

**Room 101 -- (1F)**

08:30-10:00  
W11 · Optical MEMS (II)  
Weileun Fang, National  
Tsing-Hwa University, Taiwan,  
Presider

**08:30-08:45 W11-(15)-1**  
**Out-of-plane MEMS shutter with**  
**continuous motion capability for**  
**VOA application**

*Yen-Jyh Lai, Chia-Yu Wu,  
Chengkuo Lee, Yu-Shen Lin,  
Wen-Chih Chen, Chihchung Chen,  
Ming-Hung Tsai, Ruey-Shing  
Huang, and Min-Shyong Lin*  
*Asia Pacific Microsystems, Inc.,  
Taiwan*

A new MEMS VOA with continuous motion was developed. The self-assembly mechanism was achieved by means of "extra" residual beam. We demonstrated that the optical performance had 70dB attenuation range and less than 1 dB insertion loss for this device.

**08:45-09:00 W11-(15)-2**  
**Low voltage and pull-in state**  
**adjustable**

**dual-servo-scanning-mirror**  
*Kerwin Wang, Mike Sinclair, and  
Karl F. Böhringer*  
*University of Washington; Microsoft  
Research, USA*

This paper reports a new dual-servo-scanning mirror, which makes use of thermal and electrostatic driving principles. By tuning loading of the thermal and electrostatic actuator individually, one can increase the tilting-angle of the mirror.

**Room 105 -- (1F)**

08:30-10:15  
W1E · Optical Coherence  
Tomography (I)  
K. Shimizu, Hokkaido  
University, Japan, Presider

**08:30-09:30 W1E-(12)-1**  
**(Tutorial)**  
**Optical coherence tomography:**  
**technology and application**

*Z. P. Chen*  
*University of California at Irvine,  
USA*

**Room 106 -- (1F)**

08:30-09:45  
W1H · Optical Storage (I)  
H. Horimai, OPTWARE  
Corporation, Japan, Presider

**08:30-09:00 W1H-(9)-1**  
**(Invited)**  
**Multilayered optical memory**  
**with a nanofabricated recording**  
**medium in three-dimensions**

*Yoshimasa Kawata*  
*Shizuoka University, Japan*

**Room 107 -- (1F)**

08:30-10:15  
W1J · Optical Networking  
Technologies  
Y. J. Ray Chen, University of  
Maryland Baltimore County,  
USA, Presider

**08:30-09:00 W1J-(13)-1**  
**(Invited)**  
**Broadband access using EPON**  
**and other techniques**

*Thomas Chang-Joon Chae, Elaine  
Wong, and Rodney S. Tucker*  
*The University of Melbourne,  
Australia*

Ethernet over passive optical network (EPON) has emerged as a promising broadband access method. It aims to cost-effectively deliver Ethernet frames at 1.25 Gb/s in both directions over various passive optical network topologies. Key technologies will be discussed together with alternative access techniques.

**Room 110 -- (1F)**

08:30-10:00  
W1G · Ultrafast Pulse  
Generation  
Ci-Lin Pan, National Chiao  
Tung Univ., Taiwan, Presider

**08:30-09:00 W1G-(6)-1**  
**(Invited)**  
**Ultrashort visible pulse**  
**generation by NOPA**

*Takayoshi Kobayashi*  
*University of Tokyo, Japan*  
Transform-limited (TL) visible pulses with as short as sub-4-fs duration and smooth spectrum suited to spectroscopy application have been generated for the first time by several improvements made to our previous noncollinear optical parametric amplifier.

**December 17, Wednesday**

**Int'l Reception Hall -- (1F)**

08:30-10:00  
W1F · Nonlinear Dynamics  
B. K. Rhee, Sogang University,  
Korea, Presider

**08:30-09:00 W1F-(5)-1 (Invited)**  
**Quantum chaos in deformed  
microcavities**  
*Kyungwon An*  
*Seoul National University, Korea*

**Ever Green Room -- (10F)**

08:30-10:00  
W1B · Lasers and Detectors  
J. Buus, Gayton Photonics Ltd,  
UK, Presider

**08:30-08:45 W1B-(2)-1**  
**Suppression of lasing  
wavelength change of 980 nm  
pump laser diodes by means of  
decreasing facet reflectivity as  
lengthening wavelength**  
*Kimio Shigihara, Kazushige  
Kawasaki, Hiromasu Matsuoka,  
Yasuhiro Kunitsugu, Shin'ichi  
Yamamura, Tetsuya Yagi, Etsuji  
Oomura, and Yasuo Mitsui*  
*Mitsubishi Electric Corporation,  
Japan*  
We have proposed a new method of  
suppressing the lasing-wavelength-  
change by means of decreasing facet  
reflectivity as increasing wavelength.  
Less than one-third reduction of lasing  
wavelength was realized by this  
method.

**08:45-09:00 W1B-(2)-2**  
**Soldering-induced stress on  
junction-down-mounted  
ridge-waveguide laser diodes**  
*E. Nomoto, K. Nakahara, and M.  
Shimaoka*  
*Central Research Laboratory,  
Hitachi Ltd., Japan*  
We demonstrate a novel way of  
evaluating thermal stress in  
junction-down- mounted  
ridge-waveguide laser diodes. Spatially  
resolved electroluminescence and  
photoluminescence observation  
revealed the localized stress that led to  
gradual degradation during aging.

**Spanish Room -- (10F)**

08:30-10:00  
W1D · Beam Propagation and  
X-ray Application  
C.P.J.Barty, Lawrence  
Livermore National Laboratory,  
USA, Presider

**08:30-09:00 W1D-(3)-1**  
**(Invited)**  
**Self-focusing and filamentation  
of ultrafast laser pulses in  
optical media: physics and  
applications**  
*S. L. Chin*  
*Laval University, Canada*  
Powerful femtosecond laser pulses can  
self-focus in any optical medium  
leaving behind traces of plasma  
columns called filaments, mm in length  
in condensed matters and km in the  
atmosphere. The physics and potential  
applications.....

**Auditorium -- (10F)**

08:30-10:00  
W1C · Near Field Spectroscopy  
and Luminescence in Photonic  
Crystals and Related Materials  
T. Baba, Yokohama National  
University, Japan, Presider

**08:30-09:00 W1C-(16)-1**  
**(Invited)**  
**Optical near-field microscopy of  
photonic crystals**  
*Vahid Sandoghdar*  
*ETH Zurich, Switzerland*

**Sky Lounge -- (12F)**

08:30-10:00  
W1A · Numerical Techniques in  
Photonics  
K. Yasumoto, Kyushu  
University, Japan, Presider

**08:30-08:45 W1A-(14)-1**  
**An improved TD-BPM based on  
the alternating-direction implicit  
method for wide-band analysis**  
*Jun Shibayama, Atsushi Yamahira,  
Junji Yamauchi, and Hisamatsu  
Nakano*  
*Hosei University, Japan*  
A wide-band time-domain  
beam-propagation method is proposed  
using the alternating-direction implicit  
method with the aid of an iteration  
algorithm. Substantial reduction in CPU  
time is found, compared to the  
conventional method.

**08:45-09:00 W1A-(14)-2**  
**New unconditionally stable ADI  
schemes for the wave equation**  
*Ya Yan Lu*  
*City University of Hong Kong, Hong  
Kong*  
Two unconditionally stable ADI  
(alternating direction implicit) methods  
for the wave equation are developed.  
The first method has a second order  
accuracy in time and it is more efficient  
than existing methods. The second  
method has a fourth order accuracy in  
time.

**December 17, Wednesday**

**Room 101 -- (1F)**

W1I · Optical MEMS (II) --- continued

**09:00-09:30 W1I-(15)-3 (Invited)**

**3D-mirrorarray with terraced electrodes and high aspect ratio springs**

*Renshi Sawada*

*NTT Microsystem Integration Laboratories, Japan*

**Room 105 -- (1F)**

W1E · Optical Coherence Tomography (I) --- continued

**Room 106 -- (1F)**

W1H · Optical Storage (I) --- continued

**09:00-09:15 W1H-(9)-2 Light-induced properties of Cr- and Ru-doped Bi<sub>12</sub>SiO<sub>20</sub> crystals**

*Vera Marinova, Shiuan Huei Lin, Suzanne Piquette, Ventseslav Sainov, and Ken Yuh Hsu National Chiao Tung University, Taiwan; Central Laboratory of Optical Storage and Processing of Information, Bulgaria*

Light-induced absorption in Cr- and Ru-doped Bi<sub>12</sub>SiO<sub>20</sub> crystals is modified by preliminary illumination and thermal treatments. Transient and persistent parts on light-induced absorption dynamics are observed and modification is useful for holographic recording of information.

**09:15-09:30 W1H-(9)-3 Optimization of parameters of holographic gratings in photopolymers with optical absorption**

*Sergey Sharangovich and Eugene Dovolnov Tomsk State University of Control System and Radioelectronics, Russia*

The purpose of this message is to present possibilities of optimization of holographic photopolymer gratings parameters. Optimal characteristics have been obtained on the results of numerical simulation based on analytical model of recording holographic grating.

**Room 107 -- (1F)**

W1J · Optical Networking Technologies --- continued

**09:00-09:15 W1J-(13)-2 Transient characteristic of AGC loop in burst-mode transimpedance amplifier for EPON**

*Sub Han, Hyun-Su Ko, Tae-Whan Yoo, and Man-Seop Lee Information and Communications University; Electronics and Telecommunications Research Institute, Korea*

We investigate a transient characteristic of the automatic gain control (AGC) loop in burst-mode transimpedance amplifiers and discuss the design of the loop time constant to satisfy the standard of 1.25Gb/s EPON systems.

**09:15-09:30 W1J-(13)-3 RZ/CSRZ-DPSK and chirped NRZ signal generation with simple configuration**

*Yang Jing Wen, A. Nirmalathas, and Dong Soo Lee The University of Melbourne, Australia; Information and Communications University, Korea*

This paper presents a novel configuration for return-to-zero (RZ) differential phase shift keyed (DPSK), carrier suppressed (CS) RZ DPSK and chirped non-return-to-zero (CNRZ) signal generation, which only requires a single stage dual electrode Mach-Zehnder modulator (DE-MZM).....

**Room 110 -- (1F)**

W1G · Ultrafast Pulse Generation --- continued

**09:00-09:30 W1G-(6)-2 (Invited)**

**Diode-pumped self-starting few optical cycle pulse generation at 1.5 μm**

*Sergei Naumov, Evgeni Sorokin, and Irina T. Sorokina Institut für Photonik, TU Wien, Austria*

Two ways to generate self-starting few optical cycle pulses around 1.5 μm using a compact diode-pumped Cr:YAG laser (purely Kerr-Lens mode-locking and SESAM assisted mode-locking) are reviewed. The shortest reported at 1.5 μm transform-limited 27 fs.....

**Int'l Reception Hall -- (1F)**

W1F · Nonlinear Dynamics --- continued

**09:00-09:15 W1F-(5)-2  
Composite soliton generation in systems with two peak spectral filtering**

*Nail Akhmediev and J. M. Soto-Crespo*  
*Optical Sciences Centre, Australia ; Instituto de Optica, Spain*  
The complex quintic Swift-Hohenberg equation (CSHE) is a model for describing pulse generation in mode-locked lasers with fast saturable absorbers and a complicated spectral response. We found several types of stationary and moving stable composite solitons.

**09:15-09:30 W1F-(5)-3  
Reduction of intersymbol interference in dispersion-managed soliton systems compensated by chirped fiber gratings**

*Y. H. C. Kwan , K. Nakkeeran, and P. K. A. Wai*  
*The Hong Kong Polytechnic University, Hong Kong*  
We show that the use of nonlinear optical loop mirror can significantly reduce the intersymbol interference induced by group delay ripples in dispersion-managed soliton communication systems compensated by chirped fiber gratings.

**Ever Green Room -- (10F)**

W1B · Lasers and Detectors --- continued

**09:00-09:15 W1B-(2)-3  
Improved temperature characteristics of semiconductor lasers due to carrier redistribution among nonidentical multiple quantum wells**

*Chao-Hsin Wu, Di-Ku Yu, and Ching-Fuh Lin*  
*National Taiwan University, Taiwan*  
Carriers among nonidentical multiple quantum wells (MQWs) will redistribute as temperature varies. This is due to strongly temperature-dependent Fermi-Dirac distribution, which favors carriers in high energy states in high temperature. As a result, the temperature characteristic of semiconductor can be improved.

**09:15-09:30 W1B-(2)-4  
Effect of wide band gap enhancement-capping layer on MSM-PDs**

*Hsin-Ying Lee and Ching-Ting Lee*  
*National Central University, Taiwan*  
The effect of the wide bandgap Schottky barrier enhancement-capping layer on the performance of metal-semiconductor-metal photodectors (MSM-PDs) is presented. We also measured the relationship between the photoresponsivity and difference photon wavelength.

**Spanish Room -- (10F)**

W1D · Beam Propagation and X-ray Application --- continued

**09:00-09:15 W1D-(3)-2  
Recent research on X-ray imaging techniques in China**

*Hongyi Gao, Jianwen Chen, Honglan Xie, Shisheng Xiong, and Zhizhan Xu*  
*Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China*  
Recent research on X-ray imaging techniques including X-ray contact microscopy, X-ray holography, holographic tomography and phase contrast imaging in China is presented.

**09:15-09:30 W1D-(3)-3  
Hard X-ray holography and numerical simulation**

*Jianwen Chen, Hongyi Gao, Honglan Xie, Shisheng Xiong, and Zhizhan Xu*  
*Shanghai Institute of Optics and Fine Mechanics, The Chinese Academy of Sciences, China*  
Two kinds of hard X-ray holography with atomic resolution including inside source holography and inside detector holography are presented, and the numerical simulation of X-ray fluorescence hologram and the reconstructed real space images are given.

**Auditorium -- (10F)**

W1C · Near Field Spectroscopy and Luminescence in Photonic Crystals and Related Materials --- continued

**09:00-09:15 W1C-(16)-2  
Purcell effect in a microdisk laser at room temperature**

*Daisuke Sano and Toshihiko Baba*  
*Yokohama National University, Japan*  
We evaluated the Purcell factor in a 2.6- $\mu\text{m}$ -diameter GaInAsP microdisk laser to be 6.7 through the measurement of cw lasing characteristics and the spontaneous emission lifetime. This is the first estimation at room temperature.

**09:15-09:30 W1C-(16)-3  
Electroluminescence from Ag-treated porous silicon templates**

*Sven Heisig and Ryutaro Maeda*  
*National Institute of Advanced Industrial Science and Technology, Japan*  
We present a method to improve and stabilize electroluminescence from porous silicon. The electrical breakdown power increases by a factor of more than 25. The electroluminescence intensity is about 30 times higher compared to untreated samples.

**Sky Lounge -- (12F)**

W1A · Numerical Techniques in Photonics --- continued

**09:00-09:15 W1A-(14)-3  
A new method for investigating wave propagation in optical waveguides of longitudinally invariant structures without using beam propagation algorithm**

*Chin-Sung Hsiao and Likarn Wang*  
*National Tsing Hua University, Taiwan*  
We proposed a new method to study wave propagation in longitudinally invariant waveguides with index profiles. In our method, we keep the second derivative of transverse wave field with respect to the propagation direction. a explicit expression is derived,

**09:15-09:30 W1A-(14)-4  
Simulations on the radiation characteristics of an organic light-emitting diode**

*Hung-Chi Chen, Jiun-Haw Lee, Yean-Woei Kiang, C. C. Yang, and Yih Chang*  
*National Taiwan University; RiTdisplay Corporation, Taiwan*  
The radiation angle and wavelength dependencies of electroluminescence from a multi-layer organic light-emitting diode (OLED) are numerically investigated. The numerical difficulty arising from the large thickness of the glass layer in the OLED is carefully overcome.

**December 17, Wednesday**

**Room 101 -- (1F)**

W1I · Optical MEMS (II) --- continued

**09:30-09:45 W1I-(15)-4**

**A high resolution mirror-based digitally controlled optical beam shaper**

*Sarun Sumriddetchkajorn  
National Electronics and Computer Technology Center; National Science and Technology Development Agency, Ministry of Science and Technology, Thailand*  
A novel digitally controlled programmable optical beam shaper is proposed using a two-dimensional small tilt micromirror device. The optical intensity profile at any spatial positions can be independently modified by using the macropixel concept incorporated with the binary pulsewidth modulation

**09:45-10:00 W1I-(15)-5**

**Spot size dependence of micromachined tunable filter performance**

*Wiganes Janto, Takeru Amano, Tomoyuki Hino, and Fumio Koyama*

*Tokyo Institute of Technology, Japan*

We present the modeling and experiment on the spot size dependence on the performance of micromachined filters. We point out that a proper design on the spot size of an input light is very important for realizing a narrow pass-band MEMS filter.

**Room 105 -- (1F)**

W1E · Optical Coherence Tomography (I) --- continued

**09:30-09:45 W1E-(12)-2**

**Myocardial diagnosis by using polarization-sensitive optical coherence tomography**

*Chia-Wei Sun, Yih-Ming Wang, I-Jen Hsu, Chih-Wei Lu, Yean-Woei Kiang, and C. C. Yang  
National Taiwan University, Taiwan*

A polarization-sensitive optical coherence tomography system based on a 12-fsec Ti:sapphire laser as the broadband source was used to ex vivo diagnosing diet-induced hypercholesterolemia myocardium of New Zealand white rabbits.

**09:45-10:00 W1E-(12)-3**

**Time shearing optical coherence tomography for biological samples**

*Yoshiaki Yasuno, Shuichi Makita, Takashi Endo, Masahide Itoh, and Toyohiko Yatagai*

*University of Tsukuba, Japan*

An common path- and spectral interferometric optical coherence tomography (OCT) system which has high vibration stability and fast measurement speed is developed. A cross-sectional image of tendon of bovine taken by this OCT is shown.

**Room 106 -- (1F)**

W1H · Optical Storage (I) --- continued

**09:30-09:45 W1H-(9)-4**

**Photorefractive effect in iron-doped relaxor Pb(Zn<sub>1/3</sub>Nb<sub>2/3</sub>)O<sub>3</sub> - PbTiO<sub>3</sub>**

*K. Kuroda, S. Abe, Y. Sato, R. Fujimura, H. Ono, K. Oda, and T. Shimura*

*University of Tokyo, Japan*  
Large photorefractive effect is observed in Fe-doped 0.91PZN-0.09PT relaxor ferroelectric crystal grown by the flux method. Moreover, the photochromism is induced by the illumination of blue or green laser light.

**Room 107 -- (1F)**

W1J · Optical Networking Technologies --- continued

**09:30-09:45 W1J-(13)-4**

**Experimental investigation of re-modulating upstream OOK data on downstream OFSK signal in two-way WDM access network**

*Ning Deng, Chun-Kit Chan, Lian-Kuan Chen, and Frank Tong  
The Chinese University of Hong Kong, Hong Kong*

We propose and demonstrate a WDM access network with downstream OFSK data and upstream OOK data. A simple and low-cost optical network unit is realized by re-modulating the downstream optical signal power with the upstream data; and the transmission performance is experimentally characterized.

**09:45-10:00 W1J-(13)-5**  
**On robustness of in-band polarization-assisted OSNR monitoring schemes against PMD**

*M. H. Cheung, L. K. Chen, and C. K. Chan*

*The Chinese University of Hong Kong, Hong Kong*

We present a comprehensive numerical and experimental quantification on the robustness of in-band polarization-assisted OSNR monitoring schemes against PMD in this paper, and discuss a possible way to improve the performance of polarization-nulling method.

**Room 110 -- (1F)**

W1G · Ultrafast Pulse Generation --- continued

**09:30-09:45 W1G-(6)-3**

**Harmonic mode-locked fiber lasers via gain and loss modulation – a comparison**

*Yung-Cheng Chang and Gong-Ru Lin  
National Chiao-Tung University, Taiwan*

Two configurations of actively harmonic-mode-locked Erbium-Doped fiber lasers by using direct modulation of Fabry-Perot laser diode and external modulation of Mach-Zehnder are demonstrated and their output stability, build-up dynamics, and frequency detuning characteristics are compared.

**09:45-10:00 W1G-(6)-4**  
**Optimization of beat frequency signal between synchronized Ti:sapphire and Cr:forsterite lasers**

*Zhiyi Wei, Yohei Kobayashi, and Kenji Torizuka*

*Chinese Academy of Sciences, China; National Institute of Advanced Industrial Science and Technology, Japan*

We measured relative carrier-envelope phase slipping between synchronized femtosecond Ti:sapphire and Cr:forsterite lasers. Beat signals with signal- to-noise ratio of high as 40 dB were obtained by maximized correlating doubled Ti:sapphire and tripled Cr:forsterite laser pulses.

**Int'l Reception Hall -- (1F)**

W1F · Nonlinear Dynamics --- continued

**09:30-09:45 W1F-(5)-4**  
**Characterization of ultrashort optical pulses: a comparison between TOAD and FROG**  
*Tzu-Ming Liu, Yin-Chieh Huang, Gia-Wei Chern, Kung-Hsuan Lin, Chih-Jie Lee, Yu-Chueh Hung, and Chi-Kuang Sun*  
*National Taiwan University, Taiwan*  
 Comparisons between second-harmonic-generation based frequency resolved optical gating (SHG FROG) and triple-optical autocorrelation for direct pulse-shape measurement (TOAD) have been made by computer simulation and experiments. Results show that TOAD has better accuracy than FROG.

**09:45-10:00 W1F-(5)-5**  
**Filamentation with third-harmonic generation of femtosecond laser pulses propagating in air**  
*Z. L. Duan, J. P. Chen, Z. B. Fang, R. X. Li, L. H. Lin, and Z. Z. Xu*  
*Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China*  
 It is shown experimentally that during the femtosecond laser pulse filamentation in air an intense third-harmonic pulse is generated and the characters of filament are inferred by the distribution of the third-harmonic intensity.

**Ever Green Room -- (10F)**

W1B · Lasers and Detectors --- continued

**09:30-09:45 W1B-(2)-5**  
**Detecting edges using an analog electrooptic device**  
*C. J. Vianna and E. A. De Souza*  
*Instituto de Fisica – Universidade de Brasilia, Brazil*  
 We characterized an analog Self Electrooptic Effect Device with five photodiode as an edge detector evaluating its performance using a step edge as input image. The device measured the second order of a step edge (a. u.).....

**09:45-10:00 W1B-(2)-6**  
**A new directional intensity variation detector based on self electro-optic effect device**  
*J. F. de Aquino and E. A. De Souza*  
*Physics Institute, Brasilia University, Brazil*  
 We characterized a Self Electro-optic Effect Device (SEED) as a new directional intensity variation detector (CROSS-SEED). The photodetectors spatial layout enables the calculus of local cross derivative of an incident image.....

**Spanish Room -- (10F)**

W1D · Beam Propagation and X-ray Application --- continued

**09:30-09:45 W1D-(3)-4**  
**Spatiotemporal propagation of small few-cycle pulses in an amplifying medium**  
*Chengpu Liu, Xiaohong Song, Shangqing Gong, Shiqi Jin, and Zhizhan Xu*  
*Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences*  
 We study the propagation of small area few-cycle optical pulses in a resonant amplifying medium and find an interesting pulse annexation phenomenon, which is different from that in the absorber medium for such pulses.

**09:45-10:00 W1D-(3)-5**  
**Tunneling Ionization rates of atoms and molecules: Generalization and improvement of Keldysh's Theory**  
*K. Mishima, M. Hayashi, J. Yi, S. H. Lin, H. L. Selzle, and E. W. Schlag*  
*Institute of Atomic and Molecular Sciences; National Taiwan University, Taiwan; Technical University of Munich, Germany*  
 Using the second order Coulomb corrected Volkov function as a continuum state, we quantum-mechanically derive new analytical formulas for photoionization rate of hydrogen atoms irradiated by the linearly polarized electric field in the tunneling regime.

**Auditorium -- (10F)**

W1C · Near Field Spectroscopy and Luminescence in Photonic Crystals and Related Materials --- continued

**09:30-09:45 W1C-(16)-4**  
**Isotropic photonic band gap in 2-d photonic microcavity with Penrose quasicrystal pattern**  
*Jia-yi Zhang, H. L. Tam, W. H. Wong, Y. B. Pun, and K. W. Cheah*  
*Hong Kong Baptist University; City University of Hong Kong, Hong Kong*  
 Isotropic photonic band gap is found to exist in photonic microcavity with Penrose quasicrystal pattern with 10-fold symmetry

**09:45-10:00 W1C-(16)-5**  
**Edge diffraction induced near-field contrast in subwavelength structures**  
*Hsieh-Li Chou, Yi-Chun Chen, and Pei-Kuen Wei*  
*Academia Sinica, Taiwan*  
 Optical near-field in subwavelength air-dielectric structure is studied by a collection-mode near-field optical microscopy. Concentrated optical near-field and large polarization anisotropy at the dielectric regions are measured. From the simulation of finite-difference time-domain method.....

**Sky Lounge -- (12F)**

W1A · Numerical Techniques in Photonics --- continued

**09:30-09:45 W1A-(14)-5**  
**Local field of Poynting vector around a small particle**  
*Z. B. Wang, B. S. Luk'yanchuk, M. H. Hong, Y. Lin, and T. C. Chong*  
*Data Storage Institute, Singapore*  
 The Poynting vector fields around a small particle are investigated on the basis of classical Mie theory. The influence of higher-order partial waves on the field pattern and the optical vortex effects are identified.

**09:45-10:00 W1A-(14)-6**  
**Numerical analysis of dispersion in optical fibers**  
*Chih-Cheng Chou, Ming-Jen Chang, and Nai-Hsiang Sun*  
*I-Shou University, Taiwan*  
 A numerical technique is used to determine the dispersion of optical fibers with arbitrary multi-layers profile. The total dispersion is obtained by calculating waveguide dispersion only when the index is considered as a function of wavelength.

**December 17, Wednesday**

**Room 101 -- (1F)****Room 105 -- (1F)****Room 106 -- (1F)****Room 107 -- (1F)****Room 110 -- (1F)**

W1E · Optical Coherence  
Tomography (I) --- continued

**10:00-10:15 W1E-(12)-4**

**Software dispersion  
compensation in optical  
coherence tomography**

*Chih-Wei Lu, Meng-Tsan Tsai,  
Yih-Ming Wang, Chia-Wei Sun,  
I-Jen Hsu, Yean-Woei Kiang, and  
C. C. Yang  
National Taiwan University,  
Taiwan*

We demonstrate a new method for  
dynamically and efficiently  
compensating the fundamental and  
high-order dispersion mismatches in an  
optical coherence tomography system  
based on multiple scans with split  
spectral bands and software process.

W1J · Optical Networking  
Technologies --- continued

**10:00-10:15 W1J-(13)-6**

**Testing issues of  
standard-beforehand EPON ONU  
transceiver**

*Min-Sheng Kao, Yao-Ling Cheng,  
Shou-Chien Cheng, Chi-Lun Hsu,  
and Chun-Shun Lee  
Industrial Technology Research  
Institute, Taiwan*

This paper describes a brand-new  
bidirectional optical receiver module  
with SC-Connector designed for Optical  
Network Unit (ONU) specification in  
Ethernet Passive Optical Network  
(EPON). The discussion is addressed  
on optical component characterize,  
burst mode driving technique and burst  
mode phenomena measurement.....

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**10:00-10:30  
Coffee/Tea Break**

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**Int'l Reception Hall -- (1F)**

**Ever Green Room -- (10F)**

**Spanish Room -- (10F)**

**Auditorium -- (10F)**

**Sky Lounge -- (12F)**

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**10:00-10:30  
Coffee/Tea Break**

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**December 17, Wednesday**

**Room 101 -- (1F)**

10:30-12:15  
W2J · Fiber Amplifiers Modeling and Fiber Devices Design  
C. R. Menyuk, University of Maryland, USA, Presider

**10:30-11:00 W2J-(14)-1 (Invited)**  
**Modeling and control of Er-doped fiber amplifiers and Raman optical amplifiers**  
*Chien-Jen Chen and Yan Sun Onetta, Inc., USA*  
We discuss and review the recent progress in transients and their control for both Erdoped fiber amplifiers and Raman optical amplifiers. Despite the difference in their transient mechanisms, transients in both types of amplifiers are suppressed using the same control method.

**Room 105 -- (1F)**

10:30-12:30  
W2E · Optical Coherence Tomography (II)  
M. Haruna, Osaka University, Japan, Presider

**10:30-11:00 W2E-(12)-1 (Invited)**  
**The frequency-domain delay line in optical coherence tomography: design, capabilities and limitations**  
*D. D. Sampson*  
*The University of Western Australia, Australia*

**Room 106 -- (1F)**

10:30-12:30  
W2H · Optical Information Processing (II)  
Min Gu, Swinburne University of Technology, Australia, Presider

**10:30-11:00 W2H-(9)-1 (Invited)**  
**Three-dimensional image recognition and display using lens arrays**  
*Byoungho Lee, Jae-Hyeung Park, Sung-Wook Min, Sungyong Jung, and Heejin Choi*  
*Seoul National University, Korea*  
A novel technique to recognize three-dimensional profile of an object and display it in the three-dimensional space using a lens array is discussed. Three-dimensional information is stored in the form of collection of the elemental images.....

**Room 107 -- (1F)**

10:30-12:30  
W2A · Next Generation Transport Systems  
Ron Skoog, Telcordia Technologies, USA, Presider

**10:30-11:00 W2A-(13)-1 (Invited)**  
**Spectral efficient DWDM optical label generation and transport for next generation internet**  
*Jianjun Yu and Gee-Kung Chang*  
*Georgia Institute of Technology, USA*  
We demonstrate how to generate optical label and payload in a spectral efficient DWDM optical network. A four-channel DWDM signals with channel spacing of 0.4nm and independent label and payload are transmitted over 100km SMF-28.

**Room 110 -- (1F)**

10:30-12:30  
W2G · Ultrafast Pulse Measurement and Coherent Transient  
J. Zhang, Chinese Academy of Science, China, Presider

**10:30-11:30 W2G-(6)-1 (Tutorial)**  
**The measurement of ultrashort pulses: from simple laser pulses to unstable, ultracomplex, ultrabroadband, ultraweak light pulses**  
*Xun Gu, Selcuk Akturk, Aparna Shreenath, Qiang Cao, and Rick Trebino*  
*Georgia Institute of Technology, USA*  
We review the state of the art of ultrashort-light-pulse measurement. Particularly, progress has been made in extending FROG to measuring unstable, ultracomplex, and ultrabroadband pulses (microstructure-fiber supercontinua); measuring ultraweak light pulses, which have random absolute phase and poor spatial coherence.....

**Int'l Reception Hall -- (1F)**

10:30-12:30  
W2F · Fundamental Nonlinear Optics  
Chi-Kuang Sun, National Taiwan University, Taiwan, Presider

**10:30-11:00 W2F-(5)-1 (Invited)**  
**Intrinsic pulsewidth dependence of third-order nonlinear optical susceptibility**

*Min-su Kim and Choon Sup Yoon KAIST, Korea*  
We demonstrate that second-order nonlinear optical susceptibility  $\chi^{(2)}$  and third-order nonlinear optical susceptibility  $\chi^{(3)}$  are related, in part, and that  $\chi^{(3)}$  has intrinsic pulsewidth dependence even with a single nonlinear constituent.

**Ever Green Room -- (10F)**

10:30-12:30  
W2B · VCSEL  
A. Kasukawa, The Furukawa Electric Co., Ltd., Japan, Presider

**10:30-11:00 W2B-(2)-1 (Invited)**  
**High efficiency CW Operation of 1.53 $\mu$ m vertical cavity surface emitting laser on InP**

*N. Nishiyama, C. Caneau, G. Guryanov, X. S. Liu, M. Hu, and C. E. Zah Corning Inc., USA*  
High efficiency continuous wave operation of 1.53  $\mu$ m vertical-cavity surface-emitting lasers (VCSELs) grown by MOCVD has been demonstrated. Devices show a high differential quantum efficiency of 46% and a single-mode power of 1 mW.

**Spanish Room -- (10F)**

10:30-12:30  
W2D · High-field Interaction with Atoms and Molecules  
C. H. Nam, Korea Advanced Institute of Science and Technology, Korea, Presider

**10:30-11:00 W2D-(3)-1 (Invited)**  
**Ultrafast metrology at the atomic time scale**  
*F. Krausz, M. Uiberacker, and TU Wien Austria & MPQ, Germany*

**Auditorium -- (10F)**

10:30-12:30  
W2C · Crystal Lasers and Related Devices  
Yong Hee Lee, Korea Advanced Institute of Science and Technology, Korea, Presider

**10:30-11:00 W2C-(16)-1 (Invited)**  
**Lasing action in organic photonic crystal and quasicrystal**  
*Masaya Notomi NTT, Japan*

**Sky Lounge -- (12F)**

10:30-12:30  
W2I · Optical Fiber  
S. Chu, Little Optics, USA, Presider

**10:30-11:00 W2I-(8)-1 (Invited)**  
**Optical fiber amplifiers for WDM**  
*S. Namiki The Furukawa Electric Co., Ltd., Japan*

**December 17, Wednesday**

**Room 101 -- (1F)**

W2J · Fiber Amplifiers Modeling and Fiber Devices Design ---- continued

**11:00-11:15 W2J-(14)-2  
Fokker-Planck description of the output intensity statistics of single and cascaded EDFAs**

*Malin Premaratne*

*Monash University, Australia*

A Fokker-Planck equation describing the probability density function of the output intensity of an erbium-doped fiber amplifier (EDFA) is derived. We show that a quasi-analytical solution can be obtained for arbitrary input statistics enabling the analysis of chain of cascaded EDFAs.

**11:15-11:30 W2J-(14)-3  
An analytical expression for noise figure of forward pumped Raman amplifier**

*Malin Premaratne*

*Monash University, Australia*

For the first time, an exact analytic expression for noise figure of forward-pumped Raman amplifier is presented for unequal signal and pump loss coefficients. We confirm the validity by comparing the analytical solution with numerical calculations.

**Room 105 -- (1F)**

W2E · Optical Coherence Tomography (II) ---- continued

**11:00-11:30 W2E-(12)-2  
(Invited)**

**High-resolution optical coherence tomography and its dispersion compensation**

*Chih-Wei Lu, Meng-Tsan Tsai, Yih-Ming Wang, Chia-Wei Sun, I-Jen Hsu, Su-Feng Chen, Chen-Kuan Lee, Yean-Woei Kiang, C. C. Yang, and Chii-Wann Lin*  
*National Taiwan University, Taiwan*

*We demonstrate a novel method for achieving the axial resolution of an OCT system beyond the limit set by the source spectral width. Then, a few methods for dispersion compensation and image improvement are discussed.*

**Room 106 -- (1F)**

W2H · Optical Information Processing (II) --- continued

**11:00-11:15 W2H-(9)-2  
Shifting tolerance of a 3D object of a volume-holographic spatial filter**

*Chih-Yuan Hsu, Ching-Cherng Sun, Chia-Hao Wu, and Wei-Chia Su*

*National Central University; Tatung University, Taiwan*

We propose a volume-holographic filter to perform 3D object filtering. Theoretical analysis and the corresponding experiment of the shifting tolerance of the volume-holographic filter are demonstrated.

**11:15-11:30 W2H-(9)-3  
Dynamic quantum information processing based on quantum coherent control**

*B. S. Ham*

*Inha University, Korea*

A light stop and retrieval phenomenon, which is a simple extension of coherence transfer from two-photon to one-photon via resonant Raman interactions and nondegenerate four-wave mixing processes, is analyzed for dynamic quantum information processing.

**Room 107 -- (1F)**

W2A · Next Generation Transport Systems--- continued

**11:00-11:15 W2A-(13)-2  
Compact mobile terminal for spatial optical communication system using a modified DataSlim2**

*Xin Lin and Hideo Itoh*

*AIST Tokyo Waterfront, Japan*

A compact Personal Data Assistant (PDA) named DataSlim2 is refitted and employed as a mobile terminal for data uploading in an indoor laser radar communication system. Data transmission quality of the DataSlim2 are investigated and evaluated.

**11:15-11:30 W2A-(13)-3  
Demonstration of an optical packet label swapping scheme using DPSK encoded bit-serial labels**

*Wai Hung, Chun-Kit Chan,*

*Lian-Kuan Chen, and Frank Tong*  
*The Chinese University of Hong Kong, Hong Kong*

A simple bit-serial optical packet label swapping scheme based on RZ-DPSK encoded labels is demonstrated with label swapping experiment for 10-Gb/s optical packets. Penalty-free label swapping is achievable using SOA-based interferometric wavelength converters and optical phase modulators.

**Room 110 -- (1F)**

W2G · Ultrafast Pulse Measurement and Coherent Transient --- continued

**December 17, Wednesday**

**Int'l Reception Hall -- (1F)**

W2F • Fundamental Nonlinear Optics --- continued

**11:00-11:15 W2F-(5)-2**  
**Thermal-induced two-photon absorption reduction of Li<sub>2</sub>B<sub>4</sub>O<sub>7</sub> for the high-pulse-energy scaling of the fourth harmonic generation of Nd:YAG laser**

*Genta Masada, Hiroyuki Shiraishi, Ichiro Sekine, Yuji Suzuki, Shingo Ono, and Nobuhiko Sarukura*  
*Naka Research Center, Central Research Institute, Mitsubishi Materials Corporation; Institute for Molecular Science, Japan*  
 Thermal-induced two-photon absorption reduction is found for the Li<sub>2</sub>B<sub>4</sub>O<sub>7</sub>. By raising the temperature up to 100 degrees, 0.430-J, 266-nm pulses are obtained from a 10-Hz Nd:YAG laser with a total conversion efficiency of 30.5%.

**11:15-11:30 W2F-(5)-3**  
**Investigation of sum-frequency generation of chiral molecules in solutions**

*M. Hayashi, S. H. Lin, and Y. R. Shen*  
*National Taiwan University; Academia Sinica, Taiwan; University of California, Berkeley, USA*  
 A main purpose of this paper is to examine the origin and mechanism of non-linear optical activity in solution. For this purpose, within the dipole-dipole formalism of SFG, we study the non-Condon effect.....

**Ever Green Room -- (10F)**

W2B • VCSEL --- continued

**11:00-11:15 W2B-(2)-2**  
**A simple process for high-speed vertical-cavity surface-emitting lasers fabrication up to 10Gbps**

*Hsin-Chieh Yu, Shoou-Jinn Chang, Yan-Kuin Su, Chia-Pin Sung, Yu-Wei Lin, Hong-Pin Yang, Chun-Yuan Huang, and Jin-Mei Wang*  
*National Cheng Kung University; Industrial Technology Research Institute; National Tsing Hua University, Taiwan*  
 A simple processing technology for oxide confined vertical-cavity surface-emitting lasers fabrication is reported in this article. Results of the burn-in test up to the present-day show that the high temperature lifetime of the fabricated devices exceeded 3300 hours.....

**11:15-11:30 W2B-(2)-3**  
**High performance large-area single-mode vertical-cavity surface-emitting lasers**

*Tao-Hung Hsueh, Hao-Chung Kuo, Fang-I Lai, Li-Hung Lai, and S. C. Wang*  
*National Chiao Tung University, Taiwan*  
 We report a low I<sub>th</sub> (~1.5mA), high power (>5mW) and speed performance (10Gb/s operation) single mode GaAs VCSEL employing O<sup>+</sup> implantation, MOCVD re-growth and selective oxidation.

**Spanish Room -- (10F)**

W2D • High-field Interaction with Atoms and Molecules --- continued

**11:00-11:30 W2D-(3)-2 (Invited)**  
**Generation and application of strong fields in the XUV region**

*Katsumi Midorikawa*  
*Laser Technology Laboratory, RIKEN, Japan*  
 In order to produce strong optical fields in the XUV region, we investigated the energy scaling of high-order harmonics using a long interaction length and a loosely focused geometry. Their applications to XUV nonlinear phenomena are also discussed.

**Auditorium -- (10F)**

W2C • Crystal Lasers and Related Devices --- continued

**11:00-11:15 W2C-(16)-2**  
**Continuous wave operation of surface-emitting two-dimensional photonic crystal laser**

*D. Ohnishi, K. Sakai, and S. Noda*  
*Kyoto University; ROHM Corporation Limited; Japan Science and Technology Corporation, Japan*  
 We report continuous wave operation of a surface-emitting two-dimensional photonic crystal laser. The threshold current is as low as 40 mA, and a very narrow divergence angle (1.0°) is observed.

**11:15-11:30 W2C-(16)-3**  
**Lasing characteristics of two-dimensional photonic crystal slab lasers with a modified linear shaped donor-type point defect**

*Masayuki Fujita, Yoshihiro Akahane, Atsushi Sugitatsu, Takashi Asano, and Susumu Noda*  
*Kyoto University; Sumitomo Electric Industries, Ltd.; Mitsubishi Electric Corporation, Japan*  
 We developed two-dimensional photonic crystal slab laser with a modified linear shaped donor-type point defect for ultrahigh Q cavity. A device characteristic is found to be dramatically improved by the modification of the defect structure.

**Sky Lounge -- (12F)**

W2I • Optical Fiber --- continued

**11:00-11:15 W2I-(8)-2**  
**The wide-angle TE-TM mode splitter**

*Ruei-Chang Lu and Yu-Pin Liao*  
*National I-Lan Institute of Technology; Ching Yun Institute of Technology, Taiwan*  
 We proposed a wide-angle TE-TM mode splitter using the model of nickel diffusion and proton exchange in Y-cut LiNbO<sub>3</sub>. The proposed device can achieve high splitting ratio with branching angles 14°- 30°.

**11:15-11:30 W2I-(8)-3**  
**A novel 1.3/1.55 μm 3-dB coupler based on multimode interference with a partial index-modulation region**

*Yen-Juei Lin and San-Liang Lee*  
*National Taiwan University of Science and Technology, Taiwan*  
 We propose a novel 1.3/1.55 μm dual-band 3-dB coupler on the InP material system. A partial index-modulation region is placed inside a multimode interference structure to shorten the device length. The coupling characteristics have good tolerance on the device length and wavelength variation.

**December 17, Wednesday**

**Room 101 -- (1F)**

W2J · Fiber Amplifiers Modeling and Fiber Devices Design ---- continued

**11:30-11:45 W2J-(14)-4**  
**An effective direct-search algorithm for inverse design of fiber grating filter**

*Cheng-Ling Lee and Yinchieh Lai*  
*National Chiao-Tung University;*  
*National Lien-Ho Institute of Technology, Taiwan*

An effective direct-search algorithm based on the evolutionary programming has been proposed for solving the inverse design problems of fiber gratings. Several practical filter design examples are presented to demonstrate the feasibility of the algorithm.

**11:45-12:00 W2J-(14)-5**  
**Analysis of hybrid fibers in high bit rate optical transmission system**

*Sun-ting Lin and Ing-Chin Huang*  
*Chunghwa Telecom Co., Ltd., Taiwan*

In this paper, the performance of two non-zero dispersion shifted fibers (NZ-DSF), LEAF and TrueWave, in high bit rate optical system are studied. We also test the hybrid circuit of these two fibers together in case.....

**Room 105 -- (1F)**

W2E · Optical Coherence Tomography (II) ---- continued

**11:30-11:45 W2E-(12)-3**  
**Numerical analysis on a path-length-resolved spectrum of dynamically scattered light**

*Katsuhiko Ishii and Toshiaki Iwai*  
*Hokkaido University, Japan*

The novel analysis method based on the radiative transfer theory is proposed in calculation of a path-length-resolved spectrum of dynamically scattered light. We demonstrate the property of dynamic scattering in the transition from single scattering to diffusive scattering.....

**11:45-12:00 W2E-(12)-4**  
**Compensation of higher-order dispersion in optical coherence tomography with a rapid-scanning optical phase delay line**

*I-Jen Hsu, Meng-Tsan Tsai,*  
*Chih-Wei Lu, and C. C. Yang*  
*National Taiwan University, Taiwan*

We demonstrate a new method for compensating higher-order dispersion mismatch that is usually induced in a fiber-based optical coherence tomography system with different lengths of fiber in the sample and reference arms.

**Room 106 -- (1F)**

W2H · Optical Information Processing (II) --- continued

**11:30-11:45 W2H-(9)-4**  
**Ultra-Fast Facial Recognition System based on VanderLugt Correlator**

*Eriko Watanabe and Kashiko Kodate*

*Japan Women's University, JAPAN*  
 We fabricated a fast facial recognition system based on Vanderlugt Correlator using FLC-SLM. We implemented the system to 1000 faces/s throughput of 1-channel processing and obtained the high recognition rate of 95% as a result.

**11:45-12:00 W2H-(9)-5**  
**Circular polarization resonator based on cholesteric liquid crystal mirrors**

*Yosuke Tanaka, Hiroyuki Takano,*  
*Takashi Kurokawa*  
*Tokyo University of Agriculture and Technology, Japan*

A Fabry-Perot resonator was fabricated based on UV-cured cholesteric liquid crystal (CLC) mirrors. Resonance of circular polarization at the wavelength of 638 nm was experimentally observed.

**Room 107 -- (1F)**

W2A · Next Generation Transport Systems--- continued

**11:30-11:45 W2A-(13)-4**  
**Programmable wavelength-time OCDMA coding design based on wavelength periodicity of arrayed-waveguide-grating**

*Wing C. Kwong, Guu-Chang Yangy, and Cheng-Yuan Chang*  
*Hofstra University, USA; National Chung Hsing University, Taiwan*

In this paper, we design a rapidly tunable and flexible arrayed-waveguide-grating (AWG)-based coding device, utilizing the wavelength periodicity of AWG, for wavelength-time OCDMA systems. Together with our new family of wavelength-time optical codes, the new design supports high data-rate OCDMA systems efficiently.

**11:45-12:00 W2A-(13)-5**  
**Implementaion of system-accommodated 10Gb/s optical transponder**

*Min-Sheng Kao, Cheng-Hung Tsai,*  
*Chia-Hung Chiu, and Kun-Yi Shen*  
*Industrial Technology Research Institute, Taiwan*

This paper describes a 10Gb/s ethernet pluggable (XENPAK) optical transponder with a SC-Connector designed for 1310nm 10G ethernet and 10G fiber channel specification. The discussion is addressed on 10Gb/s Opto-Electronic conversion design.....

**Room 110 -- (1F)**

W2G · Ultrafast Pulse Measurement and Coherent Transient --- continued

**11:30-11:45 W2G-(6)-2**  
**Coherent phonon spectroscopy of semiconductor-metal interfaces**

*Y. -M. Chang*  
*National Taiwan University, Taiwan*

Coherent LO and LA phonons of GaP-Au Schottky interfaces are probed with TRSHG technique. The driving mechanisms for these phonon modes are proposed. Bias-dependent carrier and phonon interaction can now be investigated in femtosecond timescale.

**11:45-12:00 W2G-(6)-3**  
**Momentum conservation in coherent transient optical Kerr effect**

*Wei-Tung Li, Chen-Wei Chen,*  
*Jiunn-Yuan Lin, Jaw-Luen Tang,*  
*Chia-Chen Hsu, Tai-Huei Wei, and*  
*Tzer-Hsiang Huang*  
*National Chung Cheng University;*  
*Wu Feng Institute of Technology, Taiwan*

We report recent results, using a femtosecond (fs) laser, on the momentum conservation of Raman-induced Kerr effect (RIKE) in  $\text{CHBr}_3$  liquid, where two intramolecular vibrations are Raman-excited.

**December 17, Wednesday**

**Int'l Reception Hall -- (1F)**

W2F · Fundamental Nonlinear Optics --- continued

**11:30-11:45 W2F-(5)-4  
Two-photon fluorescence properties of novel quadrupolar and octupolar molecules**

*Sean Liu, Kuen Shen Lin, Vicotr M. Churikov, Yi Zhen Su, Jiann T'suen Lin, Tzer-Hsiang Huang, and Chia Chen Hsu*

*National Chung Cheng University, Institute of Chemistry, Academia Sinica, Taiwan*

Two-photon excited fluorescence (TPF) properties of novel octupolar and quadrupolar molecules were measured. The experimental results show that they both have the same order magnitude of TPF cross-section and that the molecular symmetry influences the position of two-photon excited state.

**11:45-12:00 W2F-(5)-5  
Nonlinear optical performances of supramolecular 1-(4-Methyl)-piperazinyfullerene[60] - containing polysiloxane**

*Hendry Izaac Elim, Jianying Ouyang, Suat Hong Goh, and Wei Ji*

*National University of Singapore, Singapore*

The nonlinear optical (NLO) properties of 1-(4-Methyl)- piperazinyfullerene[60] (MPF) incorporated with a polysiloxane copolymer denoted as PSI-46 have been studied using nanosecond laser pulses at 532-nm wavelength.

**Ever Green Room -- (10F)**

W2B · VCSEL --- continued

**11:30-11:45 W2B-(2)-4  
Micromachined resonant cavity light emitter with low temperature dependence of emission wavelength**

*T. Amano, F. Koyama, M. Arai, and A. Mastutani*

*Tokyo Institute of Technology, Japan*

We present the design and the fabrication of novel micromachined vertical-cavity light emitters/lasers with a thermal strain control layer for temperature insensitive operations. The temperature dependence of a resonant wavelength can be freely controlled.....

**11:45-12:00 W2B-(2)-5  
Reliability of oxide confined 850 nm VCSELs for high speed interconnection systems**

*Tadayuki Sato, Norihiro Iwai, Yoshinori Haga, Maiko Ariga, Takeshi Hama, Hitoshi Shimizu, and Akihiko Kasukawa*

*The Furukawa Electric Co., Ltd., Japan*

The reliability of oxide confined 850 nm VCSELs for 10 Gb/s operation was investigated. The median life with criteria of 2 dB decrease of output power at environmental temperature of 25 °C was over 10 million hours.

**Spanish Room -- (10F)**

W2D · High-field Interaction with Atoms and Molecules --- continued

**11:30-11:45 W2D-(3)-3  
Inversion asymmetry of photoelectron angular distributions in circularly polarized short pluses**

*Zhang Jingtao, Li Shaohui, and Xu zhizhan*

*Shanghai Institute of Optical and Fine Mechanics, China*

The ejected electrons are different in opposite directions in ultrashort pulses, which results from multichannel ionizations. The initial phase of the pluses determines the optimal emission, then can be used to control the ejected electrons.

**11:45-12:00 W2D-(3)-4  
Femtosecond-laser-induced alignment in Coulomb explosion of nitrogen molecules**

*K. Miyazaki, T. Shimizu, M. Nakamura, K. Masuda, and D. Normand*

*Kyoto University, Japan*

Coulomb explosion experiments using linearly- and circularly-polarized fs laser pulses demonstrate that the highly-ionized nitrogen molecules tend to be aligned above the peak intensity of ~ 1 PW/cm<sup>2</sup>, while neutral and singly- ionized molecules are never aligned.

**Auditorium -- (10F)**

W2C · Crystal Lasers and Related Devices --- continued

**11:30-11:45 W2C-(16)-4  
Lasing characteristics and mode control of photonic crystal lasers with point and line composite defect**

*Kyoji Inoshita and Toshihiko Baba  
Yokohama National University, Japan*

We observed the room temperature photopumped lasing in photonic crystal lasers with point defects and with point and line composite defects. We also demonstrate various resonant modes and the mode control by composite defects.

**11:45-12:00 W2C-(16)-5  
Ultralow threshold microgear lasers and their fusion with quasiperiodic photonic crystals**

*K. Nozaki, A. Nakagawa, D. Sano, and T. Baba*

*Yokohama National University, Japan*

We demonstrate a GaInAsP microgear laser with the lowest record threshold of 11 μW. We also propose the fusion of a microgear and a quasiperiodic photonic crystal for high Q and smaller mode volume.

**Sky Lounge -- (12F)**

W2I · Optical Fiber --- continued

**11:30-11:45 W2I-(8)-4  
Tunable and switchable optical bandpass filters based on phase-shifted linear chirped fiber Bragg gratings**

*S. Y. Li, N. Q. Ngo, S. C. Tjin, P. Shum, and J. Zhang*

*Nanyang Technological University, Singapore*

We demonstrate a novel tunable optical bandpass filter (TOBF) by introducing and tuning the temporary phase-shifts in the linear chirped fiber Bragg grating (LCFBG) with two resistance wires. The bandwidth of the TOBF is 0.15 nm and the tuning range is 15 nm.

**11:45-12:00 W2I-(8)-5  
Complex fiber grating structures fabricated by sequential writing with polarization control**

*Kai-Ping Chuang, Yinchieh Lai, and Lih-Gen Sheu*

*National Chiao-Tung University; Van Nung Institute of Technology, Taiwan*

We propose a flexible method for fabricating complex fiber grating structures based on the sequential writing for fiber gratings with the polarization control of the UV exposure beam.

**December 17, Wednesday**

**Room 101 -- (1F)**

W2J · Fiber Amplifiers Modeling and Fiber Devices Design ---- continued

**12:00-12:15 W2J-(14)-6  
Design and analysis of new lensed-fiber for laser to fiber coupling**

*Tsung-Xian Lee, Ching-Cherng Sun, Yi-Ming Chen, Ying-Chih Chen, and Chun-Hsing Lee  
National Central University;  
Industrial Technology Research Institute, Taiwan*

A new lensed-fiber with two different rods of a spherical end is proposed. The lens geometry and refractive index are changed to obtain various working distance and spot size. We analyze the characteristic of lensed-fiber.....

**Room 105 -- (1F)**

W2E · Optical Coherence Tomography (II) ---- continued

**12:00-12:15 W2E-(12)-5  
Imaging of biological tissues using parallel polarization-sensitive spectral interferometric optical coherence tomography**

*Shuichi Makita, Yoshiaki Yasuno, Takashi Endo, Masahide Itoh, and Toyohiko Yatagai  
University of Tsukuba, Japan*  
Parallel polarization-sensitive spectral interferometric OCT has been developed to compress measurement time by detect of two polarized signal light at a time. Consequently, we obtain cross-sectional Jones matrix images of bovine tendon by double lateral scans.

**12:15-12:30 W2E-(12)-6  
Application to the optical coherent tomography of fiber Raman laser**

*Mitsuhiro Higashihata, Kei Tochigi, Yoshiki Nakata, and Tatsuo Okada  
Kyushu University, Japan*  
This paper describes the development broad-band light source for optical coherent tomography (OCT) based on the stimulated Raman scattering in the single-mode silica optical fiber pumped by a conventional nano-second solid state laser.

**Room 106 -- (1F)**

W2H · Optical Information Processing (II) --- continued

**12:00-12:30 W2H-(9)-6  
(Invited)  
Real-time joint transform correlation using optical heterodyning**

*T. C. Poon  
Virginia Tech, USA*  
Novel real-time joint-Fourier transform correlator (JTC) based on two-pupil optical heterodyning is described in this talk. Experimental results are provided.

**Room 107 -- (1F)**

W2A · Next Generation Transport Systems--- continued

**12:00-12:30 W2A-(13)-6  
(Invited)**

**Chaotic state optical communications**

*Jean-Pierre Goedgebuer  
Georgia Institute of Technology  
Lorraine, France*

**Room 110 -- (1F)**

W2G · Ultrafast Pulse Measurement and Coherent Transient --- continued

**12:00-12:15 W2G-(6)-4  
Coherent transient optical Kerr effect in liquids C<sub>2</sub>H<sub>4</sub>Cl<sub>2</sub> and C<sub>2</sub>H<sub>4</sub>Br<sub>2</sub>**

*Ying-Dar Lin, Chen-Wei Chen, Jaw-Luen Tang, Jiunn-Yuan Lin, Chia-Chen Hsu, Tai-Huei Wei, and Tzer-Hsiang Huang  
National Chung Cheng University;  
Wu Feng Institute of Technology, Taiwan*

Study on Transient optical Kerr effect of liquids C<sub>2</sub>H<sub>4</sub>Cl<sub>2</sub> and C<sub>2</sub>H<sub>4</sub>Br<sub>2</sub> with trains of 40-femtosecond laser pulses in the pump/delayed-probe experiment is presented and discussed.

**12:15-12:30 W2G-(6)-5  
Two-photon optical beam induced current imaging of indium gallium nitride blue LEDs**

*Fu-Jen Kao, Mao-Kuo Huang, Yung-Shun Wang, Sheng-Lung Huang, and Chi-Kuang Sun  
National Sun Yat-sen University;  
National Taiwan University, Taiwan*  
In this study, InGaN light emitting diodes (LEDs) are characterized by optical beam induced current (OBIC) and photoluminescence laser scanning microscopy through two-photon excitation. Light scattering and absorption in the packaging material.....

**Lunch Break**

**December 17, Wednesday**

**Int'l Reception Hall -- (1F)**

W2F · Fundamental Nonlinear Optics --- continued

**12:00-12:15 W2F-(5)-6  
Theory of coherent band renormalization in semiconductors by off-resonant laser fields**

*Yoshihiko Mizumoto and Yosuke Kayanuma  
Osaka Prefecture University, Japan*

A theory is presented for the coherent band renormalization and induced absorption in semiconductors under a strong off-resonant laser field. An induced absorption below the band gap is reproduced in agreement with experiment.

**12:15-12:30 W2F-(5)-7  
Experimental observation of the reduction of light group velocity by spectral burning hole in a ruby crystal**

*Yundong Zhang, Ping Yuan, Baohua Fan, and Zuguang Ma  
Harbin Institute of Technology, China*

Slowdown of light is observed in a ruby crystal. Here we report the reduction of light resulting from steep change of refractive index. Measured delay is about  $3.452 \pm 0.005$ ms, corresponding to a group velocity as slow as  $28.969 \pm 0.042$  m/s.

**Ever Green Room -- (10F)**

W2B · VCSEL --- continued

**12:00-12:15 W2B-(2)-6  
Multi-oxide layer vertical-cavity surface-emitting lasers with improved modulation bandwidth**

*M. Azuchi, N. Jikutani, M. Arai, T. Kondo, and F. Koyama  
Tokyo Institute of Technology, Japan*

We demonstrated VCSELs with multi-oxide layers (MOX) to reduce parasitic capacitance for high speed modulation beyond 10 GHz. We achieved a small signal modulation bandwidth of 11 GHz while that of a conventional single oxide layer VCSEL is 7 GHz.

**12:15-12:30 W2B-(2)-7  
Growth and characterization of 850nm InGaAsP/InGaP strain-compensated VCSELs by MOCVD**

*H. C. Kuo, T. C. Lu, Y. S. Chang, F. Y. Lai, G. C. Kao, L. H. Laih, and S. C. Wang  
National Chiao-Tung University, Taiwan*

In this paper, we demonstrate the growth and characterization of 850nm oxide-confined VCSELs utilizing In<sub>0.18</sub>Ga<sub>0.82</sub>As<sub>0.8</sub>P<sub>0.2</sub>/In<sub>0.4</sub>Ga<sub>0.6</sub>P strain-compensated SC-MQWs by MOCVD. The VCSELs show very low threshold current good temperature performance, and high modulation response up to 12.5Gb/s from 25C to 85C.

**Spanish Room -- (10F)**

W2D · High-field Interaction with Atoms and Molecules --- continued

**12:00-12:15 W2D-(3)-5  
Wave-front phase measurement of high-order harmonics from argon atoms**

*Jong Ju Park, Dong Gun Lee, Jae Hee Sung, and Chang Hee Nam  
Korea Advanced Institute of Science and Technology (KAIST), Korea*

The high-order harmonics from argon in a hollow tube showed excellent spatial coherence over nearly the whole cross section of the harmonic beam. Using this coherent harmonic source in the soft-x-ray region.....

**12:15-12:30 W2D-(3)-6 (This paper will be presented as a poster in session WP.)  
Analysis of high-order harmonics in the time-frequency domain for attosecond pulse generation**

*Kyung Taec Kim, Chul Min Kim, Dong Gun Lee, Moon-Gu Baik and Chang Hee Nam  
Korea Advanced Institute of Science and Technology;*

*Kyungwon University, Korea*  
The time-frequency behavior of high-order harmonics is analyzed using the spectrogram method to obtain the optimum condition for attosecond pulse generation. A criterion for the optimum bandwidth of high-order harmonics is obtained to generate.....

**Auditorium -- (10F)**

W2C · Crystal Lasers and Related Devices --- continued

**12:00-12:15 W2C-(16)-6  
Photonic molecules by coupled microdisk lasers**

*Atsuo Nakagawa and Toshihiko Baba  
Yokohama National University, Japan*

We fabricated a photonic molecule of two coupled microdisks, and observed the lasing with a photon coupling characteristic consistent with the theory. Such a molecule will provide a functional element such as a bistable device.

**12:15-12:30 W2C-(16)-7  
A novel white light LED structure using omnidirectional one-dimensional photonic crystals**

*Chung-Hsiang Lin, Jung-Chieh Su, and Jim Y. Chi  
Industrial Technology Research Institute, Taiwan*

We theoretically demonstrate a white light LED structure containing a one-dimensional photonic crystal which is designed by realistic fabrication parameters for the formation of omnidirectional photonic band gaps. With a band gap around 370 nm.....

**Sky Lounge -- (12F)**

W2I · Optical Fiber --- continued

**12:00-12:15 W2I-(8)-6  
Scalable coherent beam coupling of fiber lasers**

*Akira Shirakawa, Tomoki Sekiguchi, and Ken-ichi Ueda  
University of*

*Electro-Communications, Japan*  
Coherent addition of N fiber lasers using fiber couplers has been investigated for N=2, 4, and 8. As N increases, higher addition efficiency can be obtained due to suppression of sideband excitation by lineshape narrowing.

**12:15-12:30 W2I-(8)-7  
A micro GRIN-slab tip for integrated coupling between superfine-core waveguides and single-mode fibers**

*Kazuo Shiraishi, Chen S. Tsai, Hidehiko Yoda, and Kazushi Minagawa*

*Utsunomiya University, Japan; University of California, USA*  
A simple and robust spot size converter using a micro GRIN slab tip with a hemi-cylindrical endface is presented. The converter enables low loss coupling between single-mode fibers and small-core waveguides.

**Lunch Break****December 17, Wednesday**