Friday, 17 July 2009 – Technical Session

Room S224

8:30 a.m. – 10:30 a.m.
FA • Fiber Lasers
Hon Ki Tsang; The Chinese Univ. of Hong Kong, China, Presider

FA1 • 8:30 a.m.
Operation-State Manipulation of a Passively Mode-Locked Erbium-Doped Fiber Laser by Polarization Control, *Hsiao-Hua Wu[1], Kuei-Huei Lin[2], Jung-Jui Kang[3], Chao-Kuei Lee[3] and Gong-Ru Lin[4]; [1]Tunghai Univ., Taiwan, [2]Taipei Municipal Univ. of Education, Taiwan, [3]National Sun Yat-Sen Univ., Taiwan, [4]National Taiwan Univ., Taiwan.* We demonstrate the manipulation of a passively modelocked erbium-doped fiber laser among stable Q-switching, Q-switched mode-locking, continuous-wave mode-locking, pulse splitting, and harmonic modelocking by adjusting a polarization controller without changing the pump power.

FA2 • 8:45 a.m.
Square Shape Spectrum in 1550 nm and 1060 nm Bands in Passive Mode-Locked Fiber Laser, *Lixin Xu[1], Guoliang Chen[1], Chun Gu[1], Anting Wang[1], Hai Ming[1] and P. K. A. Wai[2]; [1]Univ. of Science & Technology of China, China, [2]The Hong Kong Polytechnic Univ., China.* Square shape spectrum is observed in passively mode-locked fiber laser both in 1550 nm and 1060 nm band, the spectrum is broad and flat, the bandwidth is up to 28 nm in 1550 nm band.

FA3 • 9:00 a.m. Invited
Development of CW and Pulsed Fiber Lasers at SIOM, *Qihong Lou, Jun Zhou and Songtao Du; Shanghai Inst. of Optics and fine Mechanics, Chinese Academy of Sciences, China.* KW level CW high power output and 150W high repetition rate pulsed output are obtained with China made multimode core fibers. The laser structure and pulse amplifier technology are given in detail.

Room S225

8:30 a.m. – 10:00 a.m.
FB • Network Subsystems I
Nobuyuki Kataoka; NICT, Japan, Presider

FB1 • 8:30 a.m.
Preliminary Demonstration of Hybrid Optical Switching Node with Dynamic Wavelength Resource Allocation Using SOA Switch, *Li Hui, Mamoru Takagi, Hideaki Imaizumi and Hiroyuki Morikawa; The Univ. of Tokyo, Japan.* In this paper, we preliminary demonstrate a hybrid optical switching node combining MW-OPS and OCS with dynamic resource allocation using SOA and MEMS switches. The primary feasibility has been confirmed in the waveform results.

FB2 • 8:45 a.m.
Surveillance Scheme Using Electronic Code Division Multiple Access Based Spectral Analysis for Passive Optical Networks, *Nishaanthan Nadarajah; The Univ. of Melbourne, Australia.* We propose and experimentally demonstrate an in-service surveillance scheme for passive optical networks using Electronic Code Division Multiple Access. We show that this technique can be used to monitor users with minimal penalty for upstream-data.

FB3 • 9:00 a.m. Invited
Electronic Processing for Generation and Detection of Multi Gbit/s CDMA over Fiber, *Miguel Pimenta and I. Darwazeh; Univ. College London, UK.* The use of distributed electronic transversal filter circuit techniques for the generation and detection of OCDMA signals is investigated. New circuit designs are proposed with simulation results indicating suitability for 40 GChip/s OCDMA systems.

Room S226

8:30 a.m. – 9:45 a.m.
FC • LEDs II
Aleksandra B. Djurišić; Univ. of Hong Kong, China, Presider

FC1 • 8:30 a.m. Invited
Recent Advances in Optoelectronic Technologies in ASTRI, *Shu Yuan, Chen-Jung Tsai, Ming Lu, SK Lam and Enboa Wu; Hong Kong Applied Science and Technology Research Inst. (ASTRI), China.* A brief introduction to ASTRI's work on optoelectronics is given. Some research results on power GaN LED chips, LED packaging, LED general lighting, LED backlight units for LCD TVs and projectors, and anti-shaking camera modules are presented.

FC2 • 9:00 a.m.
Thermal Characterization of Organic Light Emitting Devices, *P. K. L. Chan[1,2]; [1]The Hong Kong Polytechnic Univ., China, [2]Univ. of Michigan, USA.* CCD-based thermo-reflectance is applied on organic light emitting devices to investigate the temperature distribution along the device surface under different bias conditions. This technique can provide useful information on understanding the device degradation mechanism.

FC3 • 9:15 a.m.
An Emissive GaN Micro-LED Array for Visible-Light Multi-Channel Communication, *L. Zhu, P. T. Lai, H.W. Choi; Univ. of Hong Kong, China.* The feasibility of multi-channel visible-light communication using an arrayed 470-nm micro-sized light-emitting-diode emitter, together with a matched fiber array bundle, is demonstrated by transmitting a 250-kHz square wave and a 500-kHz pulse signal in parallel.

Friday, 17 July 2009 – Technical Session

Room S227

8:30 a.m. – 10:00 a.m.
FD • Optical Sensors
Youngjoo Chung; Gwangju Inst. of Science & Technology, Korea, Presider

FD1 • 8:30 a.m. Invited
Fiber-Optic Nerve Systems for Safety and Security, *Kazuo Hotate and Zuyuan He; The Univ. of Tokyo, Japan.* "Fiber optic nerve systems" have been studied to make structures and materials that can feel pain. We have developed the nerve systems with mm-order spatial resolution and kHz-order measurement speed, using optical correlation domain techniques.

FD2 • 9:00 a.m.
High Accuracy Laser Range Sensor System Based on the Self-Mixing Effect in a Single Mode VCSEL, *Xu Jun, He Deyong, Wang Huanqin, Zhao Tianpeng, Ming Hai, Xie Jianping, Yi Bo; Univ. of Science and Technology of China, China.* A miniaturized laser range sensor system based on the self-mixing effect in a single mode VCSEL is proposed. The system accuracy is better than 2mm and distance is from 100mm to 1000mm with 0.1s sampling time.

FD3 • 9:15 a.m.
Incoherent, CW Supercontinuum Source Based on Erbium Fiber ASE for Optical Coherence Tomography Imaging, *Ju Han Lee[1], Eun Joo Jung[2], and Chang-Seok Kim[2]; [1]Univ. of Seoul, Korea, [2]Pusan National Univ., Korea.* A novel light source of erbium-fiber ASE seeded, depolarized, incoherent, CW super-continuum is proposed for optical coherence tomography imaging. The OCT system using the ~110-nm bandwidth light source is experimentally demonstrated to enable high quality imaging of human tooth tissues.

Room S228

8:30 a.m. – 10:15 a.m.
FE • Wavelength Conversion
Harm Dorren; Eindhoven Univ. of Technology, The Netherlands, Presider

FE1 • 8:30 a.m. Invited
Polarization Insensitive Wavelength Conversion Techniques for 100Gb/s Polarization-Diversity Signal, *Jianjun Yu and Ming-Fang Huang; NEC Labs. America, Inc., USA.* Wavelength conversion (WC) of high-speed polarization diversity phase modulated signals based on four-wave mixing (FWM) in high-nonlinear dispersion fiber (HNLF) with a polarization diversity and digital coherent detection is experimentally demonstrated. Different schemes to realize polarization insensitive WC are investigated. By using co-polarized dual-pump scheme, the in-band WC of sixteen channels of 112Gb/s polarization diversity-return to zero quadrature phase shift keying (PD-RZ-QPSK) has been realized. Another scheme of dual-pump technique to use orthogonal polarized pumps is also been investigated. By using this scheme, four converted 112-Gb/s PD-RZ-QPSK with BER< 1×10^{-4} has also been demonstrated. The third scheme is to use single pump polarize diversity scheme. By using this scheme, we have realized WC for the signals from C-band to L-band.

FE2 • 9:00 a.m.
Polarization-Insensitive Wavelength Conversion for Polarization Shift Keying Signal Based on Four Wave Mixing in Highly Non-linear Fiber, *Md. Nur-Al-Safa Bhuiyan, Motoharu Matsuura, Hung Nguyen Tan, and Naoto Kishi; Univ. of Electro-Communications, Japan.* We demonstrate polarization insensitive all-optical wavelength conversion for polarization shift keying (PolSK) signal. Polarization sensitivity of our scheme is compared with the conventional one and the conversion performance of the PolSK signal is investigated.

FE3 • 9:15 a.m.
Improvement of Performance of a SOA Based Delayed Interference Signal-Wavelength Converter with MZDI Phase Offset and BPF Detuning, *Masatoshi Namiki, Takayoshi Mori, Hiroyuki Uenohara and Kohroh Kobayashi; Tokyo Inst. of Technology, Japan.* We investigated improvement of wavelength conversion performance of a SOA-DISC with MZDI phase offset and BPF detuning. With optimized conditions, power penalty of wavelength conversion output and transmission characteristics were improved.

Room S229

Room S224

FA • Fiber Lasers—Continued

FA4 • 9:30 a.m.
Single-Frequency Phosphate Glass Fiber Laser with 100mW Output Power at 1535nm and Its Polarization Characteristics, *Zhengqing Pan, Haiwen Cai, Li Meng, Qinfeng Xu, Jianxin Geng, Zujie Fang and Ronghui Qu; Shanghai Inst. of Optics and Fine Mechanics, Chinese Academy of Sciences, China.* We demonstrated a single-frequency Phosphate glass fiber laser with 100 mW output power in this paper. Single-frequency single-polarization operation with <5 KHz linewidth and 65dB SNR is realized by using external cavity polarization feedback technology.

FA5 • 9:45 a.m.
FDML Wavelength-Swept Fiber Laser Based on EDF Gain Medium, *Hyung Seok Lee, Eun Joo Jung, Seung Nam Son, Myung Yung Jeong, Chang Seok Kim; Pusan National Univ., Korea.* Novel Fourier domain mode locking wavelength-swept laser source is demonstrated based on erbium doped fiber medium. Instead of conventional semiconductor optical amplifier, we use erbium doped fiber amplifier, which can easily generate higher optical power output.

FA6 • 10:00 a.m.
Continuous-Wave Broadband Generation in a Fiber Laser, *Aditi Ghosh[1], Deepa Venkitesh[1,2] and R. Vijaya[1]; [1]Indian Inst. of Technology Bombay, India, [2]VES College of Arts, India.* Continuous wave (CW) broadband in the L-band wavelength region is demonstrated by introducing a highly nonlinear fiber (HNLF) in erbium-doped fiber ring laser (EDFRL). A broadband spectrum of ~21.2 nm has been obtained, utilizing the gain spectrum of EDF and nonlinearity of HNLF at pump powers as low as ~200 mW.

FA7 • 10:15 a.m.
Analysis of OSNR Variation in Multiple Laser Lines Brilouin-Raman Fiber Laser, *A. K. Zamzuri[1], M. A. Mahdi[2], M. H. Al-Mansoori[3], N. M. Samsuri[1], A. Ahmad[1] and R. Mohamad[1]; [1]TMR&D Innovation Centre, Malaysia, [2]Univ. Putra Malaysia, Malaysia, [3]Univ. Tenaga Nasional, Malaysia.* This article discusses the optical-SNR variation of Stokes lines in Brillouin-Raman fiber laser. This variation is partly attributed to the cavity modes interaction through intraline-four wave mixing residing the same spectral width. The worst OSNR is obtained at 650 mW Raman pump power (RPP) and 1555 nm Brillouin pump wavelength (BPW). The improvement is obtained for the RPP beyond 650 mW.

Room S225

FB • Network Subsystems I—Continued

FB4 • 9:30 a.m. Invited
Recent Trends in 100G Module and Subsystem Development for Long Haul DWDM Applications, *Ted Schmidt, Christian Malouin and Samuel Liu; Opnext Subsystems, USA.* We review recent trends and progress in the area of 100G module and subsystem development for long haul DWDM applications and explore how the 100G market will likely differ from that experienced at 40G.

Room S226

FC • LEDs II—Continued

FC4 • 9:30 a.m.
Improving the Luminescence of InGaN-/GaN Blue LEDs through Selective Ring-Region Ion Implantation, *Chia-Hsuan Wu, Yung-Hsiang Lin, Che-Kai Lin, Hsien-Chin Chiu, and Ray-Ming Lin; Chang Gung Univ., Taiwan.* In this study, we used the selective ring-region ion implantation technique to restrain the surface leakage current and to monitor the luminescence characteristics of InGaN/GaN multiple quantum-well blue light-emitting diodes (LEDs). The luminescence characteristics could be improved by varying the width of the highly resistive region of the current blocking area; and the leakage current also can be reduced.

10:15 a.m. – 10:45 a.m. Coffee Break

Room S227

FD • Optical Sensors—Continued

FD4 • 9:30 a.m. Invited

Optical Sensing with Coherent Imaging Fiber Bundles, *Ralph P. Tatam; Cranfield Univ., UK.* The use of coherent imaging Fiber bundles for optical sensing is discussed. A description of the characteristics of the bundles is followed by examples of their use in laser velocimetry, shearography and optical coherence tomography.

Room S228

FE • Wavelength Conversion—Continued

FE4 • 9:30 a.m.

Extinction Ratio Enhanced 80-Gbit/S Wavelength Conversion Based on Optimization of Spectrum Filtering, *Xi Huang, Yu Zhang, Yin Zhang, Dexiu Huang and Xinliang Zhang; Huazhong Univ. of Science and Technology, China.* We demonstrate extinction ratio improvement at 80Gbit/s wavelength conversion using a single semiconductor optical amplifier cascaded with a delay interferometer and band pass filters. The output extinction ratio can be improved from 3.2dB to 20dB.

FE5 • 9:45 a.m.

Discretely Tunable Optical Delay Based on Wavelength Multi-Casting and Dispersion, *Pegah Seddighian and Lawrence R. Chen; McGill Univ., Canada.* We propose a low-power and low-cost tunable optical delay using wavelength multi-casting based on injection locking in Fabry-Pérot laser and dispersion. We achieve error-free operation at a maximum delay of 954 ps.

FE6 • 10:00 a.m.

Dual-Pumped Delay-Asymmetric Nonlinear Loop Mirror for DPSK Demodulation at Widely Tunable Bit Rates, *Yongheng Dai, Chester Shu and Mable P. Fok; The Chinese Univ. of Hong Kong, China.* RZ-DPSK signals from 3 to 10 Gb/s are demodulated by a dual-pumped delay-asymmetric nonlinear loop mirror. The in-loop four-wave mixing conversion bandwidth is enhanced to over 35 nm for lower bit-rate demodulation.

Room S229

10:15 a.m. – 10:45 a.m. Coffee Break

Friday, 17 July 2009 – Technical Session

Room S224

10:45 a.m. – 12:45 p.m.
FG • Fiber Nonlinearities and Applications
Qihong Lou; Shanghai Inst. of Optics and Fine Mechanics, CAS, China, Presider

FG1 • 10:45 a.m. Invited
Progress in the Slow and Fast Light Based on Billouin Scattering in Optical Fibers, *Kwang Yong Song; Chung-Ang Univ., Korea.* Review on recent progress in the slow and fast light based on Brillouin scattering in optical fibers will be presented, where the brief history, the experimental results, and current research trends will be included.

FG2 • 11:15 a.m.
Chirped Optical Solitons: High Degree Pulse Compression, *K. Senthilnathan[1], K. Nakkeeran[2], Qian Li[3] and P. K. A. Wai[3]; [1]National Inst. of Technology, India, [2]Univ. of Aberdeen, UK., [3]The Hong Kong Polytechnic Univ., China.* We propose the high degree pulse compressor based on the chirped higher order soliton pulses in the exponentially decreasing dispersion.

FG3 • 11:30 a.m.
Supplementary Transient Suppression in a Burst-Mode EDFA Using Optical Feedback, *Benjamin J. Puttnam, Yoshinari Awaji and Naoya Wada; NICT, Japan.* We extend the performance investigation of a burst mode EDFA to μs-ms timescales applicable full range of dynamic optical networks and, in combination with optical gain-clamping, demonstrate superior performance compared to a conventional EDFA.

Room S225

10:45 a.m. – 12:00 p.m.
FH • Optical Network Design III
Kimio Oguchi; Seikei Univ., Japan, Presider

FH1 • 10:45 a.m.
Local Traffic Prediction-Based Bandwidth Allocation Scheme in EPON with Active Forwarding Remote Repeater Node, *Chien Aun Chan[1], Manik Attygalle[2] and Ampalavanapillai Nirmalathas[1]; [1]The Univ. of Melbourne, Australia, [2]Defence Science and Technology Organization, Australia.* We propose a novel local traffic prediction-based bandwidth allocation mechanism incorporated with remote repeater based EPON with active forwarding. This mechanism aims to increase the bandwidth utilization in both upstream and downstream for EPON.

FH2 • 11:00 a.m.
K-Shortest Path Algorithm for Overlay Protection in Optical Networks, *Xi Wang, Qiong Zhang, Paparao Palacharla and Takao Naito; Fujitsu Labs. of America Inc., USA.* We present a k-shortest path algorithm for overlay demand routing in optical networks. The proposed algorithm can find paths in trap topologies and show higher demand routing success rate compared to shortest path algorithm-based approaches.

FH3 • 11:15 a.m. Invited
Blocking Probability Evaluation and Traffic Management of Bufferless OPS/OBS Networks, *Eric M. W. Wong[1], Jayant Baliga[2], Moshe Zukerman[1], Andrew Zalesky[2] and Garvesh Raskutti[3]; [1]City Univ. of Hong Kong, China, [2]The Univ. of Melbourne, Australia, [3]Univ. of California at Berkeley, USA.* We present here a new method for the estimation of blocking probabilities in OPS/OBS networks, validate its accuracy by simulation, demonstrate various performance effects, and provide useful insight into efficient and stable packet/burst deflection techniques.

Room S226

10:45 a.m. – 12:00 p.m.
FI • Nanostructures II
Antonio Martí; Uni. Politecnica de Madrid, Spain, Presider

FI1 • 10:45 a.m. Invited
GaN Nanorod-Based Subwavelength Optical Media, *H.-Y. Chen[1], H.-W. Lin[1], Y.-C. Yang[1], C.-Y. Wu[1], W.-C. Chen[2], J.-S. Chen[2] and S. Gwo[1,2]; [1]National Tsing-Hua Univ., Taiwan, [2]National Applied Research Labs., Taiwan.* Vertically self-aligned gallium nitride nanorod arrays grown by plasma-assisted molecular-beam epitaxy are shown to behave as subwavelength optical media in both their discrete and integrated forms, which have important implications for optoelectronic applications.

FI2 • 11:15 a.m.
FDTD Study on the Improvement of Optical Transmission through Metallic Periodic Nano Structure, *Y. Z. Lin, F. M. Kong and K. Li; Shandong Univ., China.* Owing to reflection, photons generated in semiconductor light emitting devices are trapped inside core region; we found the implement of metallic periodic nano structure might contribute to their extraction and demonstrated it in FDTD simulation.

FI3 • 11:30 a.m.
Random Lasing from ZnO Nanowires System, *Hui Ying Yang[1], Siu Fung Yu[1], Shu Ping Lau[2], Bin Yan[1] and Ting Yu[1]; [1]Nanyang Technological Univ., Singapore, [2]The Hong Kong Polytechnic Univ., China.* We report high temperature ultraviolet random lasing from 3D ZnO nanowires system. Lasing occurs above an excitation threshold of 0.35 MW/cm2 at room temperature. The characteristic temperature of the ZnO nanoneedle lasers was derived to be 89 K in the temperature range from 300 to 550 K.

Friday, 17 July 2009 – Technical Session

Room S227

10:45 a.m. – 12:15 p.m.
FJ • Optical Systems
Ralph R. Tatam; Cranfield Univ., UK, Presider

FJ1 • 10:45 a.m.
Polarized Photon-pairs Confocal Laser Scanning Microscope, *Jheng-Syong Wu[1], Chi-Hui Chang[1], Li-Ping Yu[2], Li-Dek Chou[2], Huan-Jang Huang[2], Cheng-Chung Lee[1], Chien Chou[1,2,3]; [1]National Central Univ., Taiwan, [2]National Yang Ming Univ., Taiwan, [3]Chang Gung Univ., Taiwan.* The abilities of reducing spherical aberration and enhancing image contrast of a polarized photon-pairs confocal laser scanning microscope (PCLSM) have been investigated. The axial responses of PCLSM are compared with that of CLSM.

FJ2 • 11:00 a.m.
Inverse Scattering for a 1-D Random Surface Reconstruction, *Anting Wang[1], and Zu-Han Gu[2]; [1]Univ. of Science & Technology of China, China, [2]Surface Optics Corporation, USA.* An Optimization algorithm for the reconstruction of a random surface is presented. As the input data for our self-adaptation evolutionary strategy for surface inversion, the scattered intensity has been measured with the laser bidirectional reflectometer.

FJ3 • 11:15 a.m.
An Inspection System for Adjusting Luminance of LED Backlight Units, *Tzu-Hsuan Wei, Jen-Yu Wen, Pro-Ray Chen, Wei-Chieh Chiang, Tai-Shan Liao and Ting-Ming Huang; National Applied Research Labs., Taiwan.* An inspection system for adjusting luminance of LED backlight units is disclosed to provide a uniform light source of LCD. By adjusting the LED current, target uniform backlight luminance values and distribution can be obtained.

FJ4 • 11:30 a.m.
Inspection of Backlight Units with High Luminance Contrast, *Tzu-Hsuan Wei, Ho-Lin Tsay, Jen-Yu Wen, Wei-Chieh Chiang, Ting-Ming Huang and Tai-Shan Liao; National Applied Research Labs., Taiwan.* Two methods to measure the luminance of backlight units with high contrast by a frame CCD camera are proposed. The measurement uncertainties are compared.

Room S228

10:45 a.m. – 12:00 p.m.
FK • Optical Pulse Generation
Guo-Wei Lu; National Inst. of Inform. and Communications Tech, Japan, Presider

FK1 • 10:45 a.m. Invited
Vector Soliton Fiber Lasers, *D. Y. Tang, H. Zhang, L. M. Zhao, X. Wu; Nanyang Technological Univ., Singapore.* Experimental observation of different types of vector solitons such as the bright-bright, dark-dark, and dark-bright vector soltions in single mode fiber lasers is reported. Experimental techniques for observing each of the vector solitons are explained. Special features of the vector solitons in fiber lasers are numerically simulated and compared with the experiments.

FK2 • 11:15 a.m.
All-Optical Clock Recovery Using The Secondary Temporal Talbot Effect with Twofold Wavelength-Dispersion, *Masaki Oiwa, Shunsuke Minami, Kenichiro Tsuji, Noriaki Onodera and Masatoshi Saruwatari; National Defense Academy, Japan.* We successfully demonstrate all-optical clock recovery for ~10-Gbit/s return-to-zero signal using the secondary temporal Talbot effect with twofold wavelength dispersion via the double-round-trip transit of 40-km-long single-mode fiber. Experimental results agree well with our simulation results.

FK3 • 11:30 a.m.
A Simple 10-GHz Picosecond Pulse Source Based on Fiber Optical Parametric Oscillator, *Yue Zhou, Kim K. Y. Cheung, Sigang Yang, P. C. Chui and Kenneth K. Y. Wong; The Univ. of Hong Kong, China.* We demonstrate a simple fully fiber-integrated picosecond optical parametric oscillator based on highly nonlinear dispersion-shifted fiber. High quality picosecond pulses are generated with a 40-nm tuning range.

Room S229

Room S224

FG • Fiber Nonlinearities and Applications—Continued

FG4 • 11:45 a.m.
All-Optical Gain-Clamping in Fiber Optical Parametric Amplifiers, *Nikolaos Gryspolakis and Lawrence R. Chen; McGill Univ., Canada.* We demonstrate the feasibility of all-optical gain-clamping in a Fiber optical parametric amplifier. We investigate the impact of gain-clamping on BER performance when using NRZ and RZ-DPSK modulation formats.

FG5 • 12:00 p.m.
Noise Characterization of Raman-Assisted Fiber Optical Parametric Amplifiers, *S. H. Wang[1], Lixin Xu[2] and P. K. A. Wai[1]; [1]The Hong Kong Polytechnic Univ., China, [2]Univ. of Science & Technology of China, China.* Raman-assisted fiber optical parametric amplifiers with approaching 3-dB noise figure can be obtained by optimizing the powers of Raman and parametric pumps because of the different polarization states of the up- and down-conversion parametric spontaneous noises.

FG6 • 12:15 p.m.
Energy-Stabilized Function for Multiple FWM Processes in Fibers, *Xueming Liu; Xi'an Inst. of Optics and Precision Mechanics, Chinese Academy of Sciences, China.* Energy-stabilized function of lightwaves for multiple four-wave-mixing processes in fibers is theoretically investigated and experimentally confirmed. Theoretical and experimental results show that the ability of FWM-induced stabilizing effect is gradually lower with increasing pump number.

FG7 • 12:30 p.m.
Polarization Dependence of Raman Gain Efficiency Distribution and Its Suppression Technique, *Yasuhiro Tsutsumi, Masaharu Ohashi, Tetsuro Yabu; Osaka Prefecture Univ., Japan.* The polarization dependence of the Raman gain efficiency distribution is investigated theoretically and experimentally. The simple technique for suppressing the polarization fluctuations of Raman gain efficiency is also proposed.

Room S225

FH • Optical Network Design III—Continued

FH4 • 11:45 a.m.
Fault Recovery With Routing and Adaptation Control of Chromatic Dispersion, *Eiichi Horiuchi, Sota Yoshida, and Yoshimasa Baba; Mitsubishi Electric Corporation, Japan.* We propose mechanisms of routing and adaptation control of chromatic dispersion to enable fast recovery in various fault recovery schemes for all-optical networks. A link protection with routing based on chromatic dispersion errors is proposed and evaluated.

Room S226

FI • Nanostructures II— Continued

FI4 • 11:45 a.m.
Tight-Banding Approach for Phonic Crystal Coupled-Cavity-Mode Estimation, *Hui Sun, Bin Jiang, Wei Chen, Wenjun Zhou, Minxin Xing, Anjin Liu and Wanhua Zheng; Inst. of Semiconductors, Chinese Academy of Sciences, China*. Tight-banding approach was found to be an effective approach to gain the main feature of a coupled-cavity structure, frequency and general distribution pattern for example. A two-cavity-coupled system was shown as an example.

12:30 p.m. – 2:00 p.m. Lunch Break

Room S227

FJ • Optical Systems— Continued

FJ5 • 11:45 a.m. Invited

Beam Shaping Technology Based on Optical Fiber for Applications in Laser, Optical Tweezers, and Free Space Interconnects, *Kyunghwan Oh[1], Jongki Kim[1], Sejin Lee[1], Woosung Ha[1], Yoonseob Jeong[1], Seongrae Lee[1], Yongmin Jung[2] and Junki Kim[3]; [1]Yonsei Univ., Korea, [2]Univ. of Southampton, UK, [3]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany.* Various techniques to modify the phase front of the light wave out of an optical fiber facet are reported for beam shaping devices. The principles of beam shaping in the devices and their applications in lasers, optical tweezers, and photonic devices are discussed.

Room S228

FK • Optical Pulse Generation— Continued

FK4 • 11:45 a.m.

Conversion of 40 Gb/s OTDM to 4×10 Gb/s WDM Channels with Extinction Ratio Enhancement by Pump-Modulated Four-Wave Mixing Using Time- and Wavelength-Interleaved Laser Pulses, *Gordon K. P. Lei and Chester Shu; The Chinese Univ. of Hong Kong, China.* We demonstrate simultaneous demultiplexing from 40 Gb/s OTDM to 4x10 Gb/s WDM channels by pump-modulated four-wave mixing with a time- and wavelength-interleaved pulsed source. An extinction ratio enhancement of ~2.6 dB is achieved.

Room S229

12:30 p.m. – 2:00 p.m. Lunch Break

Friday, 17 July 2009 – Technical Session

Room S224

2:00 p.m. – 3:45 p.m.
FM • Microstructured Fibers I
Kin Seng Chiang; City Univ. of Hong Kong, China, Presider

FM1 • 2:00 p.m.
Development of Leakage Channel Holey Fibers with Large Effective Core Area and Low Bending Loss, *Masanori Takahashi, Kazunori Mukasa and Takeshi Yagi; Furukawa Electric Co., Ltd., Japan.* We designed and fabricated novel Leakage Channel Fibers (LCFs) which have circular single air-hole ring. Large effective core area (Aeff), low attenuation loss and low bending loss were achieved by fabricated circular hole fibers (CHFs).

FM2 • 2:15 p.m.
Nanospectroscopy of Cr:YAG Double-Clad Crystal Fiber, *Chien-Chih Lai[1], Kuang-Yao Huang[1], Shi-Chang Wang[2], Yen-Sheng Lin[3], and Sheng-Lung Huang[1]; [1]National Taiwan Univ., Taiwan, [2]National Sun Yat-Sen Univ., Taiwan, [3]I-Shou Univ., Taiwan.* We report the nanospectroscopy of Cr:YAG double-clad crystal fiber using near-field scanning optical microscopy and high-resolution transmission electron microscopy. The emission spectra of the strained core, and nanocrystals and clusters in inner cladding are resolved.

FM3 • 2:30 p.m. Invited
Modifying Photonic Crystal Fibers, *T. A. Birks[1], M. D. W. Grogan[1], Z. Chen[1,2], L. M. Xiao[1], S. G. Leon-Saval[1,3], C. Xiong[1,3] and R. England[1]; [1]Univ. of Bath, UK., [2]National Univ. of Defense Technology, China, [3]Univ. of Sydney, Australia.* We use controlled hole collapse in photonic crystal Fibers to reduce the splice loss between dissimilar Fibers. We also describe a hollow-core PCF as a support for a waveguide core made from silica aerogel.

Room S225

2:00 p.m. – 3:45 p.m.
FN • Network Subsystem II
Ted Schmidt; OPNEXT Inc, USA, Presider

FN1 • 2:00 p.m. Invited
40G/100G Long-Haul Optical Transmission System Design Using Digital Coherent Receivers, *Dirk van den Borne[1], Mohammad Alfiad[2], Sander L. Jansen[1] and Torsten Wuth[1]; [1]Nokia Siemens Networks GmbH & Co. KG, Germany, [2]Eindhoven Univ. of Technology, The Netherlands.* The rise of coherent detection and digital signal processing is drastically changing the design of optical transmission systems. In this paper we review the challenges and opportunities offered by such receivers in the design of long-haul 40G/100G systems.

FN2 • 2:30 p.m.
BER Performance of Coherent DPSK Free-Space Optical Systems with APD over Turbulence Channels, *Wansu Lim[1], Tae-Sik Cho[1], Changho Yun[2], and Kiseon Kim; [1]Gwangju Inst. of Science and Technology, Korea, [2]Korea Ocean Research and Development Inst., Korea.* We investigate the average bit error rate (BER) performance of coherent DPSK free space optical systems with APD over atmospheric turbulence channels. For validation of the average BER performance, we use Gauss-Hermite quadrature formula.

FN3 • 2:45 p.m. Invited
Spectrum Sliced Microwave Photonic Signal Processing, *Xiaoke Yi and Robert A. Minasian; Univ. of Sydney, Australia.* Recent new developments in spectrum sliced photonic signal processors, which address the challenges of dispersion induced distortion and noise mitigation are presented, together with a novel multi-tap filter with insensitivity to the operating optical wavelength.

Room S226

2:00 p.m. – 3:45 p.m.
FO • Lasers III
Daniel Lau; City Univ. of Hong Kong, China, Presider

FO1 • 2:00 p.m.
Optoelectronics Materials and Components Characterization for Organic Inorganic Laser Assembling, *S. Penna[1], A. Reale[1], G. M. Tosi Beleffi[2], P. S. André[3], A. L. J. Teixeira[3], M. Nakao[4], S. Shinada[4] and N. Wada[4]; [1]Univ. of Tor Vergata, Italy, [2]ISCTI, Italy, [3]Instituto de Telecomunicações Campus Universitário de Santiago, Portugal, [4]NICT, Japan.* Authors report simulations and experimental results on a small molecule-on-silica based planar grating implementation for next generation optical lasing applications.

FO2 • 2:15 p.m.
High Efficient and Tunable Edge Emitting Microlaser on Photonic Crystal Slab, *Wanhua Zheng, Mingxin Xing, Wei Chen, Wenjun Zhou, Anjin Liu, Hailing Wang, and Lianghui Chen; Inst. of Semiconductors, Chinese Academy of Sciences, China.* Tunable edge emitting microlaser was realized with a line defect waveguide, in which the radii of holes adjacent to the defect were varied gradually. A tunable range of 57 nm was obtained experimentally.

FO3 • 2:30 p.m. Invited
Wavelength Control of MEMS VCSELs, *Fumio Koyama and Hayato Sano; Tokyo Inst. of Technology, Japan.* Our recent research activities on the wavelength control of MEMS VCSELs will be reviewed. This talk explores the potential and challenges for new functions of VCSELs, including the wavelength athermalization and tuning with a micromachined structure.

Friday, 17 July 2009 – Technical Session

Room S227

2:00 p.m. – 3:45 p.m.
FP • Physical, Mechanical, and Electromagnetic Sensors
Wei Jin; The Hong Kong Polytechnic Univ., Hong Kong, Presider

FP1 • 2:00 p.m. Invited
Design and Evaluation of Optical Fiber Sensors in Civil Engineering Applications for Structural Health Monitoring, *Kenneth T. V. Grattan[1], Abdelfateh Kerrouche[1], Tong Sun[1], S. K. T. Grattan[2,3], Susan E. Taylor[2,3] and P. A. Mohammed Basheer[2]; [1]City Univ. London, UK, [2]The Queen's Univ. of Belfast, N. Ireland, [3]Sengenia Ltd., N. Ireland.* A number of studies on the use of optical Fiber sensor techniques for structural monitoring are discussed and results obtained, both in the laboratory and in the field, are reported.

FP2 • 2:30 p.m.
Birefringent Interferometer-Based Strain Sensor with Temperature Insensitivity, *Oh-Jang Kwon[1], Hyun-Joo Kim[1], Suho Chu[1], Min-Seok Kim[1], Sang Bae Lee[2], Youngjoo Chung[3], and Young-Geun Han[1]; [1]Hanyang Univ., Korea, [2]Korea Inst. of Science and Technology, Korea, [3]Gwangju Inst. of Science and Technology, Korea.* A simple scheme for a temperature insensitive strain sensor based on a birefringent interferometer is investigated. The strain sensitivity is measured to be 1.3 pm/με in a strain range from 0 to 1600 με.

FP3 • 2:45 p.m.
High Resolution Fiber Optic Temperature Sensing System Based on Pulse Correlation and TDM Technique, *Xunjian Xu, Nonaka Koji; Kochi Univ. of Technology, Japan.* A novel high resolution fiber optic temperature sensing system combined with 100m long and 3m short monitoring fibers based on optical pulse correlation and time-division combination (TDM) technique is proposed and demonstrated.

Room S228

2:00 p.m. – 3:30 p.m.
FQ • Transmission Impairment
Hoon Kim; National Univ. of Singapore, Singapore, Presider

FQ1 • 2:00 p.m.
A Experimental Study on the Effect of the Dispersion Map on a 25 Ghz Spaced RZ-DPSK Transmission System over 8,359 Km, *Kazuyuki Ishida, Toshiyuki Tokura, Takashi Mizuochi, and Katsuhiro Shimizu; Mitsubishi Electric Corporation, Japan.* The transmission performance of 25 GHz spaced RZDPSK over 8,359 km of legacy fiber was investigated experimentally to show that it depends strongly on the periodicity of the dispersion map near the zero dispersion region.

FQ2 • 2:15 p.m.
Filter Concatenation Impact on 107-Gb/s Coherent Optical OFDM System, *Yan Tang and William Shieh; The Univ. of Melbourne, Australia.* System performance of 107-Gb/s CO-OFDM system with 10 ROADM nodes is shown through simulation. 0 dB /0.9 dB Q penalty for the filter with aligned/misaligned center frequency is found.

FQ3 • 2:30 p.m.
Equalization-Enhanced Phase Noise for 100Gb/s Transmission with Coherent Detection, *Alan Pak Tao Lau[1], William Shieh[2] and Keang-Po Ho[3]; [1]The Hong Kong Polytechnic Univ., China, [2]The Univ. of Melbourne, Australia, [3]SiBEAM Technologies, USA.* We study the impact of Equalization-Enhanced Phase Noise (EEPN) for 100Gb/s coherent systems using electronic dispersion compensation through simulations. Power penalties are compared with theoretical predictions and the effects of transmitter phase noise are investigated.

FQ4 • 2:45 p.m.
Experimental Investigation of Nonlinear Effects upon Long-haul RZ-DPSK System with Block-type Dispersion Map, *Hsin Min Wang, Yen Ting Lin and Hidenori Taga; National Sun Yat-Sen Univ., Taiwan.* An experimental investigation of cross-phase modulation and self-phase modulation (SPM) upon long-haul RZDPSK system with block-type dispersion map was conducted; the SPM was confirmed to cause performance degradation near the system zero dispersion wavelength.

Room S229

Room S224

FM • Microstructured Fibers I—Continued

FM4 • 3:00 p.m.
Low-Loss Ytterbium-Doped Polarization Maintaining Solid Photonic Bandgap Fiber, *Katsuhiro Takenaga, Masahiro Kashiwagi, Shoji Tanigawa, Shoichiro Matsuo and Munehisa Fujimaki; Fujikura Ltd., Japan.* A low loss ytterbium-doped polarization maintaining solid photonic bandgap fiber (SPBGF) is fabricated using a new fabrication method. A high efficient fiber laser operated at the low-gain wavelengths is prospected by the fiber.

FM5 • 3:15 p.m.
Full-Solid Microtructured Polymer Fiber, Face Plate and Taper Toward Image Transmission, *Depeng Kong and Lili Wang; Xi'an Inst. of Optics and Precision Mechanics, Chinese Academy of Sciences, China.* A new method for fabricating 3829 pixels polymer imaging fiber, faceplate and taper is introduced, and the capabilities of the resultant fiber optical components for image transmission are demonstrated.

FM6 • 3:30 p.m.
Demodulation of DPSK Signals Using In-line Mach-Zehnder Interferometer Based on a Photonic Crystal Fiber, *Jiangbing Du[1], Yongheng Dai[1], Gordon K. P. Lei[1], Weijun Tong[2], and Chester Shu[1]; [1]The Chinese Univ. of Hong Kong, China, [2]Yangtze Optical Fiber and Cable Company Ltd., China.* We propose a novel fiber-based in-line DPSK demodulator using an in-fiber Mach-Zehnder interferometer (MZI). The device is fabricated by controlling the splicing mismatch between a photonic crystal fiber and standard single mode fibers.

Room S225

FN • Network Subsystem II—Continued

FN4 • 3:15 p.m.
Integration of Passive Optical Network and Radio Over Fiber System Using Single DFB Laser, *Chung-Yu Wu, Sheng-Ching Chen, Chieh-Hao Wang, Feng-Cheng Kuo, Jhih-Heng Yan and Kai-Ming Feng; National Tsing Hua Univ., Taiwan.* By utilizing the optical carrier suppression and separation technique, we achieved an integrated bidirectional passive optical network and radio over fiber system with only one single DFB laser for all downstream and upstream signals.

FN5 • 3:30 p.m.
Full-Duplex ROF Transport Systems Based on Broadband ASE Light Source and Nonlinear Distortions Suppression Scheme, *Chung-Yi Li, Hsiang-Chun Peng, Wen-Yi Lin, Heng-Sheng Su, Sheng-Hui Meng, and Hai-Han Lu; National Taipei Univ. of Technology, Taiwan.* Full-duplex radio-over-fiber (ROF) transport system employing broadband amplified spontaneous emission (ASE) light source and nonlinear distortions suppression scheme is proposed and demonstrated. Data rate of 10GHz/70Mbps signal is externally modulated and transmitted long-haul fiber link.

Room S226

FO • Lasers III—Continued

FO4 • 3:00 p.m.
Experimental Determination of the Message Decoding Quality in Laser Diode Based Optical Chaos Communications, *Yanhua Hong, Min Won Lee and K. Alan Shore; Bangor Univ., UK.* Experimental mapping of the message extraction performance using chaotic laser diode transmitter-receiver pairs demonstrates that the conditions for maximum signal to noise ratio (SNR) are not identical to those for achieving maximum chaos synchronization quality.

FO5 • 3:15 p.m.
Novel Post-Weld-Shift Measurement of Butterfly-Type Laser Module Employing High Resolution Capacitance Displacement Measurement Technique, *Y. D. Liu[1], M. T. Sheen[2] , Y. C. Hsu[3] , Y. C. Tsai[1,4], and W. H. Cheng[1]; [1]National Sun Yat-sen Univ., Taiwan, [2]Yung Ta Inst. of Technology and Commerce, Taiwan, [3]National Pingtung Univ. of Science and Technology, Taiwan, [4]Cheng-Shiu Univ., Taiwan.* A novel capacitance displacement measurement system with 25.4nm resolution and 0.1μm accuracy is employed to on-line measure the PWS of butterfly-type module. The coupling efficiency can be regained up to 90% by this real-time technique.

FO6 • 3:30 p.m.
Polarization Characteristics of an External Cavity Diode Laser with Littman Configuration, *Dijun Chen, Zujie Fang, Haiwen Cai, and Ronghui Qu; Shanghai Inst. of Optics and Fine Mechanics, Chinese Academy of Sciences, China.* Polarization characteristics of an ECDL with diffraction grating are presented. Both elliptical and linear polarization emission can be obtained from this ECDL. Experimental results indicated that the grating we used has strong birefringence property.

3:45 p.m. – 4:15 p.m. Coffee Break

Room S227

FP • Physical, Mechanical, and Electromagnetic Sensors—Continued

FP4 • 3:00 p.m.
A Dual-Wavelength DBR Fiber Laser Strain Sensor, *Shengchun Liu[1,2], Zuowei Yin[1], Liang Zhang[1] and Xiangfei Chen[1]; [1]Nanjing Uinv., China, [2]Heilongjiang Univ., China.* A dual-wavelength fiber distributed Bragg reflected laser sensor is presented and experimentally realized. The dual-wavelength beat frequency sensing signal can be obtained by photodetector and spectrum analyzer with a strain sensitivity of about 8.57 KHz/με.

FP5 • 3:15 p.m.
Simultaneous Measurement of Strain and Temperature with High Sensing Accuracy, *Hyun-Min Kim[1], Hochul Nam[1], Dae Seung Moon[2], Young Ho Kim[1], Byeong Ha Lee[1], and Youngjoo Chung[1]; [1]Gwangju Inst. of Science and Technology (GIST), Korea, [2]Samsung Electronics Hainan Fiber optics-Korea Co., Ltd, Korea.* We propose and experimentally demonstrate an optical fiber sensor for a simultaneous measurement of strain and temperature with high sensing accuracy by combining a long-period fiber grating pair with a polarization-maintaining fiber loop mirror.

FP6 • 3:30 p.m.
Mechanical Force Sensing by Dual-Core Photonic Crystal Fiber, *Mohammd Sabaeian[1], Hamid Reza Rezaei[2], and Hamid Nadgaran[3]; [1]Shahid Chamran Univ., Iran, [2]Islamic Azad Univ., Iran, [3]Shiraz Univ., Iran.* A mechanical force(pressure) sensor based on dual-core photonic crystal fibers was designed. The response range of the fiber was calculated to be from 1MPa to 10Mpa with its sensitivity of 0.024 Wm^{-1}/Mpa.

Room S228

FQ • Transmission Impairment—Continued

FQ5 • 3:00 p.m.
Observation of Bit-rate Dependent Spectral Performance Hole for the Long-Haul RZ-DPSK System with Block Type Dispersion Map, *Hidenori Taga; National Sun Yat-Sen Univ., Taiwan.* Bit-rate dependent spectral performance hole is observed in the long-haul RZ-DPSK system with the block type dispersion map. The performance hole exists for lower bit-rate up to 5Gbit/s, but disappears more than about 15Gbit/s.

FQ6 • 3:15 p.m.
XPM Statistics in 100% Pre-Compensated WDM Transmission for Different Modulation Formats and Transmission Fibers, *Fan Zhang; Peking Univ., China.* XPM statistics in 100% pre-compensated WDM transmission depends on bit rates, transmission Fibers and modulation formats. XPM in DPSK systems shows much less stochastic than that in OOK systems.

Room S229

3:45 p.m. – 4:15 p.m. Coffee Break

Friday, 17 July 2009 – Technical Session

Room S224

4:15 p.m. – 6:00 p.m.
FS • Microstructured Fibers II
T.A. Birks; Univ. of Bath, UK, Presider

FS1 • 4:15 p.m.
Realization of 7-Cell Hollow-Core Photonic Crystal Fibers with Low Loss in the Region Between 1.4 µm and 2.3 µm, *J. K. Lyngso[1,2], B. J. Mangan[3], C. Jakobsen[1] and P. J. Roberts[2]; [1]Crystal Fiber A/S, Denmark, [2]Technical Univ. of Denmark, Denmark, [3]Univ. of Bath, UK.* Five 7-cell core hollow-core fibers with photonic bandgap spectral positions between 1.4 µm and 2.3 µm were fabricated. The loss follows the $\approx \lambda^{-3}$ dependency previously reported [1] with a minimum measured loss of 9.5 dB/km at 1992 nm.

FS2 • 4:30 p.m.
Coupling Characteristics between the Fundamental and Higher-Order Modes in a Photonic Crystal Fiber with a Filled Hole, *Yuan Mao, Jie Li and Chao Lu; The Hong Kong Polytechnic Univ., China.* The coupling characteristics were investigated for a photonic crystal fiber when an air hole was filled with a material with higher refractive index. Narrow transmission bands were obtained, with the centre wavelength of the passband determined by the value of the refractive index of the filling material.

FS3 • 4:45 p.m.
Air Hole Control for Characteristic Adjustment in Air Hole Collapsed Photonic Crystal Fiber Coupler, *Hirohisa Yokota, Yuu Nakajima, Tomoya Ichige, Yoh Imai, and Yutaka Sasaki; Ibaraki Univ., Japan.* We proposed and demonstrated a method to adjust coupling characteristics of air hole collapsed photonic crystal fiber coupler by air hole control with CO_2 laser irradiation technique after elongation process in coupler fabrication.

FS4 • 5:00 p.m.
Selectively Liquid-filled PCFs for Optical Devices, *Jia-hong Liou and Chin-ping Yu; National Sun Yat-Sen Univ., Taiwan.* We have theoretically investigated the propagation characteristics of two kinds of selectively liquid-filled PCFs. The propagation losses are found to be efficiently reduced due to the outer or inner air-hole layers in the cladding regions.

Room S225

4:15 p.m. – 6:00 p.m.
FT • Future Optical Networks
Alan Lee; The Univ. of Melbourne, Australia, Presider

FT1 • 4:15 p.m. Invited
The Future Internet – an Energy Consumption Perspective, *Kerry Hinton, Jayant Baliga, Robert Ayre, Rodney S. Tucker; Univ. of Melbourne, Australia.* We compare the abilities of photonic and electronic technologies for improving energy efficiency of the Internet. It is not clear whether photonic signal processing technologies will provide a pathway to improving Internet energy efficiency.

FT2 • 4:45 p.m. Invited
Challenges for the Future Networks and Enabling Photonic Technologies, *S. Namiki, T. Hasama, H. Ishikawa; National Inst. of Advanced Industrial Science and Technology (AIST), Japan.* This talk will provide a high-level overview to redress the value of photonic technologies in the context of the looming energy issues, suggesting the potential of dynamic optical path switching along with enabling technologies.

Room S226

4:15 p.m. – 6:00 p.m.
FU • Optoelectronic Applications
S.P. Lau; The Hong Kong Polytechnic Univ., China, Presider

FU1 • 4:15 p.m. Invited
A New Electro-Optic Sampling Method Using Two/Multiple Wavelengths, *L. Ji, W. R. Donaldson and T. Y. Hsiang; Univ. of Rochester, USA.* A new electro-optic sampling method is proposed by modulating multiple wavelengths simultaneously to overcome the ambiguity in single-shot pulse application and enhance the signal-to-noise ratio.

FU2 • 4:45 p.m.
Impact of Transmitter Electronics for High-Speed Systems Applications, *Cristina Arellano and André Richter; VPIsystems, Germany.* Key issues related to the modeling of electro-optic transmitters are discussed in this paper. These topics include limitations resulting from the transmitter frequency response and driving electronics. Simulation results illustrate the importance of realistic modeling in high-speed systems.

FU3 • 5:00 p.m.
Fast Switching Bistable Ferroelectric Liquid Crystal Switches as a New Optical Elements for Photonics Applications, *E. P. Pozhidaev[1,2], V. G. Chigrinov[2], T. Du[2]; [1]P.N. Lebedev Physical Inst. of Russian Academy of Sciences, Russia, [2]The Hong Kong Univ. of Science and Technology, China.* Fast bistable optical switches of the light polarization based of ferroelectric liquid crystal cells are proposed. The switches are characterized by 100µs switching time and 26 db crosstalk at the wavelength of 632.8 nm and bistable, i.e. required zero power consumption in the switch state.

Room S227

4:15 p.m. – 6:00 p.m.
FV • Microstructured Fiber Sensors
Bai Ou Guan; Jinan Univ., China, Presider

FV1 • 4:15 p.m.
Temperature Insensitive Strain Sensor Based on Long Period Fiber Grating Pair in Photonic Crystal Fibers, *W. Shin, Y. L. Lee, T. J. Eom, B. -A. Yu and Y. -C. Noh; Advanced Photonics Research Inst., GIST, Korea.* We report temperature insensitive strain sensor based on long period fiber grating pair by partially tapering a photonic crystal fiber under CO_2 laser irradiation and experimentally investigated its novel mechanical characteristics and thermal properties for optical sensing.

FV2 • 4:30 p.m.
Intensity-Based in-Line Bend Sensor Using Twin Core Photonic Crystal Fiber, *Bongkyun Kim, Tae-Hun Kim, Long Cui, and Youngjoo Chung; Gwangju Inst. of Science and Technology (GIST), Korea.* We report on intensity based in-line Mach-Zehnder interferometric bend sensor using twin core photonic crystal fiber(PCF). A novel bending sensor is performed with bend induced spatial fringe shift. High air filling fraction of twin core photonic crystal fiber cladding provides immunity to bend-induced intensity fluctuation.

FV3 • 4:45 p.m.
Temperature-Insensitive Curvature Sensor Using a Hi-Bi Photonic Crystal Fiber Based Sagnac Loop Interferometer, *Kyu Jin Hwang[1,2], Gil Hwan Kim[1], Tai Yong Cho[1], Kwanil Lee[1], Jin Woo Park[2] and Sang Bae Lee[1]; [1]Korea Inst. of Science and Technology (KIST), Korea, [2]Korea Univ., Korea.* We propose and demonstrate a Sagnac loop interferometer composed of a novel Hi-Bi photonic crystal fiber with two large air holes in the outer cladding region as a curvature sensor. It has been shown that it has an insensitivity to temperature and a curvature sensitivity of 0.159 nm/m^{-1} when the fiber is bent in the slow axis.

FV4 • 5:00 p.m.
Fabrication of a Surface Long-Period Fiber Grating Based on a D-Shaped Photonic Crystal Fiber, *Hyun-Joo Kim[1], Oh-Jang Kwon[1], Suho Chu[1], Min-Seok Yoon[1], Gilhwan Kim[2], Sang Bae Lee[2], and Young-Geun Han[1]; [1]Hanyang Univ., Korea, [2]Korea Inst. of Science and Technology, Korea.* A surface long-period fiber grating based on a D-shaped photonic crystal fiber (PCF) is proposed and their optical properties such as temperature and ambient index sensitivities.

Room S228

4:15 p.m. – 6:00 p.m.
FW • Performance Monitoring
Guo-Wei Lu; National Inst. of Inform. and Communications Tech, Japan, Presider

FW1 • 4:15 p.m.
Two Occurrence Modes of Large Instantaneous DGD, Observed in Long Term PMD Field Measurement in Indiana, *Youichi Akasaka[1], Inwoong Kim[1], Andrew Lee[2], Matthew Davy[2], and Takao Naito[1]; [1]Fujitsu Labs. of America Inc., USA., [2]Indiana Univ., USA.* Through long-term field measurement, two occurrence modes of large instantaneous DGDs, less than 10^{-5} probability, were observed. Most high DGD occurrences would be predictable, as the dominant case clearly shows positive correlation with ambient temperature.

FW2 • 4:30 p.m.
An Efficient Bit Error Rate Estimation Method Based on Parzen Series for Coherent Detection QPSK Transmission Systems, *Yan Gao, Fan Zhang, Zhangyuan Chen and Anshi Xu; Peking Univ., China.* A bit error rate estimation method based on Parzen series is proposed for coherent detection QPSK transmission systems. Numerical simulation results show the proposed method's consistency with Monte Carlo method while keeping lower computational intensity.

FW3 • 4:45 p.m.
OSNR-Independent Chromatic Dispersion Monitoring on 40Gb/S DPSK Signals Using Two RF Filters, *Chang Joon Chae[1], Trevor B. Anderson[1,3], and Ampalavanapillai Nirmalathas[2]; [1]National ICT Australia Ltd. (NICTA), Australia, [2]The Univ. of Melbourne, Australia, [3]Monitoring Division Inc., Australia.* We propose a method to estimate residual chromatic dispersion from 40Gb/s DPSK signals using two RF filters and demonstrate, through simulation study, that the estimation of chromatic dispersion can be nearly OSNR-independent.

FW4 • 5:00 p.m.
OSNR and Chromatic Dispersion Monitoring Using Wiener-Hopf Equation, *Bipin Sankar Gopalakrishna Pillai[1] and Ampalavanapillai Nirmalathas[2]; [1]National ICT Australia Limited, Australia, [2]The Univ. of Melbourne, Australia.* We perform simultaneous monitoring of OSNR and residual chromatic dispersion by solving the Wiener-Hopf equation using matrix inversion. The effectiveness of this method over a wide range of received optical power is investigated using simulations.

Room S229

Room S224

FS • Microstructured Fibers II—Continued

FS5 • 5:15 p.m.
The Study on Loss Reduction of Holey Fiber by Viscosity Profile Control, *Katsunori Imamura, Kazunori Mukasa and Takeshi Yagi; The Furukawa Electric Co., Ltd., Japan.* The viscosity profile controlled holey fiber utilizing the chlorine doped capillaries was fabricated and the reduction of imperfection and defect losses by relaxation of residual stresses in the core region was confirmed.

FS6 • 5:30 p.m.
Birefringence Control of the Holey Fiber Filled with Indium, *S. H. Lee[1], B. H. Kim[2], and W. -T. Han[1]; [1]Gwangju Inst. of Science and Technology (GIST), Korea, [2]Advanced Photonics Research Institution (APRI), Korea.* A novel method for controlling birefringence of the optical fiber with two holes filled with indium metal was demonstrated. The birefringence was found to increase with the decrease of the applied pressure during the infiltration and solidification of indium.

FS7 • 5:45 p.m.
Design a New PCF Whose Zero Dispersion Wavelength of 800nm is Insensitive to its Fiber Core Diameter, *Desheng Zhang[1], Junjie Zhang[2], Qiuqin Sheng[3]; [1]Shanghai Hengtong Optic & Electronic Technology Co., Ltd., China, [2]China Mobile Shenzhen Corporation, China.* We used a new method to do numerical analysis on chromatic dispersion and ZDW of PCF, and designed a new structure of PCF whose ZDW is seven times insensitive as usual to its core diameter.

Room S225

FT • Future Optical Networks—Continued

FT3 • 5:15 p.m.
Power Saving Technique Based on Simple Moving Average for Multi-Channel Ethernet, *Hideaki Imaizumi[1], Tomohiro Nagata[2], Goro Kunito[2], Kenichi Yamazaki[2], and Hiroyuki Morikawa[1]; [1]The Univ. of Tokyo, Japan, [2]NTT DoCoMo, Inc., Japan.* In this paper, we propose power saving technique based on simple moving average method for multi-channel Ethernet and evaluate its performance through simulation with real traffic data.

FT4 • 5:30 p.m. Invited
New Generation Optical Infrastructure Technologies: "EXAT Initiative" Towards 2020 and Beyond, *Toshio Morioka; NTT Network Innovation Labs., Japan.* Research effort of most advanced optical infrastructure technologies named "EXAT: Extremely Advanced Transmission" towards the next few decades and beyond are described, enabling well over Peta bit/s per fiber link capacity and Exa-class network throughput.

Room S226

FU • Optoelectronic Applications—Continued

FU4 • 5:15 p.m.
Broadband Source Sliced by Cascaded Interleavers, *Chi-Hao Cheng[1] and Shuping Wang[2]; [1]Miami Univ., USA, [2]Univ. of North Texas, USA.* A new structure of spectrum-sliced broadband source consisting of an ASE source and two cascaded interleavers is presented. The proposed structure allows the engineer to optimize channel bandwidth and crosstalk easily.

FU5 • 5:30 p.m.
Wideband Linearisation Technique for Radio over Fiber Laser Transmitter, *S. Alifah, S. M. Idrus and N. M. Kassim; UTM, Malaysia.* This paper presented the predicted performance of the low cost optical transmitter employing feedforward linearization technique. The design is able to give significant reduction of third order IMD products up to 30 dB for system operating at 5 – 5.8 GHz band.

FU6 • 5:45 p.m.
Burst-Mode APD-ROSA Using Reset Signal for 1G/10G-Dual-Rate OLT Optical Transceiver, *Tsuyoshi Ito, Takeshi Kurosaki, Makoto Nakamura, Susumu Nishihara, Yusuke Ohtomo and Akira Okada; NTT Corporation, Japan.* We developed a 1G/10G dual-rate burst-mode APDROSA with a reset signal. We achieved high performance as regards sensitivity and a dynamic range with a response time of less than 230 ns at 0 – 85 ^{o}C.

Room S227

FV • Microstructured Fiber Sensors—Continued

FV5 • 5:15 p.m.
In-Line Fiber-Optic Fabry-Perot Ultrasound Sensor Formed by Hollow-Core Photonic-Crystal Fiber, *Yun-Jiang Rao[1,2], Wei Wang[1], Tao Zhu[1,2], Dewen Duan[1]; [1]Chongqing Univ., China, [2]Univ. of Electronic Science & Technology of China, China.* An in-line fiber-optic Fabry-Perot sensor formed by hollow-core photonic crystal fiber is used for ultrasound detection. The experimental results show that the wavelength-pressure sensitivity is ~7.29 × 10^{-3}nm/MPa, which is about twice more than that of FBG.

FV6 • 5:30 p.m.
Optical Switch Based on Fluid-Filled Photonic Crystal Fiber, *Yiping Wang[1,2], Hartmut Bartelt[2], Wolfgang Ecke[2], Klaus Moerl[2], Wei Jin[1], Kerstin Schroeder[2], Reinhardt Willsch[2], Jens Kobelke[2], Manfred Rothhardt[2], Liye Shan[2], Sven Brueckner[2] and Xiaoling Tan[1]; [1]The Hong Kong Polytechnic Univ., China, [2]Inst. of Photonic Technology, Germany.* An optical switch with a 30dB extinction ratio was developed by filling liquid into air holes of a photonic crystal fiber. The switching attributes to the waveguiding change and the absorption of the filled material.

FV7 • 5:45 p.m.
In-fiber Interferometer in Air-Core Photonic Bandgap Fibers, *Lina Ma[1,2], Jian Ju[1], Wei Jin[1], and Yongming Hu[2]; [1]The Hong Kong Polytechnic Univ., China, [2]National Univ. of Defense Technology, China.* Mach-Zehnder interferometer (MZI) comprising an offset splicing and a non-adiabatic taper was fabricated in an air-core photonic bandgap fiber. Temperature and strain responses of the MZI were experimentally measured.

Room S228

FW • Performance Monitoring—Continued

FW5 • 5:15 p.m.
In-Band OSNR Monitoring by Polarization Diversity and Electronic Signal Processing, *Qi Sui, Chao Lu, and Alan Pak Tao Lau; The Hong Kong Polytechnic Univ., China.* A cost-effective optical signal-to-noise ratio (OSNR) monitoring technique by electronically processing the received signals from both polarization is proposed. This method enables in-band OSNR monitoring without the need for polarization control.

FW6 • 5:30 p.m.
Optical Performance Monitoring via Histogram: A Data-Driven Approach, *Yonggang Wen[1] and Kevin W. Wilson[2]; [1]Cisco Systems, USA, [2]Mitsubishi Electric Research Lab., USA.* We apply three alternative statistical learning methods to estimate optical transmission impairments (e.g., noises, chromatic dispersion) from synchronous histograms. Linear regression yields good accuracy. A more sophisticated locally weighted regression technique performs better.

FW7 • 5:45 p.m.
100Gbit/s RZ-DQPSK Signal Monitoring Using Delay Tap Sampling and Asymmetry Ratio Evaluation, *Zhaohui Li, Jian Zhao, Linghao Cheng, Yanfu Yang, Chao Lu, Alan Pak Tao Lau, Hwa-Yaw Tam and P. K. A. Wai; The Hong Kong Polytechnic Univ., China.* We demonstrate a novel in-line chromatic dispersion monitoring scheme for 100Gbit/s RZ-DQPSK signal based on delay tap sampling and asymmetry ratio evaluation. This scheme can differentiate positive and negative residual chromatic dispersion.

Room S229