# ADVANCE PROGRAM

# ODF'06 Nara

**5th International Conference on Optics-photonics Design & Fabrication**

Optics-photonics ODF Design & Fabrication

***"ODF '06, Nara"***

**December 6-8, 2006**

**Nara-Ken New Public Hall（奈良県新公会堂）Nara, Japan**

**Organized by**
ODG (Optics Design Group of OSJ)

**Sponsored by**
OSJ (The Optical Society of Japan (JSAP))

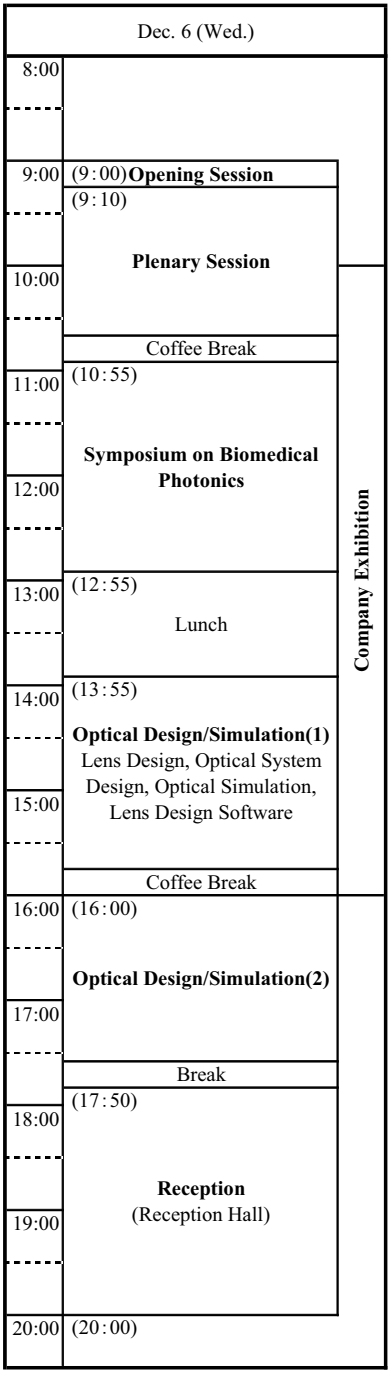
**In Cooperation with**
ICO (International Commission for Optics)
OSK (Optical Society of Korea)
COS (Chinese Optical Society)
OSA (Optical Society of America)
SPIE (The International Society for Optical Engineering)
EOS (European Optical Society)
Applied Optics Meeting in Kansai
IEICE (The Institute of Electronics, Information and Communication Engineers)
IIEEJ (The Institute of Image Electronics Engineers of Japan)
JIEP (Japan Institute of Electronics Packaging)
JOEM (Japan Optomechatronics Association)
JOMA (Japan Optical Measuring Instruments Manufacturers' Association)
JPS (The Physical Society of Japan)
JSMBE (Japanese Society for Medical and Biological Engineering)
JSPE (The Japan Society for Precision Engineering)
LSJ (The Laser Society of Japan)
OITDA (Optoelectronic Industry and Technology Development Association)

**Technical Co-sponsor**
IEEE/LEOS (The IEEE Lasers and Electro-Optics Society)

**Post-Deadline Paper Acceptance; October 31, 2006**

**http://www.odf.jp/**

# CONFERENCE SCHEDULE




Registration hours 8:00-

| Dec. 7 (Thu.) | | Dec. 8 (Fri.) | |
|---|---|---|---|
| 8:00 | | 8:00 | |
| | (8:30) **Optical Components/Devices(1)** DOEs, HOEs, Microoptics, Waveguides, Optical Communication, Lasers, MEMS, Other Components | | (8:30) **Optical Technology(1)** Optical Measurements, Optical Fabrication and Testing, Information Processing, Near Field Optics, Non-linear Optics, Other Technology |
| 9:00 | | 9:00 | |
| 10:00 | Coffee Break | 10:00 | Coffee Break |
| | (10:35) **Optical Components/Devices(2)** | | (10:35) **Optical Technology(2)** |
| 11:00 | | 11:00 | |
| 12:00 | | 12:00 | |
| | (12:40) Lunch | | (12:35) **Closing Session** |
| 13:00 | | 13:00 | |
| | (13:40) **Optical Systems(1)** Microscopes, Cameras, Optical Lithography, Optical Memory, Other Systems | | (13:20) **Optional Tour** (Horyuji : World Heritage, Jikoin : Tea service) |
| 14:00 | | 14:00 | |
| 15:00 | Coffee Break | 15:00 | |
| | (15:40) **Optical Systems(2)** | | |
| 16:00 | | 16:00 | |
| 17:00 | Break | 17:00 | (17:20) |
| | (17:35) **Poster Session** (Reception Hall and Conference Room 3,4) | | |
| 18:00 | | 18:00 | |
| 19:00 | | 19:00 | |
| | (19:35) | | |
| 20:00 | | 20:00 | |

**Company Exhibition**

Registration hours 8:00-

Registration hours 8:00-

# INTRODUCTION

The 5th International Conference on Optics-photonics Design & Fabrication "ODF'06, Nara" will be held on December 6-8, 2006 in Nara, Japan. Optics-photonics design and fabrication will continue to play a significantly important role in the 21st century achieving harmony between technology and the environment. ODF'06 is intended to provide an international forum for original paper presentations and discussions of optics-photonics design and fabrication related technological and scientific topics. These topics include theory, design, fabrication, testing, applications and others.

The conference will be held at the Nara-Ken New Public Hall, surrounded by 1000-year historical Japanese culture, as one of the best site in Japan to welcome experts in Optics & Photonics from all over the world. ODF'06 is aimed to promote international collaboration among the participants in this field including related companies' exhibition and sight seeing tour.

Collaboration and Competition make progress.

"Join us at ***ODF'06, Nara!***"

# SCOPE OF THE CONFERENCE

ODF'06 is an international forum for the engineers and scientists in the field of Optics-photonics Design and Fabrication to exchange their ideas and achievements for the future mutual progress. The conference will consist of the session for optical design/simulation, optical components /devices, optical systems, and optical technology. A special session featuring biomedical photonics is also planned. These sessions will cover the field of optical theory, software, DOE's, micro-optics, thin films, waveguides, MEMS, Lasers, fiber communications, information optics, optical storage, optical lithography, microscopy, displays, and others.

# TECHNICAL PROGRAM

## December 6, 2006 (Wednesday)

### Opening Session (9:00-9:10)

**Presider:**

*K. Tatsuno (Hitachi / Japan)*

### Opening Remarks

**(9:00)**

*Y. Ichioka (Osaka Univ. Prof. Emeritus / Japan)*

### Plenary Session (9:10-10:40)

**Presider:**

*H. Ooki (Nikon / Japan)*

**6PL-01 (Invited)**

**(9:10) Developments in 3D Microscopy**

*C. J. R. Sheppard (National Univ. of Singapore / Singapore)*

The confocal microscope is firmly established as an invaluable technique for three-dimensional microscopic imaging in areas ranging from biology and medicine through to industrial micro-inspection. However, the confocal microscope has a number of shortcomings. We compare various different alternative approaches to 3D microscopic imaging.

**6PL-02 (Invited)**

**(9:40) Optical Lithography - the recent Progress in Optical Design**

*W. Ulrich, H. Feldmann, D. Krähmer, H. Mann, M. Totzeck (Carl Zeiss SMT AG / Germany)*

A breakthrough in optical lens design using immersion technology enable hyper-NA systems for microlithography with a numerical aperture (NA) far beyond 1.0. High-index lens designs for ArF lithography push immersion beyond 40nm and new high-NA design concepts for EUVL can extend optical lithography even further.

**6PL-03 (Invited)**

**(10:10) Lens Design for Digital Still Cameras**

*T. Koyama (Canon / Japan)*

This presentation describes characteristics of lenses for compact digital still cameras. Concretely, this presentation discusses issues such as the effects of diffraction and design restrictions, and then touches on design points such as methods of utilizing aspherical lenses, etc.

## Coffee Break (10:40-10:55)

## Biomedical Photonics (10:55-12:55)

**Presiders:**

*C. J. R. Sheppard*
*(National Univ. of Singapore / Singapore)*
*M. Haruna (Osaka Univ. / Japan)*

**6SY-01 (Invited)**

**(10:55) Fluorescence diffuse optical tomography system for breast cancer imaging**

*M. B. van der Mark ,L. Bakker, M. van Beek, M. van der Voort (Philips Research Laboratories / Netherlands), T. Nielsen, T. Koehler, R. Ziegler (Philips Research Europe / Germany), K. Licha, M. Pessel (Schering AG / Germany)*

We discuss the technical design of a diffuse optical tomography system for imaging the female breast. The detectability of breast cancer is enhanced by the application of a fluorescent contrast agent. Images will be shown.

**6SY-02 (Invited)**

**(11:25) Development of autofluorescence imaging system for endoscopic diagnosis**

*K. Imaizumi (Olympus Medical Systems / Japan)*

We have developed the AFI (AutoFluorescence Imaging) system for the endoscopic detection of cancers in their early stages in practical medicine. The principle of autofluorescence endoscopy and the design of the system are described.

**6SY-03 (Invited)**

**(11:55) Fibre-optical nonlinear optical endoscopy: coming of age**

*M. Gu, L. Fu (Swinburne Univ. of Technology / Australia)*

In this talk, recent developments of fibre-optical nonlinear optical endoscopy based on double-clad photonic crystal fibres and MEMS technology will be presented. Various three-dimensional images of internal organs reveal its potential towards in vivo applications.

**6SY-04 (Invited)**

**(12:25) In vivo Tissue Fluorescence - It's implication to clinical diagnosis -**

*M. Tamura (Hokkaido Univ. / Japan)*

The measuring techniques of ultra fast phenomena of fluorescence lifetime have allowed us to measure the life-time of NADH fluorescence that can be used as the optical indicator for biochemical tissue abnormality in vivo. I will show the recent advances of single molecule detection techniques of fluorescence correlation spectroscopy (FCS) together with the fluorescence molecular imaging. The future clinical apptications will be furthermore discussed.

## Lunch (12:55-13:55)

## Optical Design / Simulation (1) (13:55-15:45)

**Presiders:**

*I. Livshits (St. Petersburg State Univ. of Information Technologies, Mechanics and Optics / Russia)*

*H. Tsuchida (Olympus / Japan)*

**6S1-01 (Invited)**

**(13:55) Development of a long-Wavelength Infrared Lens with 135 degree FOV and suitable for an Uncooled FPA**

*W. Shen, J. Yu, M. Xue (Soochow Univ. / China)*

The design and making of a LWIR lens of F/0.85 and 135 degree full FOV is reported. It consists of three aspheric lenses in the inverted telephoto and is compact, diffraction-limited, and image-illuminance uniform.

**6S1-02 (Invited)**

**(14:20) Optics design and fabrication of flatbed-type integral imaging 3-D display systems**

*Y. Hirayama (Toshiba / Japan)*

The flatbed-type autostereoscopic display systems were developed. The viewer can experience 3-D images that stand out several centimeters from the surface of the display. The optics design and fabrication of our display will be shown.

**6S1-03**

**(14:45) Optical Design on Compound Zoom Lenses**

*T. Yamanashi (Panavision / USA),*
*J. B. Caldwell (Panavision Federal Systems / USA)*

A new zoom lens type called a compound zoom enables unprecedented zoom ratios of 300x or more. The zoom ratio is given by the product of the zoom ratios of primary and relay zooming groups.

**6S1-04**

**(15:00) A wide-angle catadioptric lens for video surveillance**

*G. Kweon (Honam Univ. / Korea),*
*G. Kim, Y. Lee (Korea Basic Science Institute / Korea)*

A catadioptric wide-angle lens having a rectilinear projection scheme has been developed for 1/3-inch VGA-grade CCD sensor. The field of view is over 150° and distortion is less than 1%.

**6S1-05**

**(15:15) Supercompact Projection Display for HDTV based on MEMS**

*S. M. Shamaev (Bauman Moscow State Technical Univ. / Russia)*

A rear projection optical system that performs enlarged projection from the primary image plane on the reduction side to the second image plane on the enlargement side without forming an intermediate real image.

**6S1-06**

**(15:30) Aberration Analysis and Reduction Method For Plane-Symmetric Optical Systems**

*T. Nakano, Y. Tamagawa (Mitsubishi Electric / Japan)*

The aberration of plane-symmetric optical systems is analyzed based on the angle characteristic function and the reduction method of the remained aberration, astigmatism, is proposed. The example of a three-mirror system with F/2 is presented.

## Coffee Break (15:45-16:00)

## Optical Design / Simulation (2) (16:00-17:35)

**Presiders:**

*D. Hasenauer (Optical Research Associates / USA)*
*Y. Tanaka (Matsushita / Japan)*

**6S1-07 (Invited)**

**(16:00) Is There Order in the Merit Function Landscape of Optical Systems?**

*F. Bociort, M. van Turnhout, C. Wang (Delft Univ. of Technology / Netherlands)*

There is a certain degree of order in the optical design landscape and this order is best observed when we consider not only local minima of the merit function, but saddle points as well.

**6S1-08 (Invited)**

**(16:25) Ripple Structures Used For Optimizing Uniformity In An LED Light-piping System**

*T. L. R. Davenport, W. J. Cassarly (Optical Research Associates / USA)*

We demonstrate how surface ripples along the length of an LED light-piping system can dramatically improve spatial mixing. Examples with circular apertures and rectangular-to-circular apertures are shown. Prototypes for a circular-aperture system were constructed.

**6S1-09**

**(16:50) Database of optical elements suitable for lens CAD**

*I. L. Livshits, A. V. Salnikov (St. Petersburg State Univ. of Information Technologies, Mechanics and Optics / Russia), I. G. Bronchtein (JSC KB Jupiter / Russia), U. Cho (Korea Polytechnic Univ. / Korea)*

A special lens classification and criteria for optical elements selection are proposed. Using expert rules for determining the element's applicability index is described. Examples of database application in lens structural synthesis are given.

**6S1-10**

**(17:05) Optical Design for Wide Field Illumination Systems Featuring Large Diameter Aspherical Relay Lenses**

*Y. Kobayashi, T. Dohi (OptiWorks / Japan), T. Kume (QED Technologies Japan / Japan)*

We set up an optical design of wide field illumination system suitable for testing CCD/CMOS image sensors. Our design solution has realized high uniformity and high efficiency with applying large diameter aspherical relay lenses.

**6S1-11**

**(17:20) Optical Simulations for Optical System Using a Diffractive-Refractive Hybrid Lens Based on Diffraction Theory**

*K. Yamanaka, S. Takeuchi, M. Noguchi, K. Maruyama (PENTAX / Japan)*

We have developed a simulator for optical systems employing a diffractive-refractive hybrid lens. Simulation that considers the influence of diffraction was achieved by using not only geometrical optics evaluation, but also wave optics evaluation.

**Break (17:35-17:50)**

**Conference Reception (17:50-20:00)**
**(Reception Hall)**

## December 7, 2006 (Thursday)

### Optical Components / Devices (1) (8:30-10:20)

**Presiders:**

*G. Cincotti (Univ. Roma Tre / Italy)*
*T. Konishi (Osaka Univ. / Japan)*

**7S2-01 (Invited)**

**(8:30) Trends in Semiconductor-based Photonic Integration**

*M.K. Smit (Technical Univ. Eindhoven / Netherlands)*

Photonic integration technology is a key enabler for large-scale application of photonic technology in broadband telecommunication networks, ultrafast signal processing, health care and sensors. Trends in photonic integration technology will be reviewed and discussed.

**7S2-02 (Invited)**

**(8:55) Design of Multiport Encoder/Decoders For OCDMA Networks**

*G. Cincotti (Univ. Roma Tre / Italy)*

An accurate model for a passive multiport encoder/decoder has been presented than can be used in an OCDMA network. The device can generate/process 50 different codes simultaneously if the design parameters have been carefully selected.

**7S2-03**

**(9:20) Performance Comparisons of Optical DQPSK Signal Generated by Single Modulator With and Without Pulse Carver**

*W. Peng, S. Tsai, J. Chen (National Chiao-Tung Univ. / Taiwan), S. Chi (Yuan Ze Univ. / Taiwan)*

Optical DQPSK signals are generated using one DD-MZM. Using a RZ carver, the ripple effect in the NRZ format can be effectively suppressed and 4 dB receiving sensitivity improvement can be achieved after 60km fiber transmission.

**7S2-04**

**(9:35) Proposal of Intra-Board Chip-to-Chip Optical Interconnect Device Using Channel Waveguides with Wavelength-Division Multiplexing**

*K. Kintaka, J. Nishii (National Inst. of Advanced Industrial Science and Technology / Japan), S. Yamaguchi, S. Ura (Kyoto Inst. of Technology / Japan)*

An intra-board chip-to-chip optical interconnect device consisting of vertically Y-branched channel waveguides, distributed Bragg reflectors, and 45-degree mirrors was proposed and designed for two-dimensionally parallel signal transmission with wavelength-division multiplexing. Device characteristics were estimated numerically.

**7S2-05**

**(9:50) Multi-frequency light source with a 50-GHz channel spacing based on optical frequency comb generation for DWDM systems**

*T. Hoshi, M. Yamamoto, T. Shioda, Y. Tanaka, T. Kurokawa (Tokyo Univ. of Agriculture and Technology / Japan), S. Mori, K. Higuma (Sumitomo Osaka Cement / Japan)*

A multi-frequency light source with a 50-GHz channel spacing was constructed based on optical frequency comb generation and an arrayed waveguide grating. The error-free 10-Gbps data transmission over 100-km was successfully achieved.

**7S2-06**

**(10:05) Stability of 60-GHz Optical Millimeter-wave Generated By Mach Zehnder Modulator**

*N. Shouji, T. Shioda, Y. Tanaka, T. Kurokawa (Tokyo Univ. of Agriculture and Technology / Japan)*

We generated 60-GHz optical millimeter-wave from 15-GHz RF modulation frequency using an optical MZ modulator and an FBG filter. The frequency and intensity stability was observed at 4.2 Hz and 0.098 dB, respectively.

**Coffee Break (10:20-10:35)**

## Optical Components / Devices (2) (10:35-12:40)

**Presiders:**

*T. Milster (Univ. of Arizona / USA)*
*Y. Ono (Ritsumeikan Univ. / Japan)*

**7S2-07 (Invited)**

**(10:35) Super Wide-band Polymeric Quarter Wave Plates (QWPs) Fabricated by Nanoimprint Technologies.**

*M. Morikawa, O. Masuda, H. Miyakoshi, M. Imae, M. Yamada, K. Furuta (Konica Minolta Technology Center / Japan)*

We have developed super wide-band quarter wave plates which utilize form birefringence. We present a brief overview of the optical design and the nanoimprint technologies used to fabricate subwavelength structures on the surface of a polymer substrate.

**7S2-08 (Invited)**

**(11:00) Wavelength Division Multiplexing for MEMS-based Fiber Optic Endoscope**

*M. Nakada, H. Fujita, H. Toshiyoshi (The Univ. of Tokyo / Japan), C. Chong, K. Isamoto (Santec / Japan)*

A microelectromechanical optical scanner has been developed by silicon micromachining technique with a silicon-on-insulator wafer, and assembled into an all-optically controlled fiber endscope that could be potentially free from electrocution or electromagnetic interference.

**7S2-09**

**(11:25) Investigation of 'Nicro-optical' systems**

*M. Lang, T. D. Milster (Univ. of Arizona / USA)*

The class of optics between micro and nano-optics, dubbed 'Nicro-optics', has few testing and simulation tools to choose from. Some challenges and solutions for design & simulation, testing, and assembly of Nicro-optical systems is described.

**7S2-10**

**(11:40) Deterministic Design of Binary Diffractive Optical Element with Subwavelength Features for phase modulation under Limitation on Spatial Resolution of Fabrication Technique**

*T. Oonishi, T. Konishi, K. Itoh (Osaka Univ. / Japan)*

We propose a deterministic design method of binary subwavelength grating for phase modulation element based on fabrication limit. We have fabricated a binary blazed grating designed by the proposed method and have evaluated its performance.

**7S2-11**

**(11:55) Tunable Optical Filters by Using the Self-Suspended Subwavelength Gratings**

*J. Ye, Y. Kanamori, F. Hu, K. Hane (Tohoku Univ. / Japan )*

Through investigations into the self-suspended grating (SSG) by the rigorous coupled wave method, we find that the SSG can work as narrow- or wide-band tunable optical filters in optical telecommunication systems.

**7S2-12**

**(12:10) Towards High-reflective low-mass Optical MEMS for quantum optics**

*S. Gigan, H. Boehm, M. Paternostro, F. Blaser, A. Zeilinger, M. Aspelmeyer (Institut for quantum optics and quantum information / Austria), G. Langer, D. Baeuerle (Johannes Kepler Univ. / Austria), J. Hertzberg, K. Schwab (Univ. of Maryland / USA)*

We will detail the main fabrication challenges and the current status of our efforts towards obtaining high-reflectivity, low-mass, MEMS micromirrors. Applications to quantum optics will be discussed.

**7S2-13**

**(12:25) Research and application of Light Guide Plates on Microelectromechanical systems-based for LCD-backlighting**

*Z. Chen, C. Chien (Tatung Univ. / Taiwan)*

The microstructures are constructed on the light guide plate of the backlight unit by Microelectromechanical systems. The light guide plate could make the display thinner and brighter for LCD-backlighting application which was successfully approved.

## Lunch (12:40-13:40)

## Optical Systems (1) (13:40-15:25)

**Presiders:**

*K. Hsu (Chiao Tung Univ. / Taiwan)*
*R. Katayama (NEC / Japan)*

**7S3-01 (Invited)**

**(13:40) Liquid lenses: innovation in optical devices**

*B. H. W. Hendriks, S. Kuiper, F. Suijver, I. Helwegen (Philips Research Laboratories / Netherlands),*
*R. Tijburg, P. van der Meer, F. Verhoeckx, K. Kerkhof (Philips Applied Technologies / Netherlands)*

The design, manufacturing and applications in optical devices of voltage addressable variable electrowetting based liquid lenses are discussed. Results are presented of applying this lens in miniature autofocus and zoom cameras, in optical recording and in illumination systems.

**7S3-02 (Invited)**

**(14:05) Holographic memory and applications using doped photopolymer**

*S. Lin, K. Y. Hsu (National Chiao Tung Univ. / Taiwan)*

We present our investigations on the holographic memory and applications using doped photopolymer system. The design strategy for making the low-shrinkage samples of cm thick is described. The improvements of material sensitivity and dynamic range by modifying the material compositions are also presented.

**7S3-03 (Invited)**

**(14:30) Near-Field Optical Systems for Data Storage**

*A. Nakaoki (Sony / Japan)*

The near-field optics was developed and feasibility of high capacity recording over 100 GB was confirmed. The dust issue was examined in order to achieve the real optical disc system equipped with near-field optics.

**7S3-04**

**(14:55) A Biometric System for Walker Recognition Using a Pyroelectric Infrared Sensor and a Fresnel Lens Array**

*J. Fang, K. Y. Hsu (National Chiao Tung Univ. / Taiwan), Q. Hao, D. J. Brady, B. D. Guenther (Duke Univ. / USA)*

This paper presents a novel walker recognition system using a pyroelectric infrared sensor and a Fresnel lens array. The experimental results demonstrate the effectiveness of the proposed pyroelectric sensor system in recognizing registered subjects and rejecting unknown subjects.

**7S3-05**

**(15:10) Simultaneous Recording of 3D Color Images by Phase-shifting Holography**

*H. Fujiwara, K. Sato, K. Fujii, M. Morimoto (Univ. of Hyogo / Japan)*

A phase-shifting holographic system is developed for simultaneous recording of 3D color images with a color CCD. The phase of light is precisely shifted by moving the diffraction grating displayed on a reflective LCD panel.

## Coffee Break (15:25-15:40)

## Optical Systems (2) (15:40-17:15)

**Presiders:**

*W. Urlich (Carl Zeiss SMT AG / Germany)*
*M. Shibuya (Tokyo Polytech Univ. / Japan)*

**7S3-06 (Invited)**

**(15:40) AIMS$^{(TM)}$ - the Optical Emulator of Projection Mask Lithography**

*R. H. Semmler, A. Zibold, U. Stroessner, N. Rosenkranz, A. Ridley, R. Richter, W. Harnisch (Carl Zeiss SMT AG / Germany), A. Williams (SEMATECH / USA)*

System aspects for successful qualification of the mask and prediction of its wafer printability are discussed. About 10 years of evolution are reviewed. Results of the new AIMS$^{(TM)}$ 45-193i tool covering all aspects of immersion and polarisation are presented.

**7S3-07 (Invited)**

**(16:05) Projection Optics for Exposure Tools: Its Potential and Future**

*T. Ishiyama, T. Matsuyama, Y. Ohmura, T. Nakashima (Nikon / Japan)*

This paper describes various technical innovations that led to the realization of the current immersion lithography. Performance of the latest optics is reviewed, and candidates for the next generation equipment are discussed.

**7S3-08**

**(16:30) Stokesmeter mask for measuring polarization of illumination**

*H. Nomura (Toshiba / Japan)*

We made a novel test mask for measuring polarization of illumination used in lithography tools for semiconductor manufacturing. The test mask comprises quarter wave plates and newly developed thin plate polarizers at 193 nm.

**7S3-09**

**(16:45) Interferometric Vibrometry Algorithm Based on Recursion Formula of Bessel Functions**

*S. Sato, T. Kurihara, S. Ando (The Univ. of Tokyo / Japan)*

We report a simple interferometric vibrometry algorithm based on recursion formula of Bessel functions. Measurable amplitude range of our method is about 0-150 nm for the center wavelength of the source light 600 nm.

**7S3-10**

**(17:00) Imaging Biological Cells Using Digital Holographic Microscopy**

*S. Rehman, T. Nakatani, M. Yamauchi, K. Homma National Inst. of Advanced Industrial Science and Technology / Japan), K. Homma (The Graduate School for the Creation of New Photonics Industries / Japan)*

Digital holographic microscopy is performed by phase-difference amplification and digital magnification to achieve high axial resolution for imaging optically transparent material. This method was used to image biological specimen in vitro.

**Break (17:15-17:35)**

## Poster Session (17:35-19:35)

**7PS1-01 1.6X Zoom Ratio Projector Lens Design with Fixed Rear Element for High Definition Television (HDTV)**

*Y. Fang (National Kaohsiung Univ. of Science and Technology / Taiwan)*

In this paper the lens design samples given were focused on the application of projector with DMD (Digital Micro mirror Device) system. Lens design for TIR prism will be discussed in this paper.

**7PS1-02 High Definition DLP Zoom Projector Lens Design with Small F-number**

*Y. Fang (National Kaohsiung Univ. of Science and Technology / Taiwan)*

In this paper the lens design samples given were focused on the application of projector with DMD (Digital Micro mirror Device) system. Lens design with 1.25X zoom ratio for 720P resolution will be represented in this paper. This lens design achieve the F2 maximum aperture stop without the sacrifice of over all length and front diameter; and its limitation regarding performance, F-number and zoom ratio will be further discussed.

**7PS1-03 Light microscopes for digital applications**

*F. Dmitry, I. L. Livshits (St. Petersburg State Univ. of Information Technologies, Mechanics and Optics / Russia), A. Tabachkov (FOCUS / Russia), U. Cho (Korea Polytechnic Univ. / Korea)*

We offer a way for design light microscopes for digital applications. Most attention is devoted to microobjectives. Example of microobjective design is given. Presented paper confirms the value of proposed method of design digital microscopes.

**7PS1-04 Achieving uniform slope illumination using B-spline surface reflectors**

*D. Feng, W. Kim, H. Kim (Samsung / Korea)*

A nonimaging system using asymmetric B-spline surface reflectors is proposed for 2-D illumination application of uniform slope planar illuminance, and small system size. Using the reflectors and an extended light source, we get a uniform energy distribution better than 85%.

**7PS1-05 Optical Optimized Reflector As A Component In LCD Back Light With Special Lighting Condition For Luminance Enhancement**

*Y. Chen (BOEOT / China)*

A kind of new reflector with some special structure for LCD back light of large size are capable of enhancing the luminance outcome up to 11.4% in comparison with the existed one.

**7PS1-06 Compound surface approach in designing a lens with extended depth of field**

*J. Chern, Y. Chu (National Chiao Tung Univ. / Taiwan)*

We propose a straightforward Gaussian-optics approach as a simple mean in designing complex lens of multifunction application. Optimization is also developed. A singlet aspheric lens with extended depth of field is shown as an example.

**7PS1-07 Properties of Variable-focus Liquid Crystal Lens and Its Application in Focusing System**

*M. Ye, B. Wang, T. Takahashi, S. Sato (Akita Univ. / Japan)*

A liquid crystal lens is reported. The lens power can be changed by applied voltages. The lens properties including power and RMS aberration are given. The application of the lens in focusing system is discussed.

**7PS1-08 Simulation of anisoplanatism of adaptive optical system in turbulent atmosphere**

*M. Moradi (Shahrekord Univ. / Iran)*

The software is presented for simulation of anisoplanatic effect and its influence on performance of adaptive optical phase conjugation system in inhomogeneous turbulent atmosphere. Simulations can be made with a broad range of parameters of adaptive system and atmospheric turbulence.

**7PS1-09 Optimal Geometry for Fast Hologram Recording in Photorefractive Crystal**

*R. V. Romashko, Y. N. Kulchin (Inst. of Automation and Control Processes / Russia), A. A. Kamshilin (Univ. of Kuopio / Finland)*

Theoretical analysis of optimal geometry of focusing system for recording fast and efficient hologram in photorefractive crystal by Guassian beams is carried out. Relations between parameters of crystal, beams and focusing system have been found.

**7PS1-10 Optical Characterization of Iridescent Wings Of Mopho Didius Butterfly using A High Accuracy Nonstandard FDTD Algorithm**

*S. Banerjee (Sumitomo Chemical / Japan), J. B. Cole, T. Yatagai (Univ. of Tsukuba / Japan)*

We studied the visual appearance of the wings of the Morpho Didius butterfly by simulating a double-layered structure of wing-scales containing subwavelength surface corrugation. The simulation is done using a high accuracy nonstandard FDTD method.

**7PS1-12 Non-absorptive Polarizers with Chirped Periodic Birefringent Layered Structures**

*P. Yeh (Univ. of California / USA), R. Liu, K. Hsu, S. Lin (National Chiao Tung Univ. / Taiwan)*

Non-absorptive polarizers (also known as reflective polarizers) can increase the optical efficiency (brightness) by a factor of 2 in birefringent optical systems, including liquid crystal displays. Using 4x4 matrix method, we investigate the transmission properties of polarized light in chirped periodic birefringent layered structures which consist of alternating layers of isotropic and anisotropic media. We present simulation results of reflection/transmission spectra of polarized light at various angles of incidence.

**7PS1-13 The Stability Diagram of the Higher Modes of the Fabry-Perot Resonator**

*S. Tezuka, N. Kanbara (Yokogawa Electric / Japan)*

The stability diagram of the Fabry-Perot resonator has an exotic behaviour in the small Fresnel number region and its higher modes. We have studied these characteristics using numerical analysis.

**7PS1-14 A non-energy-concentrated lens of left handed material**

*T. Yonezawa, M. Daibo, N. Tayama (Iwate Univ. / Japan)*

A smooth and quantized bowl-shaped LHM lens is proposed. There is no energy-concentrated area in the LHM. The maximum energy in the LHM is lower than the maximum energy in a LHM planar lens.

**7PS1-15 The Ranked Phased-Array Method**

*P. Pojanasomboon (Assumption Univ. / Thailand), O. Ersoy (Purdue Univ. / USA)*

The proposed ranked phased-array method (RPAM) involves ranking the variances of phases corresponding to the DWDM operating wavelengths in order to design an array of waveguides that can enhance the utilization of arrayed-waveguide grating (AWG) with limited free-space range.

**7PS2-01 Adhesion enhancement on COC substrate via oxygen plasma treatment**

*H. Yu, J. Shu, C. Liu (National Formosa Univ. / Taiwan), S. Hwang (National United Univ. / Taiwan)*

Cyclic olefin copolymer (COC) substrate surface was modified by plasma treatment under oxygen atmosphere. The adhesive ability between the coating layer (ITO) and the COC surface can be improved after optimum plasma treating procedure, which can be proofed by the optical microscope observation after boiling water test.

**7PS2-02 Characterization of indium tin oxide (ITO) on flexible polymer substrate**

*H. Yu, M. Tseng (National Formosa Univ. / Taiwan), S. Hwang (National United Univ. / Taiwan)*

Indium tin oxide (ITO) films were deposited on cyclic olefin copolymer (COC) substrate at room temperature by a magnetron sputtering system to be water vapor barrier layer. Water vapor penetration performances and Surface morphology of the ITO coated on COC substrate after bending was observed by scanning electron microscope (SEM).

**7PS2-03 Laser-induced positive refractive-index change in fused silica by a femtosecond laser pulses at 400nm**

*T. Tamaki, Y. Ozeki, K. Itoh (Osaka Univ. / Japan), W. Watanabe (National Inst. of Advanced Industrial Science and Technology / Japan)*

Positive refractive-index change was induced by focusing 400-nm femtosecond laser pulses inside fused silica. The refractive index change with a magnitude of 5 × 10-3 was estimated from the diffraction efficiencies of an internal grating.

**7PS2-04 A High Performance Thin-Film Filter Coated on a GRIN Lens by an Ion-Beam Sputter Deposition**

*N. Uehara, R. Otowa, R. Okuda (Santec / Japan)*

We describe a high performance thin-film filter coated on a GRIN lens by an ion-beam sputter deposition. High isolations of 60dB and 43dB in transmission and reflection between 1480nm and 1550nm bands for FTTH applications are achieved.

**7PS2-05 Self-controlled Variable Threshold Optical Limiter using Photochromism of Bacteriorhodopsin Film**

*H. Goto, K. Tsuyoshi, K. Itoh (Osaka Univ. / Japan)*

We propose a self-controlled variable threshold optical limiter using photochromism in bacteriorhodopsin film. Experimental results indicate the limiting function and the controllability of threshold for the proposed optical limiter.

**7PS2-06 Wavelength dependence of electro-optic coefficients r22 of congruent and quasi-stoichiometric LiNbO3 crystals by means of reflection interference method**

*K. Yonekura, L. Jin, K. Takizawa (Seikei Univ. / Japan)*

The effective electro-optic (EO) coefficients $r_{22}$ of non-doped congruent $LiNbO_3$ (CLN) and 1.8% MgO doped quasi-stoichiometric $LiNbO_3$ (QSLN) have been measured in wavelength range from 440nm to 1580nm by the reflection interference method.

**7PS2-07 Reflection Spectrum of a Finite Dielectric Layered Structure with Subwavelength Features**

*J. B. Cole, D. Zhu, K. Chakrabarti (Univ. of Tsukuba / Japan), S. Banerjee (Sumitomo Kagaku / Japan)*

We investigate the reflection spectrum of a finite subwavelength layered structure using a high accuracy finite difference time domain algorithm based on nonstandard finite differences, and compare with Fresnel theory for infinite structures.

**7PS2-08 Error Reduction of Binary Computer-generated Holograms to Construct Two-dimensional Continuous Intensity Distribution Using Direct Binary Search**

*M. Nakata, S. Yang, H. Takajo (Kyushu Inst. of Technology / Japan), N. Wada (Sanei Hytechs / Japan)*

Speckles are serious problems in the reconstruction of computer-generated holograms especially in binary holograms. We had suggested an iterative speckle reduction algorithm to eliminate speckles. In this study, we show a method to reduce the reconstruction error of binary computer-generated holograms using the direct binary search. Simulation results show that good reconstructed distributions can be obtained and no speckles appear.

**7PS2-09 Athermalized Diffractive Doublet in the 8-12um Wavelength Band**

*J. Kudo, T. Yatagai (Univ. of Tsukuba / Japan)*

The use of a diffractive optical element in 8-12um wavelength band is discussed to reduce athermal and achromatic aberration. Optical performances of the designed doublet, such as focus shift due to temperature change, are evaluated.

**7PS2-10 Design of Circular Dammann Grating**

*S. Zhao, J. Wen, P. Chung (City Univ. of Hong Kong / Hong Kong)*

A novel circular Dammann grating is proposed to generate uniform-intensity impulse rings corresponding to different diffraction orders in the far field. Experimental demonstration is also presented.

**7PS2-11 Fabrication of highly precise holographic gratings using active phase control**

*K. Nakajima, E. Watanabe, J. Mizumo, K. Kodate (Japan Women's Univ. / Japan)*

We have been fabricating VPH gratings as high dispersion device for visible wavelengths. We report our progress on higher dispersion and extension towards longer wavelengths by the use of active phase control technique.

**7PS2-12 Holographic Femtosecond Laser Processing using a Hologram Designed with Optical Estimation**

*S. Hasegawa, Y. Hayasaki (Univ. of Tokushima / Japan)*

Multiplexed phase Fresnel lenses in holographic femtosecond laser processing is optimized with an optical estimation of the diffraction peaks. The uniformity of the diffraction peaks is improved in compared with the computational estimation.

**7PS2-13 Investigation on Imaging Characteristics of Transmission-type Volume Holographic Optical Element**

*Y. Takizawa, Y. Kitagawa (Hyogo Prefectural Inst. of Technology / Japan), H. Ueda (Daiso / Japan), O. Matoba, T. Yoshimura (Kobe Univ. / Japan)*

We investigate imaging characteristics of transmission-type volume holographic optical element (VHOE) for imaging between point light sources. A VHOE is fabricated in photopolymer and then the position error along the optical axis at the reconstructed point source is evaluated.

**7PS2-14 Holographic Recording in Glass Plates Using Corona Charging**

*D. Sakai, K. Harada, S. Kamemaru (Kitami Inst. of Technology / Japan), T. Fukuda (Advanced Industrial Science and Technology / Japan)*

We propose a new recording technique in glass plates. Polymer surface relief structure can be copied on a glass plate as electrical charge distributions by corona charging.

**7PS2-15 Holographic femtosecond laser processing using a hologram calculated with an optimal-rotation angle method**

*H. Takahashi, S. Hasegawa, Y. Hayasaki (Tokushima Univ. / Japan)*

We demonstrate holographic femtosecond laser processing using a computer-generated hologram (CGH). The CGH is calculated with the optimal-rotation angle method with compensation of a spatial frequency response of spatial light modulator.

**7PS2-16 Numerical investigation of dose modulation for fabricating short-period diffraction gratings with the electron-beam lithography**

*M. Okano (Nalux / Japan), Y. Hirai, H. Kikuta (Osaka Prefecture Univ. / Japan)*

Electron dose modulation must be deep for fabricating short-period diffraction gratings with the electron-beam lithography. We have investigated the absorbed energy density in the resist layer with a lithography simulator to understand the deep modulation.

**7PS2-17 Fabrication and Characterization of Polymer Waveguides from Alicyclic Methacrylate Copolymer**

*Y. Ichihashi, M. Bruendel, J. Mohr (Forschungszentrum Karlsruhe GmbH / Germany), D. G. Rabus (Univ. of California / USA)*

We investigate the deep-UV induced refractive index modification of alicyclic methacrylate copolymer for realizing integrated optical circuits for the development of cheap, disposable integrated optical sensors for chemical and biological monitoring.

**7PS2-18 Design of Low-Loss Tapered Waveguide by Applying Photonic-Crystal-Based Microlens in Telescopic Structure**

*Y. Tsai, M. Wu, H. Lan, J. Chang (National Central Univ. / Taiwan)*

In this paper, the design of low-loss tapered waveguide by applying photonic-crystal-based microlens is presented. The effective index of the photonic-crystal structure is calculated and properly arranged in a microlens-like shape. The results show that the photonic-crystal-based microlens in telescopic structure can serve as a novel optical element in the tapered waveguide with advantage of low-loss, high efficiency and compactness.

**7PS2-19 The Analysis Of Notch Filter With Wide Flattened Stopband By Using Asymmetric Grating Structure On Planar Waveguide**

*Y. Lee, M. Wu, C. Hsu, Y. Liu, J. Chang (National Central Univ. / Taiwan)*

The resonant leaky mode can be manipulated by the asymmetrical profile of grating. The phenomenum of flattended photonic bandgap was theoretically explained and a filter with flattened stopband of 200nm bandwidth was experimentally achieved.

**7PS2-20 Designing and Development of QPM-SHG PPLN Waveguide with Integrated Dual EO Modulator**

*T. Okaguchi, H. Onda, Y. Oki, T. Okada (Kyushu Univ. / Japan)*

A novel type of waveguided QPM-SHG device with EO modulator was proposed and demonstrated. The SHG output modulation and high extinction ratio could be obtained with dual phase modulator.

**7PS2-21 Waveguide structure design of broadband optical directional couplers**

*C. Feng, K. Sheng (National Central Univ. / Taiwan), C. Hsiung (Industrial Technology Research Inst. / Taiwan)*

The waveguide structure designs of broadband optical directional couplers based on sin-square and raised-cosine weighting functions are investigated. The objective of the work includes in the new design of adiabatic directional full couplers can obtain respectively theory ranges, low noise, large frequency and short couplers. It is surely that the proposed waveguide structure design is more effective than convention weighting for optical directional couplers.

**7PS2-22 Active Narrowband Multiple Wavelength and Frequency-Doubling Filters in Aperiodically Poled Lithium Niobates**

*C. Lin, Y. Chen, J. Chang (National Central Univ. / Taiwan)*

We report active narrowband multiple wavelength and frequency-doubling filters in aperiodically poled lithium niobates (APLN). ~100% transmission of 8 ITU wavelengths is simultaneously achieved in a 5cm APLN when a field ~298 V/mm is applied.

**7PS2-23 Thermo-Optical Control on Quasi-Mode-Coupling DFB Laser**

*K. Sanada, H. Watanabe, Y. Oki, (Kyushu Univ. / Japan), M. Tanaka (Seiko Electric Company / Japan)*

A novel scheme of switch for optical pumping of waveguided laser array was proposed. A numerical simulation predicts controllability of pumping beam coupling. It was also confirmed by experiments.

**7PS2-24 Control of Coupling between Waveguides & Microsphere Resonators**

*Y. Panitchob, G. S. Murugan, M. N. Zervas,*
*J. S. Wilkinson (Univ. of Southampton / UK)*

Coupling of 30μm diameter microsphere resonators to glass waveguides is modelled and studied experimentally for spheres separated from the waveguide by a dielectric cladding layer of varying thickness.

**7PS2-25 Propulsion and Sorting of Gold Nanospheres on Optical Waveguides**

*J. S. Wilkinson, J. P. Hole (Univ. of Southampton / UK), K. Grujic, O. G. Helleso (Univ. of Tromso / Norway)*

Propulsion of gold nanospheres in the evanescent field of caesium ion-excahnged waveguides and Y-junction waveguide sorters is demonstrated, quantified, and compared with theory for large populations of nanospheres.

**7PS2-26 Numerical Survey of Apodized Fiber Gratings for Dispersion Compensation in High-Bit-Rate Fiber Communications**

*H. H. Yee, C. T. Lee, C. L. Xiao, W. G. Hu, C. Y. Chang (National Taipei Univ. / Taiwan)*

Positive hyperbolic tangent, tanh (a=4), profile of linearly-chirped apodized fiber gratings has been proven to be most effective for dispersion compensation at B = 10 Gbits/sec in fiber optic communications. After detailed survey, however, we found that tanh (a=3), instead, would provide much better compensation for B greater than or equal to 40 Gbits/sec.

**7PS2-27 Design and fabrication of optical fiber ends**

*L. Yuan, J. Yang, Z. Liu (Harbin Engineering Univ. / China)*

State-of-the-art of bare fiber end polishing techniques are introduced and demonstrated. It is essential for many applications such as in low loss, high bit rate communication system and special requirement of fiber sensing probe.

**7PS2-28 Estimation of Pulse Width Broadening Using a Novel Mode Transfer Model in Graded-index Plastic Optical Fiber in Underfilled Launch Condition**

*R. Koyama, M. Kihara, T. Kurashima, S. Tomita (NTT / Japan)*

We propose a novel mode transfer model for multimode fibers. With this model, we can estimate pulse width broadening along a transmission in a multimode fiber from the excitation mode condition at the incident point.

**7PS2-29 Simple Method for Optical Fiber Chromatic Dispersion Estimation**

*V. A. Burdin, A. V. Bourdine (Povolzhskaya State Academy of Telecommunication and Informatics / Russia)*

Simple method for approximate calculation of chromatic dispersion slope of weakly guiding optical fiber with an arbitrary coaxial refraction index profile is described. Some examples of its application and error estimation are presented.

**7PS2-30 Spatial Coherence Shaping: A New Optical Design in Coherence Domain**

*W. Wang, Z. Duan, M. Takeda (Univ. of Electro-Communications / Japan), S. G. Hanson (Risoe National Laboratory / Denmark)*

Based on the formal analogy to laser beam shaping, a novel technique for arbitrarily shaping the spatial coherence function is proposed. Experimental results are presented to demonstrate the validity and value of the proposed method.

**7PS2-31 Automatic control of deformable mirror for shaping laser spatial profiles.**

*F. Matsui (Industrial Technology Center of FUKUI Prefecture / Japan)*

We have been developing highly qualified short pulse laser beam for microscopic processing or light source for a photo-cathode RF gun. We report automatic control of deformable mirror for shaping spatial profiles.

**7PS2-32 Er:YAG laser skin puncher**

*D. M. Savastru, E. N. Ristici, S. I. Miclos, M. M. Mustata, M. I. Rusu, V. M. Savu, C. I. Radu (National Institute of R&D for Optoelectronics INOE2000 / Romania)*

An Er:YAG laser device, free running mode, used for blood sampling is presented. This laser device has the pulse length of about 170 microseconds and four emitted energy levels corresponding to different skin types.

**7PS2-33 Self-Fields in an Electromagnetic Wiggler with Axial Magnetic field**

*M. Esmaeilzadeh (Iran Univ. of Science and Technology / Iran)*

A theory for self-fields in a free-electron laser with electromagnetic wiggler and axial magnetic field is presented. The diamagnetic and paramagnetic effects of self-magnetic field are derived and discussed.

**7PS3-01 Fabrication and characterization of poly (methyl methacrylate-co-hydroxyethyl methacrylate) photopolymer doped with photoinitiator system Eosin Y Spirit Soluble/Triethanolamine for volume holographic data storage**

*S. Lin, Y. Hsiao, W. Whang (National Chiao Tung Univ. / Taiwan)*

In this talk, we present the fabrication and experimental characterization of a novel photopolymer for volume holographic data storage, in which a bimolecular photoinitiator system, Eosin Y spirit soluble (EYss)/Triethanolamine (TEA) is doped in poly (hydroxyethyl methacrylate-co-methyl methacrylate) copolymer matrix.

**7PS3-02 Phenanthrenequinone doped poly (methyl-methacrylate) copolymers for holographic data storage**

*S. Lin, J. Lin (National Chiao Tung Univ. / Taiwan)*

We investigate improvements of phenanthrenequinone-doped poly(methyl-methacrylate) (PQ/PMMA) photopolymer by codoping two kinds of monomers. The fabrication technique and holographic characteristics are presented.

**7PS3-03 Fabrication and Characterization of poly (methyl-methacrylate) photopolymer doped with quinone-based molecules for volume holographic data storage**

*S. Lin, P. Chen, Y. Hsiao, W. Whang (National Chiao Tung Univ. / Taiwan)*

We report improvements of poly(methyl methacrylate) (PMMA) photopolymers for volume holographic storage. By doping photosensitive molecules with different kinds of the functional groups, the holographic characteristics of the materials can be modified.

**7PS3-04 Numerical Evaluation of Reflection-type Holographic Disk Memory based on Scalar Diffraction Theory**

*H. Ohnuma, M. Miura, K. Nitta, O. Matoba, T. Yoshimura (Kobe Univ. / Japan)*

Shift selectivity of reflection-type holographic disk memory is evaluated numerically by scalar diffraction theory and numerical Fresnel propagation. Numerical results of three-dimensional shift selectivity are presented.

**7PS3-05 Deterministic phase encoded holographic data storage using lenticular lens array**

*C. Chang (Ming Dao Univ. / Taiwan), G. Chen, W. Yang (National Defense Univ. / Taiwan), C. Lin, H. Yau (National Central Univ. / Taiwan)*

A novel optical holographic encrypted data storage scheme based on the phase encoding multiplexed scheme is proposed. Experimental results show that rotating a LLA as a phase modulator in the path of the reference beam provides a simple yet effective method of increasing the holographic storage capabilities.

**7PS3-06 Shift Margin of a Random Diffuser in Spatial Spread-Spectrum Multiplexing**

*T. Ito, A. Okamoto (Hokkaido Univ. / Japan)*

Signal degradation by the diffuser misalignment in the holographic recording using spatial spread-spectrum multiplexing is analyzed. Calculations show that the practical shift margin is no more than 1/16 of the diffuser correlation length.

**7PS3-07 Holographic Color Display with a High-Resolution Reflective LCD Panel**

*K. Sato, K. Tsuji, K. Fujii, M. Morimoto (Univ. of Hyogo / Japan)*

A time-sharing holographic color display system is developed with a high-resolution reflective liquid-crystal display (LCD) panel and with low-power RGB lasers. Reconstructed high-resolution images have large color gamut and exhibit fine color expression.

**7PS3-08 Thermal Mechanism for Optical Proximity Correction**

*S. Kim (Catholic Univ. of Korea / Korea)*

Thermal processes are described and modelled for the property change of a positive type 193 nm chemically-amplified resist. Due to contact hole pattern, the possibility of controlling these thermal processes for the formation of the below 45 nm critical dimension is shown.

**7PS3-09 Matrix Projection Exposure Using a Liquid Crystal Display Panel and Analogue Control of Cell Lightness**

*T. Horiuchi, A. Otani (Tokyo Denki Univ. / Japan)*

Projection exposure using a liquid crystal display panel in place of a reticle is investigated. Adopting analogue lightness control, arbitrary patterns are printed at arbitrary positions without being restricted by the matrix array.

**7PS3-10 Diffractive optics fabrication system for large aspheric surfaces**

*H. Rhee, D. Kim, J. Song, K. Ha, I. Lee, Y. Lee (Korea Research Inst. of Standards and Science / Korea)*

Large aspheric surfaces, including mirrors, are usually tested by using the null lens or computer-generated hologram (CGH). We are developing a cylindrical/circular laser writing system for the CGH fabrication. Using the system, 300 mm diameter CGH can be fabricated with 500 nm spatial resolution.

**7PS3-11 Data recording on a dental device using femtosecond laser processing with a surface detection system**

*K. Fujita, A. Takita, Y. Hayasaki, T. Ichikawa (Tokushima Univ. / Japan)*

We demonstrate a data recording on a dental device for personal identification. It is performed by femtosecond laser processing with a surface detection system that enable to process an object having complicated surface shape.

**7PS3-12 Development of Orange Fiber Laser for Photocoagulator**

*M. Adachi, K. Kojima, K. Hayashi (NIDEK / Japan), T. Yoda (Optoquest / Japan)*

We obtained 580-nm laser power of 1.3-W from 5.8-W fiber laser using a PPLN crystal. We have also developed a prototype photocoagulator and the maximum coagulation power is 700 mW which is enough for evaluation.

**7PS3-13 Light pipe laser beam shaper**

*W. Liang, C. Chen (National Taiwan Univ. of Science and Technology / Taiwan)*

A light pipe based laser beam shaper has been proposed as a lossless approach to transfer a Gaussian laser beam into a line beam with uniform distribution along the line direction for material processing.

**7PS3-14 Wavelength-Division-Multiplexed Indoor Optical Wireless LAN Using Custom CMOS Image Sensor with Function of Fast Optical Data Acquisition and Crosstalk Reduction**

*K. Nomura, T. Miyawaki, K. Kagawa, M. Nunoshita, J. Ohta (Nara Inst. of Science and Technology / Japan)*

This paper describes composition of the wavelength-division-multiplexed indoor optical wireless LAN system in which a special CMOS image sensor is utilized to realize compact, fast, and intelligent networking device.

**7PS3-15 Stereoscopic Camera with a CCD and Two Zoom Lenses Based on the Principle of Human Eyes**

*S. Lee, J. Jo (Hannam Univ. / Korea),*
*H. Chung, K. Lee (Pan Opto Mecha Tronix / Korea)*

The stereoscopic camera, based on the image formation of human, is designed and fabricated. This camera has the comfortable and realistic three-dimensional view, because the optical center distance of two zoom lenses and the convergence angle are equal to the human's eye. The continuous images are obtained by taking right and left images by turns with a CCD and the shutter blade. Also this camera has wide angle of view.

**7PS4-01 Exploitation of Nonlinear Material Based Tree-net Architecture in All-optical Time Division Demultiplexing Scheme**

*J. N. Roy (College of Engineering & Managemet / India), S. Mukhopadhyay (Univ. of Burdwan / India), A. K. Maiti (Panskura Banamali College / India)*

Optical nonlinear material based switching system is exploited to design optical tree architecture for developing time division demultiplexing scheme in all-optical domain towards super fast data and information processing.

**7PS4-02 Integrated All-optical Binary Data Addition and Subtraction with the Use of Optical Nonlinear Material Based Tree-net Architecture**

*S. Mukhopadhyay (Univ. of Burdwan / India), J. N. Roy (College of Engineering & Managemet / India), A. K. Maiti (Panskura Banamali College / India)*

Optical nonlinear material based switching system is exploited to design optical tree architecture for developing some arithmetic operational system in all-optical domain towards high speed photonic activity.

**7PS4-03 All-optical decision gate circuit using a cascaded quasi-phase-matched lithium niobate device**

*S. Yamada, T. Kawashima, Y. Kachita, Y. Fukuchi (Tokyo Univ. of Science / Japan)*

We propose a cascaded quasi-phase-matched (QPM) lithium niobate (LN) device. In the device, two crystals with different QPM wavelengths are cascaded. We numerically show that the cascaded QPM-LN device has an all-optical level discriminating characteristic

**7PS4-04 All-optical XOR-, OR-, and AND-gates using Photorefractive Two-Wave Mixing**

*D. Ishikawa, A. Okamoto, K. Harasaka (Hokkaido Univ. / Japan), S. Honma (Univ. of Yamanashi / Japan)*

We propose all-optical XOR-, AND-, and OR-gates using photorefractive two-wave mixing for two-dimensional information. We show that these logic gates operate correctly by calculating the output optical image with the finite-difference beam propagation method.

**7PS4-05 Watermark detection of an optical watermarking system**

*C. Chen, L. Lin (Feng Chia Univ. / Taiwan)*

We examine the statistical model of a correlation-based optical watermarking system, which allow prediction of the detector reliability and facilitate the development of more reliable detection. The analysis result is used to find an optimal threshold for the correlation detector, and the detection performance is evaluated.

**7PS4-06 A Steepest-Descent-Based Blind Deconvolution Method Aided by Ayers-Dainty's and Genetic Algorithms**

*T. Ueda, S. Yang, H. Takajo (Kyushu Inst. of Technology / Japan)*

Recently we proposed the steepest-descent-based method used for blind deconvolution. However, this method has a stagnation problem. In this paper, we suggest to incorporate, into this method, the Ayers-Dainty's and genetic algorithms.

**7PS4-07 Comparative study on configuration of phase-shifting array device for high-quality image in parallel phase-shifting digital holography**

*A. Kaneko, A. Fujii, S. Ura, K. Nishio, T. Kubota (Kyoto Inst. of Technology / Japan), Y. Awatsuji (Japan Science and Technology Agency / Japan)*

Reconstructed images was calculated and compared for all of basic 24 configurations of phase-shifting array device. It was found that the configurations which provide π-phase difference between diagonal pixels in reference wave attained higher-quality images.

**7PS4-08 Design and implementation of highly usable software for digital holography**

*T. Koyama, A. Fujii, K. Nishio, S. Ura, T. Kubota (Kyoto Inst. of Technology / Japan), Y. Awatsuji (Japan Science and Technology Agency / Japan)*

A software for reconstructing images of digital holography is presented. The software copes with five reconstructing methods and calculates Fresnel transform by two algorithms. For user-friendly interface, the software is developed as a window application.

**7PS4-09 Light-in-flight recording by holography for recording motion picture of magnified image of ultrashort light pulse propagation**

*T. Kakue, K. Komai, M. Yamagiwa, K. Nishio, S. Ura, T. Kubota(Kyoto Inst. of Technology / Japan), Y. Awatsuji (Japan Science and Technology Agency / Japan)*

We demonstrate motion pictures of magnified image of 226-fs laser pulse propagation. Compared with the reconstructed image of conventional light-in-flight recording by holography, magnification of 1.4 is obtained by use of a single positive lens.

**7PS4-10 Recording and reconstruction analysis of three-dimensional image of femtosecond light pulse propagation obtained by light-in-flight recording by holography**

*K. Komai, T. Katayama, K. Nishio, S. Ura, T. Kubota (Kyoto Inst. of Technology / Japan), Y. Awatsuji (Japan Science and Technology Agency / Japan)*

We demonstrate motion pictures of three-dimensional image of femtosecond light pulse propagation obtained by light-in-flight recording by holography. The reconstructed image is flipped and the flip can be confirmed by numerical simulation.

**7PS4-11 Observation of femtosecond light pulse propagation in graded-index medium as form of motion picture**

*M. Aihara, K. Komai, M. Yamagiwa, K. Nishio, S. Ura, T. Kubota (Kyoto Inst. of Technology / Japan), Y. Awatsuji (Japan Science and Technology Agency / Japan)*

We demonstrate a spatially and temporally continuous motion picture of femtosecond light pulse propagation in a graded-index medium. The picture is obtained by holography and shows that the pulse propagates on a curved optical path.

**7PS4-12 Dependence of holographic diffraction properties on applied dc field in dye-doped nematic liquid crystal**

*E. Kim, H. Yang, G. Kim, S. Park, C. Kwak (Yeungnam Univ. / Korea)*

We measured the real-time diffraction efficiency in porphyrin: Zn-doped nematic liquid crystals by using two beam coupling experiment under the influence of an applied dc field and theoretically derived an expression of the diffraction efficiency, showing good agreement with the experimental results.

**7PS4-13 Fabrication and Characterization of poly (methyl methacrylate) photopolymer doped with quinone-based photosensitive molecules for volume holographic recording**

*P. Chen, K. Hsu, S. Lin, Y. Hsiao (National Chiao Tung Univ. / Taiwan)*

In this thesis, we investigate several novel poly(methyl methacrylate)(PMMA) photopolymers doped with different quinone-based molecules for volume holographic recording .By introducing different kinds of the functional groups (electron-donor, electron-withdrawing…etc.) on the photosensitive molecules, we could tailor the characteristics of the materials for holographic data storage application.

**7PS4-14 Fabrication and characterization of poly (methyl methacrylate-co-hydroxyethyl methacrylate) photopolymer doped with photoinitiator system Eosin Y Spirit Soluble/Triethanolamine for volume holographic data storage**

*Y. Hsiao, S. Lin, Y. Hsiao, W. Whang (National Chiao Tung Univ. / Taiwan)*

In this talk, we present the fabrication and experimental characterization of a novel photopolymer for volume holographic data storage, in which a bimolecular photoinitiator system, Eosin Y spirit soluble (EYss)/Triethanolamine (TEA) is doped in poly (hydroxyethyl methacrylate-co-methyl methacrylate) copolymer matrix.

**7PS4-15 Dynamics of scattering in photopolymer holographic materials**

*S. Tao, D. Zhuo (Beijing Univ. of Technology / China), M. Shi, J. Xue, Y. Zhao, F. Wu (Chinese Academy of Sciences / China)*

A modified dynamic model for transmittance of photopolymers under illumination of a coherent beam is proposed, specifying the growth of scattering related to the fabrication parameters of the material. Experiments agree well with the model.

**7PS4-16 Response of Ferroelectric Molecules in Liquid Crystal Display under an Applied Electric Field**

*M. Takei, H. Shirochi, M. Yamashita (The Univ. of Tokyo / Japan)*

From observation of temporal behaviors of conoscopic figures, deformations of the helical structures in ferroelectric liquid crystal cells initiate at the center of the cell and move outward over a few milliseconds.

**7PS4-17 Optical Nonlinear Properties of Fast Green FCF**

*M. H. M. Ara, S. Salmani, K. Jamshidi-Ghaleh (Teacher Training Univ. / Iran)*

Nonlinear optical properties of a day type acid called Fast Green FCF were studied by using 35 mW He-Ne laser at 632.8 nm irradiation by single beam z-scan technique. The second order refractive index and nonlinear absorption coefficient are measured. The optical limiting performance of Fast Green FCF is also investigated

**7PS4-18 Multiple Interference Effect on Time-dependent Transmittance in an Amorphous As2S3 Thin Film**

*S. Park, H. Yang, E. Kim, G. Kim, C. Kwak (Yeungnam Univ. / Korea)*

We fabricated an amorphous As2S3 thin film by utilizing thermal evaporation system and determined the nonlinear optical properties by analyzing transmission spectrum and measuring the time-dependent transmittance. Abnormal transmittance observed in the high intensity regime, which is larger than unity, was described by the multiple interference effect.

**7PS4-19 Nonlinear Optical and Filter Characteristics in Thermally Poled Fused Quartz**

*H. Chen, G. Jian, C. Tsuei (Huafan Univ. / Taiwan)*

Thermally poled fused quartz with periodic interdigital electrodes can induce second-order optical nonlinear effects and generate a band-pass filter characteristic for microwave application. The filter has a center frequency of ~2.5GHz and bandwiath of ~300MHz.

**7PS4-20 Local Detection of Surface Plasmon Resonance for Sensing Applications**

*P. Tomanek, L. Grmela (Brno Univ. of Technology / Czech)*

The paper brings a description of Surface plasmon resonance fluorescence spectroscopy sensor based on Kretschmann configuration. The tip of scanning near-field optical microscope serves as a local collector of attenuated total reflection from the sample.

**7PS4-21 Appropriate Probe Selection for Optical Near-Field Microscopy(SNOM) Using FDTD Method**

*B. Zakeri, S. Golmohammadi (Azad Univ. of Garmsar / Iran)*

Two probe structures, aperture and coaxial tips, are assumed. Finite Difference Time Domain(FDTD) is used for calculating the sensed field with these probes. A numerical solution for Maxwell's equations based on Yee algorithm is performed.

**7PS4-22 Fabrication of an optical near-filed generator and detector with a new type of aperture**

*A. Utsumi, Y. Yamasaki, N. Oota, H. Matsuo, H. Jinno, K. Tatsuo, M. Fukuda (Toyohashi Univ. of Technology / Japan)*

We present a novel optical near-filed generator and detector with a new type of aperture for future nano-photonic integrated circuits and other devices.

**7PS4-23 3D Submicron Fabrication of conducting polymers for Active Opto-Electronic Devices**

*Y. Kimura, K. Yamada, J. Sone, J. Chen, S. Urabe (Tokyo Polytechnic Univ. / Japan)*

Submicron fabrications of conducting polymers were realized by the multiphoton absorption process of the photo-sensitizer. By use of the polymer binder layer, the minimum resolution of the polypyrrole pattern would be less than 800 nm.

**7PS4-24 Diffractive Optical Elements Fabricated by UV Imprinting Technique using Photosensitive Organic/Inorganic Nanocompsoites**

*S. Yamaki, A. Suzuki, H. Mataki (KRI / Japan)*

Diffractive optical elements (DOE) have successfully been fabricated by UV imprinting technique using photo-polymerizable acrylic resin containing photo-reactive silica nanoparticles. It was verified that the imprinted DOE works as a grating while keeping excellent transparency.

**7PS4-25 Numerically Controlled Local Wet Etching For Fabricating the Ultraprecision Optics**

*K. Yamamura (Osaka Univ. / Japan)*

Numerically controlled local wet etching (NC-LWE) is a novel deterministic sub-aperture figuring method. We applied NC-LWE for finishing the photomask substrate made of quartz glass, and achieved 69 nm flatness with 0.15 nm rms roughness.

**7PS4-26 The effect of the circuit pattern on the optical absorption in optical annealing process**

*H. Ohno, Y. Honguh (Toshiba / Japan)*

The optical absorption distribution in a silicon wafer is calculated using rigorous coupled wave analysis. The effect of circuit patterns on the profile and total amount of the optical absorption are estimated.

**7PS4-27 Three-dimensional measurement with a confocal optical system based on inclined-plane scanning**

*D. Miyazaki, K. Maeda, T. Murai, Y. Hisano, T. Mukai, (Osaka City Univ. / Japan)*

The three-dimensional measurement method using confocal imaging scheme without moving an object is reported. The object is illuminated by an inclined light spot array, which is moved by an optical mirror scanner.

**7PS4-28 3D Object Acquisition Using a Compound Image System**

*R. Horisaki, S. Irie, Y. Ogura, J. Tanida (Osaka Univ. / Japan)*

An effective method for 3D object acquisition is presented using a compound system. A new criterion for object distance estimation is introduced. Experimental results show effectiveness of the proposed method.

**7PS4-29 Non-contact measurement of tissue absorption coefficient using spatially resolved near-infrared spectroscopy**

*H. Murata, M. Niwayama, S. Sone, S. Shinohara (Shizuoka Univ. / Japan)*

We examined the influence of probe-tissue distance on the relationship between the muscle absorption coefficient and the spatial profile of light intensity by Monte Carlo simulation and in vivo experiments, using non-contact spatially resolved NIRS.

**7PS4-30 Variations of Fraunhofer Diffraction Pattern by Nonlinear Refractive Index Change in Amorphous As2S3 Thin Film**

*H. Yang, E. Kim, G. Kim, S. Park, C. Kwak (Yeungnam Univ. / Korea)*

We observed temporal changes of Fraunhofer diffraction pattern by nonlinear refractive index change in an amorphous chalcogenide As2S3 thin film using optical imaging system and derived the intensity distribution in steady-state based on the Fourier optics.

**7PS4-31 Embedded DSP System to Assist Nonlinear-Optical in Measure Nuclear Response on Liquids**

*L. H. Tran, D. P. McMorrow, T. V. Mai, J. A. Molnar (Naval Research Lab. / USA)*

Nonlinear-optical studies on Nuclear Response on Liquids are complex and tedious processes. With embedded DSP system to feedback control collect and analyzer data on the real time to help the searchers save time to optimize system and for more accuracy result.

**7PS4-32 Defect Measurement of Optical Disk Substrate by Mach-Zehnder Interferometer**

*Y. Takahashi, T. Oosawa, T. Takahashi (Gunma Univ. / Japan)*

Defect measurement of optical disk substrates was demonstrated using Mach-Zehnder interferometer in vertical configuration. With a phase-shifting method, it can detect shallow and broad defects on the surface which will cause disk I/O errors.

**7PS4-33 Interferometric System for Small Asphere Testing**

*N. Jang, P. Choi, J. Eun (Changwon National Univ. / Korea)*

The phase shifting interferometric system based on the Fizeau interferometer employing the aspheric analysis algorithm was developed for measuring small aspheres. Performance of the system being developed is comparable to the conventional aspheric testing system.

**7PS4-34 Recent advances in subaperture stitching interferometry for aspheres**

*T. Kume (QED Technologies Japan / Japan), P. E. Murphy, M. Tricard (QED Technologies / USA)*

QED Technologies announces the SSI-A metrology product. For the first time, an interferometer based tool allows not only the measurements of flat and spheres (with capabilities exceeding standard interferometers), but also aspheres without null lenses.

**7PS4-35 Numerical Analysis of the Conditions for Achieving Accurate Displacement Measurement Using a Self-Mixing Laser Diode**

*J. Bavogui, M. Niwayama, S. Shinohara*
*(Shizuoka Univ. / Japan)*

The allowable external feedback reflectivities for accurate displacement measurement of a vibrating target are determined by numerical simulation based on rate equations which incorporate Langevin noise.

**7PS4-36 New MTF measurement system for mobile phone lenses with small diameter and large F-number**

*S. Hong, J. Jo (Hannam Univ. / Korea), H. Lee, H. Yang, Y. Lee, I. Lee (Korea Research Institute of Standards and Science / Korea), M. Hur (JeeWoo Tech. / Korea)*

We propose and fabricate the MTF (modulation transfer function) measurement system of the mobile phone lenses with extreme small diameter and large F-number and investigate and analyze the error factors of the MTF according to the imperfection and tolerances of various components of this system.

**7PS4-37 Lens Quality Control: Tilted Edge Technology for Direct Full Field MTF Measurements**

*J. Bou, T. Dohi (OptiWorks / Japan),*
*S. Sadoulet (Edmund Optics / USA)*

We provide a cost-time effective solution for lens quality control in high-volume production environment. Considered as quality criterion, Modulation Transfer Function measurements are efficiently performed using a tilted edge detection method, reducing control time dramaticaly.

**7PS4-38 Calibration of the testing setup using a CGH and Hartmann sensor**

*H. Yang, J. Song, I. Lee, Y. Lee, (KRISS / Korea)*

We demonstrated that the significant amount of error in the test setup could be removed by using a CGH and Hartmann sensor. With this method, we accurately measured the steep convex aspheric surface (diameter 16 mm).

**7PS4-39 Semi-analytical Model of an Optical Fiber Having Kerr Nonlinearity with Three Parameter Approximation for the Fundamental Modal Field**

*R. Roy Choudhury, A. Roy Choudhury*
*(Sikkim Manipal Inst. of Technology / India)*

For the first time, number of optimizing parameters has been increased to incorporate more flexibility in the formulation of fundamental field. This formulation provides accurate analytical expressions for dispersion of optical fiber with Kerr nonlinearity.

**7PS4-40 Novel Method for Optical Fiber Beat Length Estimation by POTDR with Extended Pulse Width**

*V. A. Burdin (Povolzhskaya State Academy of Telecommunication and Informatics / Russia),*
*A. V. Bourdine (Research and Development Company "CommunicationAutomationMounting" / Russia)*

Novel method for optical fiber beat length estimation by POTDR with extended pulse width is represented. Experimental investigations of introduced method accuracy are described.

**7PS4-41 Practical Application of Visible AWG Spectroscopic Sensor Using a Parabola-Shaped Waveguide**

*Y. Komai, H. Nagano, K. Kodate (Japan Women's Univ. / Japan), K. Okamoto (Okamoto Laboratory / Japan)*

We applied a parabola-shaped sample injection waveguide to our proposed visible arrayed waveguide grating spectroscopic sensor for the improvement of the sensitivity, and demonstrated experiments for discriminating chlorophyll a and b as an environmental indicator.

**7PS4-42 Remote sensing system using fiber optic laser powering and liquid-crystal optical modulator**

*T. Nishimura, M. Nakagawa, T. Shioda, Y. Tanaka, T. Kurokawa (Tokyo Univ. of Agriculture and Technology / Japan), J. Oka (The Chugoku Electric Power / Japan)*

We developed a fiber-optic remote sensor using laser powering. It could operate with 6mW laser power, transmit light through 5-km-long fiber to a sensor, and produce optical sensing signal with 15-dB extinction ratio.

**7PS4-43 Submilli-meter resolution reflectometry using fiber ring modeless laser**

*Y. Tanaka, Q. Ngo, Y. Arase, T. Shioda, T. Kurokawa (Tokyo Univ. of Agriculture and Technology / Japan)*

A novel reflectometry based on fiber ring modeless laser is experimentally demonstrated. We achieved the measurement resolution of 200 $\mu$ m which is applicable to defect inspection for waveguide-type optical devices.

**7PS4-44 Fiber-Optical Measuring Network for Distributed Temperature Fields Monitoring**

*N. A. Rybalchenko, I. V. Denisov, V. A. Sedov (Maritime State Univ. / Russia)*

The fiber-optical measuring network on base fiber-optic microbending amplitude sensors with three-direction stacking of lines and dimension 4×4 is suggested. The fiber-optical measuring system for reconstruct the characteristics of distributed physical fields on developed fiber-optical measuring network is described.

**7PS4-45 Development of One-dimensional Fiber-optic Radiation Sensor for Measuring Dose Distributions of High Energy Photon Beams**

*K. Jang, D. Cho, B. Lee, H. Kim, J. Yi (Konkuk Univ. / Korea), S. Kim (Cheju National Univ. / Korea), H. Cho (Yonsei Univ. / Korea), S. Kim (Univ. of Florida / USA)*

We have developed a one-dimensional fiber-optic radiation sensor for measuring the one-dimensional dose distribution of high-energy photon beams which are used in radiotherapy

**7PS4-46 Low-Temperature Radiometric Measurements Using a Silver Halides Optical Fiber and Infrared Optical Devices**

*W. Yoo, B. Lee, D. Cho, S. Chung, G. Tack (Konkuk Univ. / Korea), S. Son (Cheongju Univ. / Korea), S. Cho (Sungkyunkwan Univ. / Korea)*

We have measured an infrared radiation which is transferred by a silver halides optical fiber from a heat source using a radiometer system for low-temperature measurements.

**7PS4-47 Demodulation of FBG Sensor Using a Fiber Loop Mirror**

*S. He (Beijing Univ. of Technology / China)*

A novel fiber Brrag grating sensor demodulator with birefringent fiber loop mirror is reported. It measures the wavelength shift by means of counting. This kind of demodulator has simple structure, cheap price and high precision.

**7PS4-48 Nonlinear Pulse Propagation and Switching Characteristics in Chalcogenide-fibre Bragg Gratings**

*Y. Yosia, S. Ping, L. Chao (Agency for Science, Technology, and Research / Singapore)*

We study the dynamic behaviour of nonlinear pulse propagations and switching characteristics in chalcogenide-Fibre Bragg Gratings (c-FBG) by numerical time domain simulations. Unlike conventional silica fibre Bragg gratings (FBG) that only has one optical bistability, we show phase-shifted c-FBG posses double optical bistability (optical tristability) .

**7PS4-49 Highly-accurate face recognition using a novel filtering correlation**

*Sayuri Ishikawa, Eriko Watanabe, Maiko Ohta and Kashiko Kodate (Japan Women's Univ. / Japan)*

A novel filtering correlation is introduced for face recognition using phase information with emphasis on Fourier domain. Compared with various correlation methods, our filtering correlation method revealed highly accurate EER of less than 1% at its best.

## December 8, 2006 (Friday)

### Optical Technology (1) (8:30-10:20)

**Presiders:**

*A. Kamshilin (Univ. of Kuopio / Finland)*
*K. Minoshima (AIST / Japan)*

**8S4-01 (Invited)**

**(8:30) Optofluidics - Emerging Technologies and Applications**

*D. Erickson (Cornell Univ. / USA)*

Optofluidics represents the fusion of nanophotonics and optoelectronics with microfluidic devices. Here we will discuss potential applications for nanofluidic elements in nanophotonic devices and analogously nanophotonic elements for nanofluidic devices.

**8S4-02 (Invited)**

**(8:55) Dispersive Interferometry - A Challenging Direction for New Optical Metrology**

*S. Kim, K. Joo, Y. Ghim (Korea Advanced Institute of Science and Technology / Korea)*

A systematic approach of dispersive interferometry using wide-band sources is described as a new challenging means of dimensional metrology with emphasis is on the basic theory, hardware and software configuration for implementation, and practical applications.

**8S4-03**

**(9:20) Chirp Measurement of Optical Short Pulses by Differential Processing Using a Spatial Light Modulator**

*R. Kobe, T. Shioda, Y. Tanaka, T. Kurokawa (Tokyo Univ. of Agriculture and Technology / Japan),*
*H. Takenouchi (Nippon Telegraph and Telephone East / Japan), H. Tsuda (Keio Univ. / Japan)*

We measured the chirp of optical short pulses with differential processing using an arrayed waveguide grating and a spatial light modulator. The results agreed well with the theoretical prediction.

**8S4-04**

**(9:35) 3D drag-and-drop laser trapping and manipulation**

*J. Gluckstad, P. J. Rodrigo, I. P. Nielsen (Risoe National Laboratory / Denmark)*

A fully user-interactive 3D drag-and-drop laser trapping and manipulation system is presented. Materials-scientist or micro-biologists can directly observe and interact with a 3D microscopic world consisting of a plurality of dividing cells, particles or micro-fabricated structures with nano-features.

**8S4-05**

**(9:50) Adiabatic SNOM Tips for Optical Tweezers**

*F. Xu, G. Brambilla (Univ. of Southamtpon / UK)*

Adiabatic SNOM tips have been manufactured and efficiently used as optical tweezers. Powers of the order of ten mW have been used to trap micrometric particles in a turbulent flow

**8S4-06**

**(10:05) Evaluation of a Solid Immersion Mirror for the Heat Assisted Magnetic Recording Systems**

*N. Nishida, M. Okitsu, K. Konno, K. Sekine, M. Kuiseko, H. Hatano, H. Ueda (Konica Minolta Opto / Japan)*

A solid immersion mirror (SIM) mountable on a flying slider is designed, fabricated, and evaluated. The SIM is a suitable focusing optics for the heat assisted magnetic recording systems of hard disk drive (HDD).

**Coffee Break (10:20-10:35)**

## Optical Technology (2) (10:35-12:35)

**Presiders:**

*D. Anderson (JILA/Univ. of Colorado / USA)*
*T. Kurokawa*
*(Tokyo Univ. of Agriculture & Technology / Japan)*

**8S4-07 (Invited)**

**(10:35) A Compact Holographic Chemical Vapor Sensor**

*D. Z. Anderson, S. P. Hughes (JILA/Univ. of Colorado / USA)*

A compact holographic prism-based interferometer detects optical path length changes induced by chemical vapor absorption onto a polymer array. A "sniff-loched-loop" enables synchronous detection and equivalent path length sensitivity below 1 pm in one second.

**8S4-08 (Invited)**

**(11:00) Selective detection of the "tagged photons" in acousto-optic imaging of thich highly scattering media by photo refractive adaptive holography**

*M. Gross, M. Lesaffre (Ecole Normale Supériure / France), F. Jean, F. Ramaz, G. Roosen, A. C. Boccara (Univ. Pierre et Marie Curie / France), P. Delaye (Univ. Paris-Sud / France)*

We present an adaptive wavefront holographic setup based on the photorefractive effect, to make real-time measurements of acousto-optical signals in thick scattering media, with a high flux collection at high rates for breast tumor detection. The first results obtained with this PR setup are encouraging.

**8S4-09 (Invited)**

**(11:25) Computer Controlled Light Source for Spectral Analysis**

*A. Kamshilin, S. Lebedeva, E. Nippolainen (Univ. of Kuopio / Finland)*

Novel computer controlled light source is described. It consists of the set of light emitted diodes generating at different wavelengths and filtered by tunable acousto-optic filter. Whole visual diapason can be scanned within 1 ms.

**8S4-10**

**(11:50) Measurement of meat freshness employing the polarization of diffused lights due to multiple scattering in cellular tissues**

*N. Saiki, R. Suzuki, M. Iwamoto, N. Saiga (Yonago Natl. Coll. Of Tech. / Japan), C. Hamada, M. Kinoshita (Matsushita Electric Works / Japan)*

We have found the method of knowing the preservation time of processed meat from the polarization information of the transmitted and/or reflected laser lights experiencing multiple scattering in sliced meat for food.

**8S4-11**

**(12:05) Motion picture of three-dimensional image of femtosecond light pulses diffracted by a diffraction grating**

*A. Kuzuhara, K. Komai, M. Yamagiwa, S. Ura, K. Nishio, T. Kubota (Kyoto Inst. of Technology / Japan), Y. Awatsuji (PRESTO, Japan Science and Technology Agency / Japan)*

We suceeded in observing diffracted light pulses with 226fs duration as a form of spatially and temporally continuous motion picture. Zeroth and ±1st order diffraction waves propagating in weakly scattering medium were recorded by holography.

**8S4-12**

**(12:20) Optical Identification System using Three-dimensional Phase Object by Two Wavelengths Readout**

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

An optical identification system using three-dimensional(3D) phase object by use of two wavelengths readout is proposed and is evaluated experimentally and numerically. The identification of 3D phase object is implemented by correlation of speckle patterns.

**Closing Session (12:35-12:50)**
**Presider:**
*K. Maruyama (PENTAX / Japan)*

**Best Papar Award**
**(12:35)**
*H. Ooki (Nikon / Japan)*

**Closing Remarks**
**(12:45)**
*K. Tatsuno (Hitachi / Japan)*

## Post Deadline Papers (Poster Session)

**7PD1-01 Optical and Thermal Simulator for Laser-assisted Magnetic Recording**

*W. Odajima, F. Tawa, S. Hasegawa (Fujitsu Laboratories Ltd. / Japan)*

An integrated simulator of electromagnetic and heat transfer analysis is developed for high density recording. The temperature profile of the patterned media on which the optical head irradiates a laser beam is calculated.

**7PD1-02 Embedded adjustment means for color temperature, hues and brightness of the images in digital cameras**

*C. Tsuei, H. Chen (Huafan Univ. / Taiwan)*

A method by shifting chromaticity coordinates to immediately adjust the color temperature, hues, and brightness of white-balance processed pictures in a digital camera was proposed. This method could be embedded into the firmware of an image processor to improve the shortcomings of any white-balance algorithm.

**7PD1-03 Small-size Zoom Lens Design**

*S. Menabde (Bauman Moscow State Technical Univ. / Russia)*

Automated design of small-size zoom lens with zero third order aberrations is described. Used method allows to get lots of system variations and to pick out most proper variants for further optimization.

**7PD1-04 Are Adenine Strands Helical H-aggregates?**

*Y. Zhao, L. Hu, F. Wang, G. Chen, C. Ma, W. Kwok, D. L. Phillips (Univ. of Hong Kong / Hong Kong)*

We propose that adenine strands form helical H-aggregates, and assign long-lived emissive states observed in 20-base stacks to Frenkel excitons with diminishing oscillator strength. Calculated excitonic coupling is in good agreement with measured absorption spectra.

**7PD1-05 Theoretical Analysis of P-type $Al_xGa_{1-x}N$/GaN Superlattices for Low Vertical Resistance**

*S. Huang, S. Yen, Y. Chen (National Chiao Tung Univ. / Taiwan)*

We study the vertical transport of holes through p-type AlGaN/GaN superlattices by drift-diffusion, tunnelling, and thermionic emission. It is found the resistance can be reduced by increasing the barrier width if it is thin enough.

**7PD1-06 Fabrication of Light-Shaping Flexible High Contrast Enhancement Screen**

*C. Wei, C. Lin, R. Tsai (Industrial Technology Research Institute, Electronics and Optoelectronics Research Laboratory / Taiwan)*

Metal-dielectric multiple band high reflection coatings were deposited on light-shaping flexible plastic substrate for used as a screen with high contrast enhancement performance. This screen was very suitable for mini-projectors with LED as light source.

**7PD1-07 ZnO Based Thick Film Opto-electronic Humidity Sensor for a Wide Range of Humidity**

*S. Dixit, A. Srivastava, R. K. Shukla, A. Srivastava (Univ. of Luchnow / India)*

Sensitivity of zinc oxide film to humidity is studied using prism based optoelectronic sensor configuration. Film is deposited by screen printing. It is seen that the emergent light intensity decreases as the humidity increases.

**7PD2-01 Micropositioning of Microsphere Resonators on Planar Optical Waveguides**

*S. M. Ganapathy, Y. Panitchob, J. S. Wilkinson, E. J. Tull, P. N. Bartlett (Univ. of Southampton / UK)*

Topographical structures to position microsphere resonators accurately upon planar optical waveguides have been designed and fabricated. The methods being employed to assemble the microspheres on the patterned planar waveguides are discussed.

**7PD2-02 Fiber-Bragg Grating Tuned by Micro-Heater Array**

*S. V. Kumar, S. Minoru, H. Kazuhiro (Tohoku Univ. / Japan)*

A new micro-heater array device is fabricated and examined for tuning the Bragg wavelength λB. Bragg wavelength is controlled by the temperature distribution generated by the heater array along the fiber length.

**7PD2-03 A new liquid-lens using electro-wetting with low driving voltage and high optical quality**

*Y. Kato, F. Maeda (SONY / Japan)*

In a new variable-focus liquid lens taking advantage of the electro-wetting phenomenon, the driving voltage is significantly reduced by using very thin anodic oxidized film with a high dielectric constant.

**7PD2-04 Infrared reflection, transmission and thermal emission from Si, GaAs and metallic periodic microstructures**

*N. Pinhas, M. Auslender, S. Hava (Ben-Gurion Univ. of the Negev / Israel)*

Experimental and theoretical study of transmission through, reflection and thermal emission from bare and coated grating structures on Si and GaAs substrates was carried out. Experimental results and simulation indicate the excitation of waveguide and organ pipe type modes.

**7PD3-01 Analysis on Near-Field Imaging Characteristics Using Radially Polarized Light for the Application of Optical Data Storage**

*W. Kim, N. Park (Yonsei Univ. / Korea)*

Radially polarized incident light can generate more confined longitudinal electric field on focal plane in near-field(NF) optics than the case of using linearly polarized light. Therefore, using this phenomenon, it is feasible to reduce data marks in storage media and increase areal density of optical data storage. Through this study, NF imaging characteristics of radially polarized light are investigated and further optical simulations to apply this phenomenon to NF recording optics are performed.

**7PD3-02 Applications of Optical and Laser Scanning Confocal Microscopy on New Drug Mechanism Investigation for Arterial Neointimal Hyperplasia**

*D. Son, Y. Lee, H. Kwon, J. Shim, K. Oh, J. Hong (Chungbuk National Univ. / Korea), J. Jung, M. Avery (Univ. of Mississippi / USA), D. Kim, M. Cho (Chungbuk National Univ. / Korea)*

We investigated the inhibitory activity of epothilones, a novel cellular microtubule stabilizing agents, and its action mechanism on arterial hyperplasia using optical analysing system or laser confocal microscope system.

**7PD4-01 TIF Based Material Removal Control of Deterministic Pitch Tool Polishing for Large Astronomical Optics**

*H. Yi, S. Kim (Yonsei Univ. / Korea), H. Yang, Y. Lee, I. Lee (Korea Research Institute of Standard and Science / Korea)*

We demonstrated that the pitch polishing can be deterministic by analyzing the motion of the conventional polishing machine and finding a material removal rate under the several different conditions.

**7PD4-02 E-O Coefficient Measurements for ZnxCd1-xTe Single Crystals at 1550 nm Wavelength**

*Y. Jeon (Jeonju Univ. / Korea), H. Kang (Chonbuk National Univ. / Korea)*

Nonlinear optical materials of the type $Zn_xCd_{1-x}Te$ single crystals, where x = 0.0, 0.2, 0.4, 0.6, 0.7, 0.8 and 1.0, have been grown by the Bridgman method, using a vertical furnace. We have investigated the E-O coefficient and refractive index of $Zn_xCd_{1-x}Te$ single crystals at optical communication wavelength (1550 nm). In the case of CdTe crystal, the E-O coefficient was $15.5 \times 10^{-12}$ m/V, which is the biggest among the E-O coefficients of $Zn_xCd_{1-x}Te$ crystals.

# INSTRUCTIONS FOR SPEAKERS

All speakers are required to register for participation in ODF'06.

**(Oral presentation)**

(1) Presentation time

| | Presentation | Discussion | Total |
|---|---|---|---|
| Plenary | 25min. | 5min. | 30min. |
| Invited in Symposium | 25min. | 5min. | 30min. |
| Invited Papers | 20min. | 5min. | 25min. |
| Contributed Papers | 12min. | 3min. | 15min. |

(2) Attention (Bell)

| | Warning | End of Speech | End of Discussion |
|---|---|---|---|
| Plenary | 20min. | 25min. | 30min. |
| Invited in Symposium | 20min. | 25min. | 30min. |
| Invited Papers | 15min. | 20min. | 25min. |
| Contributed Papers | 10min. | 12min. | 15min. |

(3) 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 or USB Flash Drive (Windows based) with downloaded presentation material.

**(Poster presentation)**

Poster session will be held from 17:35 to 19:35 on December 7. Each author is provided a 1.2m height x 1.8m width bulletin board on which to display his/her summary of the paper. Authors must remain in the vicinity of the bulletin board during the poster session to answer questions of attendees in English.

## POST-DEADLINE PAPERS

A limited number of post-deadline papers will be accepted for presentation in a poster session. Latest and significant results obtained after the regular deadline are most welcome. Please make online registration first and then e-mail your Abstract & Manuscripts to the secretariat for ODF'06 (odf06@odf.jp). For the layout of manuscript, please see the Guidelines on the ODF'06 Home Page. Review result will be noticed by November 13, 2006. As well as the regular submission, the copyright of the article published in the ODF'06 Technical Digest is to be transferred to the Optical Society of Japan (OSJ). The authors are required to agree to the copyright transfer when the 35-word abstract and the 2-page manuscripts are submitted. The deadline for submission of post-deadline papers is on October 30, 2006.

For inquiries, please contact: Secretariat for ODF'06

Tsuyoshi HAYASHI
Proactive Inc. Liaison Division
Promena Kobe 16F, 1-8-1 Higashi Kawasaki-cho, Chuo-ku,
Kobe 650-0044, Japan
TEL: +81-78-366-5050 FAX: +81-78-366-5051
E-mail: odf06@odf.jp
Office hours: 9:00-18:00(JST; weekdays only)

## 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.

## ODF'06 SPECIAL ISSUE OF OPTICAL REVIEW

The special issue of OPTICAL REVIEW, the journal of the Optical Society of Japan, for ODF'06 will be published in August 2007. Every authors of ODF'06 are strongly encouraged to submit the original papers to the special issue. The deadline for submission is January 31, 2007. Application form for the special issue will be distributed on site. Please note that all the submitted papers will be judged following the editorial policy of OPTICAL REVIEW. For your information, visit the web-site http://www.ipap.jp/ . The submission from invited speakers are also welcome.

If you want any further information, please contact,

Dr. H. Ooki
Editor/Secretariat, ODF'06 Special Issue
Core Technology Center, Nikon Corporation
E-mail: ooki@odf.jp

## COMPANY EXHIBITION

Company Exhibition is planned with the following schedule. Many kinds of optics related businesses, as optical design software, books, devices, equipments and others, will be presented.

Date & Time: Dec.6 10:00-16:00
Dec.7 10:00-16:00

# EXECUTIVE COMMITTEE MEMBERS

***General Chair:*** Y. Ichioka (Osaka Univ. Prof. Emeritus / Japan)

**Organizing Committee**

***Chair*** **:** K. Tatsuno (Hitachi / Japan)

*Members:*

B. Berge (Varioptic / France)
J. Braat (Delft Univ. of Tech. / Netherlands)
J. Burge (Univ. of Arizona / USA)
U. Dinger (Zeiss / Germany)
T. Dohi (OptiWorks / Japan)
A. Friberg (KTH / Sweden)
M. Haruna (Osaka Univ. / Japan)
M. Isshiki (Isshiki Opt. / Japan)
K. Itoh (Osaka Univ. / Japan)
K. Kodate (Japan Women's Univ. / Japan)
T. Kojima (Konica Minolta Opto / Japan)
K. Kuroda (The Univ. of Tokyo / Japan)
B. Lin (TSMC / Taiwan)
T. Murakami (Toshiba / Japan)
R. Ogawa (PENTAX / Japan)
K. Okamoto (UCDavis / USA)
Y. Park (Yonsei / Korea)
G. Roosen (Inst. de Opt. / France)
M. Setani (Canon / Japan)
K. Singh (IIT / India)
M. Smit (Eindhoven Tech. Univ. / Netherlands)
H. Suzuki (Topcon / Japan)
E. Takano (Inst. of Opt. Science / Japan)
M. Takeda (The Univ. of Electro-Communications / Japan)
M. Tanaka (Nikon / Japan)
K. Thompson (ORA / USA)
T. Tsuruta (Nikon / Japan)
D. Williamson (NRCA / Japan)
T. Wilson (Oxford / UK)
M. Wu (UCB / USA)
K. Yamamoto (Olympus / Japan)
T. Yatagai (Tsukuba Univ. / Japan)
J. Zhu (SIOM / China)

**Program Committee**

***Chair*** **:** H. Ooki (Nikon / Japan)

*Members:*

K. Araki (Canon / Japan)
A. Asundi (Nanyang Tech. Univ. / Singapore)
Y. Fainman (Univ. of California / USA)
D. Hasenauer (ORA / USA)
B. Hendriks (Philips / Netherlands)
H. Herzig (Univ. of Neuchatel / Switzerland)
Y. Honguh (Toshiba / Japan)
K. Hsu (Chiao Tung Univ. / Taiwan)
H. Ishikawa (Hitachi Cable / Japan)
M. Itoh (Univ. of Tsukuba / Japan)
T. Iwai (Tokyo Univ. of Agriculture & Tech. / Japan)
A. Kamshilin (Univ. of Kuopio / Finland)
R. Katayama (NEC / Japan)
T. Konishi (Osaka Univ. / Japan)
T. Kurokawa (Tokyo Univ. of Agriculture & Tech. / Japan)
R. Magnusson (Univ. of Connecticut / USA)
T. Milster (Univ. of Arizona / USA)
K. Minoshima (AIST / Japan)
I. Livshits (St. Petersburg Ins. / Russia)
Y. Ono (Ritsumeikan Univ. / Japan)
Y. Sawada (Kyushu Univ. / Japan)
M. Shibuya (Tokyo Polytech. Univ. / Japan)
T. Shimura (The Univ. of Tokyo / Japan)
Y. Tanaka (Matsushita / Japan)
H. Tsuchida (Olympus / Japan)
W. Ulrich (Zeiss / Germany)
Y. Wang (Beijing Inst. of Tech. / China)
T. Yamanashi (Panavision / USA)

**Steering Committee**

***Chair*** **:** K. Maruyama (PENTAX / Japan)

*Members:*

K. Adachi (Olympus / Japan)

H. Ishii (Canon / Japan)

H. Ishikawa (Fuji Film / Japan)

J. Kamikubo (PENTAX / Japan)

H. Kawano (Mitsubishi Electric / Japan)

Y. Komai (Japan Women's Univ. / Japan)

K. Konno (Konica Minolta Opto / Japan)

K. Kuba (Olympus / Japan)

E. Nishigohri (Cybernet Systems / Japan)

S. Nishihata (Fuji Film / Japan)

A. Obama (Nikon / Japan)

I. Ogawa (NTT / Japan)

M. Saika (Topcon / Japan)

T. Shibatoko (NEC / Japan)

M. Shiratsuchi (Toshiba / Japan)

H. Tatsuno (Ricoh / Japan)

M. Yamagata (Matsushita / Japan)

S. Yamaguchi (Konica Minolta Opto / Japan)

**For information mail**

**ODF'06 Secretariat:** Tsuyoshi HAYASHI /
odf06@odf.jp

# REGISTRATION

## ● Registration Fee

The registration fee includes admission to technical sessions and one copy of Technical Digest. All participants can join in the reception.

| Type | Before /on Nov. 6, 2006 | After Nov. 6, 2006 |
|---|---|---|
| Member [*] | JPY 35,000 | JPY 39,000 |
| General (Non-members) | JPY 35,000 | JPY 45,000 |
| Student | JPY 10,000 | JPY 10,000 |
| Additional copy of Technical Digest | JPY 10,000 | JPY 10,000 |

[*] Member of sponsor and cooperative society

## ● Registration

Those who wish to attend ODF'06 should make online registration. The deadline for the Online Registration is November 20, 2006, and discount registration fee is applied before/on Nov. 6, 2006. On-site Registration at Conference venue will also be accepted, but the Online Registration is highly recommended. The Online Registration Page is available at ODF'06 Home Page http://www.odf.jp/.

## ● Cancellation Policy

There will be no refunds for the registration fee.

# CONFERENCE SITE

The Conference Venue, Nara-Ken New Public Hall is located in the center of Japan. As to access to NARA, the most convenient transport is to take a direct flight to Kansai International Airport. From JR and Kintetsu Nara station, please take the Bus Numbers 70, 88, 97, 98 or 133, bound for "Kasugataisya Honden (春日大社本殿)" (leaves from Bus Gate No. 1), and get off at "Ken Shin-Kokaido (県新公会堂)", or take the Bus Number 2 "Shinai Junkan (市内循環)" (leaves from Bus Gate No. 1), and get off at "Daibutsuden-Kasugataisha Mae (大仏殿春日大社前)". It will need 10 minutes ride from JR and 5 minutes from Kintetsu station.

From Kansai International Airport:

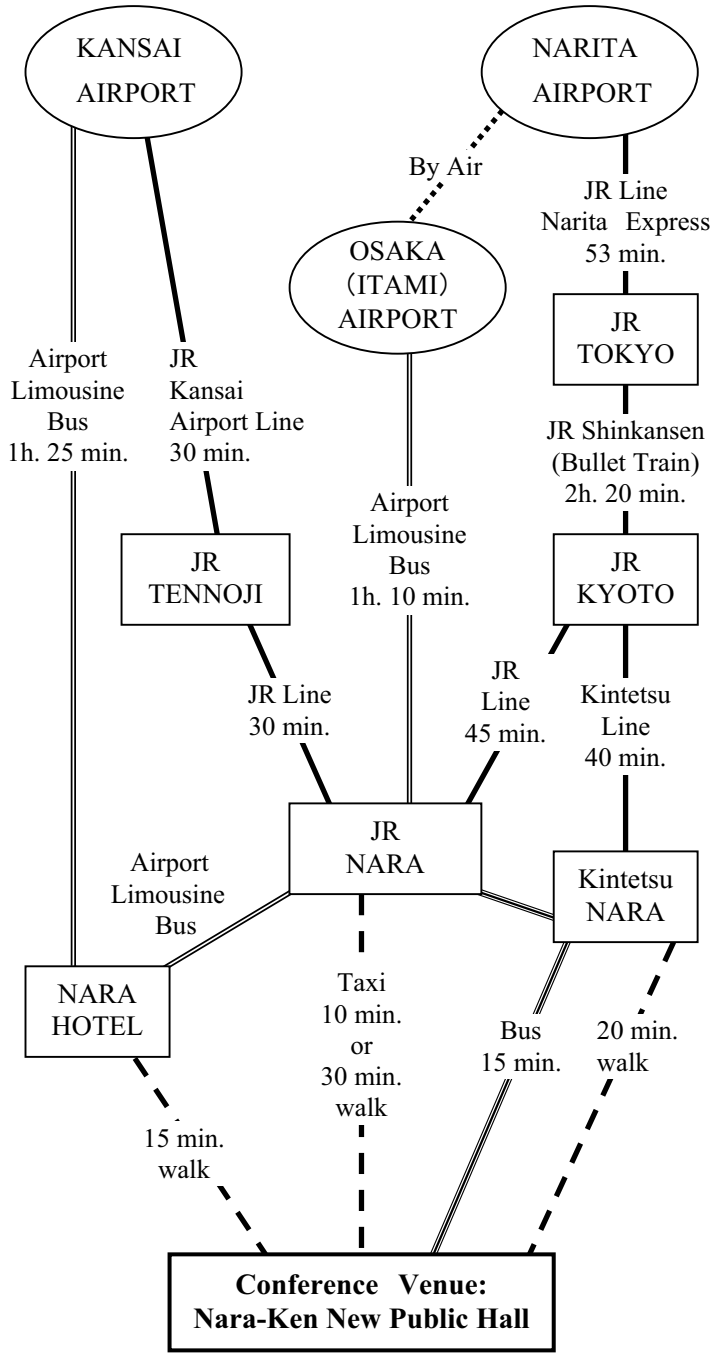
(1) Board the JR Airport Limited Express Train, HARUKA, which runs every 30 minutes or Kansai Airport Rapid Service to JR Tennoji Station. At JR Tennoji Station, please transfer to JR Yamatoji Line to JR Nara Station.

(2) Another way to get to Nara from Kansai International Airport is to take an airport limousine bus (Terminal #9). Tickets are available on the ground floor outside the terminal building. The traveling time to JR Nara Station is approximately 1 hour 25 minutes. The limousine bus also stops at Nara Hotel (the nearest hotel to the conference venue).

From Narita International Airport:

(1) Via Osaka International Airport (Itami)
A limited number of domestic flights are available to Osaka International Airport (Itami) from Narita. From there, take an airport limousine bus to JR Nara Station (about 1 hour 10 minutes).

(2) Via JR Tokyo Station
Board the JR Narita Express Train (53 minutes) to JR Tokyo Station. Then board the JR Shinkansen (bullet train: Nozomi) to JR Kyoto Station. Shinkansen trains run every 15 minutes, and the traveling time is 2 hours and 20 minutes. From Kyoto to Nara, please take Kintetsu Kyoto Line (about 40 minutes) or JR Nara Line (about 45 minutes).


KANSAI AIRPORT
NARITA AIRPORT
By Air
JR Line
Narita Express
53 min.
OSAKA (ITAMI) AIRPORT
JR TOKYO
Airport Limousine Bus
1h. 25 min.
JR Kansai Airport Line
30 min.
JR Shinkansen (Bullet Train)
2h. 20 min.
Airport Limousine Bus
1h. 10 min.
JR TENNOJI
JR KYOTO
JR Line
30 min.
JR Line
45 min.
Kintetsu Line
40 min.
JR NARA
Airport Limousine Bus
Kintetsu NARA
NARA HOTEL
Taxi
10 min.
or
30 min.
walk
Bus
15 min.
20 min.
walk
15 min.
walk
Conference Venue:
Nara-Ken New Public Hall

# OPTIONAL TOUR

On the third day (December 8th) of the Conference, after all the sessions are closed, an optional tour is arranged for the participants and accompanying persons as follows. Those who would like to join the tour are required to make online registration. The deadline for the optional tour registration is November 20, 2006.

**< Horyuji and Jikoin Half-day Tour >**
**Fee: JPY 2,000 per person (including a lunch box)**
**Date: December 8 (Fri.)**
**Assemble time and place: Nara-Ken New Public Hall 13:20**

[SCHEDULE]

Nara-Ken New Public Hall 13:20 - by bus (lunch) - 14:20 Horyuji 15:20 - by bus - 15:30 Jikoin 16:30 - by bus - 17:20 JR Nara

***"Horyuji"***

Horyuji was originally commissioned by Prince Shotoku and at the time was called "Ikaruga-dera". This first temple was completed in 607. Recent research and excavations reveal that the temple was hit by lightning and burned to the ground in 670. From 670 to 700 the temple was reconstructed in its original style but reoriented in a northwest position. Horyuji contains over 2,300 important cultural and historical structures and articles, including nearly 190 that have been designated as National Treasures or Important Cultural Properties. In December of 1993, Horyuji, as a unique storehouse of world Buddhist culture, became the first treasure of any kind in Japan to be selected by UNESCO as part of the World Heritage.

***"Jikoin"***

Jikoin temple stands near the village of Ikaruga. The temple was found in 1663 by Sekishu Katagiri, who became one of famous masters of tea ceremony and the originator of the Sekishu school of tea ceremony. A larger view of the Ikaruga area from this temple is beautifully contrast with its garden of stones and shrubbery. Powdered green tea will served to all the participants. Please enjoy the taste of tea and a mixture of Japanese Zen Buddhism and "Wabi" culture.

# HOTEL RESERVATION

● **Hotel**

Rooms at the following hotels are reserved for the participants from Dec. 5 through Dec. 8. Reservation will be made on a first-come, first-reserved basis. Please visit ODF'06 home Page and proceed to online registration page to book your room. Hotel Nikko Nara, Nara Washington Hotel Plaza, and Hotel Fujita Nara are about five minutes walk from JR Nara Station. To Nara Hotel, it takes about 8 minutes by car from JR Nara Station. The deadline for the Hotel Reservation is November 20, 2006.

| Name of Hotel (Check-in/out) | Rates (JPY) | | Address |
|---|---|---|---|
| | Single | Twin | |
| Nara Hotel (15:00 / 11:00) | 13,125 | 12,600 | 1096 Takabatake-cho Nara-city, Nara 630-8301 Tel: +81-742-26-3300 Fax: +81-742-23-5252 |
| Hotel Nikko Nara (13:00 / 11:00) | 11,025 | 9,975 | 8-1 Sanjo-Hommachi, Nara-city, Nara 630-8122 Tel: +81-742-35-8831 Fax: +81-742-35-6868 |
| Nara Washington Hotel Plaza (14:00 / 10:00) | 8,295 | - | 31-1 Shimosanjo-cho, Nara-city, Nara 630-8236 Tel: +81-742-27-0410 Fax: +81-742-27-0484 |
| Hotel Fujita Nara (13:00 / 11:00) | 7,500 | - | 47-1 Shimosanjo-cho, Nara-city, Nara 630-8236 Tel: +81-742-23-8111 Fax: +81-742-22-0255 |

1) The above rates are per person, per night, including service charge, consumption tax and breakfast.
2) Twin room may not be reserved by a single person.

### ● Cancellation Policy

In case of cancellation, please cancel your reservation by logging-in to your Personal Page. Your deposit will be refunded after deducting the cancellation fees as follows.

(a) Up to 10 days before the first night of stay:

No charge

(b) 2 to 9 days before the first night of stay:

20% of the daily room charge

(Minimum: JPY 2,000)

(c) 1 day before the first night of stay or no notice given:

100% of the daily room charge

*Please note all refunds will be made after the Conference.

## LUNCH BOX RESERVATION

Advanced reservation of box(es) lunch is strongly recommended because lunch break will be just 1 hour and it will be difficult for you to come back in time for afternoon session from downtown Nara after having lunch there. As there is one restaurant in the conference site, it is possible the restaurant will be crowded. On both December 6 and December 7, lunch boxes are available as below. Lunch box(es) reservation is available in the online registration page.

| | |
|---|---|
| Western lunch box | JPY 1,000 |
| Japanese lunch box | JPY 1,000 |
| Vegetarian lunch box | JPY 1,000 |

(including consumption tax)

## Map of Central Nara

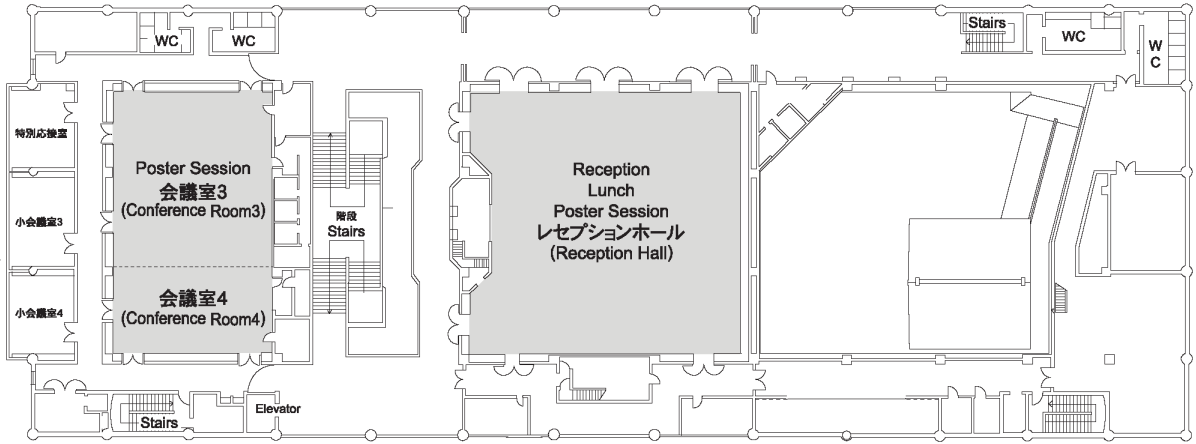



For your return trip to JR Nara and Kintetsu Nara station from the conference venue, please take the Bus Number 1 at "Todaiji Daibutsuden Kokuritsu Hakubutsukan (東大寺大仏殿･国立博物館)". Bus stop is 350m west of the conference venue. Please go down the street in front of Conference venue.

# FLOOR MAP

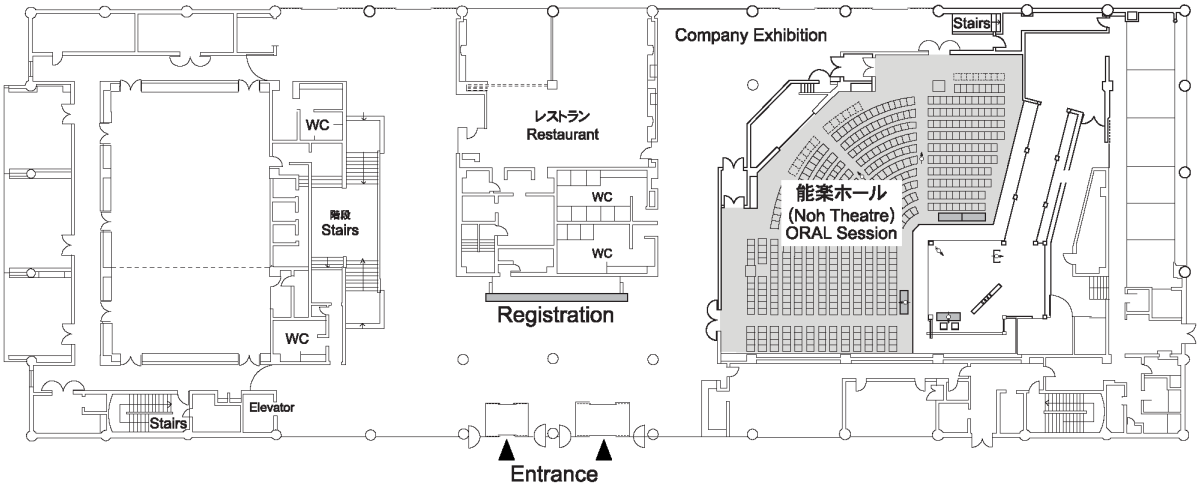
## 2F平面図

Floor plan
of the 2nd floor



# 1F平面図

Floor plan
of the 1st floor



**Deadlines**

| | |
|---|---|
| Post Deadline Papers: | October 31, 2006 |
| Discount Registration: | November 6, 2006 |
| Online Registration: | November 20, 2006 |
| Optional Tour: | November 20, 2006 |
| Hotel Reservation: | November 20, 2006 |
| Lunch Box Reservation: | November 20, 2006 |
| On-site Registration: | December 6-8, 2006 |

**For inquiries, please contact: Secretariat for ODF'06**

Tsuyoshi HAYASHI
Proactive Inc. Liaison Division
Promena Kobe 16F, 1-8-1 Higashi Kawasaki-cho, Chuo-ku,
Kobe 650-0044, Japan
TEL: +81-78-366-5050 FAX: +81-78-366-5051
E-mail: odf06@odf.jp
Office hours: 9:00-18:00(weekdays only)