ICO'04 Tokyo

jointly held with
ODF '04 & ICOSN '04

2004 ICO International Conference
Optics & Photonics in Technology Frontier

Makuhari Messe, Chiba, Japan

12-15 July, 2004

Co-located with **InterOpto '04 (13-16 July, 2004)** http://www.oitda.or.jp/main/io/io04home.html

ADVANCE PROGRAM

Organized and Sponsored by
OSJ (Optical Society of Japan/JSAP) and
ICO (Int. Commission for Optics)

In Cooperation with
OSA (Optical Society of America),
EOS (European Optical Society),
SPIE (The International Society for Optical Engineering),
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IEICE (The Institute of Electronics, Information and Communication Engineers),
IIEEJ (The Institute of Image Electronics Engineers of Japan),
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JOEM (Japan Optomechatronics Association),
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JPS (The Physical Society of Japan),
JSPE (The Japan Society for Precision Engineering),
OITDA (Optoelectronic Industry and Technology Development Association)

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http://www.ico-odf04.com/

Advanced Registration Deadline: 12 June, 2004
Hotel Reservation Deadline: 18 June, 2004
Post-Deadline Paper Deadline: 30 June, 2004

INTRODUCTION

Rapid progress is being achieved in the field of optics and photonics, especially in relation to applications in information and communication technologies, and new applications in nano- and bio-technologies are coming to light in the technology frontier. The ICO bureau has given approval to host the next ICO topical meeting in 2004 in Japan. (ICO meetings have been held in Japan every 10 years since 1964.) **ICO'04** will be held at the same site as **InterOpto'04**, the biggest optics & photonics industrial annual exposition organized by **OITDA** (Optoelectronic Industry and Technology Development Association) and will be co-supported by **JOMA** (Japan Optical Measuring Instruments Manufacturers' Association) to provide an excellent opportunity for interaction between academia and industry. **ICO'04** will be held together with two other well known international conferences organized by OSJ, **ODF'04** (Optics-photonics Design & Fabrication) and **ICOSN'04** (International Conference on Optical Engineering for Sensing and Nanotechnology).

SCOPE OF THE CONFERENCE

ICO'04 will provide an international forum for exchanging leading-edge ideas and achievements through original paper presentations, and discussions of optics-photonics related scientific and industrial topics in the fields of design, simulation, fabrication and testing for the system and components such as Information optics, Fiber communications, Bio-photonics, Storage, Measurement, Camera, Microscopy, Lithography, Printings, 3-dimensional displays and others.

SESSIONS AT A GLANCE

Monday 12 July

	Meeting Room 301	Meeting Room 302	Meeting Room 303	International Conference Room
12:00-12:15				**Opening Session** 5
12:15-14:00				**12P1 Plenary Session**
14:00-14:30	Coffee Break			
14:30-16:00	**12A2** **Optical Design and Simulations(1)** 5	**12B2** **Photonic Crystals** 5	**12C2** **Optical Coherence Tomography & Topography(1)** 5	
16:00-16:30	Coffee Break			
16:30-18:00	**12A3** **Optical Design and Simulations(2)** 6	**12B3** **Near Field Optics** 6	**12C3** **Optical Coherence Tomography & Topography(2)** 6	
18:10-20:00				ICO'04 Conference Reception

Tuesday 13 July

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12:00-13:00	Lunch			
13:00-14:30				**13D2 Poster Session** 8
14:30-16:00	**13A3** **Lithography(1)** 11	**13B3** **Photonic Information Systems(1)** 11	**13C3** **Optical MEMS** 11	
16:00-16:30	Coffee Break			
16:30-18:00	**13A4** **Lithography(2)** 12	**13B4** **Photonic Information Systems(2)** 12	**13C4** **Nano Photonics** 12	
18:00-	Inter Opto '04 Reception (Prince Hall at Makuhari Prince Hotel)			

Wednesday 14 July

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11:30-12:30	Lunch			
12:30-14:00				**14D2 Poster Session** 14
14:00-15:30	**14A3** **Optical Memory(2)** 17	**14B3** **Novel Laser Sources(1)** 17	**14C3** **Optical Diagnostics and Instrumentations(2)** 17	
15:30-16:00	Coffee Break			
16:00-17:30	**14A4** **Vision and Visual Perception** 17	**14B4** **Novel Laser Sources(2)** 17	**14C4** **Cell Optics** 17	
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Thursday 15 July

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12:00-13:00	Lunch			
13:00-14:30	**15A2** **Microoptics and DOEs(2)** 23	**15B2** **3D Displays(2)** 23	**15C2** **Optical Metrology(2)** 23	
14:30-15:00	Coffee Break			
15:00-16:30	**15A3** **Waveguide-mode Resonance Effects in Periodic Lattices and Their Applications** 24	**15B3** **Post-Deadline Session** 24	**15C3** **Optical Metrology(3)** 24	
16:40-16:55				**Closing Session** 24

TECHNICAL PROGRAM

Some tentative presiders are listed in this program.

July 12, 2004 (Monday)

Opening Session
Presider. *K. Tatsuno (Hitachi Ltd./Japan)*

12:00 Opening Remarks
Y. Ichioka (Nara Nat. College Tech/Japan)
K. Kuroda (Univ. of Tokyo/Japan)

12P1 Plenary Session
Presiders. *T. Yatagai (Univ. of Tsukuba/Japan)*
T. Shimura (Univ. of Tokyo/Japan)

12:15 12P1-1 (Plenary)
Interference, Coherence and Polarization
E. Wolf (Univ. of Rochester/USA)

13:00 12P1-2 (Plenary)
Single Molecule Nano-Bioscience
T. Yanagida (Laboratories for Nanobiology(Soft Biosystem Group) Graduate School of Frontier Biosciences Osaka Univ./Japan)
In recent years, the rapid development and progress of single molecule nano-detection techniques have opened up a new era of life science. I survey single molecule experiments designed to investigate biological molecular machines.

13:30 12P1-3 (Plenary)
Advanced Interferometric Surface Measurement in the Technology Frontier
J. C. Wyant(Univ. of Arizona/USA)
The addition of electronics, computers and software to interferometry has provided enormous improvements in the measurement of surface shape and roughness. This talk will describe some of these improvements and how they advanced the technology frontier.

14:00 Coffee Break

12A2 Optical Design and Simulations(1)
Presiders
L. Hazra (Univ. Calcutta/India)
H. Tsuchida (Olympus/Japan)

14:30 12A2-1 (Invited)
Paraxial and Aberration Analysis of Off-Axial Optical Systems
K. Araki (Canon Inc./Japan)
Off-axial optical systems are an extended concept of co-axial optical systems, where deflection surfaces are arranged along the folded reference axis. A new paraxial and aberration analysis method for asymmetric off-axial optical systems is presented.

15:00 12A2-2
Optical design, fabrication and evaluation of an ultra compact photographic objective for cellular telephones using free shaped prisms
T. Nagata, T. Nozawa, A. Sakurai, T. Ishii, T. Nagaoka (Olympus Corporation/Japan)
We used free-shaped prisms to develop an optical system for ultra compact photographic objective for use in camera-equipped cellular telephones. Since free-shaped prisms can fold optical paths, they provide several advantages, such as the ability to make optical systems thinner.

15:15 12A2-3
Variable-focus lens based on electrowetting for miniature cameras
B. Hendriks, S. Kuiper, M. van As, C. Renders (Philips Research Laboratories/The Netherlands)
The meniscus between two immiscible liquids having different refractive indices can be used as a lens. The curvature of the meniscus can be changed by electrostatic control. In this contribution we show how this principle can be used in camera modules.

15:30 12A2-4
A new optical zoom lens designs so small it can be literally hide under a US dime.
Y. Itoh (Canon Inc./Japan)
We have developed the world smallest retractable 2times optical zoom lens measures mere 17.15mm in length ,almost the same as a diameter of a US dime. We will interpret the technical topics it allows delivering the small size.

12B2 Photonic Crystals
Presiders
G. Roosen (Institut d'Optique/France)

14:30 12B2-1 (Invited)
Photonic Nanostructures and Devices based on Photonic Crystals
S. Noda (Kyoto Univ./Japan)
Photonic crystals provide exciting new tools for the manipulation of photons and have received keen interest from a variety of fields. In this conference, I will review the recent progresses and future prospects of photonic crystals.

15:00 12B2-2 (Invited)
Coupled Microcavities in Vertical Cavity Lasers
K. D. Choquette, D. Grasso, A. Danner, A. Lehman, and J. Raftery, Jr. (Univ. of Illinois at Urbana-Champaign/USA)
Longitudinal and transverse coupling of optical microcavities in vertical cavity surface emitting lasers (VCSELs) will be reported. We will show that novel emission modes of operation can be achieved with composite resonator VCSELs and photonic crystal VCSELs.

15:30 12B2-3
Formation of one dimensional photonic band with an array of size-matched microspheres
Y. Hara, T. Mukaiyama (Univ. of Tokyo/Japan), K. Takeda (SORST, Japan Science and Technology Agency (JST)/Japan), M. Kuwata-Gonokami (Univ. of Tokyo and SORST (JST)/Japan)
We examine emission from an array of size-matched dye doped polymer spheres placed in silicon V-groove and confirm the resonant coupling of whispering gallery modes to form one dimensional photonic band.

12C2 Optical Coherence Tomography & Topography(1)
Presiders
J. F. De Boer (Harvard Medical School/USA)
M. Haruna (Osaka Univ./Japan)

14:30 12C2-1 (Invited)
Novel light sources for ultrahigh resolution optical coherence tomography
W. Drexler (Univ. Vienna/Austria)
State of the art laser technology, including ultrabroad bandwidth femtosecond solid state lasers, fiber lasers and photonic crystal fibers based light sources, enables ultrahigh resolution optical coherence tomography covering the whole 400nm-1700nm wavelength region.

15:00 12C2-2 (Invited)
Three-dimensional imaging by en-face optical coherence tomography
K. Chan (Institute for Life Support Technology/ Japan)
This paper presents some of our latest work on three-dimensional imaging by optical coherence tomography (OCT), where we have developed a parallel heterodyne detection technique that enables en-face OCT images acquired at the rate of 100 frames/s.

15:30 12C2-3
Microscope OCT System with Controllable Longitudinal Resolution
K. Nitta, T. Sumiyoshi, O. Matoba, T. Yoshimura (Kobe Univ./Japan)
We present a microscope OCT system synthesizing the optical coherence function of continuously wavelength scanning laser light. The scan-width can control the longitudinal resolution from 6mm to 120mm. Tomographic imaging for biological tissue is demonstrated.

15:45 12A2-5
Real-time Invariant Object Tracking in FLIR Video Sequences Using Fringe-adjusted Joint Transform Correlation.
C. Loo, M. Alam (Univ. of South Alabama/USA)
Presented is a real-time invariant target tracking algorithm using fringe-adjusted joint transform correlator (JTC) for FLIR video sequences. The approach can track small objects while accommodating 3D distortions and ego-motion of the sensor.

15:45 12B2-4
Computing the optical properties of photonic crystals and diffractive optical elements using a high accuracy FDTD model
J. Cole, S. Banerjee (Tsukuba Univ./Japan)
We introduce a new high accuracy finite-difference time-domain (FDTD) algorithm, and a method to model complicated sub-wavelength structures on a coarse numerical grid. We used it to simulate light propagation in photonic crystals

15:45 12C2-4
Jones matrix imaging of biological samples using parallel detecting polarization sensitive spectrally interferometric optical coherence tomography
S. Makita, Y. Yasuno, T. Endo, M. Itoh, T. Yatagai (Univ. of Tsukuba/Japan)
A polarization sensitive spectrally interferometric OCT system is developed. This system require only two one-dimensional scanning for determining the Mueller matrix images of samples. The birefringence properties of the inner surface of porcine esophagus are revealed.

16:00 Coffee Break

12A3 Optical Design and Simulations(2)
Presiders
I. Livshits (State Univ. Info. Tech. Mech. Opt./Russia)
K. Araki (Canon/Japan)

12B3 Near Field Optics
Presiders
J. B. Cole(Tsukuba Univ./Japan)
M. Ohtsu (Tokyo Inst. Tech./Japan)

12C3 Optical Coherence Tomography & Topography(2)
Presiders
K. P. Chen (Yamagata Univ./Japan)
M. Itoh (Tsukuba Univ./Japan)

16:30 12A3-1 (Invited)
A prophylactic strategy for global synthesis in lens design
L. Hazra (Univ. of Calcutta/India)
A prophylactic strategy that can circumvent the inherent curse of dimensionality in the problems of global optimization of lens design is presented. The role of heuristics can also be significantly reduced by this approach.

16:30 12B3-1 (Invited)
Propagation and localization of optical fields at the nanoscale using surface plasmons
O. J. F. Martin (Swiss Federal Institute of Technology /Switzerland)
We present a new approach to the manipulation and localization of light at the nanoscale, based on surface plasmons propagating on metallic waveguides. Applications for optical signal processing, nanolithography and optical data storage are illustrated.

16:30 12C3-1 (Invited)
Ultra-high resolution and video rate in vivo retinal imaging with Spectral Domain Optical Coherence Tomography
J. F. de Boer, N. Nassif, B. Cense, A. Yun, H. Park, M. Pierce, B. Bouma, G. Tearney (Harvard Medical School/USA), T. Chen (Massachusetts Eye and Ear Infirmary/USA)
An ultra-high speed SD-OCT system continuously obtained in vivo images of a human retina at 29,300 A-lines/s. A 3-D volume of the retina was constructed from the data acquired. The system sensitivity was 98.4 dB.

17:00 12A3-2
Generalizing EPSF and its application to the phase-contrast microscope
M. Shibuya (Tokyo Polytechnic Univ./Japan), H. Ooki (Nikon Corporation/Japan), K. Saito (Sony Corporation/Japan), S.Nakadate (Tokyo Polytechnic Univ./Japan)
Under the weak diffraction approximation, we derive EPSF as the Fourier Transform of TCC and reveal that the character of optical imaging system can be prospectively understood by applying EPSF to the phase-contrast microscope.

17:00 12B3-2 (Invited)
High-speed high-resolution scanning microscopy and spectroscopy of single quantum systems
W. Jhe, H. Choe, M. Hong, S. Chang, H. Noh, Y. Seo, Y. Yu (Seoul Nat. Univ./Korea)
A high-frequency dithering probe of a quartz crystal resonator is used to realize high-speed high-resolution scanning probe microscopy and spectroscopy in non-contact mode. We report several experiments on single quantum dots and single water molecules.

17:00 12C3-2 (Invited)
An Approach to High-Definition OCT
M. Haruna, M. Ohmi (Osaka Univ./Japan)
We summarize our recent effort to approach to high-definition OCT, which is comparable to a histological picture, or a microscopic photograph of the corresponding tissue. Significant improvements of OCT imaging are presented.

17:15 12A3-3
Connected local minima in optical system design
A. Serebriakov, F. Bociort
(Delft Univ. of Technology/The Netherlands)
For the merit function landscape of several optical systems, networks consisting of local minima and saddle points will be presented.

17:30 12A3-4
Modeling Error of Sub Wavelength Structure for the Rigorous Coupled Wave Analysis
Y. Mizutani, K. Minato, Y. Otani, N. Umeda (Tokyo Univ. of Agriculture & Technology/Japan)
An effect of simulation model error to analysis results for the rigorous coupled-wave analysis is analyzed by using a model of sub-wavelength structure with error. Diffraction efficiency changes exponentially with a modeling error.

17:30 12B3-3
Development of a solid immersion mirror using a dielectric layer stack for near field optical recording
H. Hatano, M. Okitsu, K. Ogura, K. Konno (Konica Minolta Opto, Inc./Japan)
A new solid immersion mirror (SIM) utilizing angular dependence of a dielectric layer is proposed. We developed SIM with glass-molding process and measured the performances. In addition, experimental results of near field recording using the SIM are reported.

17:30 12C3-3
Nano-particle measurement using the low-coherence dynamic light scattering
H. Xia (Hokkaido Univ. /Japan), K. Ishii, T. Iwai (Hokkaido Univ. Sapporo/Japan)
The path-length-resolved power spectra of light backscattered from extremely dense media are measured by a low-coherence dynamic light scattering method. Using the CONTIN method, we obtained the radius distributions for mono- and polydisperse solutions of nano-particles with extremely high density.

17:45 12A3-5
Advanced compensation strategy for the birefringence induced by the spatial dispersion in deep UV lithography
A. Serebriakov, F. Bociort, J. Braat (Delft Univ. of Technology/The Netherlands)
Advanced compensation strategy for the birefringence induced by the spatial dispersion in deep UV lithography

17:45 12B3-4
Plasmon polariton transfer along nano-dot coupler for optical far/near field conversion
T. Yatsui (Japan Science and Technology Agency/ Japan), W. Nomura, M. Ohtsu (Univ. of Tokyo/ Japan)
We have successfully fabricated a nano-dot coupler for optical far/near-field conversion. Highly efficient energy transport in the nano-dot coupler via near-field coupling between resonant plasmon-polariton modes of neighboring particles was observed.

17:45 12C3-4
OFDR-OCT with SSG-DBR laser
H. Furukawa, T. Amano, H. Hiro-Oka, C. DongHak (Kitasato Univ./Japan), F. Kano (NTT Photonics Laboratories/Japan), Y. Agarie, K. Taniguchi, M. Tamura (Kitasato Univ. East Hospital/Japan), K. Shimizu, K. Ohbayashi (Kitasato Univ./Japan)
OFDR-OCT operates in the wavelength range from 1533 to 1574 nm with tuning speed of 10 micro second per 0.1nm step has been developed. The experimental system is described briefly and experimental results are shown.

18:10 Conference Reception

July 13, 2004 (Tuesday)

13A1 Optical Systems

Presiders
T. Wilson (Univ. Oxford/UK)
Y. Honguh (Toshiba/Japan)

10:00 13A1-1 (Invited)
Pupil function engineering
T. Wilson (Univ. of Oxford/U.K)
We will describe methods to generate arbitrary scalar and vectorial beams. Such beams may be used to taylor the pupil function of an objective lens and hence control the image contrast in microscopy.

10:30 13A1-2 (Invited)
Compact image capturing system based on compound-eye optics and post digital processing
J. Tanida (Osaka Univ./Japan), K. Nitta (Japan Science and Technology Agency/Japan), S. Miyatake (Konica Minolta Technology Center, Inc./Japan)
As an instance of novel imaging system based on opto-electronic hybridization, a compact image capturing system called TOMBO (thin observation module by bound optics) is presented. Study on the TOMBO system is summarized with recent achievements including a compact demonstration system.

11:00 13A1-3
Error correction by means of redundant multiplexing for optical sensing
A. Wuttig, R. Riesenberg (Institute for Physical High Technology/Germany)
Redundant optical multiplexing can be used for detection and correction of measurement errors in optical sensing. The correction performance for multiplexing using Hadamard sequences and new photon-noise insensitive sequences are analyzed and compared.

11:15 13A1-4
Propagation analysis of Laguerre-Gaussian beam with astigmatism.
A. Wada, H. Ohminato, T. Yonemura, Y. Miyamoto, M. Takeda (The Univ. of Electro-Communications/ Japan)
Laguerre-Gaussian (LG) beam with astigmatic aberration can undergo various transformations. We have classified the beam behavior, and established a comprehensive map of transformation patterns in relation to initial beam conditions.

11:30 13A1-5
Optical Spectral Systems made by MEMS-Spatial Light Modulators
R. Riesenberg, A. Wuttig (Institute for Physical High Technology/Germany), T. Tschudi (Technical Univ. Darmstadt/Germany)
High performance sensing by optical systems with spatial light modulators are discussed. The resolution as well as the throughput and the sensitivity are increased by the factor 5 and 40, respectively.

13B1 Information Optics

Presiders
C.-C. Sun (National Central Univ./Taiwan)
J. Tanida (Osaka Univ./Japan)

10:00 13B1-1 (Invited)
Advanced Distributed Switching Architectures for High-Capacity Parallel Information Processing
P. Guilfoyle, D. Louderback, H. Lin, M. Fish, J. Hindi, G. Pickrell, M. Simpson (OptiComp Corporation/USA)
Parallel and WDM distributed switching architectures are presented for parallel information processing applications. Enabled by monolithic, VCSEL-based modules, these architectures allow high-speed interconnectivity with reduced latency, protocol independence, and dynamic reconfigurability.

10:30 13B1-2 (Invited)
Intrachip Optical Interconnects: Challenges and Possible Solutions
M. Haney, M. Iqbal, M. McFadden, U. Hameed (Univ. of Delaware/USA)
The performance-limiting effects of delay and power consumption in global wires for future VLSI generations are reviewed. The potential for chip-scale free-space and guided-wave global fabric solutions to overcome the limits of metal is discussed.

11:00 13B1-3 (Invited)
Micro-optics for Photonic Interconnections to silicon chips.
H. Thienpont, C. Debaes, M. Vervaeke, L. Desmet, H. Ottevaere, B. Volckaerts, P. Vynck, J. Van Erps, A. Hermanne (VUB/Belgium)
We summarize the state-of-the-art of photonic interconnects to silicon chips and introduce our free-space approach based on a plastic multi-channel free-space micro-optical interconnection module, scalable well into the Tbits/cm^2 regime.

11:30 13B1-4
Implementation of fully-automatic and high-speed Facial Recognition Optical Correlator system
E. Watanabe, K. Kodate (Japan Women's University /Japan)
We successfully implemented a fully-automatic and high-speed Facial Recognition Optical Correlator, of which throughput time is 1.4s for 1000 faces. Calculating facial characteristics and using one channel of MLZP for optical processing enhances robustness of the system alignment and high SN ratio.

13C1 Diffused-Light Imaging

Presiders
M. Gu (Swinburne Univ. of Tech./Australia)
T. Iwai (Hokkaido Univ./Japan)

10:00 13C1-1 (Invited)
Molecular Imaging from Single Cell to Whole Body
M. Tamura (Hokkaido Univ./Japan)
The completion of human genome project has opened the possibility of extremely early stage of the detection of gene-related diseases, especially cancer by the technique of optical detection. The developments of diffuse optical tomography and endmicroscopy together with the development of "optical contrast agent" now are going to the stage the of clinical applications for the patients. This talk will summarize the "optical diagnosis" in the update and the future.

10:30 13C1-2 (Invited)
Photon migration in tissues, diffuse optical imaging and their applications to biomedicine
Y. Yamada (Univ. of Electro-Communications/ Japan), F. Gao, H. Zhao, Y. Tanikawa, K. Homma (National Institute of Advanced Industrial Science and Technology (AIST)/Japan)
Current status of diffuse optical imaging by near infrared light is reviewed and its future prospect is discussed.

11:00 13C1-3
Analysis of light propagation in a realistic head model by hybrid Monte Carlo - diffusion method
Y. Ogoshi, E. Okada (Keio Univ./Japan)
A realistic head model is generated from an MRI scan to analyse the light propagation during the brain function measurement by NIRS. The spatial sensitivity profile is calculated by the hybrid MCñdiffusion method.

11:15 13C1-4
Time Resolved Reflectance of an Optical Pulse in Adult Heads Based on the Finite Difference Time Domain (FDTD) Analysis
T. Tanifuji, T. Ohtomo, D. Ohmori, T. Ishikawa (Kitami Institute of Technology/Japan)
Time resolved reflectance of an optical pulse in adult heads has been analyzed. The numerical results based on the finite difference time domain analysis are in good agreement with experiments and Monte Carlo calculations.

11:30 13C1-5
Change of sensed signals depending on push distance to tissues in near-infrared spectroscopy
S. Taue, M. Fukuda, H. Yamamoto, Y. Hayasaki, N. Nishida (The Univ. of Tokushima/Japan)
A distance between sensor and tissue is changed with a shape change of fat layer by pressure given to a near-infrared spectroscopy probe. The dependency of the sensed signals on the push distance is investigated.

11:45 13A1-6
Capability of a liquid-crystal adaptive optics system based on feedback interferometry for retinal imaging
T. Shirai (National Institute of Advanced Industrial Science and Technology/Japan)
The performance of a liquid-crystal adaptive optics system based on feedback interferometry for retinal imaging is examined experimentally using an artificial eye. We demonstrate that the system works even when the model retina is a scattering object.

11:45 13B1-5
A Pulsed Vision Chip with Image Processing Functions for Retinal Prosthesis
K. Yasuoka, T. Furumiya, D. C. Ng, A. Uehara, K. Kagawa, T. Tokuda, J. Ohta, M. Nunoshita (Nara Institute of Science and Technology/Japan)
A retinal prosthesis device using a pulse frequency modulation photosensor and a stimulus electrode is demonstrated. The device has image processing functions in pulse domain. A 16x16-pixel array chip is fabricated and demonstrated.

11:45 13C1-6
Empirical model of skin diffuse reflectance for skin color analysis
N. Tsumura, N. Ojima, T. Nakaguchi, Y. Miyake (Chiba Univ./Japan)
We propose an empirical model of skin diffuse reflectance for simple skin color analysis. The model is constructed based on the data by Monte Carlo simulation of light transport in the skin model.

12:00 Lunch

13D2 Poster Session

13:00

13D2-1
A needle-fiber OCT system
T. Li, T. Karanishiki, O. Matoba, T. Yoshimura (Kobe Univ./Japan)
A needle-fiber OCT system is proposed for precise measurements in surgery. The experiments using toufu and onion as the scattering media are performed. Characteristic of backscattered lights in a two-layer model is also analyzed numerically.

13D2-2
Dynamic Range of Detected Signal by Optical Spatial Filtering in Full-field OCT System
T. Motoyama, T. Matsumoto, O. Matoba, T. Yoshimura (Kobe Univ./Japan)
In a full-field OCT system we investigated numerically the elimination effect of diffused light in high scattering media by spatial filtering. Numerical and experimental results showed that appropriate spatial filtering can decrease the noise level.

13D2-3
Fiber-optic in-focus OCT
M. Ohmi, A. Kakimoto, M. Haruna (Osaka Univ./Japan)
We propose a novel method for obtaining in-focus OCT images over the entire cross-sectional area of interest. The principle is described as well as the possible imaging configuration. The practical fiber-optic in-focus OCT is then presented, showing a successful experimental result.

13D2-4
Surface Shape Measurement of Transparent Sample by Using Vertical Scanning White Light Interferometry
X. Wu (Univ. of Tsukuba/Japan), F. Lei (You I Giken/Japan), M. Itoh, T. Yatagai (Univ. of tsukuba/Japan)
Surface Shape Measurement of Transparent Sample by Using Vertical Scanning White Light Interferometry

13D2-5
Numerical analysis on a path-length-resolved spectrum of dynamically scattered light
S. Nakamura, K. Ishii, T. Iwai (Hokkaido Univ./Japan)
The dynamic properties of light in the intermediate region between single scattering and diffusive scattering are numerically analyzed. As a result, we demonstrate the dependence of the scattered intensity and its spectrum on the scattering order and the path-length-resolved power spectrum.

13D2-6
Multiple-layer structure photovoltaic cells tin-phthalocyanine/C70
Y. Sato, K. Yamagishi, M. Yamashita (Tokyo Univ. of Science/Japan)
Four-layer photovoltaic cell composed of tin-phthalocyanine and fullerene (C70) was produced. The cell improved dramatically the photovoltaic conversion efficiency compared with the two-layer cell under 100mW/cm2 irradiation.

13D2-7
Readout of an object behind a light scattering medium using phase-shifting digital holography with a low-coherence light source
S. Tamano, H. Yamamoto, Y. Hayasaki, N. Nishida (The Univ. of Tokushima/Japan)
We propose a new method for readout of an object behind a light scattering medium in combination of low-coherence interferometry and phase-shifting digital holography. Spatial resolution and reduction of speckle noise have been investigated.

13D2-8
Design of an ultra-fast optical spectrogram scope (OSS)
M. Namiki, T. Takeyama, T. Nagaoka (Olympus Corporation/Japan), W. Yu (Osaka Science and Technology Center/Japan), Y. Oshita, T. Konishi (Osaka Univ./Japan)
An ultra-fast optical spectrogram scope (OSS) can observe ultra-fast phenomena in real time on femtosecond to picosecond timescale with only one pulse. We have designed high-performance lenses for the OSS.

13D2-9
Compact beam-shaping module using a reflective aspherical-curve
N. Kawano, T. Takaoka, K. Mizumoto, Y. Awatsuji, T. Kubota (Kyoto Institute of Technology/Japan)
We propose a compact beam-shaping module to uniform the intensity distribution of a Gaussian beam using a reflective aspherical-curve. The module is designed, and its reflective aspherical-curve fabricated, and both numerically and experimentally evaluated.

13D2-10
Liquid pressure varifocus lens
R. Kuwano (Tokyo Univ. of Agriculture and Technology/Japan), T. Tokunaga (Polytechnic Univ./Japan), Y. Otani, N. Umeda (Tokyo Univ. of Agriculture and Technology/Japan)
A liquid pressure lens is developed to change focal length continuously. The dynamic range of focal length of the lens is from 50 mm to 250mm. This lens is used in the optical system of a YAG laser processing.

13D2-11
Holographic Optical Elements For Input Device based on Eye-Gaze
Y. Takizawa, Y. Kitagawa (Hyogo Prefectural Institute of Technology/Japan), O. Matoba, T. Yoshimura (Department of Computer and Systems Engineering/Japan)
An input device with holographic optical element (HOE) for home

13D2-12
The design study of optics and baffles for Lyman-α sun camera of scientific satellite
K. Kim, J. Lee, Y. Lee, C. Rim (Hannam Univ./Korea), M. Jang (Kyounghee Univ./Korea)
The optics and baffles are designed for imaging the sun at Lyman-α line for scientific satellite. The optics are composed of conic mirrors. In order to block stray light, the new baffle design method is suggested.

13D2-13
CAD of optical system structural scheme
A. Salnikov, I. Livshits (State Univ. of Information Technologies, Mechanics and Optics/Russia)
CAD based on developed algorithm and expert rules is proposed to automate lens

13D2-14
Model of Gaussian Incident Beam for Analyzing Coupling Efficiency
H. Park, S. Ha (Inha Univ./Korea), M. Kim (Korea Electronics Technology Institute/Korea), S. Lee, B. O, S. Park, E. Lee (Inha Univ./Korea)
We have studied the efficient ray-optic modeling method of a incident beam with Gaussian beam propagation and applied to micro-optic devices with thin-film optical filters.

13D2-15
New Model of Incident Gaussian Beam for Analyzing Optical Communication Devices using Thin Film Filter
H. Park, S. Ha (Inha Univ./Korea), M. Kim (KETI/Korea), S. Lee, B. O, S. Park, E. Lee (Inha Univ./Korea)
In this paper, the improved ray-model of Gaussian beam propagation is proposed and applied to characterization of micro-optic devices with thin-film optical filters.

13D2-16
Deep notch and ultra-compacted long-period grating in large-mode-area photonic crystal fiber
Y. Zhu, P. Shum, J. Chong, M. K. Rao, C. Lu (Nanyang Technological Univ./Singapore)
A strong resonance and extremely short length long-period grating was developed in large-mode-area photonic crystal fiber using CO2 laser with point-by-point technique which is simple and repeatable. The long-period gratings produced are cost-effective and compactness.

13D2-17
Transmission properties of fractal multilayer structures with gain
T. Okamoto, A. Fukuyama (Kyushu Institute of Technology/Japan)
The transmission properties of fractal multilayer that contains a gain layer are investigated theoretically. The group velocity of light and the electromagnetic energy distribution are calculated, and their relationships to the gain characteristics are discussed.

13D2-18
Nonlinear Optical Characteristics and Morphologies of Vanadyl-Phthalocyanine Thin Films Fabricated on Polyethylene-terephthalate Substrate Maintained at Different Substrate Temperatures
Y. Jin, G. Sawa, Y. Uchida, K. Kojima, A. Ohashi, S. Ochiai (Aichi Inst. of Tech./Japan), T. Mizutani (Nagoya Univ./Japan)
Morphologies and nonlinear optical properties of VOPc thin films fabricated on a substrate maintained at different temperatures were investigated using Vis/UV spectroscopy, the Maker-fringe method and an AFM microscope.

13D2-19
Nanophotonic functional devices using optical near-field energy transfer
S. Sangu (Ricoh Company, Limited/Japan), K. Kobayashi (Japan Science and Technology Agency/Japan), M. Ohtsu (Tokyo Institute of Technology/Japan)
Nanophotonic functional devices are proposed, and the operation principles are discussed theoretically. Optical logic gates can be realized by matter coherence via optical near-field interaction and spatial symmetry in three- and four-quantum dot systems.

13D2-20
Nanoscale matching architecture using optical near-field coupling
M. Naruse, T. Miyazaki, F. Kubota (Communications Research Laboratory/Japan), S. Sangu (Ricoh Co. Ltd./Japan), K. Kobayashi, T. Kawazoe (Japan Science and Technology Agency/Japan), M. Ohtsu (Tokyo Institute of Technology/Japan)
A nanoscale data matching architecture is proposed based on optical near-field interaction between quantum dots. This architecture enables the design of a highly dense content addressable memory, which is a key device in optical networks.

13D2-21
Simultaneous observation of electron tunneling and photon emission at a molecular central-electrode of a double tunnel junction
H. Nejo, Z. Dong (National Institute for Materials Science/Japan), H. Hori (Yamanashi Univ./japan)
The double-barrier device developed in this work enables us to observe the electromagnetic dissipation simultaneously with electron transport properties, and opens up a potential application to double barrier devices in which quantum coherence is controlled.

13D2-22
Analysis of light scattering and localization of plasmon by a particle near a multilayered substrate
A. Ohta, Y. Kawata (Shizuoka Univ./Japan)
We present the electromagnetic field distribution which results from the multi-scattering between a particle and a substrate. We present the enhancement of electromagnetic field by the excitation of local plasmon on a metal surface.

13D2-23
Surface Plasmon Excitations due to Molecular Luminescence and Conversion between Two- and Three Dimensional Optical Waves
Y. Ohdaira, S. Toyoshim, K. Shinbo , K. Kato, F. Kaneko, T. Kawakamia (Niigata Univ./Japan)
Surface plasmon excitations due to molecular luminescence under reverse irradiation have been investigated in Kretschmann configuration of prism/metal/organic dye LB films. This phenomenon is very useful for conversion between two- and three- dimensional optical waves.

13D2-24
Quantum optical control of dissipation and spin states in optical near-field interactions
H. Hori (Univ. of Yamanashi/Japan), T. Inoue (Yamanashi Industrial Technology College/Japan), Y. Ohdaira (Niigata Univ./Japan)
Control of dissipation and spin states of nanometer-sized optoelectronic devices are studied based on quantum optical description and tunneling picture of optical near-field interactions and experimental evidence of circularly rotating local fields.

13D2-25
Time-independent perturbation theory for modeling channel waveguides
T. Vallius (Univ. of Joensuu/Finland), P. Vahimaa, J. Tervo, J. Turunen
The time-independent quantum-mechanical perturbation theory is applied to refining the propagation constants given by Marcatili's method. The method is proved functional by comparison with the rigorous Fourier modal method.

13D2-26
Several analysis of arrow structures
N. Espinosa (Research Center CICTE/Ecuador), D. Arcos, D. Sotomayor (Army Politechnic School, ESPE/Ecuador)
With the mathematical pattern described in the work [2], the distribution of the electromagnetic field is analysed in different multilayer waveguides with arbitrary distribution of dielectrical constant or index refraction

13D2-27
Wavelength Division Multiplexing based on phased array design
K. Suh (Purdue Univ./USA)
An arrayed waveguide grating design in 3-dimensional space is proposed to achieve high number of demultiplexing channel and to remove high-order harmonic at the same time.

13D2-28
Spatial optical point-to-point communication system for indoor location-based information services
H. Itoh (AIST/Japan), K. Kosugi (Seikei Univ. /Japan), X. Lin, Y. Nakamura, T. Nishimura (AIST/Japan), K. Takizawa (Seikei Univ. /Japan), H. Nakashima(AIST/Japan)
Personal indoor location-based information service system using low-power consuming communication terminals and the base stations is described. User locating and tracking is realized by a laser radar which is supported with infrared ID sensors.

13D2-29
Parallel quasi-phase-shifting digital holography that can achieve instantaneous measurement
M. Sasada, A. Fujii, Y. Awatsuji, T. Kubota (Kyoto Institute of Technology/Japan)
We propose a quasi-phase-shifting digital holography that is a technique to achieve instantaneous three-dimensional measurement. We have conducted both the simulation and the preliminary experiment, so that verified the validity of the proposed technique.

13D2-30
Optical Signal Dividing Router
B. Li, Y. Zhao, X. Lin, J. Li (Sun Yat-Sen Univ./ China)
A novel optical signal dividing router is proposed and fabricated in SiGe 1.3- and 1.55-um. Its crosstalk and insertion loss are characterized at a forward dividing bias of 1.2 V.

13D2-31
Improvement of detection filter for transitional spectrum matching using optical spectrogram scope (OSS)
K. Tanimura, T. Konishi, T. Oonishi, Y. Oshita (Osaka Univ./Japan), W. Yu (Osaka Science and Technology Center/Japan), K. Itoh (Osaka Univ./Japan), Y. Ichioka (NARA National College of Technology/Japan)
We considered improvement of a detection filter for transitional spectrum matching using optical spectrogram scope (OSS). We designed the filter capable of distinguishing similar transitional spectral patterns, and verified the effect of the optimized filter.

13D2-32
3-levels all-optical analog-to-digital conversion by use of self-frequency shifting in fiber and pulse-shaping technique
T. Nishitani, T. Konishi, K. Itoh (Osaka Univ./Japan)
We demonstrate the ultra-fast all-optical A/D conversion by use of self-frequencyshifting in fiber and pulse shaping technique composed of AWG and VOA. Preliminary experimental results show that 3-lebels different digitized signals can be generated.

13D2-33
Device- and Illumination-independent Color Reproduction in Medical Imaging
M. Nishibori (Tokyo Medical and Dental Univ./ Japan), K. Watanabe (Musashino Red Cross Hospital/ Japan), Y. Miyazaki (Tokyo Medical and Dental Univ./Japan), N. Tanaka, S. Arakawa (Tokyo Medical and Dental Univ. Hospital/Japan), Y. Chiba, K. Ohashi, H. Tanaka (Tokyo Medical and Dental Univ./Japan), M. Okuyama, K. Kamimura, N. Tsumura, Y. Miyake (Chiba Univ./Japan), F. Uchino, H. Yamato (Konica Minolta Technology Center, Inc./Japan)
A practical multispectral imaging system for medical use that includes spectral reflectance information for each pixel and provides partially device- and illumination-independent color reproduc-tion of skin and mucosa was developed using common equipment.

13D2-34
Light tools for optical manipulation
X. C. Yuan, W. M. Lee, S. H. Tao, D. W. Zhang, B. S. Ahluwalia (Nanyang Technological Univ./ Singapore)
Several novel laser lights, such as interference pattern from two doughnut beams, optical fields with irregular vortex shapes and fractional Bessel beams, have been introduced to be used as optical tweezers in the micro-manipulation.

13D2-35
Laser-diode phase-shifting interferometer with a high-speed camera
R. Onodera (Univ. of Industrial Technology/Japan), Z. Atan (Univ. of Industrial Technology/Malaysia), Y. Ishii (Univ. of Industrial Technology/Japan)
We have developed a laser-diode (LD) phase-shifting interferometer with a high-speed camera that can capture sequences of interferograms from 60 to 8000 frames per second. The recorded phase-shifted interferograms are used to extract a dynamic phase change from the four-step phase-shifting method.

13D2-36
Optical differentiation phase measurement using the bias shift method
H. Furuhashi, R. Sugiyama, Y. Uchida (Aichi Institute of Technology/Japan), K. Matsuda (National Institute of Advanced Industrial Science and Technology/Japan), C. P. Grover (National Research Council Canada/Canada)
An optical phase measurement involving the use of a differentiation filter together with a bias-shifting method is studied.The influence of the non-uniformities of the light intensity can be corrected using the method.

13D2-37
Quadrature phase-shifting interferometer
S. Nakadate, T. Kiire, M. Shibuya (Tokyo Polytechnic Univ./Japan)
A new type phase-shifting interferometer is presented. Two fringe patterns whose phases are shifted by 90 degrees are acquired in each states of an object measured. The original phase and phase difference can be obtained.

13D2-38
Quadrature phase-shifting interferometer using two wavelengths of illuminating light
S. Nakadate, T. Kiire, M. Shibuya (Tokyo Polytechnic Univ./Japan)
A quadrature phase-shifting interferometer is presented, which utilizes two wavelengths of illuminating light sources.Two fringe patterns in quadrature are acquired in each wavelength,and new phase calculation method gives addition and difference phase distributions.

13D2-39
Influence of quantization in phase-shifting digital holography
G. Mills, I. Yamaguchi, F. Zhang (Gunma Univ./ Japan)
Influence of quantization on reconstruction image intensity and phase for uniform and random phase objects points with slowly intensities has been investigated. Resultant intensities of object and reconstruction image show nonlinearity relationship at lower bit-depths.

13D2-40
Vibration Analysis by Phase-shifting Digital Holography
I. Yamaguchi, J. D.R. Valera, F. Zhang, M. Yokota, G. Mills (Gunma Univ./Japan)
Phase-shifting digital holography used to study vibrating objects resulted in image object with fringes superimposed.Phase modulation of reference beam made bright fringe shift to points vibrating with amplitude and phase corresponding to modulation.

13D2-41
Absolute distance measurement with a disturbance-free DSPM DBR laser diode interferometer
T. Suzuki, T. Ohizumi, O. Sasaki (Niigata Univ./ Japan)
A disturbance-free range finder that uses a distributed Bragg reflector laser diode interferometer based on the double sinusoidal phase modulation is described. Wide range of wavelength scanning enables us to realize high measurement accuracy.

13D2-42
A two color heterodyne optical zooming method for generating sub-nanometer displacement
M. Kajima (AIST/Japan), L. Zeng (Tsinghua Univ./ China), H. Matsumoto (AIST/Japan)
A two color heterodyne optical zooming method was proposed to generate sub-nanometer displacement. By using a phase-locking technique, a small displacement in the sensing arm is generated by moving the driving arm to 16-times enlarged displacement.

13D2-43
Phase Unwrapping Technique of Differential-Interference-Contrast Microscope Images for Measuring Large Steps
M. Itoh, K. Kondoh (Univ. of Tsukuba/Japan), H. Ishiwata (Olympus Optical Co. Ltd./Japan), T. Yatagai (Univ. of Tsukuba/Japan)
We propose a new technique to unwrap a large phase step of retardation-modulated- differential-interference-contrast (RM-DIC) microscope by using three different wavelengths of light sources. The reversal of the phase-contrast is determined by comparing each image.

13D2-44
Analysis of a nonlinear concentric double ring resonator
B. Vijayaaditya, T. Srinivas (Indian Institute of Science, Bangalore/ India)
This paper analyzes nonlinear effects in a novel double ring resonator structure.The transmission characteristics are derived and compared with that of a single ring resonator and with a linear concentric double ring structure.

13D2-45
Advanced thermo-optical materials for micro-optical applications
G. Liberts (Daugavpils Univ./Latvia), G. Ivanovs (Riga Technical Univ./Latvia), V. Dimza (Univ. of Latvia/Latvia), A. Firsovs, E. Tamanis (Daugavpils Univ./Latvia)
Thermo-optical phenomena in absorbing media containing nanosize ferromagnetic or ferroelectric particles in liquid or solid state matrix are investigated. Enhanced thermo-optical properties had been observed in PLZT ceramics and ferrofluids near phase transitions.

13D2-46
Iterative speckle reduction algorithm for the optimization of digital holograms
S. Yang, H. Takajo (Kyushu Institute of Technology/ Japan)
An iterative algorithm is proposed for the speckle reduction in the reconstruction of digital holograms. The speckles can be reduced by avoiding the zeros among the sampled points of the reconstructed image.

13D2-47
Zero order suppression of a binary phase grating by the generation of an additional phase level
J. Simonen, K. Jefimovs, M. Kuittinen (Univ. of Joensuu,/Finland), V. Kettunen, O. Ripoll, H. P. Herzig (Univ. of Neuchatel/Switzerland)
We present design method for suppressing the unwanted zeroth diffraction order of a binary phase grating in the presence of depth-scale fabrication errors by adding a local bias to the design.

13D2-48
UV direct-exposed sol-gel diffractive optical element for the Bessel beam transforming
S. Tao, X. Yuan (Nanyang Technological Univ./ Singapore)
A diffractive optical element (DOE) is designed to reform a Gaussian beam to a Bessel beam. The DOE is fabricated on a sol-gel film through a printed slide. The experimental results are also given.

13D2-49
Application of surface relief hologram using azobenzene containing polymer film
K. Harada, T. Maeda (Kitami Institute of Technology/Japan), M. Itoh, T. Yatagai (Univ. of Tsukuba/Japan), S. Kamemaru (Kitami Institute of Technology/Japan)
Surface relief holograms using photoinduced surface deformation on azo-polymer films are fabricated. Rewritable holograms, electrically controlled holograms and second harmonic generating holograms are demonstrated. Educational use of azo-polymer film is also discussed

13D2-50
Design and fabrication of an holographic optical element lens for a femtosecond pulsed laser using the hologram computer-aided design tool
Y. Awatsuji, Y. Shiuchi, A. Komatsu, T. Kubota (Kyoto Institute of Technology/Japan)
The authors design a holographic optical element (HOE) lens for a femtosecond pulsed laser using the hologram computer-aided design tool which we have been developing. The designed HOE lens is fabricated and experimentally demonstrated.

13D2-51
Soft-replication of multilevel computer-generate holograms
J. Bu, S. H. Tao, W. X. Yu, W. C. Cheong, H. Wang, X. C. Yuan (Nanyang Technological Univ./ Singapore)
A polydimethylsiloxane (PDMS) material is applied to replicate the surface-relief pattern of a multilevel computer-generated hologram (MCGHs) on a Sol-Gel film. The detailed fabrication process and experimental results are given.

13D2-52
Direct orientation of liquid crystal molecules using an atomic force microscope nano-rubbing
Y. Takeda, H. Nagasaki, A. Takayanagi, Y. Otani, Y. Iimura, N. Umeda (Tokyo Univ. of Agriculture and Technology/Japan)
We succeeded a direct control of liquid crystal molecular orientation by using a nano-rubbing with an AFM cantilever-tip. The observation of molecular orientation was performed by birefringence scanning near-field optical microscope.

13D2-53
Optimization of electron dose profile for fabricating a high NA diffractive cylindrical lens with the e-beam lithography
M. Okano (NALUX Co., Ltd./Japan), H. Kikuta, Y. Hirai (Osaka Prefecture Univ./Japan)
The electron dose profile is optimized for fabricating a high numerical aperture diffractive cylindrical lens with an electron-beam proximity correction method. The estimated focusing efficiency is higher than that of the conventional diffractive lens.

13D2-54
Micromirror driving and testing by laser radiation
J. M. Zanardi Ocampo, P. O. Vaccaro, K. Kubota, T. Fleischmann, N. Saito (ATR, Adaptive Communications Research Laboratories/Japan)
Laser radiation was used as a non-contacting actuation method for micro mirrors fabricated on GaAs-based compounds for optoelectronic applications. This actuation method is suitable for driving or testing small devices where contacting methods are impracticable.

13D2-55
Laser Fixation of Metal Nanoparticles on Glass Substrate using CW-NIR Laser
T. Numata, Y. Morita, Y. Otani, N. Umeda (Tokyo Univ. of Agriculture and Technology/Japan)
We have demonstrated a laser manipulation and fixation of metal nanoparticles using CW-NIR laser. Fixed particles and induced topographic change by a laser irradiation on glass substrate were investigated by atomic force microscope.

13D2-56
Fabrication of Thermo-optic Tunable Filters for WDM application
S. Park, H. Park, C. Park, B. Hwang, S. Lee, B. O (Inha Univ./Korea), D. Choi (Korea Institute of Machinery and Materials/Korea), E. Lee (Inha Univ./Korea)
In this paper, we fabricated a thermo-tunable filter using bulk micromachining of MEMS and analyzed the transmittance characteristic, as integrated micro component on the micro-bench. Tunable filter is designed using Fabry-Perot interference effect.

13D2-57
Optical manipulation of DNA information clusters using a VCSEL array for optically assisted DNA computing
F. Sumiyama, T. Kawakami, Y. Ogura, J. Tanida (Osaka Univ./Japan)
Aiming at optically assisted DNA computing, optical manipulation of DNA clusters using a VCSEL array is investigated. Translation and stacking of beads on which DNA molecules are immobilized are achieved by using multiple trapping beams.

13A3 Lithography(1)
Presiders
A. Erdman (Fraunhofer Inst. IISB/Germany)
M. Shibuya (Tokyo Polytech. Univ/Japan)

14:30 13A3-1 (Invited)
Perspective and Challenges of Lens Designs for Immersion Optical Lithography
W. Ulrich, W. Kaiser, H. Feldmann (Carl Zeiss SMT AG/Germany)
Resolution and DOF of optical systems can be increased through the use of immersion liquids. Immersion lithography allows the lithography industry to continue to follow Moore's law into future with a potential extendibility towards the 32nm node. With examples of dioptric and catadioptric projection lens designs we'll demonstrate the design principles as well as their potential and challenges.

15:00 13A3-2 (Invited)
Current Topics of Microlithographic Lens
T. Matsuyama, T. Ishiyama, Y. Ohmura (Nikon Corporation/Japan)
This paper describes various kinds of technological improvements in current microlithographic lens for success in very low-k1 and high NA lithography. Topics in optical design, lens manufacturing, aberration characterization, aberration manipulation, and flare control are discussed.

15:30 13A3-3 (Invited)
Advanced Lithographic Systems
A. Suzuki (Canon Inc./Japan)
The recent progress of advanced lithography will be reviewed with the emphasis on the immersion lithography. The historical background of NA development and the technical challenges of immersion will be surveyed.

13B3 Photonic Information Systems(1)
Presiders
M.Haney (Univ. Delaware/USA)
Y. Tomita (Univ. Electro-Commun./Japan)

14:30 13B3-1 (Invited)
Three-dimensional Information Processing Using Computational Holographic Imaging
B. Javidi (Univ. of Connecticut/USA), O. Matoba (Kobe Univ./Japan)
Three-dimensional (3D) information processing such as display and object recognition by use of computational holography is presented. Combination of digital techniques and optical processing can create potentially important applications and systems for real-time 3D processing.

15:00 13B3-2 (Invited)
Applications of Volume Holographic Optical Elements
C. Sun, T. Teng, C. Hsieh (National Central Univ./ Taiwan)
The characteristics of volume holographic optical elements are introduced and studied. A simplified model for calculating the selectivity of VHOE is presented. Novel applications in both temporal and spatial domains are proposed.

15:30 13B3-3
Dependence of reconstructed image characteristics on observation condition in light-in-flight holography
A. Komatsu, Y. Awatsuji, T. Kubota (Kyoto Institute of Technology/Japan)
The characteristics of the reconstructed image depend on the observation condition for the hologram recorded with an ultrashort pulsed laser. We analyze the dependency theoretically and show the experimental result using a femtosecond pulses laser to verify the theory.

15:45 13B3-4
Identification of seals by exploiting their three-dimensional shape based on logarithmic joint transform correlation
J. Kobayashi, S. Komatsu (Waseda Univ./Japan)
We show the feasibility of a new method to identify seals by exploiting the differences in their three-dimensional shape. Images including informations of the three-dimensional shape are put through filters, and LJTC identify them.

13C3 Optical MEMS
Presiders
M. Wu (UCLA/USA)
Y. Uenishi (NTT/Japan)

14:30 13C3-1 (Invited)
Applications of Optical MEMS in Communication, Life Sciences and Instrumentation.
N. F. de Rooij, W. Noell (Univ. of Neuchatel/ Switzerland)
Recent Optical MEMS developments at IMT of components for telecommunication (latching and non-latching switches, VOA's and Tunable Filters), very compact MEMS Fourier Transform Spectrometers and MEMS based combined AFM/SNOM probes for single molecule detection will be preseneted .

15:00 13C3-2 (Invited)
Micromachining and Microactuation for High-Performance Optical MEMS
H. Fujita (Univ. of Tokyo/Japan)
Etching technology, microactuator design, and actuation/structure material issues are discussed for better alignment, faster and larger motion, and smaller sizes of optical MEMS switches, attenuators and scanners.

15:30 13C3-3 (Invited)
Laser-based Microsensors
R. Sawada (Kyushu Univ. /Japan), E. Higurashi (Tokyo Univ./Japan)
This paper introduces various laser-based microsensors that can be incorporated into a small actuator fabricated by micromachining technologies, for example very small, highly accurate displacement sensors and Doppler blood flow sensor.

16:00 Coffee Break

13A4 Lithography(2)

Presiders
W. Ulrich (Carl Zeiss/Germany)
H. Ooki (Nikon/Japan)

16:30 13A4-1 (Invited)
Simulation of Optical Resolution Enhancement Techniques for Semiconductor Microlithography
A. Erdmann (Fraunhofer Institute IISB/Germany)
The implementation of optical resolution enhancement techniques in lithographic manufacturing processes requires the massive application of simulation. We demonstrate how flexible simulation models and optimization algorithms help to identify optimum processing conditions.

17:00 13A4-2 (Invited)
A History of Resolution Enhancement Technology
F. Schellenberg (Mentor Graphics/USA)
Resolution enhancement technology (RET) has enabled the adoption of optical lithography well below the wavelength of the exposing light. Examination of the history of RET and recent developments suggest this will continue for the foreseeable future.

17:30 13A4-3 (Invited)
A. Smith (LITEL/USA)

13B4 Photonic Information Systems(2)

Presiders
B. Javidi (Univ. Connecticut/USA)
T. Kubota (Kyoto Inst. Tech./Japan)

16:30 13B4-1 (Invited)
Ultra-fast optical spatio-temporal information processing and its applications
T. Konishi (Osaka Univ./Japan)
The substitution between ultra-fast processing and parallel processing would be one promising approach for manipulation of an ultra-short pulse. Here, ultra-fast optical spatio-temporal information processing and its applications are described based on this concept.

17:00 13B4-2 (Invited)
Fuzzy correlation of histograms for similarity measure of color-images
H. Zhai, G. Mu (Nankai Univ./China), P. Chavel (Laboratoirte Charles Fabry de I'Institut d'Optique/ France)
We report an application of fuzzy correlation of color-histograms to color-image retrievals, where fuzzy correlation with non-linearly weighted algorithm is developed, which offers an adaptive capability to retrieve color-images with local characters of color content.

17:30 13B4-3
Measurement and modeling of gonio-spectral reflection properties of paper sheets
Y. Akao, N. Tsumura, Y. Miyake(Chiba Univ./Japan)
Gonio-spectral reflection properties for paper sheets were measured and modeled as the linear combination of Torrance-Sparrow model and the Lambertian. Results for paper sheets in wide range of roughness showed good correspondence with the model.

17:45 13B4-4
Wavelength-coded image reconstruction using stratified reflection holograms
Y. Ishii, T. Takahashi, M. Kayano (Univ. of Industrial Technology, Sagamihara/Japan)
Repetitive image reconstructions from a stratified reflection hologram have been shown, numerically and experimentally, that are coded by wavelength references satisfied by Bragg condition. Multiple holographic photopolymer layers are interleaved with slide glasses.

13C4 Nano Photonics

Presiders
N. F. de Rooij (Univ. Neuchatel/Switzerland)
H. Hori (Yamanashi Univ./Japan)

16:30 13C4-1 (Invited)
Micro and Nanoscale Optical MEMS
M. C.Wu (Univ. California LA/USA)

17:00 13C4-2 (Invited)
Nanophotonics: Devices, fabrications, and systems
M. Ohtsu (Tokyo Institute of Technology/Japan)
Definition, principle, and true nature of nanophotonics are presented. Recent progresses in nanophotonic device operation (e.g., switches), size- and position-controlled fabrications (e.g., deposition and lithography), and future systems (e.g., optical fiber communication) are reviewed.

17:30 13C4-3
Simulations and velocity measurements for a microparticle in an evanescent field
H. Y. Jaising, K. Grujic , O. G. Helleso (Univ. of Tromso/Norway)
We report theoretical calculations and experimental data for guiding of polystyrene microspheres in the evanescent field of an optical waveguide. The computations were done using a generalized version of Mie theory, which gives good agreement with our experiments.

17:45 13C4-4
Improvement of detection sensitivity of solid state surface analysis using LAAF spectroscopy
D. Nakamura, T. Takayuki, Y. Oki, M. Maeda (Kyushu Univ./Japan)
Solid surface elemental analysis with extremely high sensitivities and high resolution was proposed and demonstrated based on laser ablation and laser spectroscopy. Also theoretical model was designed and its theoretical detection limit was evaluated.

July 14, 2004 (Wednesday)

14A1 Optical Memory(1)

Presiders
K. Hsu (National. Chiao Tung Univ./Taiwan)
Y. Tanaka (Matsushita/Japan)

10:00 14A1-1 (Invited)
Super-resolution Near-field Optical Storage
D. Tsai (National Taiwan Univ./Taiwan)
Results of the optical response of the local structures of the super-resolution near-field optical structures demonstrated the near-field optical interactions of the plasmonic structures in nanometer scale are the key of the near-field optical recording.

10:30 14A1-2 (Invited)
The design of flat intensity lenses for optical pick-up units
T. Tukker (Philips Research/The Netherlands)
In this paper a flexible method is presented to design beam-shaping optics with aspherical surfaces transforming the intensity profile of the light beam into any desired profile.

11:00 14A1-3 (Invited)
Pointing Vector Topologies and Applications of C-Shaped Nano Apertures
L. Hesselink, J. Matteo, Y. Yuen, B. Leen, L. Sun (Stanford Univ./CA)
In this invited paper we discuss Pointing vector flow topologies of photons passing through highly efficient resonant sub-wavelength C-apertures used for near-field optical data recording, enhanced high resolution Raman spectroscopy and single molecule detection.

14B1 Holographic Recording and Dynamic Gratings

Presiders
T.-C. Poon (Virginia Tech/USA)
S. Komatsu (Waseda Univ./Japan)

10:00 14B1-1 (Invited)
Dynamic Intensity, Polarization and Phase Holograms
K. Y. Hsu, S. Lin, V. Marinova (National Chiao Tung Univ./Taiwan)
We present investigations on recording materials for dynamic intensity, polarization, and phase holograms. We describe fabrications and characterizations of the new materials. Experimental demonstrations on applications are presented.

10:30 14B1-2 (Invited)
Inorganic-organic nanocomposite for holographic recording with net diffraction efficiency near 100 %
Y. Tomita (Univ. of Electro-Communications/Japan)
A new photopolymer incorporating inorganic nanoparticles for highly efficient holographic recording is described. Its recording mechanism is based on all-optical control of nano-scale morphology of nanoparticle distribution. The diffraction properties and potential applications are described.

11:00 14B1-3
Numerical analysis of photo-induced surface relief grating formation by MPS method
D. Barada, M. Itoh, T. Yatagai (Univ. of Tsukuba/ Japan)
The formation of photo-induced surface relief gratings (SRGs) on azobenzene containing polymers are simulated using the moving particle semi-implicit (MPS) method. The optical gradient force is considered. These numerical results are coincided with experimental results qualitatively.

11:15 14B1-4
Photorefractive effect in rhodium doped relaxor Pb ($Zn_{1/3}Nb_{2/3}$)O_3-$PbTiO_3$
T. Fujisawa, Y. Satoh, R. Fujimura, K. Oda, T. Shimura, K. Kuroda (Univ. of Tokyo/Japan)
We investigated photorefractive properties of rhodium doped Pb (Zn1/3Nb2/3)O3-PbTiO3 relaxor ferroelectric crystal by two wave mixing experiments. Large gain coefficient of 16.5 cm-1 is obtained at a wavelength of 488 nm.

14C1 Optical Diagnostics and Instrumentations(1)

Presiders
W. Drexler (Univ. Vienna/Austria)
Y. Yamada (Univ. Electro-Commun./Japan)

10:00 14C1-1 (Invited)
Blood Flow Analyses Using Laser Speckle Flowgraphy
H. Fujii, N. Konishi, M. Lee (Kyushu Institute of Technology/Japan)
New versions of the Laser Speckle Flowgraphy system are developed to visualize the blood flow map in various regions of the human body. Useful application of the system to evaluate allergic reaction is also demonstrated.

10:30 14C1-2 (Invited)
Near-field CARS and SHG microscopy
S. Kawata (Osaka Univ. and RIKEN/)
We will show our latest progress in optical microscopy and nanophotonics, where the near field effects and nonlinear spectroscopy play an important role in imaging beyond the classical diffraction-limited optics. A number of experimental results will be shown.

11:00 14C1-3
Nondestructive Evaluation of Subsurface Defect by Photoacoustic Microscope
H. Endoh, K. Inomata, K. Miyamoto, T. Hoshimiya (Tohoku Gakuin Univ./Japan)
Nondestructive evaluation (NDE) of simulated subsurface defect using photoacoustic microscope (PAM) has been demonstrated. Tow types of subsurface defects were fabricated in an aluminum plate specimen mechanically. These defects had concave and convex top shapes.

11:15 14C1-4
Respiratory Movement Monitoring System Using Fiber-Grating 3D Sensor for Diagnosing Sleep Apnea Syndrome
Y. Takemura (Keio Leading-edge Laboratory of Science and Technology/Japan), J. Sato, M. Nakajima (Keio Univ./Japan)
A non-restrictive respiratory movement monitoring system that utilizes fiber-grating 3D sensor is presented. This system discriminates between obstructive and central apnea by detecting the paradoxical movement of chest and abdomen to diagnose sleep apnea syndrome.

11:30 Lunch

14D2 Poster Session

12:30

14D2-1

Theoretical Derivation of Weight Function in Diffuse Optical Tomography

K. Nitta, K. Mio, O. Matoba, T. Yoshimura (Kobe Univ./Japan)

For the reconstruction of three-dimensional absorption distribution in diffuse optical tomography, a weight function is required. In this paper, we show that the weight function is divided into sensitivity function and optical mean path length.

14D2-2

Diffuse Reflection Light from Scattering Media

S. Xie , D. Peng, H. Li (Fujian Normal Univ./China)

The surface of biological tissue is not an ideal Lambertian diffuser. The spatial distributions of diffuse reflection light from scattering media at different conditions were presented by Monte Carlo simulation and by experiments, respectively.

14D2-3

Rapid BRDF estimation method from measured radiances based on Wiener estimation technique

K. Takase, N. Tsumura, T. Nakaguchi, Y. Miyake (Chiba Univ./Japan)

We propose a rapid BRDF estimation method from measured radiances based on Wiener estimation technique. This estimation technique uses many sample data of valid BRDF to decide transformation for accurate estimation.

14D2-4

A probe with position sensing function for near infrared spectroscopy

M. Fukuda, S. Taue, H. Yamamoto, Y. Hayasaki, N. Nishida (The Univ. of Tokushima/Japan)

A probe with position sensing function has been proposed for near infrared spectroscopy. During measurements, the probe position is detected by a camera. Spatial distribution of metabolic status has been obtained by scanning a target.

14D2-5

Spectral properties of reflected light from denaturing tissues

H. Yoshimura (Chiba Univ./Japan), J. Viator, S. Jacques (Oregon Health & Science Univ./USA)

Spectral properties of reflected light from denaturing tissues have been investigated experimentally under illumination of white light transmitted into an optical fiber. The relation between the spectral changes and the denaturation is discussed.

14D2-6

Second harmonic generation measurement on biomacromolecules: celluloses

Y. Marubashi (Hokkaido Univ./Japan), T. Higashi, S. Hirakawa, S. Tani (Yamaguchi Univ./Japan), T. Erata, M. Takai (Hokkaido Univ./Japan), J. Kawamata (Yamaguchi Univ./Japan)

The optical second harmonic generation measurements were applied for the structural analysis of a biomacromolecule. The results for cellulose polymorphs will be discussed.

14D2-7

A peak shift analysis for time resolved data at a 1.3 micrometer region

G. Nishimura, M. Tamura (Hokkaido Univ./Japan)

It is demonstrated that a peak shift analysis overcomes the limitation of the temporal resolution. This analysis is numerically confirmed and applied to a time-resolved measurement of a human tissue at a 1.3 micrometer region.

14D2-8

Improvement of transcutaneous optical image based on analytic solution of light propagation

K. Shimizu (Hokkaido Univ./Japan), K. Tochio (Hakuju Institute for Health Science Co., Ltd./Japan), Y. Kato (Hokkaido Univ./Japan)

To describe the light propagation in animal tissue, an analytic solution was obtained. In animal experiment it was shown that the deterioration of fluorescent images due to scattering could be effectively improved using the solution.

14D2-9

In vivo measurements and image reconstruction of human lower legs using NIR diffuse optical tomography

Y. Tanikawa (National Institute of Advanced Industrial Science and Technology (AIST)/Japan), H. Zhao (National Institute of Advanced Industrial Science and Technology (AIST)/China), F. Gao (National Institute of Advanced Industrial Science and Technology (AIST) and NEDO/China), K. Homma (National Institute of Advanced Industrial Science and Technology (AIST)/Japan), Y. Yamada (Univ. of Electro-Communications and AIST/Japan)

Diffuse optical tomographic images of human lower legs were reconstructed from in vivo measurements using a time-resolved NIR system. The absolute absorption and scattering images roughly revealed the anatomical structures of the legs.

14D2-10

Topographic imaging of a local blood region in human skin tissue using diffuse reflectance images at isosbestic wavelengths

I. Nishidate, Y. Aizu, H. Mishina (Muroran Institute of Technology/Japan)

To image the depth of a local blood region embedded in a skin tissue, we proposed a method using diffuse reflectance images at two isosbestic wavelengths of hemoglobin (420 and 585 nm).

14D2-11

Waveform measurement of ultra-short optical pulses based on two photon absorption in Si-image sensor

K. Aizawa, H. Aoki, Y. Ito, Y. Tanaka, T. Kurokawa (Tokyo Univ. of Agriculture and Technology/Japan)

We demonstrated a novel waveform measurement system of ultra-short optical pulses, which uses two-photon absorption process in a Si-image sensor. This system can measure the intensity auto-correlation as an image at a time.

14D2-12

Performance Analysis of a Fiber Based Wavelength Converter Employing XPM Nonlinearity

B. Sarker (Gunma Univ./Japan), T. Yoshino (Kaisei academy/Japan)

Performance analysis of a cross-phase modulation based wavelength converter is proposed for 10 Gbit/s optical signal and conversion efficiency, power penalty are evaluated due to wavelength conversion considering the optimum length of conventional single mode fiber.

14D2-13

Closure phase theorem of aperture synthesis interferometer array in astronomy

C. Tao (Nanjing Univ. of Science & Technology/China)

In this paper closure phase theorem is presented.The proof and computer simulation show exact quantity of closure phase is zero or (+ - 2pi).The theorem will significantly influence on aperture synthesis interferometer array technology.

14D2-14

Improvement of latent fingerprint image contrast by combining even step-phase shift and Pi -shift methods in phase-resolved optical technique

Z. Chao, L. Seah, D. Soudamini Amma, M. Vadakke Matham, L. Ong (Nanyang Tech. Univ./ Singapore)

A technique to increase the sensitivity of the phase-resolved fingerprint imaging system is developed and presented. An even-step-shift method is combined with p-shift method to suppress the background fluorescence and double the fingerprint image contrast. Experimental results will be demonstrated.

14D2-15

Rotation of a metallic particle using the optical force exerted by a circularly polarized Gaussian beam

H. Furukawa, S. Hirose, K. Tenjimbayashi (National Institute of AIST/Japan)

We show that optical tweezers technique can be applied to capture and rotate metallic micro-particles. The rotation speed of a nickel particle was approximately 2 Hz under a circularly polarized illumination.

14D2-16

Design and Evaluation of an Optical System for Photoluminescence / Spectral Response

V. Dutta, D. Pandya (I.I.T.Delhi/India), D. Kumar (/India)

The presented work focuses on the maximum light collection at the cryostat (sample used) due to the light excitation source using efficient condensing lens system.

14D2-17

Snapshot Imaging Spectropolarimetry

N. Hagen (Univ. of Arizona/USA), D. Sabatke (formerly at Optical Sciences Center, currently at Ball Aerospace Inc./USA), E. Dereniak (Univ. of Arizona/USA)

By combining the techniques of snapshot imaging spectrometry and of snapshot spectropolarimetry, we have designed and are building an instrument which can obtain spatial, spectral, and polarimetric information of a scene within a single frame.

14D2-18

The Influence of Bump Height on the Read-out Signal of an Optical Disc System with the Optimized Annular Phase Apodizer

S. Park (Suncheon Cheongam Coll./Korea), S. Song (Jeonbuk Sci. Coll./Korea), C. Chung (Chonnan Nat. Univ./Korea)

The read-out signal of an optical disc system with the optimized annular phase apodizer and the optimized bump height is higher than that of an optical disc system with the clear aperture and the annular phase apodizer.

14D2-19

Television remote-observation optical system with increased image field

I. Livshits (State Univ. of Information Technologies/Russia), I. Bronchtein (JSC KB Jupiter/Russia)

Proposed a method to observe remote objects with both: wide field angle and increased

14D2-20

Examination of the applied optical wireless LAN in a distance learning system

K. Shimizu, C. Fujikawa, K. Kodate (Japan Women's Univ./Japan)

We measured receive-level, BER and throughput of the optical wireless LAN on weather dependability for one year. By real-time interactive communication experiments, the optical wireless LAN has been proved as effective system for distance learning.

14D2-21
A study of Non-contact Breath Motion Monitoring System for Respiratory Disorders Diagnosis
I. Sato, M. Nakajima (Keio Univ./Japan)
This paper reports on a system which diagnoses Sleep Apnea Syndrome by measuring the respiratory movement of the chest and the abdomen with the non-contact method. Authors proposed the method which allows us to obtain the respiratory movement and the shape of human body simultaneously.

14D2-22
Bathroom Watching using a Breath Detection System
T. Nishiura, M. Nakajima (Keio Univ./Japan)
We have developed a watching system for bathrooms. New feature of this system is that it detects the person's breathing by using FG vision sensor. Detection of breath was greatly effective to reduce false alarms.

14D2-23
Impact of lens aberrations and mask transmission errors on the image formation of vortex masks
Y. Unno (Canon Development Americas, Inc./USA), T. Ebihara (Canon Inc./Japan), M. Levenson (M.D. Levenson Consulting/USA)
Image formation with a vortex (four-level phase-shifting) mask is analyzed theoretically. The origins of the peculiar imaging properties sometimes observed in experiments are discussed in association with lens aberrations and mask transmission errors.

14D2-24
Study on resolution limit for large-pitch line patterns using a newly developed Slim-Line Imaging Double-Exposure Recipe
T. Horiuchi, S. Fujio (Tokyo Denki Univ./Japan)
Resolution limit for large-pitch line patterns printed by optical projection lithography is investigated using a new Slim-Line Imaging Double Exposure Recipe (SLIDER). As a result, ultra fine patterns corresponding to the k1 value of 0.18 is obtained.

14D2-25
Parallel quasi-phase-shifting digital holography implemented by simple optical set up and effective use of image-sensor pixels
M. Sasada, Y. Awatsuji, T. Kubota (Kyoto Institute of Technology/Japan)
We propose a parallel quasi-phase-shifting digital holography implemented by simple optical setup and effective use of image-sensor pixels. We have verified the validity of the technique both numerically and experimentally.

14D2-26
Extraction of correlation signal by time-gating in header recognition using optical correlation
H. Furukawa, T. Konishi, Y. Oshita (Osaka Univ./Japan), W. Yu (Osaka Science and Technology Center/Japan), K. Itoh (Osaka Univ./Japan), Y. Ichioka (NARA National College of Technology/Japan)
In header recognition, to discriminate a target header signal from time-lag header signals, we demonstrate the extraction of the correlation signal of the target header signal by time-gating based on ultrafast phenomenon like SHG.

14D2-27
Evaluation of optically synthesized fractal images using finite box counting theorem
N. Tate, T. Kurosawa, S. Saito, J. Tanida (Osaka Univ./Japan)
We propose an evaluation method for optically generated fractal patterns using the finite box dimension. The characteristics of the method is investigated with the dimension of fractal patterns generated by a computer and an optical processor.

14D2-28
Adaptive dispersion compensator with time-to-two-dimensional-space-to-time conversion system using ultrafast time gating for unknown dispersed optical short pulses
Y. Oshita, T. Konishi, A. Nakagawa, K. Itoh (Osaka Univ./Japan), Y. Ichioka (Nara National College of Technology/Japan)
We demonstrate a novel adaptive dispersion compensation for unknown dispersed optical short pulses. For adaptive dispersion compensation, we use an ultrafast time-to-two-dimensional (2-D)-space-to-time conversion based on optical sampling and spectral decomposing techniques.

14D2-29
Quasi-regular photonic lattices induced by partially spatially incoherent light in SBN crystals
V. Shandarov (Tomsk State Univ. of Control Systems and Radioelectronics/Russia), D. Kip, M. Stepic (Technical Univ. of Clausthal/Germany)
Development of quasi-regular structures of two-dimensional waveguide channels in bulk SBN crystal is experimentally investigated. We demonstrate that such structure to induce in partially spatially incoherent light, the optical nonlinearity must exceed a threshold.

14D2-30
Maximization of the transient diffraction efficiency in a $BaTiO_3$ crystal
S. Md. Sharif, K. Ogusu (Shizuoka Univ./Japan)
An unusual enhancement of the transient diffraction efficiency with a steady-state grating in an undoped $BaTiO_3$ crystal is observed experimentally which can be maximized by proper using of the dynamic grating by the reading beam.

14D2-31
Near-infrared one-color photorefractivity in Mg-doped near-stoichiometric LiNbO3 with quasi-nonvolatile readout
W. Zou, R. Matsushima, Y. Tomita (Univ. of Electro-Communications/Japan)
We demonstrate quasi-nonvolatile one-color holography in Mg-doped near-stoichiometric lithium niobate with the photorefractive sensitivity as high as 0.23 cm/J. The dynamics of the diffraction efficiency and two-beam coupling during recording and fixing are investigated.

14D2-32
Adaptive speckle interferometer based on dynamic reflection holographic gratings formed in (100) cut BTO crystal
R. Romashko, Y. Kulchin (Far Eastern State Technical Univ./Russia), S. Shandarov, N. Burimov, D. Limarev (Tomsk St. Univ. of Control Systems & Radioelectronics/Russia), Y. Kargin, V. Volkov (Institute of General and Non-Organic Chemistry of RAS/Russia)
An experimental and theoretical study of adaptive processing of non-stationary speckled waves by dynamic reflection holographic gratings formed in photorefractive BTO crystal without applying external electrical field is presented.

14D2-33
Analyses of the Refractive Index Modulation on Photopolymer for Recording Hologram films by Near-field Optical Microscopy
N. Yamamoto (National Institute of Advanced Industrial Science and Technology (AIST)/Japan)
It is quite difficult for observation of optical material with size below wavelength and a little difference in refractive index. We demonstrated Δ n imaging of photopolymer for recording Holograms using scanning near-field optical microscope (SNOM).

14D2-34
Recording of nonvolatile photorefractive gratings in lithium niobate with surface doping by iron and copper
P. Karpushin, O. Gabitova, V. Shandarov, E. Petrushchak (State Univ. of Control Systems and Radioelectronics/Russia)
We present experimental results on characteristics of photorefractive gratings recorded within doped with iron and copper surface layer of lithium niobate. We use incoherent green light as a gating and coherent red beams as recording light.

14D2-35
Contribution of a drift mechanism to the spatial self-action of light beams within photorefractive waveguides in $LiNbO_3$
E. Smirnov, V. Shandarov (Tomsk State Univ. of Control Systems and Radioelectronics/Russia)
Self - defocusing of light beams and formation of dark spatial solitons in planar optical waveguides in lithium niobate are studied in conditions of simultaneous contributions of both, photovoltaic and drift mechanisms of the photorefractive response

14D2-36
Chaos synchronization with bandwidth-enhanced semiconductor lasers by strong optical injection
K. Ohyagi, J. Ohtsubo (Shizuoka Univ./Japan)
Modulation bandwidth of semiconductor lasers is greatly enhanced by a strong optical injection. Characteristics of chaos synchronization have been numerically studied in bandwidth-enhanced semiconductor lasers with optical feedback.

14D2-37
Noise in mode-locked external cavity lasers
N. Dogru (Univ. of Gaziantep/Turkey)
Mode-locking is difficult to achieve for some value of bias currents and large spontaneous coupling factor because of increasing noise for hybrid soliton pulse source. Hence, transform-limited pulses are not generated over a wide tuning range.

14D2-38
Distributed feedback dye-doped polymer laser using light-induced surface relief hologram in azo-polymer film
T. Hirose (Chiba Univ./Japan)
We present a distributed feedback dye-doped polymer waveguide laser fabricated by the use of a light-induced surface relief hologram in azo-polymer film. Laser emission at wavelength 630nm was obtained at the pump fluence of $<0.1 mJ/cm^2$.

14D2-39
Multi-watt high quality pico-second output from a phase conjugate Nd:YVO4 laser amplifier
M. Goto, T. Imaizumi, Y. Ojima, T. Omatsu (Chiba Univ./Japan)
6W diffraction-limited pico-second output from a diode-pumped Nd:YVO4 slab amplifier with a photorefractive phase-conjugate mirror are generated. The corresponding energy extraction efficiency of 26% was achieved.

14D2-40
High power and high repetition rate yellow laser based on self-stimulating Nd3+ :KGd $(WO4)^2$ Raman crystal
M. Okida, M. Itoh, T. Yatagai (Univ. of Tsukuba/Japan), A. Hamano (Furukawa Co.,Ltd./Japan), T. Omatsu (Chiba Univ./Japan)
Yellow light output with high repetition frequency is obtained by compact, diode-pumped, self-stimulating Nd3+ :KGd (WO4)2 Raman laser. The maximum average power of 68.8mW at pulse repetition frequency of 500Hz was obtained at 591nm.

14D2-41
Highly efficient organic waveguide laser including an random scattering active layer
H. Watanabe (Kyushu Univ./Japan), T. Omatsu (Chiba Univ./Japan), Y. Oki, M. Maeda (Kyushu Univ./Japan)
We present a novel organic waveguide laser based on an active random scattering medium. It operated at a single longitudinal mode. The slope efficiency of 11.5% and lasing threshold of 0.2uJ were obtained, respectively.

14D2-42
Development of Efficient Distributed Feedback Solid-state Dye Laser
M. Tanaka, Y. Chisaki (Seiko Electric/Japan), Y. Oki, M. Maeda (Kyushu Univ./Japan)
The efficient laser operation is evaluated about very compact tunable lasers that integrates distributed feedback (DFB) dye laser, and the laser operation was demonstrated from dye doped laser multi-mode waveguides with DFB structures.

14D2-43
Thermo optical effect wavelength control on distributed feedback plastic dye laser
S. Miyawaki (Kyushu Univ./Japan)
Thermo optical effect was applied to a distributed feedback plastic dye laser. Wavelength modulation was confirmed and investigation of the heating characteristic was conducted.

14D2-44
Second harmonic generation of laser diode from waveguided Periodically-Poled LiNbO/sub 3/ with fiber Bragg grating
K. Ohnishi, S. Tokuhisa, Y. Oki, T. Okada, M. Maeda (Kyushu Univ./Japan)
Blue/green compact lasers were developed using waveguided z-cut MgO doped PPLN and LD. SHG wavelengths of 470nm and 530nm were investigated. Using Fiber Bragg Grating made SHG output stable and suppress the scattering less than 0.5 percent s.d.

14D2-45
Distributed feedback tunable plastic laser with organic electro-luminescence materials
H. Sato, A. Abe, H. Watanabe, Y. Oki, M. Maeda, S. Mataga (Kyushu Univ./Japan), M. Era (Saga Univ./Japan)
The distributed feedback plastic laser doped with organic electro-luminescense molecules was demonstrated. This laser was oscillated in 400nm-500nm by THG pumping and expected high performance from with laser dye.

14D2-46
Bessel-Gauss output beam from a diode-pumped Nd:YAG laser
H. Elfstrom, J. Simonen, P. Paakkonen, J. Turunen (Univ. of Joensuu/Finland), A. Hakola, S. Buchter, T. Kajava (Helsinki Univ. of Technology/Finland)
We have designed and fabricated a simple and compact laser source that directly produces a fundamental mode of Bessel-Gauss beam. The simulations are calculated and successfully compared with experimental measurements

14D2-47
Steady State Distributed Equivalent Circuit Model for Semiconductor Laser Amplifier
M. Razaghi, A. Zarifkar, M. Soroosh (Iran Telecommunication Research Center/Iran), V. Ahmadi (Tarbiat Modares Univ./Iran)
In this paper, we present an equivalent circuit model for analysis of the gain, saturation power and carrier density in a semiconductor laser amplifier (SLA). Our model is based on the transfer matrix method.

14D2-48
A Neural Network Model for Determination of Excess Noise Factor for Separate Absorption and Multiplication Region Avalanche Photodiode
M. Soroosh, A. Zarifkar, M. Razaghi, M. K. Moravvej Farshi (Iran Telecommunication Research Center (ITRC)/Iran)
We present a MLP neural network model for the calculation of the excess noise factor versus multiplication in SAM-APD. Results from the model show a good agreement with the experimental data.

14D2-49
Microscopic DESPI for deformation analysis of micro-structures
S. Toyooka, H. Kadono, V. Madjarova (Saitama Univ./Japan)
Dynamic ESPI to analyze a micro-structure is presented. The proposed method was examined in two different experiments, i.e., to study thermal expansion of bonded structure and to examine moving characteristics of a MEMS component.

14D2-50
Density of Phase Singularities in Analytic Signal of Speckle Pattern with Application to Micro-displacement Measurement
W. Wang, N. Ishii (The Univ. of Electro-Comm./Japan), S. Hanson (Risoe National Laboratory/Denmark), Y. Miyamoto, M. Takeda (The Univ. of Electro-Comm./Japan)
Theoretical and experimental investigations of the density of phase singularities in the complex analytic signals of speckle patterns are presented. The result provides the theoretical basis for the new principle of optical vortex metrology.

14D2-51
Investigation of effect of fiber directions on deformation of wood under shearing loads using electronic speckle pattern interferometry
E. Umezaki, R. Kawato (Nippon Institute of Technology/Japan)
The deformations of the radical, tangential and end sections of Douglas firs are investigated using ESPI. Results reveal that the directions of earlywood and latewood have an effect on the deformation and failure of wood.

14D2-52
Vibration measurements of rough surfaces using an LCSLM
K. Matsuda (National Institute of Industrial Science and Technology/Japan), B. Ye (Zhejiang Univ./China), N. Fukuchi, H. Okamoto, T. Hara (Hamamatsu Photonics K.K/Japan)
This paper describes vibration measurements using the time average method of holography recording applied to an optically addressed LCSLM. The advantage of this method is that a vibrating object having rough surfaces can be measured in near-real time.

14D2-53
Zoomable reconstruction algorithm for digital holograms
F. Zhang, I. Yamaguchi (Gunma Univ./Japan)
A generalized convolution algorithm, which is capable of magnification with adjustable zoom factor, is proposed for the reconstruction of digital holograms. The effectiveness of the algorithm is demonstrated by experimental data.

14D2-54
Digital phase difference technique for nanoscale measurement
M. Roy (The Univ. of Sydney/Australia), K. Matsuda (National Institutes of Advanced Industrial Science and Technology/Japan), S. Rehman (The Univ. of Sydney/Australia), H. Furuhashi (Aichi Institute of Technology/Japan)
We report a new technique for phase difference amplification using digital processing. The novel feature of this technique is that high resolution phase images can be obtained with a simple white light interferometry based on Fizeau configuration.

14D2-55
Position measurement of reflecting surfaces by back-propagation of multiple-wavelength optical fields
O. Sasaki, K. Masui, T. Suzuki (Niigata Univ./Japan)
We detect optical fields on a detecting plane for multiple-wavelengths with a sinusoidal phase-modulating interferometer. An optical field of an object is reconstructed by back-propagating the detected multiple-wavelength optical fields to measure positions of the reflecting surfaces of the object.

14D2-56
Thickness and surface profile measurement by a sinusoidal wavelength-scanning interferometer
H. Akiyama, O. Sasaki, T. Suzuki (Niigata Univ./Japan)
We propose a sinusoidal wavelength-scanning interferometer for measuring thickness and surface profile of a thin film. By reducing the difference between the detected signal and the estimated signal, we estimate values of Z and a of the front and rear surfaces.

14D2-57
Holographic recording in nanoparticles-dispersed photopolymer films
N. Suzuki, Y. Tomita (Univ. of Electro-Communications/Japan)
We demonstrate holographic recording in inorganic nanoparticles-dispersed photopolymers with diffraction efficiency near 100%. Grating-formation mechanism accompanying with the mutual diffusion of monomers and nanoparticles is confirmed experimentally.

14A3 Optical Memory(2)

Presiders
L. Hesselink (Stanford Univ./USA)
R. Katayama (NEC/Japan)

14:00 14A3-1 (Invited)
Toward the commercial realization of high performance holographic data storage
W. Wilson(InPhase Technologies/USA)
An overview of a holographic demonstration platform is presented. This compact holographic drive is complete with custom optics, and control and channel electronics. This device paves the way for the commercialization of this technology.

14:30 14A3-2 (Invited)
Advanced Collinear Holography
H. Horimai (OPTWARE Corporation, Japan Science and Technology Corporation/Japan)
Advanced collinear holography is proposed. The 3-D interference pattern and its cross section image of recording media are simulated. The system margin of the collinear holographic recording system is also studied and the experimental results are presented.

15:00 14A3-3 (Invited)
Volume holographic storage with cross-polarization channels
Q. He, H. Wei, L. Cao, S. He, M. Wu, G. Jin (Tsinghua univ./P.R. China)
A novel volume holographic storage scheme with cross-polarization channels is proposed. In this scheme, data of two channels are stored synchronously and retrieved independently. The validity of this scheme has been confirmed experimentally.

14B3 Novel Laser Sources(1)

Presiders
M. Damzen (Imperial College/UK)
T. Omatsu (Chiba Univ./Japan)

14:00 14B3-1 (Invited)
Self-frequency-doubling ytterbium lasers
J. Dawes, P. Dekker, P. Burns, J. Piper (Macquarie Univ./Australia)
Ytterbium-doped self-frequency-doubling lasers offer high efficiency, tunable visible and near-infrared, cw and pulsed operation from compact devices. We review the laser performance of Yb:YAB (ytterbium-doped yttrium aluminum borate) in such systems.

14:30 14B3-2 (Invited)
Laser diodes in photorefractive self-adapted extended cavities for telecom and interferometric applications
G. Roosen, N. Dubreuil, G. Pauliat (Laboratoire Charles Fabry de l'Institut d'Optique/France)
Photorefractive crystals inside extended cavity laser diodes lead to self-organization : the interaction of the oscillating modes with the dynamic photorefractive hologram forces the single-mode oscillation. We applied this principle to interferomeric and telecom applications.

15:00 14B3-3
Novel type end fired operation of distributed feedback dye laser
M. Ide (Kyushu Univ./Japan)
A novel pumping scheme named 'quasi end firing' was proposed and demonstrated for a fiber-top distributed feedback solid-state dye laser. A laser oscillation was confirmed experimentally using this scheme, and its characteristics were evaluated theoretically.

15:15 14B3-4
Basic Property of Deformable Mirror for High-Power Lasers
Y. Sakai (Tokyo Univ. of Science/Japan), T. Ogawa (RIKEN/Japan), K. Akagawa (Megaopto Co.,Ltd/Japan), N. Saito (RIKEN/Japan), D. Mansell (Intellite Inc/America), M. Yamashita (Tokyo Univ. of Science/Japan), S. Wada (RIKEN/Japan)
The damage characteristics and basic property of dielectric-coated deformable mirrors (DMs) are investigated. The DMs show no damage irradiated with 200 W, 10 kHz laser beams of 1mm diameter.

14C3 Optical Diagnostics and Instrumentations(2)

Presiders
H. Fujii (Kyushu Inst. of Tech./Japan)
K. Shimizu (Hokkaido Univ./Japan)

14:00 14C3-1 (Invited)
Fibre-optic nonlinear optical microscopy for endoscopic applications
M. Gu (Swinburne Univ. of Technology/Australia)
The recent development of two-photon fluorescence and second-harmonic endocsopy will be reviewed. These instruments are based on the use of fibre optics and micro-optics and offer promising tools for early cancer detection.

14:30 14C3-2 (Invited)
Imaging Technology for early diagnosis of cancer
K. Gono (OLYMPUS Co./Japan)
In order to increase the chance to detect an early cancer, endoscopic imaging systems, Auto Fluorescence Imaging, Infrared Imaging and Narrow Band Imaging, have been developed. Clinical tests have been conducted for confirming their clinical usefulness.

15:00 14C3-3
Fibre Optic Spectroscopy for Detecting Genetically Modified Plants
O. Liew, X. Chean, P. J. Chong, Z. J. Ho (Singapore Polytechnic/Singapore), J. Chen, A. Asundi (Nanyang Technological Univ./Singapore)
Fibre optic spectroscopy (FOSpectr) was developed for detection and quantification of recombinant green fluorescent proteins (EGFP) in transgenic tobacco plants. The amplitude of fluorescence emission from FOSpectr correlated well with the level of EGFP expressed in the modified plants.

15:15 14C3-4
Development of a micro Raman optic-fiber probe for intravascular diagnostics
H. Sato, Y. Komachi (RIKEN/Japan), K. Aizawa (Tokyo Medical College/Japan), H. Tashiro (RIKEN/Japan)
A micro Raman probe (MRP) was developed for diagnostics of atherosclerotic plaques in coronary artery.

15:30 Coffee Break

14A4 Vision and Visual Perception

Presiders
D. R. Williams (Univ. Rochester/USA)
S. Shioiri (Chiba Univ./Japan)

16:00 14A4-1 (Invited)
Applications of adaptive optics in the human eye
D. Williams (Univ. of Rochester/USA)
Adaptive optics can compensate for the aberrations in the living eye, providing a microscopic view of the normal and the diseased retina and a novel tool for studying the limits of human vision.

14B4 Novel Laser Sources(2)

Presiders
J. M. Dawes (Macquarie Univ./Australia)
T. Omatsu (Chiba Univ./Japan)

16:00 14B4-1 (Invited)
Self-organising high power lasers
M. Damzen (Imperial College London/UK)
Self-organising lasers based on dynamic gain holography are shown to be scalable to 100W level and beyond with correct for severe thermal induced distortions to maintain excellent beam quality and single frequency operation.

14C4 Cell Optics

Presiders
M. Tamura (Hokkaido Univ./Japan)
T. Araki (Osaka Univ./Japan)

16:00 14C4-1 (Invited)
A. Miyawaki (RIKEN/Japan)
I'd like to discuss fluorescence imaging technology that allows us to visualize cellular functions in real time.

16:30 14A4-2 (Invited)
Motion-based pattern perception
S. Nishida (NTT Corporation/Japan)
A psychophysical study of a visual illusion (spatiotemporal interpolation in multi-slit displays) suggests that the human visual system uses neural mechanisms for motion analysis to improve the visibility of the spatial pattern of moving objects.

16:30 14B4-2 (Invited)
New techniques for laser beam shaping and beam quality control.
J. -P. Huignard, A. Brignon (Thales Research & Technology/France)
Application of diode pumped lasers now require to control the beam profiles and to achieve maximum brightness. To attain these objectives with bulk and fiber gain media, we will present new techniques including adaptive liquid crystal light valves, phase conjugation in laser crystals and beam cleanup in photorefractive crystals.

16:30 14C4-2
Rapid sensor for detecting Mycobacterium tuberculosis
A. M. Pariwono, C. S. Lim (Nanyang Technological Univ./Singapore), X. Wang (Singaopre General Hospital/Singapore), A. K. Asundi (Nanyang Technological Univ./Singapore)
An optics-based sensor to rapidly screen for the presence of Mybacterium tuberculosis is described. Based on the detection of specific biochemical metabolic by-products of viable cells, sensitivity and detection time is assessed.

16:45 14C4-3
Multiple-wavelength excitation fluorescence microscopy using supercontinuum
K. Isobe, W. Watanabe, S. Matsunaga, K. Fukui, K. Itoh (Graduate School of Engineering, Osaka Univ./Japan)
We propose a novel technique of multiple-wavelength excitation fluorescence microscopy by use of supercontinuum as a light source. Fluorescence images obtained by one-photon and two-photon absorption of supercontinuum are presented.

17:00 14A4-3
Color appearance of the small field stimuli presented in periphery
K. Fujisawa, M. Ayama, A. Komaba, K. Hagiwara (Utsunomiya Univ./Japan)
Quantitative measurement of the appearance of small field color stimuli presented at the different eccentricities in the visual field was carried out. Results similar to previous studies are obtained but in nearer eccentricities.

17:00 14B4-3
Group-velocity matched second-harmonic generation in noncollinear quasi-phase matching geometry
N. Fujioka, S. Ashihara, T. Shimura, K. Kuroda (Univ. of Tokyo/Japan)
We demonstrate efficient frequency doubling of 80 fs pulses under simultaneous quasi-phase matching and group-velocity matching. Second harmonic pulses of 100 fs duration and 780 nm center-wavelength were generated with 50% efficiency by using a periodically-poled lithium niobate device.

17:00 14C4-4
Diffusional motions of tandem green fluorescent proteins in living cell
C. Pack, K. Saito, M. Tamura, M. Kinjo (Hokkaido Univ./Japan)
In order to analyze the nuclear microenvironment, we have synthesized tandem type of enhanced green fluorescent proteins (EGFP1~EGFP5) as a molecular ruler and measured the diffusions of EGFPns in living cell using fluorescence correlation spectroscopy.

17:15 14A4-4
Contribution of color to 3D motion aftereffect
S. Shioiri, T. Nakajima, H. Yaguchi (Chiba Univ./Japan)
We measured duration of motion aftereffect for depth perception based on interocular velocity differences using color and luminance gratings. The results showed clear contribution of color signals as well as luminance signals to 3D motion.

17:15 14B4-4
Second harmonic generation of Nd:YAG laser in cerium-doped KTP
M. Kato, N. Saito (RIKEN/Japan), K. Sakurai, Y. Murayama (Earth Chemical Co. LTD/Japan), M. Katsumata (Kogakugiken Co. LTD/Japan), S. Wada (RIKEN/Japan)
Ce:KTP was used for second harmonic generation of Nd;YAG laser. Energy conversion efficiency reached to 65% and the efficiency was maintained without gray tracking for two hours applying temperature of 145 degrees

17:15 14C4-5
Fluorescence lifetime properties of various calcium ion indicators
K. Yoshiki, H. Azuma, M. Hashimoto, T. Araki (Osaka Univ./Japan)
We compared fluorescence lifetime dependencies of several Ca2+ probes to find a suitable probe. To re-alize the imaging of intracellular Ca2+ concentration, a confocal fluorescence lifetime imaging microscopy system using asynchronous sampling method has been developed.

14D5 Poster Session

17:30

14D5-1
Real-time imaging ellipsometer using rotating polarizer/analyzer and correlation image sensor
T. Shimizu, T. Kurihara, N. Ono, S. Ando (The Univ. of Tokyo/Japan)
A novel imaging ellipsometer which enables simultaneous 2-D measurement of complex ellipsometric parameters is proposed. Applications of this system to the real-time visualization of oxidization process are shown.

14D5-2
A compact polarimeter using a flint glass fiber Faraday rotator
M. Yokota, N. Yoneyama, I. Yamaguchi (Gunma Univ./Japan), T. Yoshino (The Kaisei Academy/Japan)
A compact polarimeter using a flint-glass fiber Faraday rotator has been developed. By using double coils to enable the null method, the resolution of 0.05 g/dl and measurement range of 25 g/dl is performed for glucose sample in a cell of 10-mm path length.

14D5-3
Full-field determination of principal-stress directions using photo- elasticity with plane polarized RGB lights
P. Pinit, T. Ogasawara, E. Umezaki (Nippon Institute of Technology/Japan)
A method of full-field automated determination of principal-stress directions is developed based on color photoelastic fringes obtained in plane polariscopes. The principal-stress directions obtained by this method are in good agreement with the theoretical ones.

14D5-4
A differential Jones matrix model for twisted nematic liquid crystal devices
M. Yamauchi (AIST/Japan)
We propose a Jones matrix model for twisted nematic liquid crystal devices. The model contains two angular parameters related to the twist and tilt angles through differential equations, and simulates phase modulation characteristics well.

14D5-5
Thin film characterization over a micron area
D. Baranov, E. Zolotov (General Physics Institute of Russian Academy of Sciences/Russia)
A method of a characterization of thin metal film over a micron area by using the response of a differential heterodyne microscope is considered. The method is based on the film thickness and the metal refractive index dependencies of polarization contrast for reflected probing beams.

14D5-6
Birefringence dispersion measurement by geometric phase shifter
T. Wakayama, Y. Otani, N. Umeda (Tokyo Univ. of Agriculture and Technology/Japan)
This paper describes a measurement method of birefringence dispersion by geometric phase shifter. It can be achieved an achromatic phase shift to apply the geometric phase shifter of type QHQ.

14D5-7
Measurement of temperature-dependent of refractive index of UV-curing polymer
M. Tomiki, N. Kurihara, N. Okamoto (Shizuoka Univ./Japan), O. Sugihara (Tohoku Univ./Japan)
The temperature-dependent of refractive index of UV-curing polymer film was measured and the measured value was increased over glass transition temperature. We suggest polymeric thermo-optical switch with this polymer for the clad.

14D5-8
Measurement of sectional profile of a metal cylinder using a sinusoidally vibration light with sinusoidal intensity
J. Li, O. Sasaki, T. Suzuki (Niigata Univ./Japan)
A method is proposed to measure accurately a sectional profile of a metal cylinder in which a sinusoidal interference pattern is used as an exact spatial scale along one direction. A sectional profile of the metal cylinder is measured.

14D5-9
Infrared veiling glare measurement using a point light source method
J. Kudo (The Japan Society of Applied Physics/Japan)
We propose a new type of veiling glare measurement system using a point light source method. In this study, stray light spatial distribution was measured when used a simple combination lens consisting of uncoated ZnSe concave flat lens and ZnSe parallel plate.

14D5-10
The standard for the energy unit of pulse
J. Owsik, J. Janucki (Institute of Optoelectronics/ Poland)
A device for metrology applications in measurements of laser pulse energy is presented. Due to its parameters it can be used as a standard of the energy unit of pulse laser radiation. Main characteristics of the standard are shown.

14D5-11
Image Analysis with Jacobi-Fourier Moments
Z. Ping (Inner Mongolia Normal Univ./P. R. China), H. Ren (National Institute for Control of Pharmaceutical Products/P. R. China), Y. Sheng (LAVAL Univ./Canada), W. Bao (Beijing Univ./P. R. China)
Abstract: A novel set of orthogonal moments, Jocobi-Fourier Moments (JFM), was proposed. The definition, the reconstruction of original image, theory analysis and the experiment results were given.

14D5-12
Blind Recovery for Degraded Image Blurred with Shift Variant PSF: Series Segmenting Method
N. Ishihara, S. Komatsu (Waseda Univ./Japan)
Conventional blind deconvolution algorithms are effective only when the PSF is shift invariant. We propose a new method for shift variant blurred images. The proposed method using dynamic layers, is based on hybrid AD/SA algorithm.

14D5-13
Iterative blind deconvolution algorithm without support constraint
T. Takahashi (Oita National College of Technology/ Japan), H. Takajo (Kyushu Institute of Technology/ Japan)
We propose an iterative blind deconvolution algorithm which is based on the minimization of the Fourier error and the projection onto nonnegative image space. This algorithm works without support constraint and has stable convergence property.

14D5-14
Multiple 3D object data recording onto a digital hologram based on a hybrid optical encryption
T. Nomura, K. Uota, Y. Morimoto (Wakayama Univ./Japan)
The 3D object multiple storage method using a hybrid optical encryption is presented. The multiple encrypted digital hologram is obtained as the sum of the digital holograms of objects encrypted using independent virtual phase masks.

14D5-15
An optical identification system based on random phase encoded holograms
W. Su (Tatung Univ./Taiwan), Y. Chen
We present a novel optical identification system based on a holographic memory that records the complex amplitude of the mask. The hologram is used as an optical correlator to verify the access phase mask.

14D5-16
Image processing of a fingerprint pattern using an optoelectronic feedback system
E. Hikosaka, H. Yamamoto, Y. Hayasaki, N. Nishida (The Univ. of Tokushima/Japan)
We demonstrate that an optoelectronic feedback system performs a contrast enhancement effect, a spatial filtering effect, and filling-up of vacant space while maintaining surrounding structures for fingerprint patterns.

14D5-17
Maximum entropy restoration of blurred forensic images
C. Chen (Jiangsu Police Institute/China)
The algorithm of maximum entropy method (MEM) proposed by Hollis et al. is introduced. Some restoration examples of real blur images were shown, which proved this method was effective and feasible in forensic area.

14D5-18
Three-dimensional Secure Display System by Use of Phase-only Information from Digital Hologram
O. Matoba, T. Miyake, K. Nitta, T. Yoshimura (Kobe Univ./Japan)
We evaluate reconstructed three-dimensional (3D) objects in a secure 3D display system by use of phase-only information. A 3D object is successfully reconstructed with moderate error by 5 bits phase resolution per pixels.

14D5-19
Image quality improvement in a compound-eye imaging system
R. Shogenji (Osaka Univ./Japan), K. Nitta (Japan Science and Technology Agency/Japan), S. Miyatake (Konica Minolta Technology Center, Inc./Japan), J. Tanida (Osaka Univ./Japan)
Methods for improving quality of images captured by a compound-eye imaging system are presented. Lens misalignment correction and deblurring methods are considered. Their performance is evaluated with an experimental TOMBO prototype system.

14D5-20
Hologram Bandwidth Reduction and Magnification of 3D Images for Visual Display
Y. Hamada, K. Sato, K. Fujii, M. Morimoto (Univ. of Hyogo/Japan)
Information in hologram is drastically reduction by the superimposing method without loss of resolusion of 3D images.

14D5-21
Computer-generated holograms based on the three-dimensional Fourier spectrum
Y. Sando, M. Itoh, T. Yatagai (Univ. of Tsukuba/ Japan)
A new method for synthesizing a CGH based on the extraction of components from the three-dimensional Fourier spectrum has been proposed. The efficient Fourier component extraction techniques from projection images are also presented.

14D5-22
Synthetic aperture coherence multi-spectral 3-D imaging
K. Yoshimori (Iwate Univ./Japan)
An interferometric technique to retrieve three-dimensional multispectral images of spatially incoherent, polychromatic source distributions is considered. Numerical demonstration show that the desired information of each point source component is successfully retrieved by the proposed method.

14D5-23
Fast creation of digitally synthetic holograms of surface objects by use of a wave-optical method
K. Matsushima (Kansai Univ./Japan)
A wave-optical method is proposed for fast creation of synthetic holograms. Objects are composed of polygons regarded as a surface source of light. The computational cost is estimated as 1 or 2 FFT/polygon dependently on occlusion.

14D5-24
Advanced sub-aperture polishing and metrology solutions for precision optics manufacturing
T. Kume (QED Technologies Japan, Inc./Japan), M. Tricard (QED Technologies, Inc./USA)
This paper summarizes QED Technologies latest developments in the field of high precision polishing using Magneto-Rheological Finishing (MRF) and high precision metrology using a Sub-aperture Stitching Interferometry (SSI) approach.

14D5-25
Measurements of Nonlinear Optical Properties in Saturable-Dye-Doped Films by Z-Scan Method
S. Miyanaga, M. Hayasaka (Muroran Insitute of Technology/Japan)
Z-scan characteristics in saturable-dye-doped films are numerically and experimentally investigated. Nonlinear refractive index as well as absorption properties associated with saturable absorption can be determined from the comparison of experimental results with numerical ones.

14D5-26
Timing jitter control of dispersion-managed solitons
M. Ferreira, M. Sousa (Univ. of Aveiro/Portugal)
Exact analytical solutions are derived for the variance of the timing jitter of a dispersion-managed soliton in the presence of synchronous amplitude modulators and/or optical filters. The conditions for the suppression of the timing jitter are analysed.

14D5-27
Decryption characteristics in message modulation type secure communication system using optical fiber ring resonator chaos exhibiting periodic synchronization
K. Suzuki (Ibaraki Univ./Japan)
Message modulation type secure communication system with optical fiber ring resonators exhibiting periodic chaos synchronization is analyzed numerically. The better decrypted message appears under the better synchronized condition, independent of the input power level.

14D5-28
Optical Chaotic Communication Using Laser Diode Transmitter/Receiver Array
S. Ebisawa, S. Komatsu (Waseda Univ./Japan)
We show the numerical simulation of an optical chaos communication in the Chaotic LD-Transmitter/Receiver scheme and compare with the Chaotic Making scheme to investigate the tolerance over the difference of hardware parameter.

14D5-29
Free-space wavelength-division-multiplexing optical communications using a multi-channel photoreceiver
A. Fujiuchi, T. Ikeuchi, K. Kagawa, J. Ohta, M. Nunoshita (Nara Institute of Science and Technology/Japan)
We propose a free-space wavelength-division-multiplexing optical communications using a multi-channel photoreceiver. A phase-only wavelength-multiplexing filter is incorporated to demultiplex optical signals. A free software "lambda" is utilized to design the filter.

14D5-30
UV-molding of high aspect ratio diffractive gratings for spectrograph applications
J. Pietarinen, S. Siitonen, P. Laakkonen (Univ. of Joensuu/Finland), E. Herrala, J. Lehtomaa (Specim Ltd/Finland)
Feasible fabrication of wide-band spectrograph gratings with high diffraction efficiency is presented by using replication of SiO2 and Ni masters by UV-molding. The method is proved effective and reliable.

14D5-31
Formations of Monolayer of FettbPc Langmuir-Blodgett Films
T. Higo, J. Chisaka, T. Ikehara, K. Irokawa, M. Yamashita (Tokyo Univ. of Science/Japan)
LB films of mixing tetra-tert-butyl-pthtalocyaninato-iron (II) and stearic acid were investigated by atomic force microscope , X-ray diffraction ,and absorption spectroscopy to reveal their film-structure and surface morphology.

14D5-32
Electro-optical characteristics of a twisted nematic liquid-crystal cell doped with carbon nanotubes in a dc electric field
W. Lee, H. Chen (Chung Yuan Christian Univ./Taiwam, Republic of China)
Electro-optical properties of twisted nematic cells of pristine and carbon-nanotube-doped liquid crystal were obtained. Comparisons indicate that multi-walled carbon nanotubes are a more effective dopant in reducing the threshold dc voltage than single-walled nanotubes are.

14D5-33
Dynamic Molecular Alignments of FLC from Conoscopic Figures
K. Yamanaka (Tokyo Univ. of Science/Japan), T. Ishii (Chino Corporation/Japan), M. Yamashita (Tokyo Univ. of Science/Japan)
A helical structure in SmC* phase is changed greatly whether the electrical field is turned on. Dynamic molecular alignments of ferroelectric liquid crystals were studied with time resolving power 0.1ms.

14D5-34
High fidelity color reproduction on multi-primary display considering age-related change of color matching functions
Y. Murakami, S. Sugino, K. Okajima, M. Yamaguchi, N. Ohyama (Tokyo Institute of Technology/Japan)
Through computer simulations, this paper examined the influence of the age-related changes of color matching functions on the color reproduction accuracy and the effectiveness of multi-primary display with the primary-signal optimization in terms of color reproduction accuracy.

14D5-35
Influence of dashboard noise on visual detection through low reflection windshield
K. Noda (Asahi Glass Company / Tokyo Institute of Technology/Japan), K. Uchikawa, T. Uchida (Tokyo Institute of Technology/Japan), T. Yajima, K. Sato (Asahi Glass Company/Japan)
We quantitatively evaluated the positive effects of low reflection windshield when the dot noise pattern exists on the dashboard. Under such situations, low reflection windshield is twice more effective than normal windshield.

14D5-36
Multilayer memory in a holographic disk
W. Su (Tatung Univ./Taiwan), X. Lee
High longitudinal selectivity of spherical reference waves is obtained and permits the implementation of multilayer storage in a holographic disk. An optical head comprising a fiber array is used to replace the longitudinal translation stage for multiplayer storage.

14D5-37
Shift-multiplexed Reflection-type Holographic Memory with Optical Security
Y. Yokohama (Kobe Univ./Japan)
A shift-multiplexed reflection-type holographic memory with optical security is proposed. In the experiments, we performed shift-multiplexed record without encryption and measured characteristics of diffraction efficiency to recording interval. Binary images are also recorded.

14D5-38
Re-writable high-density optical recording on azobenzene polymer thin film
T. Fukuda (AIST/Japan)
A variation of holographic optical recording is investigated making use of photo-induced surface relief formation occurs on azobenzene functionalized polymer media. The proposed method is potentially useful for re-writable high-density recording.

14D5-39
Spectral Anomalies in the Young's Double-slit Interference Experiment
J. Pu, C. Cai (Huaqiao Univ./China), S. Nemoto (Univ. of Tsukuba/Japan)
We investigate the spectral anomalies in the interference field of a Young's double-slit interference experiment illuminated by polychromatic light. Their potential applications in information encoding and information transmission are also considered.

14D5-40
Energy band and effective mass parameters of wurtzite ZnO
W. J. Fan (Nanyang Technological Univ./Singapore), J. B. Xia (Chinese Academy of Sciences/China)
Band structures of wurtzite ZnO are calculated using empirical pseudopotential method (EPM). The parameters of the Zn and O atom pesudopotential form factors are obtained. The effective mass parameters are extracted by using k.p Hamiltonian to fit the EPM results.

14D5-41
Multifractal analysis of intensities scattered by power-law-illuminated diffusers
H. Funamizu, J. Uozumi (Hokkai-Gakuen Univ. /Japan)
Simulated and experimental intensities scattered by power-law-illuminated diffusers are analyzed on the basis of multifractal theory and are shown to be multifractals for a certain range of the exponent of the illumination power-law.

14D5-42
Numerical analysis of resonant modes within a two-dimensional random medium
H. Fujiwara (CREST, JST/Japan), Y. Momose, K. Sasaki (Hokkaido Univ./Japan)
We have investigated resonant modes of a two dimensional random medium by a numerical simulation, and found that their Q factors were changed by their spatial intensity profile and size of dispersion area of scatterers.

14D5-43
Lensless imaging by use of a phase-retrieval method with a scanning slit aperture
N. Nakajima (Shizuoka Univ./Japan)
A coherent imaging with a scanning slit aperture is presented in which a complex-valued object is reconstructed from Fresnel-zone intensities of a wave field transmitted through the slit by using a phase-retrieval method.

14D5-44
Biomass determination using a fiber optic-based technique
C. S. Lim, P. Preejith, A. K. Asundi, T. F. Chia (Nanyang Technological Univ./Singapore)
A system to determine biomass protein concentration is described. Based on evanescent wave spectroscopy, it incorporates a dye-immobilized porous coating on an optical fiber. Response time and reusability of the fiber sensor were also evaluated.

14D5-45
Application of Digital speckle shearography for NDT of inner curved surfaces of tissue/tissue-like phantoms
N. U. Sujatha, V. M. Murukeshan (Nanayang Technological Univ./Singapore)
We present an NDT analysis on the curved inner surfaces of tissue phantom specimens using digital speckle shearography. The slope contours are numerically generated using FEM and are compared with the experimentally obtained results.

14D5-46
Quantitative time-resolved near-infrared spectroscopy measurement of muscle oxygenation in an infant with arterial thrombosis
S. Ijichi, T. Kusaka, K. Isobe, S. Itoh (Kagawa Univ. /Japan)
In this study, we estimated the muscle oxygenation for arterial thrombosis in a low birth weight infant using near-infrared time-resolved spectroscopy before, during and up to 5 days after the therapy.

14D5-47
Non-restricting Respiration Monitoring System Using Near-infrared Bright Spots Matrix Irradiation
H. Aoki, Y. Takemura (Keio Leading-edge Laboratory of Science and Technology/Japan), H. Nakamura, M. Nakajima (Keio Univ. /Japan)
Our proposed monitoring system utilized to fiber-grating vision sensor has availability for sensing of respiration without restraint and contact. The system enables to measure fluctuation of respiratory rate with a high degree of accuracy.

14D5-48
Laser feedback interference in DFB laser diodes
M. Wang, H. Huan (Nanjing Normal Univ./China)

14D5-49
Channeled spectropolarimeter with integrated polarization-analyzing optics
A. Taniguchi, K. Oka (Hokkaido Univ./Japan)
The channeled spectropolarimeter using an integrated polarization-analyzing optics and a multichannel spectrometer is presented. This method is suited for the miniaturization of the polarimeter, which is required for in vivo applications.

14D5-50
A numerical analysis of structural colors in wing-scales of Morpho Butterflies
T. Nakamura (Kushiro National College of Technology/Japan), T. Matsuda, E. Nishiyama (Kumamoto National College of Technology/Japan), H. Itoh (Cyber Assist Research Center/Japan)
Structural colors in wing-scales of Morpho butterflies are investigated by using numerical analysis. We demonstrate that the structural color is associated with the diffraction of light from periodic structures in the wing-scales.

14D5-51
Time-Division Multiplexed Fiber-Bragg Grating Vibration Sensor Array with Temperature Compensation
H. Yokosuka, T. Ogawa, S. Tanaka, N. Takahashi (National Defense Academy/Japan)
A thermally stabilized fiber Bragg grating vibration sensor array with time division multiplexing is proposed based on the intensity-modulation method and demonstrated to perform independent and stable measurement of vibration.

14D5-52
Fabrication of a confocal polarization laser microscope for a transparent oxide thin film
N. Saiga, W. Tamura, R. Hayashi (Yonago National College of Technology/Japan)
The polarized-laser confocal microscope was fabricated to assure that a converging light illumination to a transparent oxide thin film could perform the image graded only by its surface topography and internal dielectric structure.

14D5-53
Monitoring of calcium daily intake of rats by the nanosecond time-gated spectroscopy of laser-ablation plume
M. Ohmi, R. Konishita, M. Haruna (Osaka Univ./ Japan)
We present the experimental results for Ca detection of rat nail by the nanosecond time-gated spectroscopy of laser-ablation plume. In the resulting spectra, there was a remarkable difference in the peak intensity of Ca+ between Ca-deficient and control rats.

14D5-54
A method for holographic security device testing
J. Janucki, J. Owsik (Military Univ. of Technology/ Poland)
The use of the Wiener filter based method allows the holograms patterns to be identified from a printed page. Due to elimination of background influence on a correlation function of two analysed images it is possible to estimate a quality factor of a holographic device.

14D5-55
A resonance-mode grating filter with the quadratic electro-optic effect
H. Ichikawa (Ehime Univ./Japan), H. Kikuta, T. San'o (Osaka Prefecture Univ./Japan), A. Mizutani (Osaka Science & Technology Center/Japan), K. Iwata (Osaka Prefecture Univ./Japan)
A resonance-mode grating filter will acquire extra potential such as finer and faster dynamic wavelength selection in a smaller area with the quadratic electro-optic effect. Theoretical background with FDTD simulation and experimental preparation are presented.

14D5-56
Bistable optical switching in a guided-mode resonant grating with a Kerr medium
A. Mizutani (Osaka Science and Technology Center/Japan), H. Kikuta, K. Iwata (Osaka Prefecture Univ./Japan)
Optical switching effects of a guided-mode resonant grating with a Kerr medium were simulated by nonlinear calculation. The field energy of pump light will be accumulated efficiently by using the bistable phenomenon.

14D5-57
Numerical analysis of resonance absorptions of light in a multilayer-coated bigrating
T. Matsuda (Kumamoto National College of Technology/Japan), T. Ohtsu, Y. Okuno (Kumamoto Univ./Japan)
Plasmon resonance absorptions of light in a multiplayer-coated bigrating which consists of dielectric and metallic thin-films corrugated periodically in two directions are investigated by a numerical analysis based on an electromagnetic theory.

14D5-58
Enhanced polarization azimuth rotation in subwavelength 2D-nanogratings
K. Jefimovs (Univ. of Joensuu/Finland), N. Saito (Univ. of Tokyo/Japan), T. Vallius (Univ. of Joensuu/Finland), R. Shimano, Y. Ino (Univ. of Tokyo/Japan), Y. Svirko, J. Turunen (Univ. of Joensuu/Finland), M. Kuwata-Gonokami (Univ. of Tokyo/Japan)
We report on the observation of a strong polarization effect in a planar subwavelength metallic nanograting and demonstrate that the subwavelenth-period arrays of chiral metallic nanoparticles rotates the polarization azimuth at normal incidence.

14D5-59
Confined Surface Plasmon Polariton Generated by Grating Coupler
T. Onuki, T. Tokizaki (National institute of advanced industrial science and technology/Japan)
For optical-contact to nanosize devices such as a quantum dot, surface plasmon polariton waveguides and grating couplers with transversal sizes smaller than wavelength were investigated. Optical coupling on the waveguides were accorded to computer simulation.

July 15, 2004 (Thursday)

15A1 Microoptics and DOEs(1)

Presiders
P. Lalanne (Institut d'Optique/France)
Y. Ono (Ritsumeikan Univ./Jpana)

10:00 15A1-1 (Invited)
Integrated Output Grating Coupler in Semiconductor Lasers
M. G. Moharam, A. Greenwell (Univ. of Central Florida/USA)
An extremely efficient rigorous electromagnetic analysis of grating coupled surface emitting structures is developed. Electromagnetic fields and power flow distributions within the structure as well as those coupled into both the output and substrate regions are presented.

10:30 15A1-2 (Invited)
Progress in wave-optical engineering
F. Wyrowski (Univ. of Jena/Germany), J. Turunen (Univ. of Joensuu/Finland)
Optical engineering is often associated with lens design and ray optics. However, that is a too restricted understanding of optical engineering to tackle actual and future demands of photonics. A wave-optical generalization of optical engineering is demanded.

11:00 15A1-3
Development of 3-layer diffractive optical elements employed for wide incident angles
T. Nakai, H. Ogawa (Canon Inc./Japan)
We have developed and released telephoto zoom lens using improved 3-layer diffractive optical elements. We explain the configuration and performance about the DOEs. After that, the specifications of the telephoto zoom lens are reported.

11:15 15A1-4
Polarization dependent optical elements fabricated with multilayered subwavelength structures
W. Yu (Osaka science and technology center/Japan), k. Satoh (Technology Research Institute of Osaka Prefecture/Japan), H. Kikuta (Osaka Prefecture Univ./Japan), T. Konishi (Osaka Univ. /Japan), T. Yotsuya (Technology Research Institute of Osaka Prefecture/Japan)
Multilayered subwavelength structures have been proposed to the realization of form birefringent quarter-wave plates and polarization selective diffractive optical elements. In this presentation the design method and some fabricated results of such elements will be presented.

11:30 15A1-5
A diffraction grating for a holographic ultra-violet laser exposure system to fabricating antireflection structured surfaces
H. Toyota, A. Mizutani (Osaka Science and Technology Center/Japan), H. Fukuda (Technology Research Institute of Osaka Prefecture/Japan), R. Yagura, H. Kikuta, K. Iwata (Osaka Prefecture Univ./Japan)
A diffraction grating for a holographic ultra-violet laser exposure system was made to fabricating antireflection structured surface. The grating was a close-packed two-dimensional columnar structure, which was designed to obtain the high-contrast interference pattern.

15B1 3D Displays(1)

Presiders
J. Rosen (Ben-Gurion Univ. of the Negev/Israel)
T. Nomura (Wakayama Univ./Japan)

10:00 15B1-1 (Invited)
Horizontal-parallax-only optical scanning holography
T. Poon (Virginia Tech/USA)
Optical scanning holography (OSH) is a technique in which the holographic information of a three-dimensional (3-D) object is extracted by a single 2-D optical heterodyne scan. We first review OSH and then discuss how horizontal-parallax-only holographic information can be extracted using OSH.

10:30 15B1-2 (Invited)
Holographic Video Display. Development Based on Acoustooptical Interaction Peculiarities
V. Petrov (Saratov State Univ./Russia)
Method of holographic display creation, based on the principle of acoustooptical interaction, is considered. Some results of registraction and reconstruction process numerical simulation of bulk image are shown and discussed.

11:00 15B1-3 (Invited)
Massive directional images for natural 3D images
Y. Takaki (Tokyo Univ. of Agriculture & Technology/Japan)
A number of directional images with fine horizontal display angle pitch provide natural 3D images. Three prototype 3D display systems, which projects 64, 72, and 128 directional images, are shown. Related 3D techniques, including 3D camera and 3D processor, are also shown.

11:30 15B1-4
Holographic three-dimensional display for medical images
Y. Sakamoto (Hokkaido Univ./Japan), K. Matsushima (Kansai Univ./Japan), A. Myojoyama (Tokyo Metropolitan Univ. of Health Sciences/Japan)
We propose a new three-dimensional display system based on computer generated hologram (CGH) in order to visualize 3D medical image scanned by CT (Computer Tomography).

15C1 Optical Metrology(1)

Presiders
J. Schmit (Veeco Instruments/USA)
R. Onodera (Univ. of Ind. Tech./Japan)

10:00 15C1-1 (Invited)
Optics beyond the limits: The future of high precision optical metrology and implications for optical lithography
W. Osten (Univ. Stuttgart/Germany)
Solution of problems in optical metrology needs a maximum of information that can be satisfied by high precision measurement data and model-based predictions. The state in digital holography and CD measurements is discussed.

10:30 15C1-2 (Invited)
The manufacturing and testing of a large aperture aspheric mirror
J. Cao (Changchun Institute of Optics and Fine Mechanics/China)

11:00 15C1-3
Determination of 3D particle location in fluid using illumination having sinusoidal intensity modulation
H. Kadono, M. Mizunaka, S. Toyooka (Saitama Univ./Japan)
We propose a simple system to measure the 3D location of particles that uses only one CCD camera. For this purpose, we newly introduce two sinusoidally modulated illumination with the phase difference by $\pi/2$ for the proving area.

11:15 15C1-4
Achromatic nulling interferometry with common-path 3D design
A. Tavrov, T. Kurokawa (Tokyo Univ. of Agriculture and Technology/Japan), M. Takeda (The Univ. of Electro-Communications/Japan)
Achromatic nulling interferometer based on 3D-common-path design is proposed. Interferometer can effectively compensate OPD for broadband light. Potential applications include star coronagraphy, and generation of white-light-doughnut and annular beams. Simulations and experiments will be presented.

11:30 15C1-5
Detection of heavy metal elements in China loess by Laser-Induced Breakdown Spectroscopy
M. Ijuin (ISEE/Japan)
A laser breakdown spectroscopy was adopted for it in-situ elemental analysis of China loess at first time. Ca-I signal was observed with the Nd:YAG laser pulse and they show dependencies on the particles sizes.

11:45 15A1-6
Calculation of Diffraction Characteristics of Subwavelength Conducting Gratings using a High Accuracy Nonstandard FDTD method
S. Banerjee, J. Cole, T. Yatagai (Tsukuba Univ./ Japan)
We have calculated the diffraction properties of a subwavelength conducting grating using a high accuracy nonstandard FDTD method. We compared these data with results obtained from standard FDTD, finite element method (FEM) and actual experiments.

11:45 15B1-5
Real-Time Full-Color Holographic Display and Enlargement of Viewing Zone or Visual Field
A. Sugita, K. Sato, K. Fujii, M. Morimoto (Univ. of Hyogo/Japan)
A full-color holographic display is developed using a high-resolution reflective LCD panel. The viewing-zone angle or the visual-field angle of the 3-D display can be extended up to about degrees using three LCD panles.

11:45 15C1-6
Simple and accurate propagation-angle observation of a collimated laser beam within a short optical path range by use of a dual-focus Fresnel lens
T. Fujita, K. Nakamura, T. Matozaki (Mitsubishi Electric Corporation/Japan)
We propose a method for observing the propagation-angle displacement of a collimated beam by use of a dual-focus Fresnel lens. We present the experimental result of 0.5 mrad angular accuracy within a range of 16 mm.

12:00 Lunch

15A2 Microoptics and DOEs(2)
Presiders
F. Wyrowski (Univ. Jena/Germany)
Y. Tanaka (Matsushita/Japan)

13:00 15A2-1 (Invited)
Monolithic lithography integration using UV-molding and fabrication of tungsten carbide core for molding of glass microoptics
S. Kang, S. Kim, W. Choi (Yonsei Univ./Korea), S. Ahn (Optomecha Co., Ltd./Korea)
The monolithic lithography integration using UV-molding for fabricating microlens array on optoelectronic modules is studied, and novel fabrication method of tungsten carbide core with micro patterns for molding of glass micro-optical components is suggested.

13:30 15A2-2 (Invited)
Physical mechanisms for boosting the Q/V ratio of photonic crystal microcavities
P. Lalanne, J. P. Hugonin (Institut Optique/France)
We identify two physical mechanisms which rely on a fine tuning of the geometry of the holes around the cavity defect of photonic-crystal microcavities and which drastically increase the Q/V factor.

14:00 15A2-3
Compact Optical Device for One Dimensional Spectroscopic Imaging
S. Ura, F. Okayama, K. Takegami, K. Nishio (Kyoto Institute of Technology/Japan), H. Nishihara (The Univ. of the Air/Japan)
Planar grating lens, fiber array and two-dimensional image sensor were assembled and packaged to be a compact spectroscopic imaging unit. Spatial resolution of 0.3 mm and spectral resolution of 5 nm were obtained with 100 nm spectral range.

14:15 15A2-4
Integration of waveguide gratings for optical interconnects with add/drop multiplexing of free space waves
J. Ohmori, Y. Imaoka, M. Nishihara, S. Ura (Kyoto Institute of Technology/Japan), K. Kintaka (National Institute of Advanced Industrial Science and Technology/Japan), R. Satoh (Osaka Univ./Japan), H. Nishihara (Osaka Univ., The Univ. of the Air/Japan)
Integrated optic wavelength division multiplexer for chip to chip optical interconnects was fabricated by integration of focusing grating coupler and distributed Bragg reflector. Two channel multiplexing with 5nm wavelength spacing was demonstrated.

15B2 3D Displays(2)
Presiders
V. V. Petrov (Saratov State Univ./Russia)
Y. Takaki (Tokyo Univ. Agri. Tech./Japan)

13:00 15B2-1 (Invited)
Activities to expand stereoscopic market by 3D Consortium
M. Taniguchi (Sharp Corporation and 3D Consortium /Japan), Y. Yamamoto (Sharp Corporation/Japan)
3D market is premature in size today, but is believed to have significant potential for coming years. Sharp, as a core member of 3D Consortium, has been working actively to support growth of the market.

13:30 15B2-2 (Invited)
NOISE: Noninvasive optical imaging by speckle ensemble
J. Rosen, D. Abookasis (Ben-Gurion Univ. of the Negev/Israel)
We survey recently invented methods of optical imaging through scattering medium. An image hidden between two biological tissues is recovered from many noisy speckle pictures obtained on the output of a multi-channeled optical imaging system.

14:00 15B2-3
Recording of Holograms and Reconstruction of Moving 3-D Images
K. Sato, K. Fujii, M. Morimoto (Univ. of Hyogo/ Japan)
Fringe patterns for a practical object are recorded by a high-resolution CMOS sensor, and a moving 3-D image of the object is reproduced by displaying the fringe patterns on a high-resolution reflective LCD panel.

14:15 15B2-4
Fluorescent volumetric display by single beam excitation
D. Miyazaki, K. Matsushita (Osaka City Univ./ Japan), M. Lasher (SPAWAR Systems Center San Diego/USA), Y. Fainman (Univ. of California San Diego/USA)
A volumetric display using fluorescence excited by a single infrared beam is proposed. Three-dimensional scanning by the focal point is achieved by moving an inclined image plane in the lateral direction.

15C2 Optical Metrology(2)
Presiders
G. Haeusler (Univ. Erlangen/Germany)
Y. Otani (Tokyo Univ. Agri. Tech./Japan)

13:00 15C2-1 (Invited)
White Light Profilometry
J. Schmit (Veeco Instruments/USA)
Interference microscope with internal self-calibration directly measures scanner motion and fringe spacing during each scan and delivers more reliable interferometric measurements by greatly reducing errors due to object tilt that are commonly overlooked.

13:30 15C2-2 (Invited)
Meso-scale 3-D form profile measurements: White-light scanning interferometry vs. moire interferometry
S. Kim (Korea Advanced Institute of Science and Technology/Korea)
Current technological issues arising to meet rapidly growing demands on 3-D measurements of form profiles of meso-scale microelectronics products are addressed with special emphasis on white-light interferometry and moire interferometry.

14:00 15C2-3
Simultaneous measurement of thickness, refractive-index and dispersion-curve by spectral interferometry
Y. Yasuno, H. Sumimura, G. Aoki, T. Endo, S. Makita, M. Itoh, T. Yatagai (Univ. of Tsukuba/Japan)
A method which simultaneously determines the thickness, group refractive index, and dispersion-curve is proposed. This method is based on low-coherence spectral interferometry, and determines the three optical parameters by one-shot measurement without mechanical scanning.

14:15 15C2-4
In-situ remote-measurements of optical products using a low-coherence tandem interferometer with an optical fiber
H. Matsumoto, A. Hirai, K. Sasaki(National Metrology Institute of Japan/Japan)
In-situ remote-measurement technique of the thickness of optical products is developed. The optical path difference in a Michelson interferometer is transmitted through a single-mode optical fiber to an optical product of a Fizeau's interferometer.

14:30 Coffee Break

15A3 Waveguide-mode Resonance Effects in Periodic Lattices and Their Applications

Presiders
R. Magnusson (Univ. Connecticut/USA)
H. Kikuta (Osaka Pref. Univ./Japan)

15:00 15A3-1 (Invited)
Controlling light with photonic crystals
S. Fan, M. Yanik, W. Suh, X. Yu (Stanford Univ./United States)
We present our works on self-collimation devices, new MEMS optical switches, and dynamic process in photonic crystals that coherently stops light pulses.

15:20 15A3-2 (Invited)
Design and fabrication of guided-mode resonant gratings
H. Kikuta (Osaka Prefecture Univ./Japan), A. Mizutani, H. Toyota, W. Yu (Osaka Science and Technology Center/Japan), K. Iwata (Osaka Prefecture Univ./Japan)
Design and fabrication methods of several guided-mode resonant gratings are presented. The FDTD method is useful to design non-periodic, anisotropic and optically nonlinear gratings. A high refractive-index thin-film deposited on a corrugated substrate improves the performance.

15:40 15A3-3 (Invited)
Waveguide-mode Resonance Effects in Periodic Lattices and Their Applications
R. Magnusson, Y. Ding (Univ. of Connecticut/USA), P. Priambodo (Univ. of Texas at Arlington/USA), T. Maldonado (Texas A&M Univ./USA)
Experimental and theoretical results as well as concepts for new resonance elements are presented. This includes bandstop- and bandpass filters and vertical-cavity surface-emitting lasers containing resonant gain layers.

16:00 15A3-4 (Invited)
Fabrication of nonlinear resonating periodic elements using molecular self-assembly
T.A. Maldonado (Univ. of Texas at Arlington/USA)

15B3 Post-Deadline Session

Closing Session

Presider. *T. Shimura (Univ. of Tokyo/Japan)*

16:40
Best Paper Award Ceremony
Closing Remarks
T. Yatagai (Univ. of Tsukuba/Japan)
I. Yamaguchi (Gunma Univ./Japan)

15C3 Optical Metrology(3)

Presiders
J. Cao (Changchun Inst. Opt. Fine Mech./China)
H. Matsumoto (AIST/Japan)

15:00 15C3-1 (Invited)
How much should we pay for optical 3d-sensors? - a respectable scientific question
G. Haeusler (Univ. of Erlangen/Germany)
Regarding optical sensors as communication channels, we find that common sensors are wasting "expensive channel capacity". Source encoding by proper illumination can highly improve the efficiency. Low cost high quality sensors are discussed.

15:30 15C3-2 (Invited)
Miniaturized, low-cost optical sensors: Implementation, function and industrial application.
S. G. Hanson, M. L. Jakobsen (Risoe National Laboratory/Denmark)
The combination of VCSELs, refractive optical elements and digital signal processors provide for a strong combination for large dissemination into industry. Low-cost systems for measuring transverse velocity, rotational speed and in-plane vibrations will be discussed.

16:00 15C3-3
3 D anisotropy reconstruction: an iterative tensorial tomographic algorithm
J. Kauffmann, N. Kerwien, H. J. Tiziani, W. Osten (Univ. Stuttgart/Germany)
Tomography is a well known method to determine a spatial distribution of a quantity. This tomographic approach can be adapted to tensorial refraction index reconstruction. An iterative algorithm for tensorial tomography is here presented.

16:15 15C3-4
Real-time 2-D phase-sensitive vibrometer using heterodyne moire and correlation image sensor
T. Kurihara, Y. Nagai, T. Shimizu, N. Ono, S. Ando (The Univ. of Tokyo/Japan)
A real-time imaging vibrometer is proposed which enables the visualization of amplitude/phase distribution simultaneously for a single frequency component.Examples of results for traveling-wave and standing-wave type vibrations and a dynamic mode-transition of a plate vibration are shown.

REGISTRATION

•*Registration Fee*

The registration fee includes admission to technical sessions and one copy of Technical Digest.

Type	Before /on 12 June, 2004	After 12 June, 2004
Member*	40,000 yen	45,000 yen
General (Non-member)	45,000 yen	48,000 yen
Student	10,000 yen	15,000 yen
Additional copy of Technical Digest	10,000 yen	10,000 yen

*Member of sponsor and cooperative society

•*Registration and Payment*

Those who wish to attend ICO'04 Tokyo should fill out the Registration Form, and return it with remittance. The deadline for advanced registration is 12 June, 2004. After that the registration will be processed at the conference site upon arrival.

The Registration Form will be available at ICO'04 Home Page. http://www.ico-odf04.com/

•*Cancellation Policy*

There will be no refunds for the registration fee.

INSTRUCTIONS FOR SPEAKERS

All speakers are requested to register for participation in ICO'04.

(Oral presentation)

(1) Presentation time

	Presentation	Discussion	Total
Invited Papers	25min.	5min.	30min.
Contributed Papers	12min.	3min.	15min.

(2) Equipment

A PC-based data projector will be available at the conference site. Speakers are asked to bring in their own personal computer plus a back-up CD-R (Windows based) with downloaded presentation material. Requests for using overhead projector, etc. should be addressed to the secretariat no later than two weeks prior to the day of presentation.

(Poster presentation)

Each author will be provided 2.4m width by 1.8m height bulletin board to display his/her summary of the paper on. Authors should remain in the vicinity of the poster board during the poster session to answer any questions of attendees.

Schedule including setup and removal of poster presentation:

	13D2	14D2	14D5
Set up start	09:30	09:30	15:15
Set up end	12:30	12:00	17:20
Session start	13:00	12:30	17:30
Session end	14:30	14:00	19:00
Removal end	16:30	15:00	19:30

If you have any inquiry, please contact at:

ICO'04 Tokyo Secretariat
c/o ICS Convention Design, Inc.
3-24 Kanda-Nishikicho, Chiyoda-ku, Tokyo 101-8449, JAPAN
Phone: +81-3-3219-3541
Fax: +81-3-3292-1811
E-mail for general inquiry : ico-odf04@ics-inc.co.jp
E-mail for registration : ico-odf04reg@ics-inc.co.jp

POST-DEADLINE PAPERS

A limited number of post deadline papers will be accepted for presentation at an oral session. Latest significant results obtained after the regular deadline are most welcome.

Deadline of the post deadline papers is 30 June 2004. Acceptance of the post deadline will be noticed 9 July 2004. Paper submission procedure is the same as the regular paper.

CONFERENCE RECEPTION

ICO'04 conference reception will be held at 6:10 p.m., 12 July at International Conference Room in Makuhari Messe, and Inter Opto'04 reception will be held at 6:00 p.m., 13 July at Prince Hall at Makuhari Prince Hotel.

BEST PAPER AWARD

The best paper among the contributed papers will be awarded through the examination by the program committee at the end of conference.

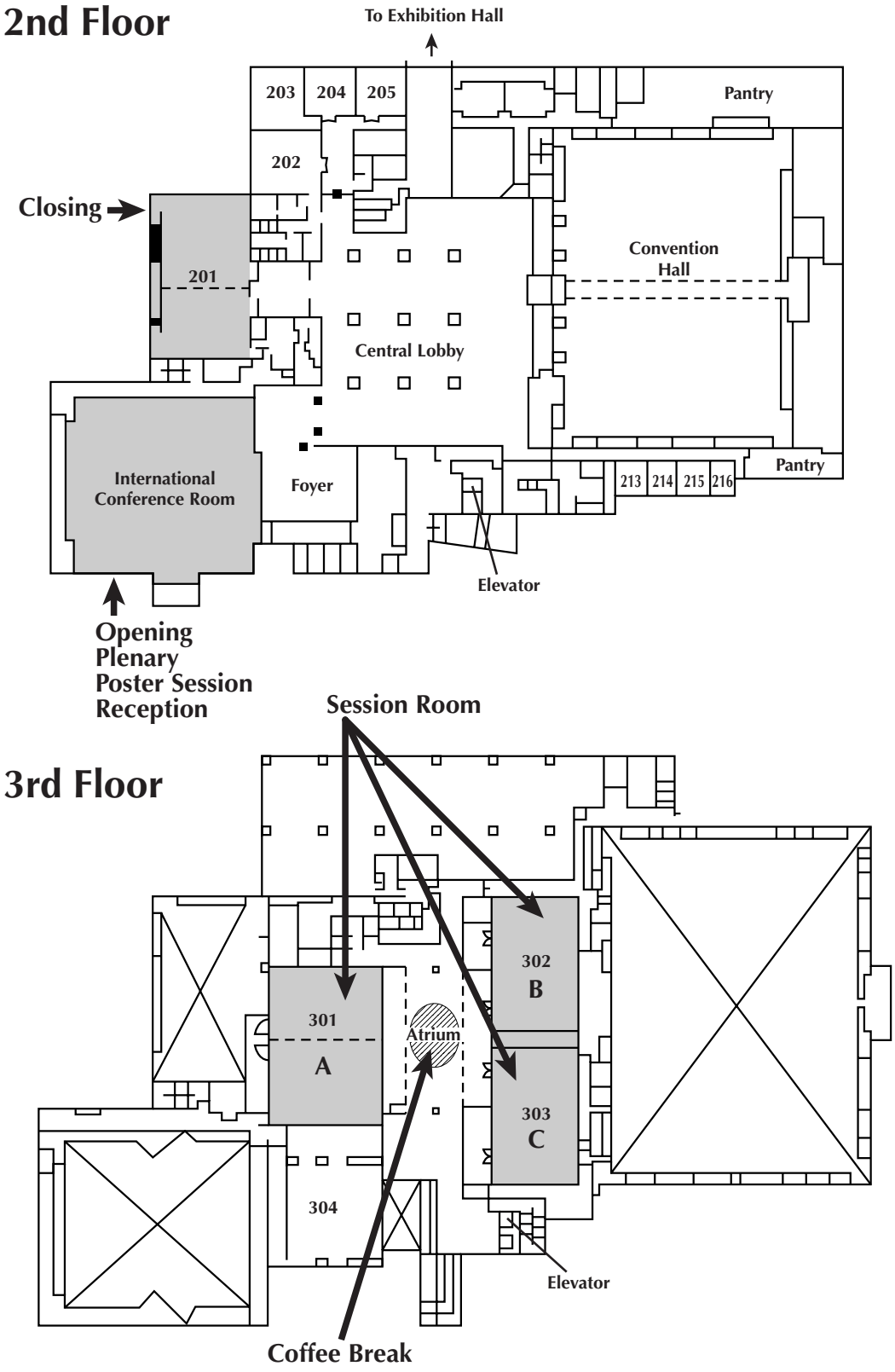
ICO'04 TOKYO SPECIAL ISSUE OF OPTICAL REVIEW

The presented papers can be resubmitted and published in the ICO'04 Tokyo special issue of the OPTICAL REVIEW which is the journal of the Optical Society of Japan (OSJ). Application Form for the special issue will be distributed on site.

The special issue on ICO'04 of OPTICAL REVIEW is scheduled for publication in January 2005. The participants to the conference are strongly encouraged to submit original papers to the special issue. The deadline for submission is August 13, 2004. If you want any further information, please contact,

Dr. T. Shimura
Editor/Secretariat, ICO'04 Special Issue
Institute of Industrial Science
The University of Tokyo
4-6-1 Komaba, Meguro-ku, Tokyo 153-8505 Japan
TEL: +81-3-5452-6139 FAX:+81-3-5452-6140
E-mail: shimura@iis.u-tokyo.ac.jp

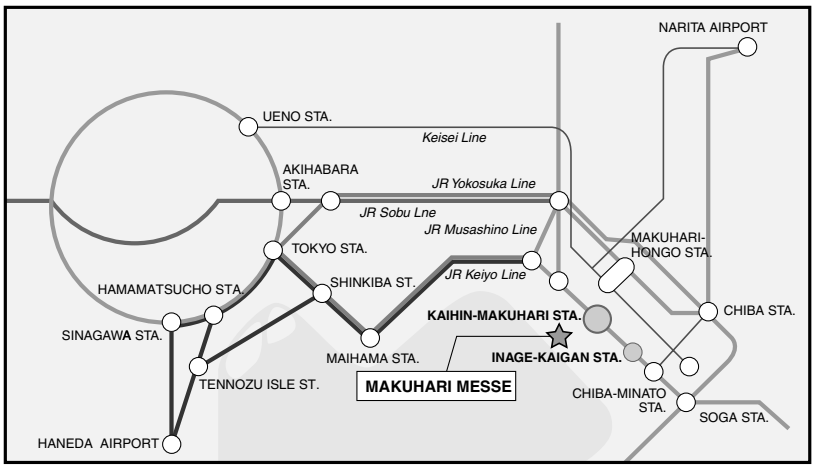
Makuhari Messe International Conference Hall



CONFERENCE SITE

Makuhari Messe is conveniently located halfway between central Tokyo and the New Tokyo International Airport (Narita Airport).

The airport can be reached by bus or car in 30 minutes. Tokyo Station is also only 30 minutes away using the JR Keiyo Line when traveling by train.



Access to Makuhari Messe from Narita Airport

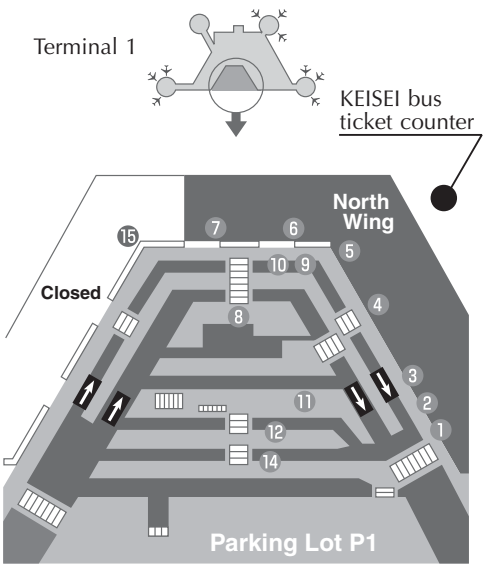
By car

Approximately 30 minutes by car from Narita Airport (http://www.narita-airport.or.jp/airport_e) via the Higashi Kanto Expressway. Exit at the Wangan Chiba Interchange.
(5 minutes from the interchange.)

By bus

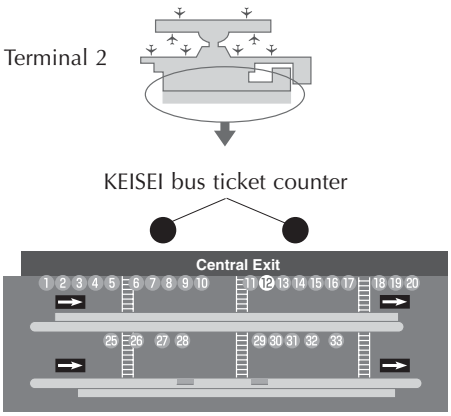
- ***Terminal 1, 1st floor Bus stop***

Please buy the ticket at the KEISEI bus ticket counter, and get on the bus at the NO.15 bus stop.



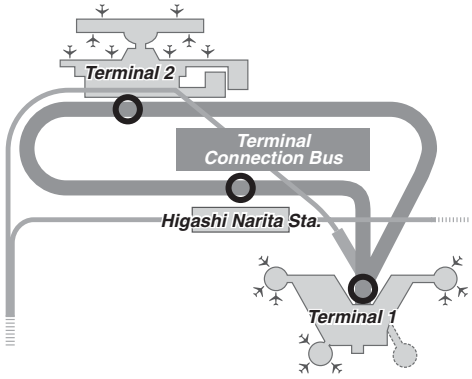
- ***Terminal 2, 1st floor Bus stop***

Please buy the ticket at the KEISEI bus ticket counter, and get on the bus at the NO.12 bus stop.



- ***Terminal connection Bus (free of charge)***

Available for transfers between Terminals 1 and 2.



HOTEL RESERVATION

JTB Corp. (JTB) has been appointed as an official travel agent for the conference and will be handling hotel accommodations.

JTB has booked rooms at the following hotels in Makuhari for the conference period.

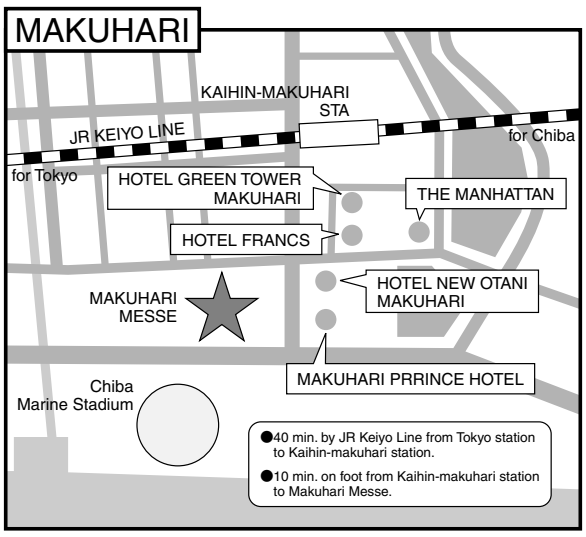
Room Rates for ICO '04 Tokyo (*The following rates are valid from 10 to 17 July, 2004)

HOTELS	**SINGLE** (average sqm)	**TWIN** (average sqm)
HOTEL NEW OTANI MAKUHARI http://www.newotani.co.jp/makuhari/en/	¥18,480 (26sqm)	¥21,945 (26sqm)
HOTEL THE MANHATTAN http://www.the-manhattan.co.jp/other/english.html	¥15,750 (23sqm)	¥23,100 (33sqm)
MAKUHARI PRINCE HOTEL http://www.princehotelsjapan.com/makuhariprincehotel/	¥11,025 (18sqm)	¥22,050 (32sqm)
HOTEL FRANCS MAKUHARI http://www.francs.co.jp/index.html (in Japanese)	¥10,500 (17sqm)	¥18,900 (25sqm)
HOTEL GREEN TOWER http://www.greentower.co.jp/html/makuhari/index.html (in Japanese)	¥8,400 (17sqm)	¥14,700 (25sqm)
TOYOKO INN CHIBA MAKUHARI http://www.toyoko-inn.com/hotel/00005/ (in Japanese)	¥5,460 (15sqm)	¥8,610 (15sqm)

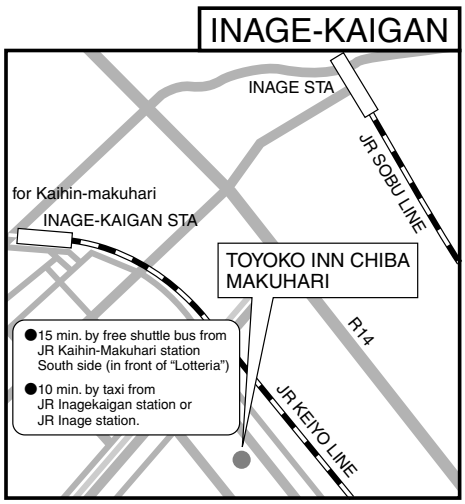
*The above rates are per room per night, including 10% service charge and 5% consumption tax.
*Room rates include no meals.
*These rates are applicable only to conference attendees.
*The 'sqm' in the table means 'square meters'.

Hotel Reservation Deadline : 18 June, 2004

For more information and your booking, please see the ICO '04 official website, http://www.ico-odf04.com/



MAP OF HOTEL



ICO '04 Tokyo Office
c/o JTB Corp.
International Travel Division
Convention Center (CD101923-290)
2-3-11 Higashi-shinagawa Shinagawa-ku Tokyo 140-8604 JAPAN
Phone; +81-3-5796-5445 Fax; +81-3-5495-0685

OPTIONAL TOUR

Fuji Film Factory and Hakone Sightseeing
Date: 16 July, (Fri.)　8:00 - 19:30
Fare: JPY5,000 per person
Morning transfer from Makuhari Messe to Fuji Film Factory by bus.
After lunch, enjoying Hakone sightseeing at following place.

Lake Ashi:

A delightful view from the boat will be available, weather permitting.

Hakone Old Check Point:

Located in the small town of Hakone on the shore of Lake Ashi and was once operated by the Tokugawa Shougunate from 1619 to 1869 as a means of controlling the flow of anything unwanted in and out of Edo that ranged from people and arms to ideas. The present-day check point is a recent reproduction of the original.

Return to Makuhari Messe via Tokyo station.

* It is possible to leave the group and stay at a hotel in Hakone instead of returning to Makuhari.
* We can arrange accommodation at Hakone Hotel Kowaki-en at the following room rates.

Hakone Hotel Kowakien				Check-in 14:00 / Check-out 11:00	
Room rates per night (Service charge and Tax inclusive)					
Single	¥17,900	Double	¥19,000	Triple	¥25,200

Optional Tour Reservation Deadline : 18 June, 2004

For more information and your booking, please see the ICO '04 official website, http://www.ico-odf04.com/

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