

Advance Program

Mitigating Channel Degrading Effects

Monday, 21 July 2008

ALL SESSIONS WILL BE HELD IN MARQUESA II

13.30 - 15.00

Session ME1: OUTLOOK IN MITIGATING CHANNEL DEGRADING EFFECTS

Session Chair: Lianshan Yan, *Southwest Jiaotong University, Chengdu, China*

ME1.1 13.30 - 14.00 (Invited)

Ultrafast All-Optical Switching Using Nonlinear Integrated Photonic Devices, B. J. Eggleton, *CUDOS, University of Sydney, Sydney, NSW, Australia*

This paper reviews our recent progress in developing ultrafast all-optical devices for signal processing in next generation communication systems. Our approach is based on highly nonlinear chalcogenide waveguides.

ME1.2 14.00 - 15.00 (Plenary)

Future Broader-Bandwidth Optical Communication Systems, A. E. Willner, *University of Southern California, Los Angeles, CA, USA*

This paper will highlight various optical transmissions issues that might be critical for future 100-Gbit/s and 1-Tbit/s Ethernet systems. Topics will include: spectral efficiency, advanced modulation formats, combating impairments, data granularity, and performance monitoring.

15.00 - 15.30

COFFEE BREAK

15.30 - 16.30

Session ME2: THE ROLE OF DEVICES

Session Chair: Robert I. Killey, *University College London, London, UK*

ME2.1 15.30 - 15.45

Dispersion Compensation for On-Chip Ultrafast Signal Processing, D. T. H. Tan, K. Ikeda, R. E. Saperstein, B. Slutsky and Y. Fainman, *University of California - San Diego, La Jolla, CA, USA*

A strongly coupled, chirped Bragg grating with sinusoidally modulated sidewalls is proposed for on-chip dispersion compensation. The device bandwidth, magnitude and sign of dispersion may be engineered for specific dispersion compensation requirements.

ME2.2 15.45 - 16.15 (Invited)

Mitigating Channel Impairments in High Capacity Serial 40G and 100G DWDM Transmission Systems, T. Schmidt, C. Malouin, R. Saunders, J. Hong and R. Marcocchia, *StrataLight Communications, Los Gatos, CA, USA*

A perspective on impairment mitigation strategies is provided for past, present, and future commercial 40G deployments. Requirements for practical 100G deployments are ascertained from commercially successful 40G solutions, where seamless upgrade to existing 10G systems was a key requirement. Options meeting these requirements are explored.

ME2.3 16.15 - 16.30

Low-Cost L-Band Raman Amplifier for CWDM Systems, M. C. Fugihara and A. N. Pinto, *University of Aveiro, Aveiro, Portugal*

A low-cost Raman amplifier for CWDM systems and a model suitable for its design is presented. An amplifier offering 9 dB over 60nm is obtained using only three low-power (< 200mW) semiconductor lasers.

16.30 - 17.00

Session ME3: BEST PAPER AWARD**Session Chair:** Michael Frankel, *Ciena Corporation, Linthicum, MD, USA*

16.30 - 16.45

Ciena Best Paper Announcement**ME3.1 16.45 - 17.00****Experimental Demonstration of Fiber Impairment Compensation using the Split-Step Infinite Impulse Response Method**, G. Goldfarb, M. G. Taylor and G. Li, *University of Central Florida, Orlando, FL, USA*

The use of infinite impulse response filtering for back-propagation of an optical signal is investigated. Experimental results and a comparison between several compensation techniques show the feasibility of this approach.

Tuesday, 22 July 2008

09.00 - 10.00

Session TuE1: POLARIZATION EFFECTS AND MITIGATION**Session Chair:** Yun C. Chung, *Korea Advanced Institute of Science and Technology, Daejeon, Korea***TuE1.1 09.00 - 09.30 (Invited)****Polarization Management for Polarization-Division-Multiplexing and Coherent Detection Systems**, S. Yao, *General Photonics Co., Chino, CA, USA* and L. Yan, *Southwest Jiaotong University, Chengdu,*

PDM and coherent detection are enabling technologies for 40-Gbps and beyond. Unlike in a single polarization direct detection system, polarization management is essential in a system incorporating PDM and coherence detection. We review different approaches and compare their pros and cons.

TuE1.2 09.30 - 10.00 (Invited)**PMD Mitigation by Polarization Filtering for High-Speed Optical Transmission Systems**, M. Suzuki, M. Daikoku, M. Hayashi, I. Morita and H. Tanaka, *KDDI R&D Laboratories, Saitama, Japan*

The automatic PMD compensator using polarization filtering with a polarizer was evaluated in 40Gbit/s and 160Gbit/s WDM transmission over installed fiber cables. The performance and long-term stability were enhanced with the simple PMD mitigation scheme.

10.00 - 10.30

COFFEE BREAK

10.30 - 12.00

Session TuE2: ELECTRONIC MITIGATION**Session Chair:** Frank Chang, *Vitesse Semiconductor Corp., Camarillo, CA, USA***TuE2.1 10.30 - 11.00 (Invited)****Electronic Mitigation for 10, 40 and 100G**, F. Buchali, B. Franz and H. Buelow, *Alcatel-Lucent, Stuttgart, Germany*

Electronic dispersion compensation by analog and digital equalizers enable a considerable increase of high bit rate optical transmission system tolerances. Electronic equalizers are small size and low power consumption subsystems suitable for compact transponder integration.

TuE2.2 11.00 - 11.15**Electronic Versus Optical Mitigation of Nonlinearities in 4x25 Gb/s WDM System for 100 Gb Ethernet**, R. Gutierrez-Castrejon, *Universidad Nacional Autónoma de México, Mexico, D. F., Mexico* and M. Duelk, *Exalos, Schlieren, Switzerland*

A comparison between optical and electronic solutions to mitigate the SOA nonlinearities found in next-generation WDM-based 40-km Ethernet links is presented. The former solution exhibits better performance whereas the latter one is more cost-effective.

TuE2.3 11.15 - 11.45 (Invited)**Mitigation of Linear and Nonlinear Impairments in High-Speed Optical Networks by Using LDPC-Coded Turbo Equalization**, I. B. Djordjevic, *University of Arizona, Tucson, AZ, USA*

We present a nonlinear ISI cancellation scheme based on LDPC-coded turbo-equalization. This scheme is suitable for simultaneous suppression of intra-channel nonlinearities, chromatic-dispersion compensation, and PMD-compensation. LDPC coding is based on large-girth block-circulant codes, and maximum a posteriori probability equalizer is based on Bahl-Cocke-Jelinek-Raviv (BCJR) algorithm.

TuE2.4 11.45 - 12.00

Mitigation of Group Velocity Dispersion in Optical CDMA Networks using Electronics, M. N. Pimenta, *University College London, London, UK*

We propose a flexible post-detection scheme for Group Velocity Dispersion compensation in multi-wavelength Optical CDMA systems. The compensator is based on embedding a specially designed distributed amplifier structure in the receiver preamplifier. The system performance is assessed through network modeling.

12.00 - 13.30**LUNCH BREAK****13.30 - 15.00****Session TuE3: NETWORK ISSUES**

Session Chair: Mark D. Feuer, *AT&T, Middletown, NJ, USA*

TuE3.1 13.30 - 14.00 (Invited)

OFDMA-based Passive Optical Networks (PON), L. Xu, D. Qian, J. Hu, W. Wei and T. Wang, *NEC Laboratories America, Inc., Princeton, NJ, USA*

We propose a PON architecture based on orthogonal frequency division multiple access (OFDMA) technologies. The system produces transparent pipes for transmission of heterogeneous services. A virtual PON scheme based on OFDMA is further introduced.

TuE3.2 14.00 - 14.30 (Invited)

Signal Power Transients in Transparent Networks, D. Kilper, C. A. White and S. Chandrasekhar, *Alcatel-Lucent, Holmdel, NJ, USA*

The modification of transient channel-power excursions due to propagation through nodes with different add-drop configurations are observed through experiments. Simulation results demonstrate similar propagation of channel power excursions through transparent networks.

TuE3.3 14.30 - 15.00 (Invited)

Discrete Multitone for Novel Application Areas of Optical Communications, J. Lee, J. W. Walewski, S. Randel, *Siemens AG, Munich, Germany*, F. Breyer, *Technical University of Munich, Munich, Germany*, H. P. A. van den Boom and A. M. J. Koonen, *Eindhoven University of Technology, Eindhoven, The Netherlands*

Discrete multitone (DMT) is a multicarrier modulation technique, derived from the more general orthogonal frequency division multiplexing. In this paper, the use of DMT in novel optical communication applications such as wireless visible light communication and plastic optical fiber links will be presented and discussed.

15.30 - 16.45**Session TuE4: NONLINEARITIES AND REGENERATION**

Session Chair: Juerg Leuthold, *University of Karlsruhe, Karlsruhe, Germany*

TuE4.1 15.30 - 16.00 (Invited)

Nonlinearity Compensation in WDM Transmission, E. Yamazaki, F. Inuzuka, K. Yonenaga, A. Takada and Y. Miyamoto, *NTT Corporation, Kanagawa, Japan*

This paper introduces a technique that compensates for nonlinear inter-channel crosstalk in wavelength division multiplexing (WDM) transmission. Electronic pre- and post- compensation of four-wave mixing are experimentally shown in carrier phase-locked WDM.

TuE4.2 16.00 - 16.30 (Invited)

Multi-Wavelength All-Optical Regeneration, I. Tomkos, *Athens Information Technology Center, Athens, Greece*, J. Leuthold, *University of Karlsruhe, Karlsruhe, Germany*, P. Petropoulos, *University of Southampton, Southampton, UK*, D. Bimberg, *Technical University Berlin, Berlin, Germany* and A. D. Ellis, *University College Cork, Cork, Ireland*

Recent developments in the area of multi-wavelength all-optical regeneration will be discussed. Simulation and experimental studies related with the design of such regeneration sub-systems based on a) quantum dot semiconductor optical amplifiers and b) highly non-linear fibers will be presented.

TuE4.3 16.30 - 16.45

Joint Mitigation of Optical Impairments and Phase Estimation in Coherent Optical Systems, L. S. Pessoa, *Instituto de Engenharia de Sistemas e Computadores, Porto, Portugal*

The electrical compensation of chromatic dispersion (CD) and polarization mode dispersion (PMD) in a coherent optical system exploiting polarization multiplexing is discussed in this paper. The benefits of combining a phase estimation algorithm with a decision directed least-mean-square equalizer in a feedback configuration is reported.

Wednesday, 23 July 2008

09.00 - 11.00

Session WE1: TRANSMISSIONS

Session Chair: Werner Rosenkranz, *University of Kiel, Kiel, Germany*

WE1.1 09.00 - 09.30 (Invited)

Full Field Receiver Side Processing for Electronic Dispersion Compensation, M. McCarthy, *Tyndall National Institute, Cork, Ireland*

Accessing the full optical field with the addition of only a single AMZI and photodiode to the receiver enhances the reach of receiver side electronic dispersion compensation to 2160km without the complexity of coherent detection.

WE1.2 09.30 - 10.00 (Invited)

>1 Tbps.km Transmission Over MMF, D. H. Shim, Y. Takushima, and Y. C. Chung, *Korea Advanced Institute of Science and Technology, Daejeon, Korea*

We have demonstrated the transmission of 100-Gb/s signal (10 x 10 Gb/s) over 12.2 km of multimode fiber using the mode-field matched center-launching technique. The performance of this technique is robust against the mechanical perturbations such as fiber bending and fiber shaking.

10.00 - 10.30

COFFEE BREAK

WE1.3 10.30 - 11.00 (Invited)

Effect of Carrier Phase Estimation for 111Gbit/s POLMUX-RZ-DQPSK Equalization in Presence of 10.7Gbit/s OOK Neighbours, M. Alfiad, *Technical University of Eindhoven, Eindhoven, The Netherlands*, D. van den Borne, T. Wuth, *Nokia Siemens Networks, Munich, Germany*, M. Kuschnerov, B. Lankl, *Federal Armed Forces University, Munich, Germany*, C. J. Weiske, E. de Man, *Nokia Siemens Networks, Munich, Germany*, A. Napoli, *Nokia Siemens Networks, Vienna, Germany* and H. de Waardt, *Eindhoven University of Technology, Eindhoven, The Netherlands*

We optimize carrier phase estimation (CPE) to increase the XPM tolerance of 111 Gb/s POLMUX-RZ-DQPSK in the presence of 10.7 Gb/s OOK neighbours transmitted over an 1140 km EDFA-only link.

END OF PROGRAM