WiMAX with MIMO, *Peng Lin[1], Ting Wang[1], Yoshihiko Suemura[2], Shinya Nakamura[2], ChunMing Qiao[3]; [1]NEC Labs America, USA, [2]Optical Network Div., NEC Corp., Japan, [3]SUNY at Buffalo, USA.* We propose and evaluate a near-optimal antenna allocation approach for a PON+WiMAX network with MIMO that takes advantage of the optical wireless integration to achieve a high throughput and good resilience.

4:00 p.m.–4:30 p.m. Coffee Break, Exhibit Hall

Ballroom A

4:30 p.m.–6:30 p.m.
OTuH • Transmission Subsystems
Salim Gurib; France Telecom, France, Presider

OTuH1 • 4:30 p.m.
Optical Transceiver Employing an RSOA with Feed-Forward Current Injection, *Wooram Lee, Seung Hyun Cho, Mahn Young Park, Jie Hyun Lee, Chulyoung Kim, Geon Jeong, Byoung Whi Kim; Electronics and Telecommunications Res. Inst., Republic of Korea.* We propose an optical transceiver employing an RSOA of which gain is controlled by feed-forward current. With a low injection power below the gain saturation, the improved remodulation is clearly demonstrated at 1.25-Gb/s data rate.

Ballroom B

4:30 p.m.–6:15 p.m.
OTuI • Wavelength Conversion
Stefan Spaelter; Siemens, Germany, Presider

OTuI1 • 4:30 p.m. Invited
All Optical Tunable Wavelength Conversion at > 160 Gb/s, *Hideaki Furukawa[1], Ampalavanapillai Nirmalathas[2], Naoya Wada[1], Satoshi Shinada[1], Hiroshi Tsuboya[3], Tetsuya Miyazaki[1]; [1]Natl. Inst. of Information and Communications Technology, Japan, [2]Natl. ICT Australia, Australia, [3]OPTOQUEST CO., Japan.* We describe error-free 160 Gb/s tunable all-optical wavelength conversion using cascaded sum- and difference-frequency generation in periodically poled $LiNbO_3$ waveguide. By using spectral-shaping, the BER of less than 10^{-9} is achieved in 23 nm tuning-range.

Ballroom C

4:30 p.m.–6:30 p.m.
OTuJ • Nonlinear Fibers II
Misha Brodsky; AT&T Labs - Res., USA, Presider

OTuJ1 • 4:30 p.m. Invited
Practical Considerations for the Application of Highly Nonlinear Fibers, *Toshiaki Okuno, Tetsuya Nakanishi, Masaaki Hirano, Masahi Onishi; Sumitomo Electric Industries, Ltd., Japan.* Comparison of recent reported highly nonlinear fibers is carried out with viewpoints of practical use. Currently, silica-based highly nonlinear fibers are concluded to be most promising, and their recent progress is briefly reviewed.

Ballroom D

4:30 p.m.–6:30 p.m.
OTuK • Waveguide Lasers
Paul Wysocki; Unopsys LLC, USA, Presider

OTuK1 • 4:30 p.m.
High-Gain Optical Amplification of Europium-Aluminum Nanocluster Doped Planar Polymer Waveguide, *Hiroshi Mataki[1], Nobuko Mibuka[1], Kaname Tsuchii[1], Ayami Suzuki[1], Shigeru Yamaki[1], Jun Sun[1], Hironori Taniguchi[2], Kenichi Yamashita[2], Kunishige Oe[2]; [1]KRI Inc., Japan, [2]Kyoto Inst. of Technology, Japan.* We have successfully demonstrated optical amplification using a planar PMMA (polymethylmethacrylate) optical waveguide with doped Eu-Al nanoclusters. The optical gain of 5.57dB/mm was observed while well suppressing the concentration quenching.

Ballroom E

4:30 p.m.–6:15 p.m.
OTuL • High-Speed Multimode Fiber Transmission and Modeling
Werner Rosenkranz; Univ. of Kiel, Germany, Presider

OTuL1 • 4:30 p.m. Invited
Compensating Multimode Fiber Dispersion Using Adaptive Optics, *Joseph Kahn; Stanford Univ., USA.* Adaptive optics can compensate multimode dispersion, enabling 10 Gbit/s transmission through 11 km of standard 50 micron fiber. This method scales better than electrical equalization to multiple WDM channels, high bit rates and long fibers.

Room 304 A/B

OTuF • Pulsed Lasers—Continued

OTuF7 • 3:45 p.m.
Generation of 160-GHz Sub-Picosecond In-Phase Pulse Train from Optical Beat Signal, *Takashi Inoue, Yu Mimura, Jiro Hiroishi, Takeshi Yagi, Misao Sakano; Furukawa Electric Co., Ltd., Japan.* We propose a method to generate in-phase optical pulse train from optical beat signal based on four-wave mixing and asymmetric spectral filtering. A 160-GHz repeating, 0.7-ps-FWHM, nearly transform-limited, in-phase sech pulse train is successfully generated.

Room 303 A

OTuG • Colorless ONU's—Continued

OTuG7 • 3:45 p.m.
A Self-Restorable Colorless Bidirectional WDM-PON Based on ASE-Injected FP-LDs, *Kwanil Lee[1], Ju Han Lee[1], Young-Geun Han[1], Sang Bae Lee[1], Sil-Gu Mun[2], Sang-Mook Lee[2], Chang-Hee Lee[2]; [1]Korea Inst. of Science and Technology, Republic of Korea, [2]Korea Advanced Inst. of Science and Technology, Republic of Korea.* We propose and demonstrate a cost-effective self-restorable bidirectional WDM-PON based on ASE-injected FP-LDs, which utilizes the periodic and routing characteristics of the arrayed waveguide grating. The network restoration was achieved within 7 ms.

Room 303 B

Room 303 C

NTuB • ASON/GMPLS—Continued
(Panel Discussion)

Notes

4:00 p.m.–4:30 p.m. Coffee Break, Exhibit Hall

4:30 p.m.–6:00 p.m.
OTuM • Silicon Photonics II
Olav Solgaard; Stanford Univ., USA, Presider

OTuM1 • 4:30 p.m.
Compact, Low-Loss Waveguide Crossings for High-Index-Contrast SOI Photonic Wires, *Wim Bogaerts, Pieter Dumon, Dries Van Thourhout, Roel Baets; Ghent Univ., IMEC, Belgium.* Waveguide crossings are essential for complex photonic circuits. We present compact crossings for silicon-on-insulator photonic wires. By locally applying a lower index contrast, 97.5% transmission is achieved in a 6μm length with only -40dB crosstalk.

4:30 p.m.–6:15 p.m.
OTuN • Fiber PMD and Polarization
Paul Westbrook; OFS Labs, USA, Presider

OTuN1 • 4:30 p.m.
Fourier Pulse-Shaper Based Programmable DGD Emulator, *Shawn X. Wang, Andrew M. Weiner; Purdue Univ., USA.* We developed and tested a deterministic differential group delay (DGD) emulator based on a VIPA Fourier pulse-shaper. The DGD emulator can be programmed to generate essentially arbitrary frequency dependent DGD profiles.

4:30 p.m.–6:30 p.m.
NTuC • Advanced Optical Network Architectures
Mehran Esfandiari; AT&T, USA, Presider

NTuC1 • 4:30 p.m.
Applications of ROADMs and Control Planes in Metro and Regional Networks, *Klaus Grobe; ADVA AG Optical Networking, Germany.* Reconfigurable OADMs (ROADMs), together with Control Planes, can have significant influence on network configurations, applications, and efficiency. This paper identifies most relevant applications areas and resulting benefits. It also discusses ROADM/GMPLS references.

4:30 p.m.–6:30 p.m.
NTuD • Optical Network Control and Management
Bruce Miller; Alcatel, USA, Presider

NTuD1 • 4:30 p.m.
GMPLS RSVP-TE Signaling Recovery with Graceful Restart in Optical User Network Interface, *Zhiyu Zhou, Kang Chen, Ludi Zheng; Bell Labs Res. China, China.* OIF UNI signaling re-uses the GMPLS RSVP-TE between clients connected to the transport network. This paper proposes an approach to make use of standard messages to recover the signaling state on the source client router.

Ballroom A

OTuH • Transmission Subsystems—Continued

OTuH2 • 4:45 p.m.
Transmitter Comparison and Unequal Bit Error Probabilities in Coherent QPSK Systems, *Hongxia Zhao, Magnus Karlsson, Erik Agrell; Chalmers Univ. of Technology, Sweden.* We compare different QPSK transmitters and find that some simple configurations can give rise to a significant difference in BER between the two transmitted bits. The optimum receiver filter bandwidth is affected by this phenomenon.

OTuH3 • 5:00 p.m.
Dispersion Compensation Using All-Pass Digital IIR Filters, *Gilad Goldfarb, Guifang Li; College of Optics & Photonics: CREOL & FPCE, Univ. of Central Florida, USA.* The use of infinite impulse response filters to achieve chromatic dispersion compensation for homodyne phase-diversity detection systems employing digital signal processing is proposed. Theory, simulation and experimental results show the advantages of this approach.

Ballroom B

OTuI • Wavelength Conversion—Continued

OTuI2 • 5:00 p.m.
Widely Tunable Wavelength Conversion by Four-Wave Mixing in 1-m Dispersion-Shifted Bismuth-Oxide Photonic Crystal Fiber, *K. K. Chow[1], K. Kikuchi[1], T. Nagashima[2], T. Hasegawa[2], S. Ohara[2], N. Sugimoto[2]; [1]Res. Ctr. for Advanced Science and Technology, Univ. of Tokyo, Japan, [2]Asahi Glass Co. Ltd., Japan.* We demonstrate four-wave mixing based wavelength conversion using a 1-meter-long dispersion-shifted bismuth-oxide photonic crystal fiber. A 3-dB conversion range of 35 nm is obtained with around 1-dB power penalty for 10 Gb/s NRZ signal.

Ballroom C

OTuJ • Nonlinear Fibers II—Continued

OTuJ2 • 5:00 p.m.
High Power Parabolic Pulse Generation in Dispersion Decreasing Tapered Fibre, *Alexei Plotski[1], Alexej A. Sysoliatin[1], Michail Y. Salganskii[1], Paul Harper[2], Jim Harrison[2], Sergei K. Turitsyn[2], Anton I. Latkin[3]; [1]Fibre Optics Res. Ctr., Russian Federation, [2]Photonics Res. Group, School of Engineering and Applied Science, Aston Univ., UK, [3]Inst. of Automation and Electrometry SB RAS, Russian Federation.* High-power pulse propagation in fibre with tapered decreasing normal dispersion is studied experimentally and numerically. With appropriate fibre design and launch conditions generation of parabolic pulse and step-function waveforms in passive fibre is confirmed.

Ballroom D

OTuK • Waveguide Lasers—Continued

OTuK2 • 4:45 p.m.
High-Power Stable Single-Frequency Waveguide Laser, *Giuseppe Della Valle[1], Alessandro Festa[1], Karin Ennser[1], Stefano Taccheo[1], Paolo Laporta[1], Gino Sorbello[2]; [1]Politecnico di Milano - IFN-CNR, Italy, [2]Univ. di Catania, Italy.* We demonstrate a waveguide laser providing over 20 mW in robust single-frequency operation using 9-mm-long active waveguide. Overall cavity length is <60 mm including butt-coupled fiber-Bragg-grating mirrors. Power scaling to 100 mW is discussed.

OTuK3 • 5:00 p.m. **Tutorial**
Teaching Silicon New Tricks, *Bahram Jalali; Univ. of California at Los Angeles, USA.* This tutorial will elucidate silicon's prospect as an active optical medium. It will review recent breakthroughs on amplification, lasing, wavelength conversion, energy harvesting, and a new class of devices based on nonlinear multi-mode structures.

Bahram Jalali is a Professor of Electrical Engineering, the and the Director of the Optoelectronic Circuits and System Laboratory at UCLA. From 1988-1992, he was a Member of Technical Staff at the Physics Research Division of AT&T Bell Laboratories in Murray Hill, N.J. where he conducted research on ultrafast electronics and optoelectronics. His current research

Ballroom E

OTuL • High-Speed Multimode Fiber Transmission and Modeling—Continued

OTuL2 • 5:00 p.m.
10.7 Gb/s Over 300 m GI-MMF Using a 2 x 2 MIMO System Based on Mode Group Diversity Multiplexing, *Stefan Schoellmann, Steven Soneff, Werner Rosenkranz; Chair for Communications, Univ. of Kiel, Germany.* We investigate experimentally the feasibility of a 2x2 MIMO system based on Mode Group Diversity Multiplexing to enlarge the bandwidth distance product of MMF. A data rate of 10.7Gb/s over 300m GI-MMF is achieved.

Room 304 A/B

OTuM • Silicon Photonics II—Continued

OTuM2 • 4:45 p.m.
A Compact Polarization-Independent Wavelength Duplexer Using a Polarization-Diversity SOI Photonic Wire Circuit, *Wim Bogaerts[1], Dirk Taillaert[1], Pieter Dumon[1], Elroy Pluk[2], Dries Van Thourhout[1], Roel Baets[1]; [1]Ghent Univ. - IMEC, Belgium, [2]Genexis B.V, Netherlands.* We present a wavelength duplexer in silicon-on-insulator photonic wires. We made a polarization-diversity circuit using fiber grating couplers with polarization splitter and a bidirectional AWG, resulting in a polarization dependent loss of only 0.66dB.

OTuM3 • 5:00 p.m.
Ultra-Compact Reconfigurable Silicon Optical Devices Using Micron-Scale Localized Thermal Heating, *William M. J. Green, Hendrik F. Hamann, Lidija Sekaric, Michael J. Rooks, Yurii A. Vlasov; IBM Thomas J. Watson Res. Ctr., USA.* Novel design of a compact low-loss and high-efficiency micro-heater is demonstrated for silicon photonic wire ultra-compact reconfigurable devices. Highly localized heating enables reduced thermal crosstalk for densely packed, individually addressable cascaded devices.

Room 303 A

OTuN • Fiber PMD and Polarization—Continued

OTuN2 • 4:45 p.m.
Broadband All-Order Polarization Mode Dispersion Compensation, *Houxun Miao[1], Li Xu[1], Andrew M. Weiner[1,2], Carsten Langrock[2], Rostislav V. Roussev[2], Martin M. Fejer[2]; [1]Purdue Univ., USA, [2]Stanford Univ., USA.* We demonstrate broadband all-order polarization mode dispersion (PMD) compensation by applying broadband states of polarization sensing, frequency-resolved optical gating (FROG), and ultrafast pulse shaping techniques.

OTuN3 • 5:00 p.m. Invited
PMD Outage Probabilities Revisited, *Herwig Kogelnik, Peter J. Winzer; Lucent Technologies, USA.* In the time intervals of its validity, the new hinge model for optical fiber transmission links requires a re-examination of the traditional concepts of PMD outage and their impact on system design.

Room 303 B

NTuC • Advanced Optical Network Architectures—Continued

NTuC2 • 4:50 p.m.
Network Planning and Architecture Analysis of Wavelength Blocking in Optical and Digital ROADM Networks, *Serge Melle, Vijay Vusirikala; Infinera, USA.* Detailed network planning analysis indicates wavelength blocking in all-optical ROADM networks incurs additional OEO for wavelength conversion, and constrains service reconfiguration. Analyses show that digital ROADM systems mitigate these problems and provide greater service flexibility.

Room 303 C

NTuD • Optical Network Control and Management—Continued

NTuD2 • 4:50 p.m.
Backup Path Multiplexing over Survivable GMPLS Networks, *Yuanqiu Luo[1], Si Yin[1], Ting Wang[1], Shinya Nakamura[2], Nirwan Ansari[3]; [1]NEC Labs America, USA, [2]NEC Corp., Japan, [3]New Jersey Inst. of Technology, USA.* This paper proposes a traffic recovery scheme for GMPLS networks. By considering SRLG information, recovery failure probability, recovery time, and signal loss, our scheme achieves high sharing of the backup resources.

Notes

Ballroom A

OTuH • Transmission Subsystems—Continued

OTuH4 • 5:15 p.m.
A Study on Residual Distortion Equalization in Combination with Pre-Distortion and Post-Equalization, *Takashi Sugihara, Hiroshi Kubo, Takashi Mizuochi, Katsuhiro Shimizu; Mitsubishi Electric Corp., Japan.* We show numerically that in a 40Gb/s-QPSK system, dispersion incompletely compensated by pre-distortion can be precisely equalized by a post-equalizer. The compensation capability is strongly dependent on the demodulation scheme, i.e. coherent or incoherent.

OTuH5 • 5:30 p.m.
A Novel Bias Control Technique for MZ Modulator with Monitoring Power of Backward Light for Advanced Modulation Formats, *Kenro Sekine, Chie Hasegawa, Nobuhiko Kikuchi, Shinya Sasaki; Hitachi, Ltd., Central Res. Lab, Japan.* We propose a novel high-sensitive and cost-effective bias control scheme for MZ modulator with minimizing monitored power of backward-traveling light, and demonstrate its effectiveness with the experiments of 10-Gbit/s CSRZ and 43-Gbit/s RZ-DQPSK signals.

Ballroom B

OTuI • Wavelength Conversion—Continued

OTuI3 • 5:15 p.m.
320 Gbit/s DQPSK All-Optical Wavelength Conversion Using Four Wave Mixing, *Michael Galili[1], Bernd Huettl[2], Carsten Schmidt-Langhorst[2], Alexandre Gual i Coca[2], Reinhold Ludwig[2], Colja Schubert[2]; [1]COM-DTU, Denmark, [2]Fraunhofer Inst. for Telecommunications, Heinrich-Hertz-Inst., Germany.* In this paper we demonstrate wavelength conversion of 320Gbit/s DQPSK and 160Gbit/s DPSK data signals by four wave mixing in highly nonlinear fibre. Error free operation is shown for conversion of both DPSK and DQPSK.

OTuI4 • 5:30 p.m.
All-Optical Wavelength Conversion and Multicasting by Cross-Gain Modulation in a Single-Stage Fiber Optical Parametric Amplifier, *Kenneth Kin-Yip Wong[1], Guo-Wei Lu[2], Kwan-Chi Lau[3], P. K. A. Wai[3], Lian-Kuan Chen[4]; [1]Univ. of Hong Kong, Hong Kong, [2]Natl. Inst. of Information and Communications Technology, Japan, [3]Hong Kong Polytechnic Univ., Hong Kong, [4]Chinese Univ. of Hong Kong, Hong Kong.* We have demonstrated an all-optical wavelength conversion and multicasting for a 10Gb/s NRZ system with 100GHz channel spacing by using a single-stage two-pump fiber optical parametric amplifier (OPA) with conversion gain of at least 15dB.

Ballroom C

OTuJ • Nonlinear Fibers II—Continued

OTuJ3 • 5:15 p.m.
Parabolic Pulse Generation through Passive Reshaping of Gaussian Pulses in a Normally Dispersive Fiber, *Christophe Finot, Lionel Provost, Periklis Petropoulos, David J. Richardson; Optoelectronics Res. Ctr., UK.* We numerically and experimentally demonstrate that a Gaussian pulse can be reshaped into a pulse with a stable parabolic intensity profile during propagation in two sections of normally dispersive nonlinear fibers.

OTuJ4 • 5:30 p.m.
Supercontinuum Spectrum Broadening by One-Bobbin Compact Modules Comprised of Re-Coated Comb-Like Profiled Fiber and HNLF, *Masanori Takahashi, Takashi Inoue, Yuki Taniguchi, Masateru Tadakuma, Misao Sakano, Takeshi Yagi; Furukawa Electruc Co., Ltd., Japan.* We demonstrated SC spectrum broadening from the original value of 25nm to 100nm without changing output power and module size by the efficient pulse compression and novel package of a 6-step CPF and 500m HNLF.

Ballroom D

OTuK • Waveguide Lasers—Continued

interests are in silicon photonics and ultrafast photonic signal processing. Dr. Jalali has published over 200 scientific papers in and holds 6 US patents. He is a Fellow of IEEE and of Optical Society of America (OSA) and the Chair of the Los Angeles Chapter of the IEEE Lasers and Electro Optics Society (LEOS). In 2005, he was chosen by the Scientific American Magazine as the 50 Leaders Shaping the Future of Technology. He is a member of the California Nano Systems Institute (CNSI). While on leave from UCLA from 1999-2001, Dr. Jalali founded Cognet Microsystems, a Los Angeles based fiber optic component company. He served as Company's CEO, President and Chairman, from the company's inception through its acquisition by Intel Corporation in April 2001. He has received the BridgeGate 20 Award for his contribution to the southern California economy. From 2001-2004, he served as a consultant to Intel Corporation. Dr. Jalali serves on the Board of Trustees of the California Science Center.

Ballroom E

OTuL • High-Speed Multimode Fiber Transmission and Modeling—Continued

OTuL3 • 5:15 p.m.
Transmission of 10-Gb/s and 40-Gb/s Signals over 3.7 km of Multimode Fiber Using Mode-Field Matched Center Launching Technique, *Dong Hoon Sim, Yuichi Takushima, Yun C. Chung; KAIST, Republic of Korea.* We experimentally demonstrate the transmission of 10-Gb/s and 40-Gb/s signals over 3.7 km of multimode fiber by using the mode-field matched center launching technique.

OTuL4 • 5:30 p.m.
10 Gb/s Transmitter-Based Equalization for Extended-Reach Multimode-Fiber Datacommunication Links, *Jonathan D. Ingham, Richard V. Penty, Ian H. White; Univ. of Cambridge, UK.* Transmitter-based equalization is investigated for enhanced performance in 10Gb/s multimode-fiber links. Rigorous simulations and proof-of-principle experiments over 500m of FDDI-grade-fiber confirm for the first time the potential superiority of the technique relative to receiver-based schemes.

OTuM • Silicon Photonics II—Continued

OTuM4 • 5:15 p.m.
Silicon-on-Insulator Platform for Building Fiber-to-the-Home Transceivers, *Serge Bidnyk[1], Matt Pearson[1], Ashok Balakrishnan[1], Mae Gao[1], Dazeng Feng[2], Hong Liang[2], Wei Qian[2], Cheng-Chih Kung[2], Joan Fong[2], Peter Zhou[2], Jeremy Yin[2], Mehdi Asghari[2]; [1]Enablence Technologies Inc, Canada, [2]Kotura Inc., USA.* A silicon-on-insulator platform is proposed for building bi-directional transceivers for fiber-to-the-home applications. The platform includes a monolithically integrated planar reflective grating and a multi-stage interferometer combined with hybridization structures for placement of lasers and photodetectors.

OTuM5 • 5:30 p.m.
Demonstrated 4x4 Gbps Silicon Photonic Integrated Parallel Electronic to WDM Interface, *Benjamin G. Lee[1], Benjamin A. Small[1], Justin D. Foster[1], Keren Bergman[1], Qianfan Xu[2], Michal Lipson[2]; [1]Columbia Univ., USA, [2]Cornell Univ., USA.* A 4x4 Gbps microring modulator cascade with the ability to directly convert parallel electrical bus data into multiple-wavelength optical signals in a single silicon-on-insulator waveguide interface is demonstrated with $< 10^{-12}$ bit error rates.

OTuN • Fiber PMD and Polarization—Continued

OTuN4 • 5:30 p.m.
All-Fiber PMD Emulator with Reduced Number of Polarization Controllers between Sections, *Lianshan Yan[1], Bo Zhang[1], X. Steve Yao[1], Alan Willner[2]; [1]General Photonics Corp., USA, [2]Univ. of Southern California, USA.* We propose an all-fiber PMD emulator based on polarization-maintaining- fiber and fiber-squeezer type polarization controllers. The number of polarization controllers has been significantly reduced to lower the cost without distorting the statistical distributions.

NTuC • Advanced Optical Network Architectures—Continued

NTuC3 • 5:10 p.m.
Optical Cross Connects Architecture with per-Node Add&Drop Functionality, *Paolo Ghelfi[1], Filippo Cugini[1], Luca Poti[1], Antonella Bogoni[1], Piero Castoldi[2], Rodolfo Di Muro[3], Bimal Nayar[3]; [1]CNIT, Italy, [2]Scuola Superiore Sant'Anna, Italy, [3]Ericsson Ltd., UK.* We propose a cost-effective implementation of add&drop functionality in Optical-Cross-Connects, based on per-node add&drop. The architecture is shown to significantly reduce the node cost at any nodal degree without affecting the network behavior.

NTuC4 • 5:30 p.m.
Study of Impact of Photonic Switch Speed on Transport Networks, *Tiejun Xia, Glenn Wellbrock; Verizon Communications, USA.* Impact of photonic switch speed on performance of transport networks is studied with a new variable switch speed test set. The results of the study generate the requirements for new "maintenance friendly" optical networks.

NTuD • Optical Network Control and Management—Continued

NTuD3 • 5:10 p.m.
Experimental Validation of Fibre Channel over Multi Protocol Label Switching for the Wide-Area Storage Area Networks, *Munefumi Tsurusawa[1], Takahiro Miyamoto[1], Hideaki Tanaka[1], Moran Roth[2], Ronen Solomon[2]; [1]KDDI R&D Labs Inc., Japan, [2]Corrigent Systems, USA.* We validated the feasibility of Fibre Channel over MPLS technology. The fundamental evaluation as well as the statistical multiplexing of FC frame and Ethernet frame over MPLS network was successfully demonstrated for the first time.

NTuD4 • 5:30 p.m. Invited
OAM in Packet Transport Networks, *Leon Bruckman[1], Bert Basch[2]; [1]Corrigent Systems, USA, [2]Verizon Labs, USA.* Networks are transitioning from TDM to packet transport optimized architectures. Packet networks are based on technologies traditionally lacking OAM tools. We will present the OAM tools being developed and their application to the transport layers.

Ballroom A

OTuH • Transmission Subsystems—Continued

OTuH6 • 5:45 p.m.
Characteristics of Printed Circuit Interconnect Induced Jitter on 10Gb/s Optical Transmitters, *Badri N. Gomatam, George Noh; Vitesse Semiconductor Corp., USA.* We report on the effects of printed circuit interconnects on jitter induced in the optical domain. We show this jitter may be equalized without the need for additional clock-and-data recovery prior to optical conversion.

OTuH7 • 6:00 p.m. Invited
Status of Optical Modules and Sub-Systems Standards, *Peter Anslow; Nortel, UK.* The current status of standardisation of the optical specifications applied to transmitters and receivers is reviewed with particular emphasis on the standards emerging from the ITU-T targeted at Metro DWDM links.

Ballroom B

OTuI • Wavelength Conversion—Continued

OTuI5 • 5:45 p.m.
Error-Free 320 Gb/s Simultaneous Add-Drop Multiplexing, *Hans Christian Hansen Mulvad[1], Leif K. Oxenløwe[1], Anders T. Clausen[1], Michael Galili[1], Lars Grüner-Nielsen[2], Palle Jeppesen[1]; [1]COM•DTU, Dept. of Communications, Optics & Materials, Denmark, [2]OFS Fitel Denmark, Denmark.* We report on the first demonstration of error-free time-division add-drop multiplexing at 320 Gb/s. The add- and drop-operations are performed simultaneously in a nonlinear optical loop mirror with only 100 m of highly nonlinear fibre.

OTuI6 • 6:00 p.m.
Demonstration of an All-Optical Data Vortex Switch Node, *Hyun-Do Jung[1], Idelfonso Tafur Monroy[2], A.M.J. Koonen[1]; [1]Eindhoven Univ. of Technology, Netherlands, [2]Technical Univ. of Denmark, Denmark.* We report on the fully all-optical operation of a data vortex switch node based on MZI-SOA gates. All-optical self-routing of WDM 10Gb/s optical packets has been successfully achieved.

Ballroom C

OTuJ • Nonlinear Fibers II—Continued

OTuJ5 • 5:45 p.m.
Light Generation beyond a Continuum Edge Using a Fiber Bragg Grating, *Paul Westbrook, Jeffrey Nicholson, Kenneth Feder; OFS Labs, USA.* We generate light beyond the short wavelength edge of an optical continuum in highly nonlinear fiber pumped by an Er femtosecond laser, with a Bragg grating as a phase matching element.

OTuJ6 • 6:00 p.m. Invited
Entanglement Generation with Fiber Nonlinearity for Quantum Communication in the Telecom Band, *Prem Kumar, Kim Fook Lee, Jun Chen, Chuang Liang; Northwestern Univ., USA.* The Kerr nonlinearity of optical fiber can be utilized to create high-fidelity entangled photons in the telecom band. We review our progress to date and the potential for practical quantum communications in fiber-optic networks.

Ballroom D

OTuK • Waveguide Lasers—Continued

OTuK4 • 6:00 p.m. Invited
Hybrid Silicon Evanescent Laser in a Silicon-on-Insulator Waveguide, *John Bowers[1], Alexander W. Fang[1], Hyundai Park[1], Richard Jones[2], Mario J. Paniccia[2], Oded Cohen[3]; [1]Univ. of California at Santa Barbara, USA, [2]Intel Corp., USA, [3]Intel Corp., Israel.* We demonstrate electrically pumped silicon evanescent lasers operating cw at 40°C. Light is confined by SOI waveguides, and the evanescent tail is amplified by AlGaInAs quantum wells. This process is applicable to silicon-evanescent-photonic-integrated circuits.

Ballroom E

OTuL • High-Speed Multimode Fiber Transmission and Modeling—Continued

OTuL5 • 5:45 p.m.
Impact of Noise Transfer in Transparent Networks on Different 43 Gb/s Formats, *Hans Bissessur, Christian Bastide; Alcatel, France.* We experimentally investigate the sensitivity of different 43 Gb/s formats to non-white noise which occurs in a reconfigurable network, and discuss the system design to reduce its penalty.

OTuL6 • 6:00 p.m.
Adaptive Split-Step Quasi-Spectral Finite Difference Method for Nonlinear Optical Pulse Propagation, *Tristan Kremp; Inst. für Geometrie und Praktische Mathematik, RWTH Aachen Univ. of Technology, Germany.* Combining a new semi-analytical step size estimation strategy with highly efficient quasi-spectral finite differences, a fast adaptive split-step solver for the nonlinear Schrödinger equation is presented. For large WDM systems, a substantial speed-up is obtained.

6:30 p.m.–8:00 p.m. Conference Reception, Hilton Anaheim Hotel

Room 304 A/B	Room 303 A	Room 303 B	Room 303 C	Notes

OTuM • Silicon Photonics II—Continued

OTuM6 • 5:45 p.m.
CMOS Compatible Guided-Wave Tunable Optical Equalizer, *Douglas M. Gill[1], Mahmoud S. Rasras[1], Xiang Liu[1], Kun-Yii Tu[1], Y. K. Chen[1], Alice E. White[1], Sanjay S. Patel[1], Andrew Pomerene[2], Daniel Carothers[2], Thomas Love[2], Micheal J. Grove[2], Daniel K. Sparacin[3], Mark Beals[3], Jurgen Mitchel[3], Jifeng Liu[3], L. C. Kimerling[3]; [1]Bell Labs, USA, [2]BAE Systems, USA, [3]MIT, USA.* A compact 4th-order pole-zero optical filter fabricated entirely in a silicon complementary metal-oxide semiconductor foundry is configured as a tunable optical equalizer. Equalization of a bandwidth-limited 10-Gb/s signal is demonstrated with a single voltage control.

OTuN • Fiber PMD and Polarization—Continued

OTuN5 • 5:45 p.m.
An All-Fiber Tunable Polarization-Dependent Loss Element, *Rong Huang, Fares Alhassen, David Tseng, Ozdal Boyraz, Henry P. Lee; Univ. of California at Irvine, USA.* We describe the implementation of a wavelength-tunable polarization-dependent-loss element on polarization-maintaining fiber using two independently-controlled acoustic gratings. Continuous attenuation in both fast and slow axes at the same wavelength is demonstrated.

OTuN6 • 6:00 p.m.
Ultrafast Sampling of Complex Polarization Components for Characterizing Polarization Mode Dispersion, *Keiji Okamoto, Xinyu Fan, Fumihiko Ito; NTT Corp., Japan.* We demonstrate the ultrafast observation of the complex polarization components by using a multi-channel linear optical sampling technique. Simultaneous characterization of the temporal waveform and the PMD provides a unique feature for diagnosing high-speed channels.

NTuC • Advanced Optical Network Architectures—Continued

NTuC5 • 5:50 p.m.
T-MPLS: Carrier-Class Transport for Converged Optical/Packet Networks, *Enrique Hernandez-Valencia; Lucent Technologies, USA.* Transport MPLS (T-MPLS) is a recent recommendation from ITU-T specifying a connection-oriented, packet-switched architecture for carrier class transport networks. Here discuss T-MPLS forwarding model, OA&M and control plane capabilities for connection supervision, performance and survivability.

NTuC6 • 6:10 p.m.
Field Trial of Photonic Switches for Efficient Fiber Network Operation and Maintenance, *Tiejun Xia[1], Michael F. Lane[1], Timothy Lawter[1], Glenn Wellbrock[1], Richard Jensen[2], Mike Bitting[2], Aaron Bent[2], Kevin Karch[3], Jonathan Lacey[3], David Altstaetter[3]; [1]Verizon Communications, USA, [2]Polatis Inc., USA, [3]Calient Networks, Inc., USA.* Results of Verizon field trial using MEMS and Beam-steering photonic switching technologies for automating network operation and maintenance functions show that operational expenses and downtime can be significantly reduced.

NTuD • Optical Network Control and Management—Continued

NTuD5 • 6:10 p.m.
Emerging Network Need for Alien Wavelength Management, *David Zhi Chen, Michael F. Lane; Verizon, USA.* Optical-transmission-distance reaches coast-to-coast without regeneration; costs have been reduced due to elimination of regenerations. Mixed-traffic-pattern leads to challenging task of managing the dynamic-wavelength which traverses multiple-network-domains. Effective optical interoperability starts with proper management of Alien-Wavelength.

6:30 p.m.–8:00 p.m. Conference Reception, Hilton Anaheim Hotel