

Thursday 13:30 – 15:30 December 18, 2003

Der-Hou Room -- (B1)

THP • Poster Paper

**THP-(1)-1****Lasing mode selection in a layered 2-dimensional square microcavity**

*Hee-Jong Moon, Gun-Woo Park, Sang-Bum Lee, Kyungwon An, and Jai-Hyung Lee*

*Sejong University; Seoul National University, Korea*

We propose a scheme for mode selection in a square-shaped two-dimensional layered microcavity Laser. By using a fused-silica square-shaped capillary containing dye-doped liquid as a layered microcavity, we could realize our idea for mode selection.

**THP-(1)-2****Plasma shutter for TEA CO<sub>2</sub> laser**

*Yanchen Qu, Deming Ren, Xiaoyong Hu, Lili Zhang, and Fengmei Liu*

*Harbin Institute of Technology, China*

A plasma shutter which can achieve pulse shaping of TEA CO<sub>2</sub> laser are presented. The system is described and the dependence of the gas breakdown by filled various gases and various pressures is discussed.

**THP-(1)-3****Picosecond solid-state dye lasers with a spectro-temporal selection**

*Do Q. Hoa, P. H. Minh, N.T. Thanh, D. V. Trung, T. Imasaka, and N. Dai Hung*

*Institute of Physics, Vietnam; Kyushu University, Japan*

A very fast spectral evolution in the broadband pulsed solid-state dye laser emissions generated from low-Q and short cavities is proved both experimentally and theoretically. This leads to a very fast oscillation damping on the short-wavelength wing.....

**THP-(1)-4****Elongation of the stable range of a thermal-birefringence compensated two-rod resonator without a discontinuity**

*Hyun Su Kim and Jin-Tae Kim*

*Chosun University, Korea*

A method for the continuous power increase without an abrupt power drop in a thermal-birefringence compensated two-rod resonator with increasing an electric power is proposed and numerically investigated. The removal of the unwanted power.....

**THP-(1)-5****Self-pulsing emission from an optically-pumped bi-directional CH<sub>3</sub>OH ring laser**

*K.Maeda, Y.Kodama, and N.Sokabe*

*Osaka City University, Japan*

Self-pulsing dynamics in an optically-pumped CH<sub>3</sub>OH ring laser has been observed. Under bi-directional operation, both the forward and backward output intensities display self-organized dynamics due to mode coupling depending on the medium pressure. Numerical analysis based on an inhomogeneously-broadened.....

**THP-(1)-6****Spectroscopy studies of the B1Piu state of Cs<sub>2</sub>**

*Chin-Chun Tsai, Yi-Chi Lee, Fang-Cheng Lin, and Thou-Jen Whang*

*National Cheng Kung University, Taiwan*

More than 1000 rovibrational transitions between the B1Piu to X1Sigma<sup>+</sup> states of Cs<sub>2</sub> were observed and analyzed which yield the potential parameters Te=13043.638(5)cm<sup>-1</sup>, Re=4.85 Å, De=2338.5(8)cm<sup>-1</sup>, Be=0.01077(1)cm<sup>-1</sup>, and we=34.37(4)cm<sup>-1</sup>

**THP-(2)-1****Spectroscopic and photorefractive properties of Ti-doped CdTe crystals**

*Yu. P. Gnatenko, A. O. Borshch, N. Kukhtarev, T. Kukhtareva, I. O. Faryna, V. I. Volkov, P. M. Bukivskij, R. V. Gamernyk, S. Yu. Paranchych, and L. D. Paranchych*

*Institute of Physics of NASU; Lviv National University; Chernivtsi National University, Ukraine ; Alabama A&M University; USA*

Studies were made of the optical, photoelectric and photorefractive properties CdTe:Ti crystals which provided information on the nature and energy structure of the impurity centers and intrinsic defects as well as on their photorefractive parameters.

**THP-(2)-2****Characteristic measurement of a new fiber laser with same DC bias adjustment for fiber loop mirror and internal phase modulator**

*Shyh-Lin Tsao, Huang-Cuang Lin, and Ta-Chun Lin*

*National Taiwan Normal University; Yuan Ze University, Taiwan*

We study a fiber laser with a non-symmetric resonant cavity with same DC bias adjustment for fiber loop mirror and internal phase modulator in this paper. Operation parameters for lasing are reported.

**THP-(2)-3****Self-organized superlattice in III-V alloys as the result of complex kinetic oscillation**

*D. H. Jaw, C. L. Lin, and Y. K. Su*

*Wu-Feng Institute of Technology; National Cheng Kung University, Taiwan*

The formation of self-organized superlattice in some III-V epilayers is mysterious. We propose a time dependent kinetic model for the crystal growth. The self-organized superlattice can be explained as the result of complex kinetic oscillation.

**THP-(2)-4****Positive and negative optical responses in high-electron mobility transistors and their applications to optically controlled microwave oscillators**

*Atsushi Ishikawa, Hiroshi Murata, Takuo Tanaka, Hidehisa Shiomi, and Sadahiko Yamamoto*

*Osaka University, Japan*

We found positive and negative optical responses in high-electron mobility transistors by changing the position of a focused optical beam in the optical mixing. Their applications to optically controlled microwave oscillators are also demonstrated.

**THP-(2)-5****Performances and reliability of 850nm VCSELs with various offset in gain peak and Fabry-Perot dip**

*Fang-I Lai, Li-Hong Lai, T. H. Hsueh, S. P. Tseng, H. C. Kuo, and S. C. Wang*

*National Chiao Tung University, Taiwan*

The 850nm VCSELs with various wavelength offsets in gain peak and Fabry-Perot dip were designed and fabricated. The VCSEL with 10 nm offset has the threshold current with less temperature sensitivity and the best reliability.

**THP-(2)-6****Characterization of 850nm AlGaAs/GaAs implant vertical cavity emitting lasers utilizing silicon implantation induced disordering**

*H.C. Kuo, W.C. Shu, T.C. Lu, Ya-hsien Chang, Fang-i Lai, Li-Hung Lai, and S. C. Wang*

*National Chiao Tung University, Taiwan*

In this paper, we report a novel implant VCSELs utilizing silicon implantation induced disordering. This VCSELs exhibit kink-free current-light output performance with threshold currents ~2.2 mA, and the slope efficiencies ~0.45 W/A.....

Thursday 13:30 – 15:30 December 18, 2003

Der-Hou Room -- (B1)

THP • Poster Paper

**THP-(2)-7****Analysis of polarization independent diffused QW optical amplifiers***Wallace C.H. Choy**University of Hong Kong, Hong Kong*

The features of polarization independence of optical amplifiers achieved by using diffused QW are discussed. Our theoretical results successfully explain why polarization independence can achieve in the long wavelength tail of the modal gain.....

**THP-(2)-8****Characteristics of InGaAs vertical-cavity surface-emitting lasers***Hung-Pin D. Yang, Chen-Ming Lu, Chun-Yuan Huang, and Jing-May Wang**Industrial Technology Research Institute, Taiwan*

We report our results on InGaAs vertical-cavity surface-emitting lasers (VCSELs) for fiber-optic applications at 1.3mm range. The epitaxial layers were grown on the n-GaAs substrates in a MOCVD system. The nitrogen composition of the InGaAs/GaAs active region is 0 to 0.01.....

**THP-(2)-9****Two-dimensional Vertical-cavity Surface-emitting Laser Arrays Fabricated by Zinc Diffusion***J. L. Yen, and Y. J. Yang, and C. Y. Lin**National Taiwan University, Taiwan*

Vertical-cavity surface-emitting laser (VCSEL) arrays with seven devices arranged in a honeycomb pattern have been fabricated by a selective zinc diffusion process. An optical coupled theory is used to predict the mode behavior.....

**THP-(2)-10****Photovoltaic cell characteristics for high intensity laser light***Hiroshi Miyakawa, Yosuke Tanaka and Takashi Kurokawa**Tokyo Univ., Japan*

Photovoltaic cell characteristics for high intensity laser light including Si, GaAs, InGaAs photovoltaic cells and an uni-traveling-carrier photodiode are investigated. We estimate the values of the series resistance of photovoltaic cells and clarify.....

**THP-(2)-11****The study on InGaAsP/InGaAs MQW-LD with symmetric and asymmetric separate confinement heterostructure***D. Heo, H. C. Bae, J. I. Lee, J. Jeong and I. K. Han**Korea Institute of Science and Technology (KIST), Korea University, Korea*

We improved the performance of InGaAsP/InGaAs 1.55  $\mu$ m multi-quantum well laser diodes with differently highly p-doped layers in the two-step separate confinement heterostructure (SCH) by inserting additional InGaAsP layer in n-SCH.....

**THP-(2)-12****Quantum-well-intermixing induced shift in material bandgap and refractive index using low-energy ion implantation***Yen-Ting Pan, San-Liang Lee, Rong Xuan, and Yu-Chen Yu*  
*National Taiwan University of Science and Technology; Industrial Technology Research Institute, Taiwan*

We developed a semi-analytical model to analyze the induced change in optical parameters of InGaAsP/InGaAsP MQWs by phosphorus-implanted quantum well intermixing (QWI). The results match well with the experimental results and can be applied for realizing photonic integrated circuits.

**THP-(4)-1****Generation of vortex by light-induced phase mask in a V-type atomic system***Jin-Ho Jeon, Won-Shik Choi, Myoung-Kyu Oh, Kyungwon An, and Jai-Hyung Lee**Seoul National University, Korea*

Optical vortices on a weak probe beam were generated by a strong pump beam with a vortex array or an L-shape stripe. We also observed a pair of vortices having opposite charges with the total charges conserved.

**THP-(4)-2****Elimination of self-focusing and self-defocusing under the condition of electromagnetically induced transparency in a lambda-type atomic samarium vapor***Myoung-Kyu Oh, Won-Kyu Lee, Jin-Ho Jeon, Won-Shik Choi, Kyungwon An, and Jai-Hyung Lee*  
*Seoul National University, Korea*

We observed that the spatial distortions of a probe pulse from Kerr nonlinearity were eliminated almost perfectly when a strong coupling pulse copropagates with the probe on two-photon-resonance in  $\Lambda$ -type 3 levels of atomic Sm.

**THP-(4)-3****NH<sub>3</sub> detection under water vapor influence by mid-IR source based on Yb fiber laser pumped difference frequency generation***Takuro Ono, Kazufumi Yasumoto, Hiroaki Ashizawa, Shigeru Yamaguchi, Masamori Endo, Katuhiko Sunako, Kenzo Nanri, Tomoo Fujioka, and Shuzaburo Takeda**Tokai University, Japan*

NH<sub>3</sub> detection in water vapor contained gas mixture with mid-IR light source at 3mm based on difference frequency generation was demonstrated. High spectral resolution measurements of NH<sub>3</sub> avoiding interference of water are reported.

**THP-(4)-4****Ab Initio/RRKM study of dissociation mechanism of C<sub>6</sub>H<sub>6</sub><sup>3+</sup>: a view on coulomb explosion of benzene***T. S. Zyubina, S. H. Lin, A. D. Bandrauk, and A. M. Mebel**Institute of Atomic and Molecular Sciences, Academia Sinica, Taiwan; Institute of Problems of Chemical Physics, Russian Academy of Sciences, Russia; Université de Sherbrooke, Canada*

Density functional B3LYP/6-31G(d,p) calculations have been performed in order to investigate isomerization and dissociation of benzene trication, which are relevant to the Coulomb explosion mechanism of benzene.

**THP-(4)-5****A complete analysis of double-excitation resonances in the photoionization spectrum of the Be atom***L. -R. Wang, W. -C. Chu, J. -Y. Lin, and K. -N. Huang*  
*Academia Sinica; National Taiwan University, Taiwan*

Angular distribution and spin polarization parameters of all five Rydberg series of double-excitation resonances in the photoionization of the Be atom are calculated in the multiconfiguration relativistic random-phase approximation. Energies and widths of these resonances.....

Thursday 13:30 – 15:30 December 18, 2003

Der-Hou Room -- (B1)

THP • Poster Paper

**THP-(4)-6****Electron-impact ionization for U91+ in the QED theory**

*Hsiao-Ling Sun, Tien-Yow Kuo, and Keh-Ning Huang*  
National Taiwan University;  
National Taiwan Ocean University;  
Institute of Atomic and Molecular Sciences, Academia Sinica, Taiwan

Electron-impact ionization of highly charged ions is studied in the QED theory. Our calculation will include the transverse-photon interaction as well as the vacuum-polarization potential between charges. We apply the two-potential distorted wave approximation.....

**THP-(4)-7****Measurement of hyperfine structures and isotope shifts of the thallium  $6^2P_{1/2}$  -  $7^2D_{3/2, 5/2}$  levels by using the saturated and linear absorption spectroscopy with velocity selective optical pumping**

*Kwang-Hoon Ko, Sang Eon Park, Do-Young Jeong, Jaewoo Kim, Taek-Soo Kim, Gwon Lim, and Cheol-Jung Kim*  
Korea Atomic Energy Research Institute, Korea

The linear and saturated absorption spectroscopy was performed for the  $6^2P_{3/2}$  -  $7^2D_{3/2, 5/2}$  transition lines of Tl-203, 205 isotopes. The hyperfine splittings and isotope shifts of the  $7^2D_{3/2, 5/2}$  levels of Tl atoms were also measured.

**THP-(4)-8****Frequency modulation of grazing-incidence PPLN OPO and its application in photoacoustic spectroscopic measurements**

*Jimmy Ng and A. H. Kung*  
Institute of Atomic and Molecular Sciences, Taiwan; University of Heidelberg, Germany

We report on a novel frequency modulation of a pulsed optical parametric oscillator and its application to photoacoustic spectroscopic detection of trace gases under atmospheric conditions.

**THP-(5)-1****Characterization of nonlinear-optical parameters of polymethine dye solutions**

*R. A. Ganeev, A. I. Rysanyansky, R. I. Tugushev, A. A. Ishchenko, N. A. Derevyanko, H. Kuroda, and T. Usmanov*

*NPO Akadempribor; Samarkand State University, Uzbekistan; Tokyo University, Japan; Institute of Organic Chemistry, Ukraine*  
Nonlinear optical characteristics of various polymethine (cyanine) dye solutions were investigated at the wavelength of 1064 nm. Their saturation characteristics as well as comparison of various types of nonlinear absorption were studied.

**THP-(5)-2****High average infrared output power of 1W with LiNbO<sub>3</sub> optical parametric oscillator**

*Ki-Ho Cho, Bum Ku Rhee, and K. B. Chung*

*Sogang Univ.; Hongik Univ., Korea*  
With a singly resonant parametric oscillator based on a bulk LiNbO<sub>3</sub> crystal pumped by a Q-switched Nd:YAG laser, we attain the average output power as high as 1 W for the signal wave of 1540 nm.

**THP-(5)-3****Efficient femtosecond CPOPA at 1kHz with an all-diode-pumped double stage scheme using PPKTP**

*V. Petrov, F. Noack, F. Rotermund, V. Pasiskevicius, A. Fragemann, F. Laurell, H. Hundertmark, P. Adel, and C. Fallnich*

*Max-Born-Institute, Germany; Ajou University, Korea; Royal Institute of Technology, Sweden; Laser Zentrum Hannover e. V., Germany*  
A practical double-stage CPOPA scheme is demonstrated which provides a compact solution to amplify stretched pulses to the 100  $\mu$ J level (signal + idler) at 1 kHz. The amplified signal pulses at 1.574  $\mu$ m are recompressed to 270 fs.

**THP-(5)-4****Widening bandwidth of second harmonic generation for efficient third-harmonic generation**

*G. Zhao, H. Liu, S. N. Zhu, Y. Y. Zhu, and N. B. Ming*  
*Nanjing University, China*

The bandwidth of second harmonic generation can be widened using an aperiodic QPM structure. The widening is considerably useful for improving design and fabrication tolerances for practical high-order harmonic devices.

**THP-(5)-5****Manifestation of polarization incoherency in self-action effects**

*Irina V. Shapochkina, and Igor I. Gancheryonok*

*Belarusian State University, Belarus*  
On the basis of covariant approach generalizations of the theory of polarization self-action effects in isotropic (polarization inhomogeneous) resonance media have been done. The results obtained demonstrate influence of the degree of polarization on evolution.....

**THP-(5)-6****New scheme of phase matching for four wave mixing laser spectroscopy of C<sub>2</sub> molecules in acetylene-oxygen flame**

*Eun Seong Lee, Dae Sik Choi, Jae Yong Lee, and Jae Won Hahn*  
*Inje University, Korea Research Institute of Standards and Science; Yonsei University, Korea*

A weak resonant probe and two strong off-resonant pump beams are aligned in a new scheme of phase matching to generate third order nonlinear optical signal for application in laser spectroscopy.....

**THP-(5)-7****Numerical simulation of EM pulses propagating through dielectric films characterized by complex first-order susceptibility**

*Mingtsu Mark Ho*  
*Wu-Feng Institute of Technology, Taiwan*

Numerical simulation of the effects of complex first-order susceptibility on EM pulses is reported. Dielectric thin films characterized by complex susceptibilities are used for the simulation of the reflection and transmission of EM pulses.

**THP-(5)-8****Message modulation type secure communication characteristics using optical fiber ring resonator chaos**

*Kanako Suzuki and Yoh Imai*  
*Ibaraki University, Japan*  
Message modulation type chaos secure communication system using optical fiber ring resonators is analyzed numerically. It is found that the decryption characteristics improve up to the noise level with a decrease in the parameter difference.

**THP-(5)-9****Diffraction efficiency of scalar and vector holograms in a methyloange- doped PVA film**

*H. R. Yang, E. J. Kim, S. Y. Woo, C. H. Sohn, S. J. Lee, and C. H. Kwak*

*Yeungnam University, Korea*  
We fabricated MQ/PVA thin films at various concentrations of dye. The real-time diffraction efficiencies for scalar and vector holograms were measured for various intensities of writing beams, and theoretical analysis was presented.

Thursday 13:30 – 15:30 December 18, 2003

Der-Hou Room -- (B1)

THP • Poster Paper

**THP-(5)-10****Determination of nonlinear optical constants in amorphous As<sub>2</sub>S<sub>3</sub> thin film by transmission spectrum**

S. Y. Woo, S. J. Lee, E. J. Kim, H. R. Yang, G. Y. Kim, and C. H. Kwak

*Yeungnam University, Korea*  
By simple measurement of transmittance spectrum of amorphous As<sub>2</sub>S<sub>3</sub> thin film the changes of nonlinear optical properties such as refractive index, absorption coefficient, thickness of the film and optical band gap energy were determined.

**THP-(5)-11****Two-photon pumped fluorescence and lasing of phenalenon derivatives**

V. A. Svetlichnyi, T. N. Kopylova, L. G. Samsonova, V. A. Reznichenko, and S. M. Dolotov

*Tomsk State University, Russia*  
The two-photon processes in phenalenon derivatives in polymethylmethacrylate (PMMA) solutions and matrix excited with Nd<sup>3+</sup> : YAG-laser radiation are investigated. The efficiency of two-photon fluorescence is estimated.

Upconversion lasing of phenalimine-512 in ethanol and PMMA.....

**THP-(5)-12****Soliton self-frequency shift in the air-clad tapered fiber**S. M. Kobtsev, S. V. Kukarin, A. A. Pustovskikh, and N. V. Fateev  
*Novosibirsk State University, Russia*

We report the first observation of self-frequency-shifted solitons in the silica/air-clad tapered fiber. Femtosecond tunable soliton generation with a spectral shift of wavelength up to 1127 nm has been demonstrated for 55-fs pump pulses at 805 nm.

**THP-(5)-13****Characterization of OPCPA with BBO crystal for femtosecond Ti:sapphire laser pulses**Yong Ho Cha, Kitae Lee, Seong Mo Nam, Byoungduk Yoo, Yong Joo Rhee, and Cheoljung Kim  
*Korea Atomic Energy Research Institute, Korea*

We have numerically and experimentally investigated the characteristics of the optical parametric chirped-pulse amplification (OPCPA) of femtosecond Ti:sapphire laser pulses by using BBO crystals. Numerical calculations showed that a high gain.....

**THP-(5)-14****Properties of multi-hump temporal cavity solitons**B. Zhao, D. Y. Tang, P. Shum, Y. D. Gong, W. S. Man, H. Y. Tam  
*Nanyang Technological University, Singapore; Hong Kong Polytechnic University, Hong Kong*

The properties of multi-hump (-pulse) temporal solitons in passively mode-locked fiber lasers have been investigated. All the features reported before on soliton operation have been discovered on multi-hump soliton operation for the first time.

**THP-(5)-15****Coupled-wave theory of distributed-feedback optical parametric amplifiers and oscillators**Y. C. Huang and Y. Y. Lin  
*National Tsinghua University, Taiwan*

A distributed-feedback optical parametric amplifier allows idler-seeding without concerning Bragg-reflection loss. An oscillator of this type has both wavelength and mode selectivities. We have developed a coupled-wave theory for the gain and resonance of this new class of laser devices.

**THP-(5)-16****Probability density of signal with nonlinear phase noise**Jen-An Huang and Keang-Po Ho  
*National Taiwan University, Taiwan*

The probability density of a signal contaminated by nonlinear phase noise is derived analytically. The distribution of received phase is also given and found to be asymmetrical with respect to the mean nonlinear phase shift.

**THP-(6)-1****Characterization of photogenerated terahertz radiation in high-T<sub>c</sub> superconductors**P. I. Lin, K. H. Wu, J. Y. Juang, J. -Y. Lin, T. M. Uen, and Y. S. Gou  
*National Chiao Tung University, Taiwan*

The characteristics of photogenerated terahertz (THz) pulses radiation about 450 fs wide from a current-biased superconducting YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7- $\delta$</sub>  (YBCO) bow-tie antenna were investigated using a free-space electro-optic sampling technique. The dynamics of the quasiparticles optically induced by the ultrafast laser.....

**THP-(6)-2****Experimental observation of a PS-laser-induced shock wave**J. P. Chen, R. X. Li, Z. N. Zeng, X. T. Wang, and Z. Z. Xu  
*Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China*

We present femtosecond-time-resolved measurements of a Mbar pressure shock wave release process with a chirped pulse spectral interferometer. The phase shift and reflectivity history reveal that the shock accelerates the rear surface before its ablation.

**THP-(6)-3****Charge carrier mobility in organic materials measurement with time-of-flight technique**Shun-Wei Liu, Ching-An Huang, and Yih Chang  
*Chang-Gung University, Taiwan*

We have measured mobility of organic materials with time-of-flight (TOF) technique. Experimental results indicate hole mobility of those materials is about one order magnitude higher than that of electron mobility.

**THP-(6)-4****Observation of coherent optical phonons in GaAs/AlGaAs single heterojunction**

Y. -M. Chang, N. -A. Chang, and Y. -H. Chang

*National Taiwan University, Taiwan*  
Time-resolved second-harmonic generation was used to generate and detect coherent LO phonons in semiconductor heterojunctions. Three coherent LOGaAs, LOGaAs-like, and LOAlAs-like phonons were launched by transiently screening the depletion field in the GaAs/Al<sub>x</sub>Ga<sub>1-x</sub>As interfacial region.

**THP-(6)-5****Adaptive pulse compression of femtosecond laser pulses using a low-loss pulse shaper**Kyung-Han Hong and Chang Hee Nam  
*Korea Advanced Institute of Science and Technology (KAIST), Korea*

A low-loss pulse shaper, composed of a micro-machined deformable mirror and a Brewster-cut prism, is demonstrated for the adaptive compression of femtosecond laser pulses. The transmission efficiency of the pulse shaper reaches 93 % with dielectric mirrors and 85 % with gold-coated mirrors.

Thursday 13:30 – 15:30 December 18, 2003

Der-Hou Room -- (B1)

THP • Poster Paper

**THP-(6)-6****Ultrafast intersubband relaxation at 1.55  $\mu\text{m}$  in GaN/AlN MQWs**

*J. Hamazaki, S. Matsui, H. Kunugita, K. Ema, H. Kanazawa, T. Tachibana, A. Kikuchi, and K. Kishino*  
*Sophia University, Japan*  
 We have observed intersubband transition dynamics in GaN/AlN MQWs at 1.55  $\mu\text{m}$ . The relaxation dynamics consists of ultrafast (170 fs) and slower (1.1 ps) components. The origin of these dynamics is discussed.

**THP-(6)-7****Biexciton dynamics in an organic-inorganic hybrid quantum-well material.**

*H. Kunugita, D. Ichii, K. Umeda, M. Toda, K. Ema, K. Tanaka, and T. Kondo*  
*Sophia University; The University of Tokyo, Japan*  
 We studied biexciton dynamics of an layered perovskite-type quantum-well material  $(\text{C}_6\text{H}_{13}\text{NH}_3)_2\text{PbI}_4$ . We estimated biexciton binding energy to be 60meV. The equilibrium temperature of biexciton is 160K which is much higher than the lattice temperature.

**THP-(6)-8****Soliton stability in inhomogeneously broadened lasers**

*Li Yan, Wei Lu, and Song Han*  
*University of Maryland; Columbia University, U.S.A.*  
 Insufficient gain filtering gives rise to a new type of instability on soliton pulse in inhomogeneously broadened lasers. We studied the clean mode-locking region in lasers with different degree of inhomogeneity.

**THP-(7)-1****Fiber-optic plate bonded  $\text{Al}_{0.3}\text{Ga}_{0.7}\text{As}/\text{GaAs}$  transmission photocathode**

*K. M. Kim, M. Kim, J. H. Cha, J. H. Kim, and Y. S. Kwon*  
*Korea Advanced Institute of Science and Technology, Korea*  
 An AlAs/GaAs/ $\text{Al}_{0.3}\text{Ga}_{0.7}\text{As}$  heterostructure on a GaAs substrate has been directly bonded on a fiber-optic plate for the first attempt of the 3rd generation transmission photocathode. The substrate is removed mechanically and etched chemically.....

**THP-(7)-2****Surface treatment of inductively coupled plasma on P-GaN**

*C. T. Tseng, S. H. Su, M. Yokoyama and C. W. Ou, and S. M. Chen*  
*I-Shou University, Epitech Technology Corporation, Taiwan*  
 A reduction of Ni/Au ohmic contact on p-type GaN is obtained by surface treatment using  $\text{Cl}_2$  inductively coupled plasma. The formation of  $\text{GaCl}_x$  increases Ga-vacancies and decreases the Schottky barrier for the conduction of holes.

**THP-(7)-3****Self-organized iron silicide nano dots on silicon (001) substrate**

*L. J. Chou and Y. L. Chuen*  
*National Tsing-Hua University, Taiwan*  
 In this experiment, self-aligned (1-D) light emitted iron disilicide quantum dots have been successfully grown by a UHV electron gun evaporation system, using either  $\text{Si}_x\text{Ge}_{1-x}$  or strained Si as a substrate.

**THP-(7)-4****Influence of growth parameters on gray-track formation in  $\text{Gd}_x\text{Y}_{1-x}\text{Ca}_4\text{O}(\text{BO}_3)_3$** 

*Y. Syuto, S. Yasuda, R. Kuwabara, K. Sato, H. Kitano, S. Brahadeeswaran, H. Nakao, M. Yoshimura, Y. Mori, and T. Sasaki*  
*Osaka University, Japan*  
 Gray-tracking susceptibility of  $\text{Gd}_x\text{Y}_{1-x}\text{Ca}_4\text{O}(\text{BO}_3)_3$  (GdYCOB) was investigated by measuring a change in optical transmission at 355 nm. Crystals grown from high-quality sintered materials possess higher damage tolerance than conventional ones.

**THP-(7)-5****Rate equation analysis of fluorescence characteristics of Er; Yb; Ce codoped ZBLAN glass**

*K. Nagamatsu, Z. Meng, M. Higashihata, Y. Nakata, Y. Kubota, N. Nishimura, T. Teshima, and T. Okada*  
*Kyushu University; Kyoto University; Chemical Research Center (Ube), Central Glass Co. LTD., Japan*  
 To improve 1.55  $\mu\text{m}$  band fluorescence, Ce and Yb were doped into Er doped ZBLAN glasses, the fluorescence characteristics and energy transfer dynamics of Ce:Er:Yb:ZBLAN glasses were investigated.

**THP-(7)-6****Numerical and experimental investigation of 2x2 optical switch in silica-on-silicon**

*Shang-Yu Huang, Jiann-Shiun Kao, Chien-Kang Kao, Chuen-Hong Tsai, and I-nan Lin*  
*National Tsing-Hua University; National Science Council, Taiwan*  
 We designed a 2x2 Mach-Zehnder (MZI) thermo-optic switch based on multimode interference (MMI) couplers in silica-on-silicon. Issues concerning the influence of a number of design parameters for a 2x2 multimode interference couplers are discussed. The silica-on-silicon technology with surface micromachining revealed.....

**THP-(7)-7****Engineering nanoscaled nonlinear optical thin film via Langmuir-Blodgett technique**

*Hsing-Lin Wang, Peter A. Chiarelli, Ding-Guo Liu, Jeanne M. Robinson, Joanna L. Casson, and Jaroslaw Majewski*  
*Los Alamos National Laboratory, Mexico*  
 We use Langmuir-Blodgett technique to assemble newly synthesized amphiphiles that have highly polarizable chromophores into multilayered thin films. These thin films have long-range structural order and high nonlinear optical signals .

**THP-(8)-1****Characterization of PECVD oxynitride optical waveguides**  
*Ailing Zhang and Kam Tai Chan*  
*The Chinese University of Hong Kong, Hong Kong*

Rectangular channel waveguides are fabricated using SiON. Propagation loss has been characterized and annealing is an effective means to reduce the loss significantly. A broader waveguide have much smaller loss than a narrow waveguide.

**THP-(8)-2****Tolerance design of optical micro-bench by statistical design of experiment**

*B. C. Hwang, H. Y. Park, J. Y. Lee, S. G. Park, S. G. Lee, B. H. O, D. S. Choi, and E. H Lee*  
*Inha University; Nano Process Laboratory, Intelligence & Precision Machine Department, Korea*  
 Tolerance of positional error of components assembled onto optical micro-bench is determined for optical fiber connection with ball lenses. Efficient array by design of experiment is generated and optical coupling efficiency is calculated.

**THP-(8)-3****A novel coupled fiber ring laser and its application in CATV signals transmission**

*Shyh-Lin Tsao, Huang-Cuang Lin, and Huang-Ping Chen*  
*National Taiwan Normal University; Yuan Ze University, Taiwan*  
 We demonstrate a fiber laser with three coupled fiber rings and a 2x2 electro-optical modulator for transmitting CATV signals in this paper. The system performance including CNR, CSO, and CTB are also reported.

Thursday 13:30 – 15:30 December 18, 2003

Der-Hou Room -- (B1)

THP • Poster Paper

**THP-(8)-4****Effect of LPG bending and its application in fiber accelerometers***Chwen-shell Ho and Jiun-Woei Huang**Chung-Yuan University; Chung-Shan Institute of Science and Technology, Taiwan*

We discovered that the transmission spectra of bending long period fiber gratings (LPGs) exhibit a splitting of loss peaks. This phenomenon allows LPGs can be used as the strain sensors and the accelerometer.

**THP-(8)-5****Optical interconnection using 450-ended rods and waveguide-embedded printed circuit boards***Byung Sup Rho, Han Seo Cho, Ji-Young Eo, Saekyoung Kang, and Hyo-Hoon Park**Information and Communications University, Korea*

We demonstrated a new architecture of the chip-to-chip optical interconnection using optical connection rods which can be applied in the polymeric-waveguide-embedded electrical-optical printed circuit board. We used 450-ended optical connection rods as a medium to guide light.....

**THP-(8)-6****Horn-shaped multimode interference-based Nx1 combiners***Zhigang Wu and Katsuyuki Utaka**WASEDA University, Japan*

We proposed a new structure of MMI-based Nx1 combiners with more compact, lower insertion loss and no end reflection. Also, the position of self-images can be changed by adjusting the curvature of the MMI sides.

**THP-(8)-7****Fabricating a silicon microlens mold by ICP dry etching***R. L. Chen, C. M. Wang, and J. Y. Chang**National Central University, Taiwan*

In this paper, a silicon mold, with spherical/aspherical concave microlens arrays, was made by using ICP dry etching technique. A PMMA microlens was molded by using this mold and then tested by SEM, Dektak profiler and etc.

**THP-(8)-8****High-precision fiber optical gyroscope with linear digital output***Y. Korkishko, V. Fedorov, S. Kostritskii, E. Paderin, V. Prilutskii, and V. Ponomarev**Optolink Ltd., Moscow Institute of Electronic Technology, PROTON, Russia*

The design and industrial production of closed loop fiber optical gyroscopes with linear digital output is considered. This gyro characterized by high accuracy can be applied in high-grade (space, aviation, marine, land) inertial navigation systems.

**THP-(8)-9****Long-period planar waveguide gratings devices***H. Y. Tang, H. C. Tsoi, W. H. Wong, and E. Y. B. Pun**City University of Hong Kong, Hong Kong*

Long-period waveguide gratings based on a low-loss negative tone ENR polymer have been fabricated using two different fabrication processes. Both structures exhibit similar transmission characteristics.

**THP-(8)-10****A novel Si-based stacked free space pick-up head and holographic optical element***Chien Chieh Lee, Jenq Yang Chang, Yu Cheng Chang, and Guo Chung Chi**National Central University, Taiwan*

We propose an optical pick-up head system, which can be used in optical MEMS technology, has been designed on stacked Si substrates. Transmission holographic grating was fabricated and studied the diffraction effect of the holographic optical element.

**THP-(8)-11****Fabrication of Pb(Zr,Ti)O<sub>3</sub> optical waveguide devices on silica substrate by metallo-organic decomposition***Chien-Kang Kao, Jiann-Shiun Kao, Chuen-Hong Tsai, Cheng-Chung Chi, and I-Nan Lin**National Tsing-Hua University; National Science Council, Taiwan*

The highly textured PZT films were successfully synthesized on amorphous silica substrates with SrTiO<sub>3</sub> buffer layer by MOD method. Utilizing this heterostructure, a PZT optical waveguide was fabricated by photolithography and etching process.....

**THP-(8)-12****Gain-flattened wideband Raman amplifier with broad-linewidth pumps approximating continuous-spectrum pump***S. M. Kobtsev and A. A. Pustovskikh**Novosibirsk State University, Russia*

We propose the design of flat-gain Raman amplifiers with continuous-spectrum pump and four broad-linewidth 14XX-nm pumps with 0.1/0.15-dB gain flatness at the average amplification of 7.7/7.6 dB within the 1528- 1599/1520-1600 nm ranges respectively.

**THP-(8)-13****Use of fiber Bragg grating sensors for fiber optic pavement monitoring system development***Jaw-Luen Tang, Jian-Neng Wang, Er-Liang Chien, and Yi-Shian Wang**National Chung Cheng University; National Yunlin University of Science and Technology, Taiwan*

A new program dedicated to be the first fiber optic pavement monitoring system in Taiwan is introduced. The overview of the project and the state of sensor design, calibration and test are presented

**THP-(8)-14****Electrical crosstalk analysis for gigabit optical transceiver module***Sung-IL Kim, Yong-Seong Eom, Byung-Seok Choi, Kwang-Seong Choi, Ho-Gyeong Yun, Jong-Hyun Lee, Jun-Hee Park, Jong-Deok Kim, and Jong-Tae Moon**Basic Research Laboratory, Electronics and Telecommunications Research Institute, Korea*

We propose the electrical crosstalk reduction method of the gigabit transceiver module for the FTTH (Fiber-To-The-Home) applications. For the electrical crosstalk reduction between LD and PD, we insert a dummy ground line nearby a signal lines.

**THP-(9)-1****Analysis of 8x8 spot converter of VCSEL array module using microlens array***Wen-Ming Cheng, Hen-Wai Tsao, and Shyh-Lin Tsao**National Taiwan University; National Taiwan Normal University, Taiwan*

Analysis of the minimized physical size and increasing of optical coupling intensity are considered using 8 x8 VCSEL array and microlens array scaled to 4 mm<sup>2</sup> area.

Thursday 13:30 – 15:30 December 18, 2003

Der-Hou Room -- (B1)

THP • Poster Paper

**THP-(9)-2****Performance analysis of various switching architecture based on 2x2 LiNbO<sub>3</sub> electro-optical switches**

*Shyh-Lin Tsao, Yu-Min Lu, and Hsin-Hung Lin*  
National Taiwan Normal University, Taiwan

We design a lot of spatial switching networks based on integrating 2x2 LiNbO<sub>3</sub> electro-optical switches. In this paper, we consider various spatial switching networks such as General MDB (GMDB), Modified Double Crossbar (MDX), dilate Benes, etc.....

**THP-(9)-3****Distortion tolerant color pattern recognition in terms of a non-zero order Joint transform correlator with a phase-shifting technique**

*Jian-Shuen Fang and Chulung Chen*

National Chiao Tung University; Yuan Ze University, Taiwan

We present a non-zero order joint transform correlator (NOJTC) with a phase-shifting technique for color pattern recognition. Both the color target image and the reference function are separated into three channels (R, G, B).

**THP-(9)-4****Photorefractive optical image interaction in feedback signal communication**

*Tzu-Chiang Chen, Chi-Ching Chang, Wen-Fun Liu, Hon-Fai Yau, and Hsiao-Yi Lee*

National Defense University; National Center University; Ming-Hsin Institute of Technology, Taiwan

An optical setup and relevant communication schemes interconnecting optical signals among mutually coherent optical channels are proposed to enhance the functionality of optical devices used for communication purposes. Based on self-pumped phase conjugation and two-wave mixing mechanisms in an un-doped BaTiO<sub>3</sub> photorefractive crystal.....

**THP-(9)-5****Low-crosstalk 3x3 optical fiber cross connector**

*Hyun Seo Kang and Joon Young Jung*

Electronics and Telecommunications Research Institute, Korea

In the textured microcavity, Bragg scattering is expected to provide optical bandgap. Careful tailoring of the photonic lattice parameters allows us to tune the emission characteristic of the microcavity.

**THP-(10)-1****Surface profile measurement and stabilized Michelson interferometer**

*Jin-Tae Kim, Dohyoung Kim, and Hyun Su Kim*  
Chosun Univ., Korea

Surface profile measurement has been investigated by using Vikhagen filtering method and Michelson interferometer. The stabilization of the interferometer has been done by fringe locking method and phase unwrapping combined with these will be presented.

**THP-(10)-2****Automatic optical fiber sensor system based on white light interferometer with heterodyne signal processing**

*Yan-Ching Chiu, Ching-Lung Lai, Hsiu-Chen Hsu, Chung-Ping Liu, and Ming-Wen Chang*

Yuan Ze University, Taiwan

A system based on white light interferometry and synthetic-heterodyne demodulation is described. In our experiment of measuring the displacement of a PZT driving mirror, sensitivity of 100 nanometers has been realized.

**THP-(10)-3****The application of three-intensity measurement technique in ellipsometry**

*K. Y. Lee, C. J. Chen, and Y. F. Chao*

NCTU, Taiwan

A three-intensity technique is applied in ellipsometry for measuring the ellipsometric parameters of a polymer thin film surface. In addition to the thickness of polymer film, the regions of pure substrate, intermediate and polymer are studied separately.

**THP-(10)-4****Compact long-path absorption laser radar system for measuring greenhouse molecular concentration**

*M. Imaki, T. Tada, T. Higashikawa, A. Hayashi, and T. Kobayashi*  
Fukui University, Japan

A compact long-path absorption laser radar system has been developed incorporating a single-mode optical parametric oscillator with the PPMgLN crystal for methane concentration measurements. Spatial distribution can be derived using topographic targets as the reflectors at several directions.

**THP-(10)-5****Construction of a reference filter radiometer for the spectral irradiance measurements**

*Murat Durak, A. Kamuran Türkođlu, and Farhad Samadov*  
TÜBÝTAK -Ulusal Metroloji Enstitüsü, Turkey

Characterization of a home-made reference filter radiometer, which is constructed from three-element reflection trap detector, a precision aperture and temperature controlled band-pass filters, is introduced.

**THP-(10)-6****Image processing techniques for measuring wavefront distortion of a laser beam**

*Seung-Kyu Park, Sung-Hoon Baik, Byung Heon Cha, Cheol-Jung Kim, and Sung Woong Ra*

Korea Atomic Energy Research Institute; Chungnam University, Korea

The wavefront measuring resolution and speed are important to improve the performance of a wavefront measurement and correction system. There is a trade-off between the measurement resolution and the measurement speed for a measuring system using a Shack-Hartmann sensor.

**THP-(11)-1****The study of the effects of laser UV-radiation on the structure and properties of fluorine thin-film coats**

*Slavomir Anufrik, Andrey Ginel, and Kazimir Znosko*  
Yanka Kupala State University of Grodno, Belarus

We have studied the functional dependence of the microhardness of a number of steel brands covered with the fluorine thin – film coats on the energy density of the laser radiation. The optimal energy parameters for processing were specified.

Thursday 13:30 – 15:30 December 18, 2003

Der-Hou Room -- (B1)

THP • Poster Paper

**THP-(11)-2****Measurement of post-welding shift for to-can pigtail package**

*C. H. Yiu and Y. M. Cheung*  
*ASM Assembly Automation Ltd., Hong Kong*

By using non-contact capacitive sensors to measure post-welding shift (PWS), the effects of external pre-load on welding parts and variation of welding spot location on PWS are studied. The importance of structure and mechanical tolerance of welding parts is also discussed.

**THP-(12)-1****Comparison of tissue optical properties for localized and homogeneous model of light absorption by blood**

*V. V. Barun and A. P. Ivanov*  
*Belarus National Academy of Sciences, Belarus*

Optical absorption characteristics of multicomponent biological tissues are studied and compared for homogeneous and discrete localization of absorbers. The effects of localized absorbers are discussed as applied to light and heat transfer through biological tissues.

**THP-(12)-2****Nondestructive evaluation of sugar content in fruits by the use of near-infrared lasers**

*Yoshiaki Shimomura*  
*Industrial Technology Center of Nagasaki, Japan*

For nondestructive evaluation of sugar content in fruit, we have proposed a new method that used the near-infrared lasers. The method doesn't need the diffraction grating that is used in the current spectroscopic method.

**THP-(12)-3****Photobleaching of dendrimer under multi-photon excitation**

*Xin Hong, Chifang Chang, Chiyu Jiang, and Fu-Jen Kao*  
*Tianjin University, China; National Sun Yat-sen University, Taiwan*

Photobleaching as a result of intense laser irradiation has been an important issue in the applications of laser scanning microscopy. In this study we are employing time-lapsed techniques to study the effects of photobleaching of dendrimer under multi-photon excitation.....

**THP-(12)-4****Topical application of photofrin for photodynamic diagnosis of oral neoplasms**

*Chun-Yuan Huang, Cheng-Jen Chang, Pei-Shu Hwang, Muh-Shi Lin, and Petra Wilder-Smith*  
*Chang Gung Memorial Hospital, Taiwan; University of California, USA*

The prognosis of patients with oral cancer can be improved by early diagnosis and treatment. Light-induced fluorescence detection using photofrin topically provides a sensitive, non-invasive technique for early identification of oral cancer. ....

**THP-(12)-5****Nonlinear optical spectroscopy of biotin and biotin ester: two-photon fluorescence and second harmonic generation**

*Elena Perevedentseva, Artashes Karmenyan, Arthur Chiou, and Fu-Jen Kao*  
*National Sun Yat-sen University; National Yang Ming University, Taiwan*

The femtosecond laser was used for simultaneous single-beam three-dimensional optical trapping of, and excitation of second-harmonic as well as two-photon fluorescence in biotin and biotin ester microcrystals.

**THP-(12)-6****Implementation of autofluorescent excitation-emission matrices for differentiation of cervical tissue**

*Shou-Chia Chu, Jui-Wen Teng, Tzu-Chien Hsiao, Zhi-Yu Chen, Jiu-Chong Yuan, and Huihua Kenny Chiang*  
*National Yang-Ming University; Taipei Veterans General Hospital, Taiwan*

We used partial least squares (PLS) to analyze autofluorescent excitation-emission matrices (EEM) in normal and abnormal cervical tissue. The result shows autofluorescence technology with PLS analysis can diagnose pathological changes of the cervical tissue.

**THP-(13)-1****Low cost package of parallel optical receiver module**

*Weng-Jin Wu, Yao-Ling Cheng, Yi-Ming Chen, Shu-Jou Chen, and Cherng-Shiun Wu*  
*Industrial Technology Research Institute, Taiwan*

This paper describes a 4-channel parallel optical receiver module with a MPO-Connector designed for a very short reach OC-192 specification. The discussion is addressed on optical design, package and measurement. The applicability of 4-channel parallel optical receiver module.....

**THP-(13)-2****Analysis of a simplex coherent satellite communication system**

*Shyh-Lin Tsao, Yi-Chih Lin, and Chih-Shang Liu*  
*National Taiwan Normal University, Taiwan*

In this paper, we describe a new simplex coherent satellite communication system. We analyze the numerical results to estimate the performance of the system by BER and CNR for some impact factors.....

**THP-(13)-3****Holographic Fresnel multiplexer/demultiplexer**

*Xuechang Ren, Xiangsu Zhang, and Shou Liu*  
*Xiamen University, China*

The primary holographic WDM using off-axis holographic Fresnel lens has been fabricated. The principle and fabricating technology of the WDM with the working wavelength of 1542-1558 nm and the channel spacing of 8 nm are described.

**THP-(13)-4****Implementation of advanced 10Gb/s optical transceiver module**

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

This paper describes a 10Gb/s small form pluggable (XFP) optical transceiver module with a LC-Connector designed for a very short reach 10G ethernet and 10G fiber channel specification. The discussion is addressed on 10Gb/s Opto-Electronic conversion design.....

**THP-(14)-1****Expert system for dispersion flattened filter design with fiber Bragg grating**

*Su-Frang Shu and Ci-Ling Pan*  
*National Chiao Tung University, Taiwan*

An expert system with querying interface and knowledge base is set for designing optical filters with flat-dispersion. User queries for the nearest filter with desired features or selects a further evolution for preciser filter parameters.

**THP-(14)-2****Dynamic performance analysis of four-wave mixing wavelength conversion in light-holding SOA's**

*Jyh-Tsung Hsieh, Jingshown Wu, and San-Liang Lee*  
*National Taiwan University;*

*National Taiwan University of Science and Technologies, Taiwan*  
 We propose and analyze a wavelength converter based on four-wave mixing (FWM) in a semiconductor optical amplifier with the injection of a CW-holding light for improvement of wavelength conversion efficiency and frequency chirping characteristics.

Thursday 13:30 – 15:30 December 18, 2003

Der-Hou Room -- (B1)

THP • Poster Paper

**THP-(14)-3****A characteristic analysis of laser resonators**

*K. Sato, W. Yamahatsu, K. Sunako, S. Yamaguchi, M. Endo, K. Nanri, and T. Fujioka*  
Tokai University, Japan

Some resonators were two-dimensionally analyzed using a partially coherent input field. The calculation based on the Fresnel-Kirchhoff integral formula showed the applicability of new type resonators to high-power and high-quality laser.

**THP-(14)-4****On the convergence characteristics of the modal analysis of fused fiber-optic couplers**

*Yao-Chun Tsai, Bo-Rui Jiang, and Hung-chun Chang*

National Taiwan University, Taiwan  
Analysis of the birefringent property of the fused fiber-optic coupler needs very accurate calculation of modal propagation constants. We study the numerical convergence of such calculation using the boundary integral method for both 2 × 2 and 3 × 3 couplers.

**THP-(15)-1****Optical angle sensor utilizing pattern recognition of pseudorandom and double-triangle pattern**

*Hui-Sung Kim and Kyu B. Doh*  
Hankuk Hangkong University, Korea

In this communication, we propose a technique that utilizes pseudorandom pattern and double-triangle pattern to determine accurate angular position of coded disk. We present the experimental results to demonstrate the validity of the idea.

**THP-(15)-2****Development of novel micromechanism for movement translation and out-of-plane displacement amplification**

*Chengkuo Lee, Yen-Jyh Lai, Yu-Shen Lin, Ruey-Shing Huang, and Min-Shyong Lin*  
Asia Pacific Microsystems, Inc., Taiwan

Novel micromechanism is designed and characterized to transfer small in-plane motion or displacement into the out-of-plane amplified rotation or amplified vertical displacement. Preliminary results proved the feasibility of using this micromechanism to optical switch and variable optical attenuator (VOA) applications.

**THP-(16)-1****Optical lenses by photonic crystals**

*Bikash Gupta and Zhen Ye*  
National Central University, Taiwan

By numerical simulations, we show that properly arranged photonic crystals, formed by dielectric cylinders embedded in parallel in a uniform medium, can indeed act as an optical lens to focus electromagnetic waves.

**THP-(16)-2****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

In the textured microcavity, Bragg scattering is expected to provide optical bandgap. Careful tailoring of the photonic lattice parameters allows us to tune the emission characteristic of the microcavity.

**THP-(16)-3****Exact calculation of local density of states in three-dimensional photonic crystals**

*Ben-Yuan Gu, Rongzhou Wang, and Xue-Hua Wang*  
Chinese Academy of Sciences, China

The modulus of electric field eigenvector in photonic crystals (PC's) is proven to be variant for a set of k points in a k-star. New transformation is established for saving the computing time and bringing correct results.

**THP-(16)-4****Novel design of organic one-dimensional photonic crystal filter**

*Ming-Chun Chen, Pi-Gang Luan, and Ching-Ting Lee*

National Central University, Taiwan  
We present a new structure of one-dimensional photonic crystal filter which is more efficiently than traditional designs. To combine periodic and gradually-increasing-thickness structures of one-dimensional photonic crystals can enlarge the photonic band gap.

**THP-(16)-5****Optical constants determination of an anisotropic thin film by attenuated total reflection method analyzed by sensitivity calculation**

*Yi-Jun Jen and Cheng-Yu Peng*  
National Taipei University of Technology, Taiwan

In order to measure the anisotropic optical constants of thin films accurately, the sensitivity of attenuated total reflection curve is analyzed. According to the analysis, two curve fitting procedures are developed to determine two principal indices of refraction and principal axes.....

**THP-(16)-6****Resonating characterizations of photonic-crystal cavity with triangular-arrayed rods of both dielectric and magnetic permeability functions**

*H. E. Horng, S. Y. Yang, I. Drikis, Chin-Yih Hong, and H. C. Yang*  
National Taiwan Normal University; Academia Sinica; Da-Yeh University; National Taiwan University, Taiwan

The modified frequency-domain method is used to simulate the photonic properties of triangular-arrayed rods which are surrounded with air and possess non-unity dielectric  $\epsilon_{rod}$  and magnetic permeability functions. It was found that the electromagnetic energy concentration.....

**THP-(16)-7****1D and 2D ordered structures for photonic crystals by using magnetic fluid films**

*Chin-Yih Hong, H. E. Horng, S. Y. Yang, and H. C. Yang*  
Da-Yeh University; National Taiwan Normal University; Academia Sinica; National Taiwan University, Taiwan

Structural evolution along the edges of magnetic fluid micro-strips under external magnetic fields perpendicular or parallel to the strip surface is investigated in this paper. For the perpendicular fields, two-dimensional ordered array of columns was achieved.....

**THP-(16)-8****Coupling between core and ring modes in a microstructured fiber**

*Yu-Hsiang Cheng, Chin-Ping Yu, Chi-Wen Huang, Yean-Woei Kiang, Hung-chun Chang, Hua-Kuang Liu, and C. C. Yang*  
National Taiwan University, Taiwan

The propagation characteristics of the core and ring modes and the coupling behaviors between them under micro bending in a specially designed micro-structured fiber were numerically studied with the finite-difference method.

**THP-(16)-9****Design of omnidirectional reflector air-waveguide**

*Chii-Chang Chen, Pi-Gang Luan, Jenq-Yang Chang, and Hsiao-Wen Lee*  
National Central University; ITRI, Taiwan

We propose a structure and the fabrication process of 3-dimensional photonic crystal air-waveguide using omnidirectional reflectors fabricated with AlGaAs and AlGaAs-oxide. Polarization-independent photonic crystal waveguides may be achieved by this structure.

Thursday 13:30 – 15:30 December 18, 2003

Der-Hou Room -- (B1)

THP • Poster Paper

**THP-(16)-10****Two-dimensional near-infrared void channel photonic crystal fabricated in solid resin***G. Zhou, M. Ventura, M. Straub, and M. Gu**Swinburne University of Technology, Australia*

Photonic stop gaps of two-dimensional triangular photonic crystals fabricated by laser scanning of void channels in solid resin are examined in two different directions. Fundamental and higher-order gaps are observed in infrared transmission and reflection.

**THP-(16)-11****Height controllable two-dimensional photonic crystal structures fabricated with two-photon photopolymerisation***Baohua Jia, Xiaosong Gan, and Min Gu**Swinburne University of Technology, Australia*

Photonic crystal structures were fabricated with shot by shot method. By utilizing two-photon photopolymerisation feature size can be decreased to less than 300nm. Feature height can be accurately controlled by using different sized obstructions.

**THP-(17)-1****An active host material for double wavelength white-light organic light-emitting diodes***Jin-Kai Luo, Ching-Wu Wang, and Shih-Fang Chen**National Chung-Cheng University; I-Shou University, Taiwan*

We have demonstrated that the active host material of Anthracene could effectively transfer energy to the blue and orange fluorescent dyes. Evidence showed that the good enough overlapping between the absorption spectrum of BczVBI.....

**THP-(17)-2****Orthoscopic integral imaging 3D display by use of negative lens array***Jang-Il Ser, Sungdo Cha, Seung-Ho Shin, and Bahram Javid*  
*Kangwon National University, Korea; University of Connecticut, USA*

We have proposed a new method to implement orthoscopic three-dimensional integral imaging display system by use of negative lens array. In the proposed system, the three-dimensional image can be reconstructed as an orthoscopic image.....

**THP-(17)-3****Study on operation lifetime of organic light emitting device***Jiun-Haw Lee, Chih-Chih Liao, Chih-Chien Lee, Peir-Jy Hu, and Yih Chang**National Taiwan University; RiTdisplay Corporation, Taiwan*

In this paper, we studied the operation lifetime of organic light emitting device (OLED) with different device structure. In our experiments, the organic materials were fixed while the thickness of the hole transport layer (HTL) and electron transport layer (ETL) were.....

**THP-(SS1)-1****Light emission in (La,Al)<sub>2</sub>O<sub>3</sub>/Si MOS tunnel diodes***C. Y. Lin, H. Y. Lee, Albert Chin, Y. T. Hou, M. F. Li, S. P. McAlister, and D. L. Kwong**National Chiao Tung Univ., Taiwan; National Univ. of Singapore, Singapore; National Research Council, Canada; Univ. of Texas, USA*

We have demonstrated the efficient light emission from (La,Al)<sub>2</sub>O<sub>3</sub>/Si MOS tunnel diodes with photon energies ranging from 1.4 to 1.6 eV. This novel technology should find wide applications in optical interconnect and wireless communications.

**THP-(SS1)-2****Dependencies of optical and material properties on nominal indium content and well width in InGaN/GaN quantum well structures***Tsung-Yi Tang, Chih-Chung Teng, Shih-Chun Lin, En-Chiang Lin, Meng-Ku Chen, Cheng-Ming Wu, Jiun-Yang Chen, Yung-Chen Cheng, Shih-Wei Feng, C. C. Yang, Kung-Jen Ma, Cheng-Ta Kuo, and Jian-Shih Tsang**National Taiwan University; Chung Hua University; Advanced Epitaxy Technology Inc., Taiwan*

Optical properties and material microstructures of InGaN/GaN quantum wells structures with various nominal indium contents, quantum well widths, and different thermal annealing conditions were compared to show the effects of indium aggregations and strains.

**THP-(SS2)-1****The characteristic of 3-stacked InGaAs/GaAs QD (quantum dot) lasers grown by atomic layer molecular beam epitaxy***D. Heo, J. D. Song, W. J. Choi, J. I. Lee, J. Jeong, and I. K. Han**Korea Institute of Science and Technology; Korea University, Korea*

The characteristics of InGaAs quantum dots laser diodes grown by atomic layer molecular beam epitaxy were reported. The peak of photoluminescence is about 1.24μ at room temperature. The lasing wavelength is 1.025μ.

**THP-(SS2)-2****Quasistationary states of an electron in open quantum dots***Ming-Chieh Lin and Der-San Chuu*  
*Fu Jen University; National Chiao Tung University, Taiwan*

The quasistationary states of an electron in a spherically N-layered open quantum dot are investigated. A novel complex eigen-solver is presented to determine both the resonance positions  $E_R$  and the corresponding lifetimes of the system.

Room 101 -- (1F)	Room 105 -- (1F)	Room 106 -- (1F)	Room 107 -- (1F)	Room 110 -- (1F)
16:00-18:00 TH4J · Material Synthesis and Nanotechnology Hiroyuki Niino, AIST, Japan, Presider	16:00-18:00 TH4E · Liquid Crystal Display Technologies T. Zyung, ETRI, Korea, Presider	16:00-18:00 TH4H · Nonlinear Optical Materials (II) T. Sasaki, Osaka University, Japan, Presider	16:00-18:00 TH4G · Nonlinear Optics at Surfaces A. H. Kung, Academia Sinica, Taiwan, Presider	16:00-17:45 TH4I · High Power Gas Lasers Jim Piper, Macquarie University, Australia, Presider
16:00-16:30 TH4J-(11)-1 (Invited) <b>Laser micro- &amp; nanoprocessing of glass substrates</b> <i>M. H. Hong</i> <i>Data Storage Institute, Singapore</i>	16:00-16:30 TH4E-(17)-1 (Invited) <b>Bistable liquid crystal displays</b> <i>H. S. Kwok</i> <i>The Hong Kong University of Science &amp; Technology, Hong Kong</i>	16:00-16:30 TH4H-(7)-1 (Invited) <b>Micro-structuring of lithium niobate crystal based on domain engineering</b> <i>Kazuya Terabe and Kenji Kitamura</i> <i>National Institute for Materials Science, Japan</i> Ferroelectric domain and surface engineering of a LiNbO <sub>3</sub> crystal was investigated by using a scanning force microscope. The domain structures were patterned in the samples, where the domains were inverted by scanning with the cantilever while applying voltages.....	16:00-17:00 TH4G-(4)-1 (Tutorial) <b>Surface nonlinear optical spectroscopy</b> <i>Y. Ron Shen</i> <i>University of California, USA</i>	TH4I-(1)-1 (Invited) <b>Withdrawn</b>

December 18, Thursday

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

16:00-17:45  
TH4C · Guided-wave Devices and Design  
K. S. Chiang, City University of Hong kong, Hong kong, Presider

**16:00-16:30 TH4C-(14)-1 (Invited)**  
**Novel adiabatic and grating-based devices for WDM wavelength add/drop applications**

*John Love*  
*Australian National University, Australia*

A new type of grating for DWDM add/drop wavelength applications has particular symmetry properties in the core cross-section, and a novel planar add/drop wavelength device for CWDM applications relies only on its geometrical shape.

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

16:00-17:45  
TH4B · Quantum Dot Physics and Devices (II)  
D. Huffaker, University of New Mexico, USA, Presider

**16:00-17:00 TH4B-(SS2)-1 (Tutorial)**  
**Growth and physics of quantum dots for optoelectronics applications**

*Y. Arakawa*  
*University of Tokyo, Japan*

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

16:00-18:00  
TH4D · New Metrology  
Kaoru Minoshima, AIST, Japan, Presider

**16:00-16:15 TH4D-(10)-1**  
**Low-coherence tandem interferometer for measurement of group refractive index without knowledge of thickness**

*Akiko Hirai and Hirokazu Matsumoto*  
*National Institute of Advanced Industrial Science and Technology, Japan*

A low-coherence interferometric technique is proposed for the measurement of the group refractive index. A tandem interferometer compensates for asymmetrical distortions of interferograms due to dispersion and enables the measurements without knowledge of the thickness of the sample.

**16:15-16:30 TH4D-(10)-2**  
**Stroboscopic two-wavelength interferometer for in-line displacement measurement**

*Takamasa Suzuki, Masanori Ohida, Kazuhiro Yokoyama, and Osami Sasaki*  
*Niigata University, Japan*  
We propose a stroboscopic two-wavelength interferometer that is applicable to displacement measurement of rotating object. The system we propose uses two different wavelengths and two CCD cameras which are equipped with a high-speed electrical shutter.....

**Auditorium -- (10F)****Sky Lounge -- (12F)**

16:00-18:00  
TH4A · Optical Components (II)  
Jason Chen, National Chiao Tung University, Taiwan, Presider

**16:00-16:30 TH4A-(8)-1 (Invited)**  
**InP-based photonic integrated circuits**

*Jian-Jun He and Emil S. Koteles*  
*Lightip Technologies, Inc., Canada*  
We review recent advances in InP-based photonic integrated circuits (PICs) for optical communications. The latest results on an optical channel monitor monolithically integrating an echelle grating and a photodetector array are presented.

**December 18, Thursday**

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

TH4J · Material Synthesis and Nanotechnology --- continued

**16:30-16:45 TH4J-(11)-2  
Periodic nanostructure formed on TiN and DLC by femtosecond laser pulses**

*N. Yasumaru, K. Miyazaki, and J. Kiuchi*

*Fukui National College of Technology; Kyoto University, Japan*

Periodic nanostructures were formed on hard thin films of TiN and DLC by femtosecond laser pulses at 800 and 267 nm. The size of these surface structures is 1/10 - 1/5 of the laser wavelengths.

**16:45-17:00 TH4J-(11)-3  
Low dimensional graphite nanoparticles prepared by laser ablation of PTCDA/Co target with 355 nm beams**

*Satoru Nishio, Chihiro Kanazawa, and Hiroshi Fukumura*

*Tohoku University, Japan*

Ablation of mixture targets of perylenetetracarboxylic dianhydride (PTCDA) with Co powder was carried out using the third harmonic of a Nd:YAG laser to obtain nanoparticles of polyperinaphthalene, one of low dimensional graphite family.

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

TH4E · Liquid Crystal Display Technologies --- continued

**16:30-17:00 TH4E-(17)-2  
(Invited)  
Design and analysis of gratings and diffractive optical elements for displays**

*ByoungHo Lee, Seoul National University, Korea*

*ByoungHo Lee, Hwi Kim, and Kyongsik Choi*

*Seoul National University, Korea*  
The design and analysis of gratings and diffractive optical elements (DOEs) for displays are discussed. The topics include the analyses for subwavelength structures, boundary-modulated DOEs and prism sheets for LCD.

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

TH4H · Nonlinear Optical Materials (II) --- continued

**16:30-16:45 TH4H-(7)-2  
Growth of ZnO epitaxial films by metal organic chemical vapor deposition at various temperatures**

*B. P. Zhang, K. Wakatsuki, N. T. Binh, N. Usami, and Y. Segawa*

*The Institute of Physical and Chemical Research (RIKEN); Tohoku University, Japan*

ZnO epitaxial films were obtained on sapphire (0001) substrates by MOCVD at growth temperatures of  $T_g = 200 \sim 500^\circ\text{C}$ . The crystalline quality, surface morphology, and optical property of these films were investigated.

**16:45-17:00 TH4H-(7)-3  
Lanthanum fluoride optical thin films deposited by resistive heater with ion-assisted at room temperature**

*Ming-Chung Liu, Cheng-Chung Lee, and Chi-Hong Tung*

*National Central University, Taiwan*

Lanthanum fluoride ( $\text{LaF}_3$ ) optical thin film prepared by resistive heater at room temperature has been investigated. The working parameters of ion source in the ion-assisted process strongly influence the optical behavior and surface morphology of the deposited film in UV and visible regimes.

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

TH4G · Nonlinear Optics at Surfaces --- continued

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

TH4I · High Power Gas Lasers --- continued

**16:30-16:45 TH4I-(1)-2  
Development of a kilo-watt class prototype coil module**

*K. Sunako, K. Tei, D. Sugimoto, N. Takeishi, S. Takeishi, and T. Fujioka*

*Tokai University; Miki Pulley Co. Ltd., Japan*

A test COIL module has been constructed in our laboratory. The achieved chemical efficiency was 17.5 % at the chlorine flow rate of 13.2 mol/min. The corresponding laser power was 3.5kW.

**16:45-17:00 TH4I-(1)-3  
Development of a mist singlet oxygen generator for chemical oxygen iodine laser**

*K. Nanri, S. Muto, G. Watanabe, M. Endo, S. Takeishi, and T. Fujioka*

*Tokai University; Miki Pulley Co. Ltd., Japan*

Mist Singlet Oxygen Generator has been developed.  $\text{H}_2\text{O}_2$  utilization reached to the theoretical limit (42%) by the 15  $\mu\text{m}$  BHP droplets. Spray type water vapor trap was successfully operated.

**December 18, Thursday**

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

TH4C · Guided-wave Devices and Design --- continued

**16:30-16:45 TH4C-(14)-2  
Substrate leakage loss of an optical waveguide fabricated on a high-index material**

*Junji Yamauchi, Yuji Fujita, Jun Shibayama, and Hisamatsu Nakano*

*Hosei University, Japan*

The leakage loss of an optical waveguide fabricated on a Si substrate is investigated using the beam-propagation method. The leakage losses of three-dimensional waveguides are compared with those of two-dimensional ones.

**16:45-17:00 TH4C-(14)-3  
Square  $\mu$ -pillar cavity channel add/drop filters: FDTD simulation, k-space modeling and ray tracing**

*Chung Yan Fong and Andrew W. Poon*

*Hong Kong University of Science and Technology, Hong Kong*

Waveguide laterally-coupled square  $\mu$ -pillar cavity channel add/drop filters have been designed and simulated using finite-difference time-domain (FDTD) method. Preliminary results demonstrated an extinction and an on/off ratio of 11dB and 8dB.

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

TH4B · Quantum Dot Physics and Devices (II) --- continued

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

TH4D · New Metrology --- continued

**16:30-16:45 TH4D-(10)-3  
Two-dimensional linear birefringent parameters measurement by polarization-shifting heterodyne interferometer**

*Hui-Kang Teng, Chien Chou, and Tung-Sheng Hsieh*

*Nan-Kai College; National*

*Yang-Ming University, Taiwan*

A novel polarization shifting interferometer is proposed. The measurement of the linear birefringent parameters of a wave plate in two dimensional distribution is demonstrated experimentally.

**16:45-17:00 TH4D-(10)-4  
Frequency-stabilized 1520 nm diode laser to rubidium two photon absorption**

*Hsiang-Chen Chui, Sen-Yen Shaw, Yi-Wei Liu, Jow-Tsong Shy, Rostilav Roussev, and Martin. M. Fejer*

*National Tsing Hua University, Taiwan; Stanford University, USA*

We locked the frequency of a 1520 nm diode laser to the  $5S_{1/2} \rightarrow 7S_{1/2}$  two photon transitions of rubidium by frequency doubling the amplified laser output in a periodically poled lithium niobate waveguide.

**Auditorium -- (10F)****Sky Lounge -- (12F)**

TH4A · Optical Components (II) --- continued

**16:30-16:45 TH4A-(8)-2  
Polymer-based waveguide VOA suitable for ultra-broadband network**

*Ying-Tsung Lu, Huang-Chen Guo, Hseng-Tsong Wang, and Sien Chi*  
*National Chiao-Tung University; Industrial Technology Research Institute, Taiwan*

A polymer-based thermal controllable waveguide type VOA is proposed. The S-bend buried waveguide structure with polymer core and silica cladding that attenuates light with satisfactory extinction ratio through the band from 1.28  $\mu\text{m}$  to 1.58  $\mu\text{m}$  is presented.

**16:45-17:00 TH4A-(8)-3  
Wavelength switching in fiber ring laser using spectral polarization- dependent transmission element**

*Yong Wook Lee and Byoung Ho Lee*

*Seoul National University, Korea*

We propose a novel wavelength switching scheme in fiber ring laser by using a long-period grating written on a polarization-maintaining fiber. Dual-wavelength switching operation was accomplished by rotating the polarization plane of the laser cavity.

**December 18, Thursday**

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

TH4J · Material Synthesis and Nanotechnology --- continued

**17:00-17:15 TH4J-(11)-4 Stimulated emission from ZnO nanorods synthesized by pulsed-laser deposition**

*B. H. Agung, M. Kawakami, Y. Nakata, Xu Ning, and T. Okada Kyushu University, Japan; Fudan University, China*  
We succeeded in synthesizing ZnO nanorods by pulsed-laser deposition (PLD) at comparatively high gas pressure without using any catalyst. Stimulated emission was observed from ZnO nanorods at 388 nm by optical pumping.

**17:15-17:30 TH4J-(11)-5 Application of laser-driven shock wave to triboluminescence**

*Yasuyuki Tsuboi, Toshiaki Seto, and Noboru Kitamura Hokkaido University, Japan*  
Laser-driven shock wave (LDSW) can rapidly deposit a stress energy with an amplitude of ~GPa to materials. We applied LDSW to triboluminescence (TL) of a organic crystal. Utilizing this technique, we succeeded in controlling the timing and intensity of TL.

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

TH4E · Liquid Crystal Display Technologies --- continued

**17:00-17:15 TH4E-(17)-3 New developments in photo-aligning: physics and applications**

*V. G. Chigrinov, V. M. Kozenkov, H. S. Kwok, H. Takada, and H. Takatsu Hong Kong University of Science and Technology, Hong Kong; Dainippon Ink and Chemicals Incorporated, Japan*  
This review presents the status of our research in liquid crystal display (LCD) photo-aligning. We present the basic mechanisms of the photo-induced order in various photo-aligning materials and in azo-dye layers in particular and show that photo-aligning methods.....

**17:15-17:30 TH4E-(17)-4 Field-induced molecular re-orientation dynamics of a surface stabilized ferroelectric liquid crystal**

*Wen-Tse Shih, Jung Y. Huang, and Jing Y. Zhang National Chiao Tung University, Taiwan; Georgia Southern University, USA*  
In this study, combination of linear optical properties measurement with polarized time resolved infrared spectroscopy, the information of molecular switching dynamics from the macroscopic optical axis orientation and the detail switching behaviors in molecular scale is revealed.....

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

TH4H · Nonlinear Optical Materials (II) --- continued

**17:00-17:15 TH4H-(7)-4 Azo-benzene polymer thin-film laser amplifier with grating couplers based on light-induced relief hologram**

*Tomohiro Hirose, Takashige Omatsu, Ryosuke Kato, Katsuyoshi Hoshino Takeshi Watanabe, and Kenji Harada Chiba University; Institute for Molecular Science; Kitami Institute of Technology, Japan*  
We investigated waveguide laser amplifier with grating couplers based on light-induced surface grating hologram in laser-dye doped azo-benzene polymer film. Optical coupling efficiency to the film was 1.1%. The amplifier exhibited small-signal gain of 0.4cm<sup>-1</sup>.

**17:15-17:30 TH4H-(7)-5 Fused-silica-clad Cr:YAG fiber**

*Chia-Yao Lo, Shih-Yu Tu, Kuang-Yao Huang, and Sheng-Lung Huang National Sun Yat-Sen University, Taiwan*  
A low-propagation-loss (<0.1 dB/cm) fused-silica-clad Cr:YAG fiber is demonstrated and investigated. The simulation shows that more than 0 dBm of amplified spontaneous emission could be generated with a 2-W pump and an 8-microns core.

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

TH4G · Nonlinear Optics at Surfaces --- continued

**17:00-17:30 TH4G-(4)-2 (Invited) Nonlinear optical probing low-dimensional ferroelectricity and magnetism in surface structures and ultra-thin films**

*Oleg A. Aktsipetrov Moscow State University, Russia*  
An approach of second-harmonic generation studies for low-dimensional ferroelectricity and magnetism in surface structures and ultra-thin films is presented. Nonlinear optical probing is illustrated by applying it to literally two-dimensional ferroelectricity and magnetism in nanoparticles.

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

TH4I · High Power Gas Lasers --- continued

**17:00-17:15 TH4I-(1)-4 A high repetition rate (50kHz) high power (10W) gold vapour laser**

*G. D. Marshall and D. W. Coutts University of Oxford, UK*  
A gold vapour laser with record breaking efficiency (0.23%) and maximum pulse repetition frequency (50kHz) has been demonstrated. The laser used a sapphire plasma tube to enable operation at temperatures up to 2000 degrees centigrade.

**17:15-17:30 TH4I-(1)-5 Second-generation kinetically-enhanced copper vapour lasers**

*R. P. Mildren, M. J. Withford, J. A. Piper, G. D. Marshall, and D. W. Coutts Macquarie University, Australia; University of Oxford, UK*  
We report the performance of compact kinetically-enhanced copper vapour lasers designed with reduced thermal insulation. We obtain several-fold enhancements in the specific output power and other performance indicators than previously obtained from copper lasers of any type.

**December 18, Thursday**

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

TH4C · Guided-wave Devices and Design --- continued

**17:00-17:15 TH4C-(14)-4  
ARROW-based MMI power dividers**

*Han-Chieh Wu, Shih-Hsin Hsu, and Yang-Tung Huang  
National Chiao Tung University, Taiwan*

The design of ARROW-based MMI power dividers is discussed.  $1 \times 2$ ,  $1 \times 4$ , and  $2 \times 2$  dividers are designed. Simulation results show that the loss and the imbalance are lower than 0.05 and 0.06 dB, respectively.

**17:15-17:30 TH4C-(14)-5  
Design of three-branch power divider with a low-index trapezoidal microprism**

*Chia-Chih Huang, Chin-Yu Chang, and Way-Seen Wang*

*National Taiwan University, Taiwan*  
Design of low loss power divider with a trapezoidal microprism of low index is proposed. Simulated results shows that total transmitted power at a branching angle of  $4^\circ$  is 9.7% higher than that reported.

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

TH4B · Quantum Dot Physics and Devices (II) --- continued

**17:00-17:15 TH4B-(SS2)-2  
CW lasing of self-assembled InAs quantum dot lasers on GaAs substrates grown by metalorganic chemical vapor deposition**

*Jun Tatebayashi, Hideo Kakuma, Nobuaki Hatori, Mitsuru Ishida, Hiroji Ebe, Hisao Sudo, Akito Kuramata, Yoshiaki Nakata, Mitsuru Sugawara, and Yasuhiko Arakawa*

*RCAST&IIS NCRC; University of Tokyo; Fujitsu Laboratory, Japan*  
We report the fabrication of self-assembled InAs quantum dot lasers on GaAs substrates grown by metalorganic chemical vapor deposition. Continuous-wave lasing at room temperature with low threshold current (6.7 mA) has been achieved.

**17:15-17:30 TH4B-(SS2)-3  
Quantum dot structures and their optical properties of a high-indium InGaN film**

*Shih-Wei Feng, En-Chiang Lin, Yung-Chen Cheng, Hsiang-Chen Wang, C. C. Yang, Kung-Jen Ma, Cheng-Hsing Shen, L. C. Chen, K. H. Kim, J. Y. Lin, and H. X. Jiang*  
*National Taiwan University; Chung Hua University, Taiwan; Kansas State University, USA*

Yellow luminescence from an InGaN film of high indium content shifted into blue emission upon thermal annealing. The shift was attributed to the quantum dot-like cluster size reduction through spinodal decomposition at thermal annealing.

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

TH4D · New Metrology --- continued

**17:00-18:00 TH4D-(10)-5  
(Tutorial)**

**Progress in high-spectral resolution lidars for remote sensing of the environment**

*Takao Kobayashi*

*Fukui University, Japan*

Recent progress in the high-spectral resolution lidar technique is reviewed. The new system is used for precise remote sensing of atmospheric aerosol parameters, temperature and wind velocity for practical applications in meteorological and industrial monitoring.

**Auditorium -- (10F)****Sky Lounge -- (12F)**

TH4A · Optical Components (II) --- continued

**17:00-17:15 TH4A-(8)-4  
Acousto-optic induced cladding-modes reflection in superstructure fiber gratings**

*Ming-Yue Fu, Wen-Fung Liu, Tzu-Chiang Chen, Ping-Ju Tseng, and Hao-Jan Sheng*

*National Defense University; Feng-Chia University, Taiwan*

We experimentally demonstrated the cladding modes of a superstructure fiber grating can be coupled back to the core mode by applying both transverse and longitudinal acoustic waves for the function of wavelength- switchable comb filters.

**17:15-17:30 TH4A-(8)-5  
All-optical switching of a nonlinear fiber-optic grating coupler utilizing cross-phase modulation of intense pump pulse at 1.55  $\mu\text{m}$**

*Masaaki Imai, Shinya Sato, and Narihiro Kita*  
*Muroran Institute of Technology, Japan*

An all-optical switching in a fiber-optic grating coupler (FGC) has been demonstrated using a mode-locked EDF laser with a EDFA at 1.55  $\mu\text{m}$ , which induces Kerr nonlinearity in the grating region of the FGC due to cross-phase modulation.

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

TH4J · Material Synthesis and Nanotechnology --- continued

**17:30-17:45 TH4J-(11)-6**  
**Fabrication of LINBO<sub>3</sub> thin film by pulsed laser deposition and estimation of nonlinear property**

*Soichiro Gunji, Youhei Shimizu, Yoshiki Nakata, Tatsuo Okada, and Mitsuo Maeda*

*Kyushu University, Japan*

LiNbO<sub>3</sub> thin films were deposited by pulsed-laser deposition (PLD) method. Crystalline and transparent films were deposited on sapphire substrate at 400 °C and in 100 mTorr of oxygen gas pressure. The nonlinear property was measured.

**17:45-18:00 TH4J-(11)-7**  
**Preparation and morphology control of silver colloids by laser ablation in water**

*Takeshi Tsuji, Norihisa Watanabe, Toshihiko Kakita, and Masaharu Tsuji*

*Kyushu University, Japan*

Nano-size colloids of silver were prepared by laser ablation in water in various conditions of laser pulses, such as wavelength, intensity, and pulse duration.

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

TH4E · Liquid Crystal Display Technologies --- continued

**17:30-17:45 TH4E-(17)-5**  
**Temporal emission characteristics of pulse-driven and sinusoidally-modulated white light-emitting diodes**

*Tsuyoshi Miyata, Youhei Imamoto, Tetsuo Iwata, and Tsutomu Araki Niihama Natnl. Coll. of Technology; Univ. of Tokushima; Osaka Univ., Japan*

For a sensor purpose, we measured temporal emission waveforms of pulse-driven and sinusoidally-modulated white light-emitting diodes (LEDs). Comparison was made for three types of LEDs provided by different manufactures.

**17:45-18:00 TH4E-(17)-6**  
**Reconfigurable organic light-emitting diodes**

*Chieh-Wei Chen, Ting-Yi Cho, and Chung-Chih Wu National Taiwan University, Taiwan*

We report a promising type of reconfigurable organic light-emitting diodes (OLEDs) incorporating a thin carrier-blocking layer as the sacrificial fusing layer, which emit blue light as fabricated but can be transformed into a green-emitting one.....

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

TH4H · Nonlinear Optical Materials (II) --- continued

**17:30-17:45 TH4H-(7)-6**  
**Holographic recording using azo-polymer film and its replication**

*K. Harada, T. Maeda, S. Kamemaru, T. Asami, M. Itoh, and T. Yatagai*

*Kitami Institute of Technology; University of Tsukuba, Japan*  
 New rewritable surface relief holograms using photoinduced surface deformation on azo-polymer films are proposed. Holograms are fabricated by irradiation of interference fringes of Ar-laser. Replication of surface relief hologram is also demonstrated.

**17:45-18:00 TH4H-(7)-7**  
**Nd:YVO<sub>4</sub> film fabricated by pulse laser deposition and its waveguide properties**

*K. Li, F. Wang, C. S. Yuan, S. N. Zhu, Y. Y. Zhu, and N. B. Ming Nanjing University, China*

Nd:YVO<sub>4</sub> films were grown by pulsed laser deposition on sapphire and SiO<sub>2</sub> substrates. Their structure, wave-guide performance and absorption properties has been studied. We get the highly crystalline films, which has well optical properties.

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

TH4G · Nonlinear Optics at Surfaces --- continued

**17:30-17:45 TH4G-(4)-3**  
**Nonlinear optical probe of ultra thin molecular films on a metal surface**

*Susan Dounce, Shi-Huei Jen, Minchul Yang, and Hai-Lung Dai University of Pennsylvania, USA*  
 Second harmonic generation, resonantly enhanced by a surface state transition and in combination with Rayleigh scattering, has been developed as a versatile means for probing, with real time resolution, the kinetics of the wetting-dewetting.....

**17:45-18:00 TH4G-(4)-4**  
**Vibrational sum frequency generation of aqueous solutions of alcohol**

*Shan-Shan Ju, Tzong-Daw Wu, Yuh-Lin Yeh, Tai-Huei Wei, Jung-Yaw Huang, and Sheng-Hsien Lin Industrial Technology Research Center; Academia Sinica; National Chung-Cheng University, Taiwan*  
 We measured vibrational spectra of the surface of alcohol (C<sub>n</sub>H<sub>2n+1</sub>, n=1 to 3) and water as a binary mixture via sum frequency generation (SFG) in the OH region at the interface between air and liquid phases.....

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

TH4I · High Power Gas Lasers --- continued

**17:30-17:45 TH4I-(1)-6**  
**RF discharge physics in slab carbon monoxide lasers**

*A. A. Ionin, I. V. Kochetov, A. P. Napartovich, D. V. Sinitsyn, Yu. V. Terekhov, and P. N. Lebedev Physical Institute; Troitsk Institute for Innovation and Thermonuclear Research, Russia*

The properties of RF discharge in gas mixtures containing carbon monoxide molecules were studied experimentally and theoretically. A satisfied agreement between experimental results obtained and numerically calculated data for the experimental conditions was observed.

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

TH4C · Guided-wave Devices and Design --- continued

**17:30-17:45 TH4C-(14)-6  
Transmission-line designs for efficient operation of high-speed low-impedance optical modulators**

*T. Y. Chang  
National Sun Yat-Sen University,  
Taiwan*

We show that a low-impedance optical modulator with external pads and unmatched termination can achieve a bandwidth that is more than double its overall RC-limited value with only a small loss of low-frequency response.

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

TH4B · Quantum Dot Physics and Devices (II) --- continued

**17:30-17:45 TH4B-(SS2)-4  
Strain-induced material intermixing in multiple-stacked Ge/Si quantum dots grown by chemical vapor deposition**

*Wen-Hao Chang, Wen-Yen Chen,  
An-Tai Chou, Tzu-Min Hsu,  
Pan-Shiu Chen, Zingway Pei, and  
Li-Shyue Lai  
National Central University; ITRI,  
Taiwan*

Photoluminescence investigations on stacked Ge/Si quantum dots with different thicknesses of Si spacer layer are presented. According to the emission energy shift in the Ge dots, we found that thinner spacer will lead to remarkable Ge-Si intermixing.....

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

TH4D · New Metrology --- continued

**Auditorium -- (10F)****Sky Lounge -- (12F)**

TH4A · Optical Components (II) --- continued

**17:30-17:45 TH4A-(8)-6  
Multi-channel dispersion compensating fiber grating by single-period overlap-step-scan exposure**

*Lih-Gen Sheu, Kai-Ping Chuang,  
and Yinchieh Lai  
Van Nung Institute of Technology;  
National Chiao-Tung University,  
Taiwan*

We theoretically demonstrate a high-quality multi-channel dispersion-compensating fiber grating can be fabricated by a properly designed single-period overlap-step-scan exposure method. A practical design example and a detailed discussion of this new fabrication method are given.

**17:45-18:00 TH4A-(8)-7  
Erbium-doped fiber Bragg grating based all-optical switch**  
*Bai-Ou Guan, Shun-Yee Liu,  
Hwa-Yaw Tam, and P. K. A. Wai  
The Hong Kong Polytechnic  
University, Hong Kong*

All-optical switching in  $\text{Er}^{3+}$ -doped fiber Bragg grating was investigated. The response time is not limited by the radiative relaxation but by the cooperative ion interaction induced fast nonradiative relaxation in the high concentration  $\text{Er}^{3+}$ -doped fiber.....

**December 18, Thursday**