

7th **Advance Program**
International Conference on Optics-photonics



Design & Fabrication
(Co-located with LENS EXPO 2010)

“ODF '10, Yokohama”
April 19–21, 2010



Pacifico Yokohama Conference Center
(パシフィコ横浜 会議センター)
Yokohama, Japan

Organized by

The Optics Design Group (ODG) of OSJ
Japan Society for the Promotion of Science (JSPS)

Sponsored by

Optical Society of Japan (OSJ; an affiliate of the Japan Society of Applied Physics)

In cooperation with

ICO (International Commission for Optics) • OSK (Optical Society of Korea) • COS (Chinese Optical Society) • The Optical Engineering Society, Taiwan • PIDA (Photonics Industry & Technology Development Association) • Taiwan Optics/Optronics Manufacturers' Association • OSA (Optical Society of America) • SPIE (The International Society for Optical Engineering) • EOS (European Optical Society) • Rozhdestvensky Optical Society (ROS) • Applied Optics Meeting in Kansai • IEICE (The Institute of Electronics, Information and Communication Engineers) • IEIJ (The Illuminating Engineering Institute of Japan) • IIEEJ (The Institute of Image Electronics Engineers of Japan) • JIEP (Japan Institute of Electronics Packaging) • JOEM (Japan Optomechatronics Association) • JOMA (Japan Optical Measuring Instruments Manufacturer's 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) • SPSTJ (The Society of Photographic Science and Technology of Japan) • The Astronomical Society of Japan • The Color Science Association of Japan • The Spectroscopical Society of Japan



Post-Deadline Paper Submission by February 26, 2010

<http://www.odf.jp/>

Time Table

April 19 (Mon.)		April 20 (Tue.)	
		8:30	New Technologies (2) (for Optical Design and Fabrications)
9:00	Opening Session		
9:10	Plenary Session		10:00
		10:20	Coffee Break
		10:40	New Technologies (3) (for Optical Design and Fabrications)
10:50	Coffee Break	Poster Session (1)	
11:10	Optical Design/Simulation (1)		12:00
12:35	Lunch	12:30	Lunch
13:35	Optical Design/Simulation (2)	13:30	Optical Components / Devices (1)
15:10	Coffee Break		
15:30	Optical Design/Simulation (3)	15:20	Coffee Break
16:40	Break	15:40	Optical Components / Devices (2)
16:55	New Technologies (1) (for Optical Design and Fabrications)		
17:15		17:15	Break
18:15	Break	17:30	Optical Components / Devices (3)
18:30	Reception		
20:00		19:05	

Registration hours 8:00 – 19:00

April 21 (Wed.)	
8:30	Optical Systems (1)
10:20	Coffee Break
10:40	Optical Systems (2)
12:05	Lunch
13:05	Optical Systems (3)
14:25	Coffee Break
14:45	Special Session Reflection Control by Nano-structure
16:50	Break
17:00 17:20	Closing Session

Registration hours 8:00 – 16:00

INTRODUCTION

The 7th International Conference on Optics-photonics Design & Fabrication, “ODF'10, Yokohama,” will be held on April 19–21, 2010 at Pacifico Yokohama Conference Center, 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'10 is intended to provide an international forum for original paper presentations and discussions of optics-photonics design- and fabrication-related technological and scientific topics, including theory, design, fabrication, testing, applications and others.

Collaboration and Competition make progress.

Join us at ***ODF'10, Yokohama!***

LENS EXPO 2010 will also be held April 21–23 at the conference site. For more information please visit the website below.

<http://lens.optronicsjp.com/>

SCOPE OF THE CONFERENCE

ODF'10 is an international forum for engineers and scientists in the field of Optics-photonics Design and Fabrication to exchange their ideas and achievements with the goal of future mutual progress. The conference will consist of sessions on optics-photonics design, simulation, optical components, optical systems, and optical technology. These sessions will cover the fields of optical theory, fabrication and testing, software, DOEs, micro-optics, nano-optics, photonic crystals, near-field optics, thin films, waveguides, MEMS, lasers, fiber communications, information optics, optical storage, optical lithography, microscopy, displays, bio-medical optics and others. A special session on “Reflection Control by Nano-structures” is also planned.

TECHNICAL PROGRAM

April 19, 2010 (Monday)

Opening Session (9:00-9:10)

Presider:

H. Tsuchida (Olympus / Japan)

Opening Remarks

K. Kodate (Japan Women's Univ. / Japan)

Plenary Session (9:10-10:40)

Presiders:

K. Kodate (Japan Women's Univ. / Japan)

H. Lefevre (iXCore / France)

19PL-01 (Invited)

(9:10) Design Challenges in Micro-Optics

H. P. Herzig (Optics & Photonics Tech. Lab / Switzerland)

Micro-optics includes elements and systems fabricated by modern micromachining. It offers a large degree of freedom for the design. However, a deep knowledge of fabrication techniques is required in order to exploit the full potential of micro-optics.

19PL-02 (Invited)

(9:35) Unified Photonic Optical Design

R. Chipman (Univ. of Arizona / USA)

New polarization methods allow the ray tracing simulation of polarization critical components, including multilayer biaxial films, anisotropic and gyrotropic crystals, electro-optical, magneto-optical, and stress-optical modulators, photonic crystals and meta-materials.

19PL-03 (Invited)

(10:00) Evolution and development of optical thin film design and fabrication

C. C. Lee (National Central Univ. / Taiwan)

Evolution and development of optical thin film, both in theory and fabrication were discussed. The technology which led the growth in theory and fabrication were presented. We also discussed some novel technologies which make the progress of optical thin film.

19PL-04 (Invited)

(10:25) Manipulation of photon-electron interaction in quantum dot with photonic nanocavity systems for advanced nanophotonics

Y. Arakawa (The Univ. of Tokyo / Japan)

We discuss recent advances in cavity quantum electrodynamics in quantum dots with high-Q photonic crystal nano-cavities for ultra-low-power nanophotonics, including single quantum dot (artificial atom) lasers in strong/weak coupling regimes and 3D photonic crystal nanolasers.

Coffee Break (10:50-11:10)

Optical Design/Simulation (1) (11:10-12:35)

Presiders:

D. Hasenauer (ORA / USA)

M. Kato (Canon / Japan)

19S1-01(Invited)

(11:10) New Discoveries: Nodal Aberration Fields of Misaligned Three-Mirror Anastigmatic Telescopes

K. P. Thompson (Optical Research Associates / USA),

T. Schmid (The College of Optics and Photonics /

USA), and J. P. Rolland (The College of Optics and

Photonics and Univ. of Rochester / USA)

After 100 years of two-mirror telescopes, astronomers are using three-mirrors. The new limiting aberration is a form of astigmatism with new field dependence: field-linear, field-asymmetric astigmatism. This paper will present the origins and implications.

19S1-02

(11:35) Investigation of some problems of the global optimization method GE2

M. Isshiki (Isshiki Optics / Japan), and S. Kaneko

(Chart Inc. / Japan)

Global optimization method named Global Explorer is now almost an established technology. The method includes various tactics to increase the design speed. The validity of these tactics will be shown with experimental results.

19S1-03**(11:50) Optical systems classification as an instrument for getting knowledge from optical expert.**

I. L. Livshits and V. N. Vasiliev (Saint Petersburg State Univ. of ITMO /Russia)

The purpose of this paper is to explain how we've got the heuristic knowledge from optical design expert, analyzed it and presented as a set of mathematical equations to develop algorithm for expert system generating starting points for objectives. Optical system classification is an important part of this process. Number of classifications is presented.

19S1-04**(12:05) Mid-frequency Effect of Phase Mask in Computational Imaging System**

C. C. Chang (Industrial Technology Research Inst. / Taiwan), and C. C. Lee (National Central Univ. / Taiwan)

The mid-frequency effect of phase mask in computational imaging system is analyzed by using optical transfer function and PSNR image metrics. Finally, the required manufacturing accuracy of phase mask will be discussed.

19S1-05**(12:20) Coherence Holography for Real-time Object Recording and Reconstruction**

D. N. Naik, T. Ezawa, Y. Miyamoto, and M. Takeda (The Univ. of Electro-Communications / Japan)

Coherence holography capable of real-time recording and reconstruction is proposed and experimentally demonstrated. Image is reconstructed as a spatial coherence function from an incoherently illuminated hologram represented by an instantaneous interference fringe formed on a rotating ground glass.

Lunch (12:35-13:35)

Optical Design/Simulation (2) (13:35-15:10)

Presiders:

I. Livshits (St. Petersburg State Univ. of ITMO / Russia)

Y. Aono (Nikon / Japan)

19S1-06(Invited)

(13:35) Effective Characterization of the Nominal Shape of Aspheric Optics

G. Forbes (QED Technologies Inc. / USA)

Advances in versatile fabrication and metrology systems enable the wider penetration of optical aspheres. Starting from the hands of designers, a more effective specification of shape can support these developments in surprising ways.

19S1-07(Invited)

(14:00) Meaning and Effectiveness of Odd-Order Aspherical Surface

M. Shibuya, K. Maehara, and S. Nakadate (Tokyo Polytechnic Univ. / Japan)

We mathematically derive that odd-order aspherical surfaces cannot be represented in the form of a power series of even-order. We also reveal that the first and the third order aspherical surfaces are valuable in practical lens designing.

19S1-08

(14:25) Development of ultra-wide angle compact camera using free-form optics

K. Takahashi (Olympus Corp. / Japan)

We report as the result of examining free-form optics which is applied to the ultra-wide angle compact cameras, in regard to the design, fabricated prototype FSP camera and evaluation of optical systems.

19S1-09**(14:40) New Optical Design for Subaru HSC Corrective Optics**

T. Matsuda, M. Suzuki, M. Suzuki (Canon Inc./ Japan), Y. Kawashima, N. Goto (OHARA Inc./ Japan), Y. Tanaka, K. Nariai, Y. Komiyama, S. Miyazaki, and H. Karoji (National Astronomical Observatory of Japan / Japan)

We have completed the optical design for Subaru HSC, which will significantly enlarge the surveying capability of Subaru telescope's prime focus. This paper presents the latest design of HSC corrective optics.

19S1-10**(14:55) Process and Mould Design Optimization for Precision Glass Moulding via a Flexible and Reliable Numerical Simulation**

F. Klocke, O. Dambon, D. Hollstegge, F. Wang (Fraunhofer Inst. for Production Technology / Germany.), and A. Y. Yi (Ohio State Univ. / USA)

A flexible and reliable numerical simulation tool is developed for precision glass moulding. Basing on the simulation result, process and mould design can be optimized previously to eliminate try-out moulding and mould correction.

Coffee Break (15:10-15:30)

Optical Design/Simulation (3) (15:30-16:40)

Presiders:

H. Sato (Konica Minolta Opto / Japan)

G. Forbes(QED Technologies / USA)

19S1-11(Invited)

(15:30) **Polarization aberration influence on image in lithography system at hyper-NA**

Y. Li, X. Guo, and X. Liu (Beijing Inst. of Technology / China)

Based on excellent works done by others, we present a new method for Jones pupil construction and decomposition of designed projection optics for 45nm node. Polarization aberration and its impact on wafer pattern are analyzed in this paper.

19S1-12

(15:55) **Enabling Efficient Multilayer Optimization Based on the Extended Nijboer-Zernike (ENZ) Imaging Algorithm**

S. van Haver, J. J. M. Braat, and S. F. Pereira(Delft Univ. of Technology / the Netherlands)

Recently, an Extended Nijboer-Zernike based method for simulation of image formation in stratified space has become available. We will show that, based on this approach, efficient optimization of imaging in multilayer configurations is possible.

19S1-13

(16:10) **Investigation of a ray-tracing method for subwavelength structured surfaces**

A. Mizutani, S. Hamataka, Y. Kobayashi, and H. Kikuta (Osaka Prefecture Univ. / Japan)

A ray-tracing method based on a group velocity for subwavelength structured surfaces was investigated with FDTD method. The accuracy of wavefront aberration was less than $\lambda/10$ for an antireflective aspherical lens with NA 0.8.

19S1-14

(16:25) Design Optimization of Photonic Crystal Organic Solar Cells using the FDTD method in Combination with Particle Swarm Optimization

M. Kawano and J. Pond (Lumerical Solutions Inc. / Canada)

Light absorption enhancement of photonic crystal organic solar cells is studied. An enhancement of nearly 15% compared with a conventional planar solar cell is achieved by a combination of FDTD and particle swarm optimization.

Break (16:40-16:55)

New Technologies (1) (for Optical Design and Fabrications) (16:55-15:10)

Presiders:

J. W. M. Chon (Swinburne Univ. of Tech. / Australia)

T. Tanaka (Riken and JST PRESTO / Japan)

19S2-01(Invited)

(16:55) Wafer-scale fabricated imaging systems

A. Bräuer, F. Wippermann, and A. Brückner (Fraunhofer Inst. for Applied Optics and Precision Engineering / Germany)

Micro-optical imaging systems have to meet three demands in order to be compliant to the specifications of high volume mobile imaging applications: price, miniaturization and resolution which requires the integration of the components in a parallelized batch process.

19S2-02(Invited)**(17:20) New beam shaping: Matched filtering combined with GPC**

J. Glückstad (Technical Univ. of Denmark / Denmark)

We adapt concepts from matched filtering to propose a method for generating reconfigurable multiple beams. Combined with the Generalized Phase Contrast (GPC) technique, the proposed method coined mGPC can yield dynamically reconfigurable optical beam arrays with high light efficiency for optical manipulation, high-speed sorting and other parallel spatial light applications.

19S2-03**(17:45) Operation of DNA logic gates by optical manipulation of DNA microdroplets**

T. Nishimura, Y. Ogura, and J. Tanida (Osaka Univ. / Japan)

Optical manipulation of microdroplets containing DNA solutions was applied to operate DNA logic gates within a micrometer-scale volume. Experimental results demonstrate that OR operation is successfully executed by mixing the solutions in different microdroplets.

19S2-04**(18:00) Application of aptasensor by using guided mode resonance for thrombin detection**

S. F. Lin, T. H. Yang, W. Y. Chen, J. T. Liu, T. J. Ding, Y. L. Tsai, and J. Y. Chang (National Central Univ. / Taiwan)

We demonstrated a real time optical label-free aptasensor, which used guided mode resonance. The device can detect the interaction between thrombin and its ligand and the kinetics is determined by GMR detection system.

Break (18:15-18:30)

**Reception (18:30-20:00)
(Room 502)**

April 20, 2010 (Tuesday)

New Technologies (2) (for Optical Design and Fabrications) (8:30-10:20)

Presiders:

A. Kamshilin (Univ. of Kuopio / Finland)

G. Barbastathis (Singapore-MIT Alliance for Research and Technology Centre / Singapore)

20S2-05(Invited)

(8:30) Resolution Enhancement by using Polarization

H. P. Urbach, R. de Bruin, and S. F. Pereira (Delft Univ. of Technology/ the Netherlands)

We present closed formulas for pupil fields which, for given total power, give the maximum possible linear polarized field amplitude in a prescribed direction in the focal point of a diffraction limited lens.

20S2-06(Invited)

(8:55) High power optical vortex generation and its applications

T. Omatsu (Chiba Univ. / Japan)

We presented the production of high power optical vortex based on a solid-state laser and a fiber amplifier technologies. High power vortex allowed laser ablation with less debris and low threshold.

20S2-07

(9:20) Spectroscopic Three-Dimensional Measurement Using Supercontinuum

T. Ohta, N. Nishizawa, K. Itoh (Osaka Univ. / Japan), and T. Ozawa (Miyagi National College of Technology / Japan)

Functional 3D measurement system was demonstrated using supercontinuum source and fiber interferometer. In addition to the 3D shape, signal intensity, power spectrum, and spectral modulation were acquired to observe the surface asperity.

20S2-08**(9:35) Development of Off-Axis Aberration Retrieval Method using Spot Images**

*K. Okada, K. Amaya, M. Ueshima, and Y. Onishi
(Tokyo Inst. of Technology / Japan)*

Off-axis aberration retrieval method using spot images was developed. By using this method, off-axis aberration can be measured efficiently and accurately. The effectiveness of this method was verified by the experiment.

20S2-09**(9:50) Verification of the Fabrication Process for the Micro Holographic Optical Pickup**

*K. C. Hou, P. C. Chou, J. C. Chiou, and S. Cheng
(National Chiao Tung Univ. / Taiwan)*

Fabrication process of the micro holographic optical pickup has been successfully verified. Experimental results of the spot diameter, focusing error S curve, and the efficiency of light path through prisms and holographic elements are demonstrated.

20S2-10**(10:05) High-speed PSK Signal Detection using Low-speed Detector with Dual Heterodyne Mixing Method**

T. Shioda, T. Yamazaki, and H. Ono (Nagaoka Univ. of Technology / Japan)

Novel method for relative phase measurement between optical longitudinal modes has been proposed. It was applied for higher-speed signal sensing than the cut-off frequency of electric circuits with high-resolution amplitude spectrum.

Coffee Break (10:20-10:40)

Poster Session (1) (10:00-12:00)
Optical Design/Simulation
Optical Components/Devices

20PSa-01 Improved optical realization of the complex Gabor-wavelet filter

H. E. Hwang, G. H. Yang, M. C. Chien, and S. C. Chen (Chung Chou Inst. of Technology / Taiwan)

A modified 2D complex Gabor-wavelet filter (CGWF) optical architecture based on the proposed Gaussian chirplet transform (GCT) approach is presented. This study improves the author's previous work focused on the subject which was published in the Optics Letters [15]. Far from the conventional setup schemes in which only the real part of the CGWF (even-symmetric GWF) can be implemented optically, the proposed optical scheme shows that the real and also the imaginary part of the CGWF (odd-symmetric GWF) can be achieved. The computer application simulations to the oriented edge feature extraction are given to validate the feasibility of the proposed scheme.

20PSa-02 Investigation of Temporal and Angular Dispersions in Conical Mirrors Systems for Ultra-short Pulses

H. M. Al-Juboori, J. Baehr (DESY / Germany)

The dispersion properties of reflective surfaces become increasingly important for short pulse measurements. The discussion will focus, in particular, on considerations regarding incorporation of temporal dispersion with angular dispersion in reflective optical systems.

20PSa-03 The Optical and Opto-mechanical Design of the Liquid Crystal Display LED Backlight Modular

J. Chen, J. C. Chen, S. Y. Lin, C. H. Yeh, and C. Y. Liu (Chung-Hua Univ. / Taiwan)

LED backlight source for the LCD with practical optical and opto-mechanical design will be presented in detail. By optimizing incident angles, distances to the light guide plate, we have the output light efficiency 73.55%.

20PSa-04 The variable light pattern of illumination devices

C. H. Lin, C. C. Lin, H. H. Lo, T. Y. Chen, and L. P. Chung (Industrial Technology Research Inst. Taiwan)

The lens design of symmetric and asymmetric light distribution has been designed. The LED illuminated devices combine with above two kinds of lenses, and it will get the particular light pattern to match the region shape.

20PSa-05 Optimization of Color Rendering of Light Mixtures

K. C. Lin (Kun Shan Univ. / Taiwan)

A method is developed for optimization of color rendering for a light mixture. No derivatives of the rendering function are required. Constraints of color correlated temperature and approximately white can be incorporated. Applicability has been illustrated by simulation and a mixture of 3 colors is demonstrated in this paper.

20PSa-06 Spectroscopic Studies on Aquatic Angiosperm

A. Ozawa, N. Oomizo, R. Fujinami, R. Imaichi, and H. Imai (Japan Women's Univ. / Japan)

In order to clarify the mechanism of photosynthesis, we conducted the spectral analysis in aquatic angiosperm. We observed the absorption peak associated with chlorophyll-a around 430 nm. The chlorophyll population was found larger inside the organ than the surface.

20PSa-07 Simulation method for measuring the displacement and angle on the test plane with a DVD pickup head

W. S. Sun (National Central Univ. / Taiwan)

This study presents a method for measuring tilt angle and displacement on test plane with a pickup head. The test plane displacement and tilt can be judged from one focus error signal and two angular signals, respectively.

20PSa-08 The Study of Aberration Variations in Zoom Lens Objectives

J. C. Yen, J. J. Chen (National Changhua Univ. of Education / Taiwan) and K. L. Huang (Mingdao Univ. / Taiwan)

In a fixed-focus lens design, the Petzval sum and chromatic aberrations are the main issues in thin lens layout. We extend this design methodology to zoom lens design and investigate the aberrations and solutions.

20PSa-09 Application of self alignment technology for cylindrical micro lens array

Y. Nagasaka, K. Okada, M. Nishikawa, and K. Ikuta (Sharp Corp. / Japan)

We propose new exposure method using the self-alignment technology (SAT), and fabricate a LCD panel with cylindrical microlens array by applying SAT.

20PSa-10 Parallel simulated annealing optimize the design of diffractive optics element

W. Rong, H. Neng (Chinese Academy of Sciences / China), and D. Yaping (Chinese Academy of Engineering Physics / China)

We present, in this paper, a parallel simulated annealing (PSA) with good convergence and efficiency for the optimization of diffractive optics element (DOE). The results demonstrate the fastness and effectiveness of PSA.

20PSa-11 The Diagonalization of the 3D Fox–Li Integral Equation with the Gaussian Quadrature Formula of Very High Order

S. Tezuka (Yokogawa Electric Corp. / Japan)

This paper discusses a numerical method of the diagonalization of the 3D Fox–Li equation with the Gaussian quadrature formulas of very high order. The diffraction loss of the equation covers relatively small number of divisions and calculation time is about a hour by use of an ordinary personal computer.

20PSa-12 Calculation optical systems of lenses objectives with using elements of adaptive-selection assembly

O. A. Vinogradova, D. N. Frolov (Firm "Focus" / Russia), A. D. Pavliy, and A. D. Frolov (Saint-Petersburg State Univ. of ITMO / Russia)

The presentation confirms possibility of an estimation of quality of a microobjective in such a way for the further assemblage based on adaptive selection of components.

20PSa-13 A Study of Design and Optimization of Ultra Light LED Back Light Module

J. C. Yu, Y. C. Fang, C. H. Huang, B. W. Wu, B. R. Hsueh, W. C. Lai, S. F. Wang (National Kaohsiung First Univ. of Science and Technology / Taiwan)

Modern displays are required to be much thinner and thinner with best colour gamut. LED play the role at such the kind of modern display light source thanks to its power consumption and the most important, outstanding colour gamut. Modern displays are required to be much thinner and thinner with best colour gamut. It is very important to improve the display properties of backlight module systems to provide better uniformity of brightness, lower power consumption, and lower weight. In backlight modules, the light guide plate (LGP) is a key component in reducing the cost and easier access to develop LGPs on its own. We have manipulated the pattern distribution of the micro features to obtain the required optical characteristics. A light guide plate (LGP) of 3.5 inch dimension using an LED light source is used as an example for the study of integrated LGPs. An integrated LGP reduces the use of optical films, which can reduce the thickness of the backlight module, increase the overall brightness, and reduce costs.

20PSa-14 Optical Design and Optimization of a Laser Processing System with Genetic Algorithm

C. M. Tsai (Kun Shan Univ. / Taiwan), W. D. Chen, Y. C. Fang, Z. H. Chen (National Kaohsiung First Univ. of Science and Technology / Taiwan), S. H. Liu, and H. T. Cheng (Industrial Technology Research Inst. / Taiwan)

In this research, we propose a new optimization method with genetic algorithm for a laser processing optics in order to achieve the best results. Genetic Algorithms is written in macro language of Light Tool in this experiment. After optimization, 75% of uniformity will be achieved successfully.

20PSa-15 Optical Design of 400X Zoom Optics

C. C. Hung (Kao Yuan Univ. / Taiwan), K. S. Tseng (MIRDC / Taiwan), H. C. Lin, B. R. Hsueh, S. F. Wang, C. A. Chen, and Y. C. Fang (National Kaohsiung First Univ. of Science and Technology / Taiwan)

In this paper, we propose a newly developed optical design of 400X zoom ratio for sports and various purposes. With additional six aspheric surfaces, this lens delivers decent performance with reasonable chromatic aberrations.

20PSa-16 An Optical Design of Fast Switching Zoom Optics for Aerial Surveillance System

C. C. Cheng (Industrial Technology Research Inst. / Taiwan), S. F. Wang, B. R. Hsueh, C. A. Chen, Z. H. Chen, and Y. C. Fang (National Kaohsiung First Univ. of Science and Technology / Taiwan)

This paper propose an optical design with multiple mirror for aerial surveillance purpose in order to achieve multiple FOV via fast switching without sacrifice of optical quality and volumetric size and weight. The result and its MTF shows that this design delivers outstanding performance, which match all the specification. The specification is following: 1/3" CCD, 135 format Equivalent Focal Length is 200mm and 1000mm F/number : f#3.8 (EFL=200mm Equivalent) and f#4.9 (EFL=1000mm Equivalent), Focal length 200 mm's offaxis MTF at 135 lp/mm is over 55%, Focal length 1000 mm's off-axis MTF at 135 lp/mm is over 40%, Relative illumination is over 95%; Distortion is less than 1%

20PSa-17 Design of Imaging Lens for Laser Scanning Application

K. L. Huang, M. Chu (MingDao Univ. / Taiwan), C. H. Chen (ChinHua Univ. / Taiwan), Y. C. Lin, M. K. Lee, and S. H. Liu (Industrial Technology Research Inst. / Taiwan)

Imaging lens for laser scanning application has been designed. Combining with f-theta lens, the imaging lens works in real time monitoring for laser lithography defect inspection and MTF is greater than 0.45 @ 40 c/mm

20PSa-18 Automated system for monitoring of the image quality of the micro-objectives with different apertures and magnification factors

O. A. Vinogradova, D. N. Frolov (Firm "Focus" / Russia), A. D. Pavliy, and A. D. Frolov (Saint-Petersburg State Univ. of ITMO / Russia)

The presentation confirms possibility of an automating assembly of the micro-objectives and monitoring of the image quality of micro-objectives.

20PSa-19 Near-field Talbot Patterns in Nanometer Permalloy Gratings

C. Y. Kuo, H. M. Lee, C. T. Chao, J. C. Wu (National Changhua Univ. of Education / Taiwan), and T. H. Wu (National Yunlin Univ. of Science and Technology / Taiwan)

The Talbot images are studied using surface plasmon polariton launching permalloy gratings. The transversal intensity distributions at approximately half Talbot distance are clearly observed by near-field scanning optical microscopy as well as finite element simulation.

20PSa-20 Optimization Design of Microlens for High Data Transfer Rate

C. L. Tien, H. Y. Hsu (Feng Chia Univ. / Taiwan), Y. N. Lin, and W. S. Sun (National Central Univ. / Taiwan)

The optimization design of a spherical and an aspherical microlens for achieving high-speed data transfer rate is presented. The tolerance analysis for the optical power loss is investigated. The simulation results are also discussed.

20PSa-21 Thermal Effect on the Stress and Optical Properties of Obliquely Deposited MgF₂ Thin Films

C. L. Tien, C. Y. Chen, H. D. Tzeng (Feng Chia Univ. / Taiwan), and Y. N. Lin (National Central Univ. / Taiwan)

We present the thermal effect on residual stress and optical properties of MgF₂ thin films. Thin films were prepared by e-beam evaporation method with different oblique angles. The temperature-dependent stress and optical properties was investigated.

20PSa-22 Lenticular Lens Design for Small-Size LCD Panel in Applications of Autostereoscopic Display

K. X. Yang (Chung Yuan Christian Univ. / Taiwan), Y. P. Huang, Y. Y. Kao, and P. C. P. Chao (National Chiao Tung Univ. / Taiwan)

The design of a lenticular lens sheet for realizing a 3-dimensional autostereoscopic display mode in a 2.8"-diagonal liquid-crystal display is proposed. The simulated crosstalk of ~2% is perfect low in this scheme.

20PSa-23 Liquid-Crystal Lenticular Lens Design for Small-Size LCD Panel in Applications of 2D/3D Switchable Display

K. X. Yang (Chung Yuan Christian Univ. / Taiwan), Y. P. Huang, Y. Y. Kao, and P. C. P. Chao (National Chiao Tung Univ. / Taiwan)

A liquid-crystal lenticular lens sheet for realizing a 2-dimensional/3-dimensional switchable display mode in a 2.8"-diagonal liquid-crystal display is designed. The simulated crosstalk of ~9% is quite well in this scheme.

20PSa-24 The Model Simulation of Human Eyes as Aids to Optical System Design

S. H. Huang, H. P. Chiang (National Taiwan Ocean Univ. / Taiwan), M. W. Chang (Yuan Ze Univ. / Taiwan), and Y. H. Chen (National Taipei Univ. of Technology / Taiwan)

A model to stimulate human eyes was designed, which fits the optical properties and modulation transfer function (MTF) requirement. It contains optical components and can be adjusted to circumstance accommodation to form a zoom system.

20PSa-25 A Secondary Optical Design of Six-cells LED Projection Lamp with High Uniform Illumination

C. H. Kuo, K. C. Huang, W. H. Wu, and C. Y. Huang (Instrument Technology Research Center of National Research Laboratories / Taiwan)

The paper presents a new secondary optical design of LED projection lamp without bright spots and shadow stacks. The cover plate, with secondary optical design, is designed to able to offer a very uniform light circle in 45 degrees and 20-centimeter distance, so it can improve illumination uniformity form 13to 78

20PSa-26 Athermalization of Elastomeric Lens Mount

*H. Kihm, H. S. Yang, I. K. Moon, and Y. W. Lee
(Korea Research Inst. of Standards and Science /
South Korea)*

We investigated the optimum adhesive thickness for athermalizing an elastomeric lens mount in space optics application. A pilot sample was made to check finite element results and thermo-optical stress was assessed using an interferometer.

20PSa-27 Design of a reflective concentrator for III-V photovoltaic cells

*K. F. Liu, and W. C. Su (National Changhua Univ. of
Education / Taiwan)*

A reflective concentrator for III-V photovoltaic cells was designed. The reflective concentrator uses primary and secondary mirrors to collect the sunlight onto a photovoltaic cell. Tracing error of sunlight of the whole tracing system is considered in our design.

20PSa-28 Image Qualities of Biological Tissue under Microdisplay based Illuminator

*C. J. Ou, C. D. Huang (Hsuiping Inst. of Technology
/ Taiwan), and C. I. Shen (National Chung Hsing
Univ. / Taiwan)*

Microscopy that using the spatial light modulator as illuminator is proposed. Results indicate the flexibilities and the feasibilities of the system for tissue illuminating, and the image enhancement can be achieved through this system.

20PSa-29 Thermal Stress and Polarization Effects in Conjugate Optical Components

C. J. Ou (Hsiuping Inst. of Technology / Taiwan), C. M. Ou (Kainan Univ. / Taiwan), and R. Her (RayOpt Research / Taiwan)

Analysis of optical components in system environments becomes critical for energy delivery qualities, thermal effects on the optical components are discussed through simulation and experiments. Response on thermal-optical phenomena in optical system is presented, and the methodology is demonstrated.

20PSa-30 Practical Issues for Two Light Sources Model of Phosphor Based White LED

L. A. Hong, Y. C. Chang, F. S. Juang (National Formosa Univ. / Taiwan), and C. J. Ou (Hsiuping Inst. of Technology / Taiwan)

We report an institutive approach to simulate the performance of the phosphor-based LED by using the two light source mode. Both the spectrum and spatial apodization of the LED secondary optical structure is discussed.

20PSa-31 Design and Fabrication of LED Nonspherical Concave Packaging Lens for the Balancing between Illumination Divergence and Uniformity

Y. C. Chang, L. A. Hong, F. S. Juang (National Formosa Univ. / Taiwan), and C. J. Ou (Hsiuping Inst. of Technology / Taiwan)

A methodology is proposed to improve the uniformity of the LED illumination system. A non-spherical lens is design to optimize the uniformity. Improvement on the uniformity from 28.4% to 64% is demonstrated.

20PSa-32 Basic one-to-three lenses solutions for starting optical systems with aspheric surfaces

R. V. Anitropov, I. G. Bronchtein, Y. L. Kolesnikov, I. L. Livshits, V. A. Zverev, S. K. Stafeev, and M. A. Pashkovsky (St. Petersburg State Univ. of ITMO / Russia)

We propose to analyse classical optical solutions as potential starting points for modern optical systems design. Examples presented for design pick-up lens and mobile phone lens are intended to confirm the statement that this approach helps to minimize the total number of the components in the optical system.

20PSa-33 Design of Optical Shuttle

J. H. Chen, K. H. Chen, W. P. Huang, S. W. Kuo, and S. Y. Jhong (Feng Chia Univ. / Taiwan)

In this paper, a design of optical shuttle is proposed. A 3-port device was fabricated with insertion and return losses of about 0.3 and 31 dB, respectively. The isolation can be higher than 27 dB.

20PSa-34 Extend distance of Local Area Network Ethernet LAN by using a Free Space Laser Link

Ameen Hashim Farhan (Ministry of Science and Technology / Iraq)

Laser beam used as carrier in free space to connect and transfer information between two computers as client and server within Local Area Network technology for high bit rate and long distance.

20PSa-35 InGaN/GaN MQW Metal-Semiconductor-Metal Ultraviolet Photodetectors with AlN Cap Layers

K. H. Lee, S. J. Chang (National Cheng Kung Univ. / Taiwan), P. C. Chang, Y. K. Su (Kun Shan Univ. / Taiwan), and S. L. Wu (Cheng Shiu Univ. / Taiwan)

Multiple-quantum-well metal-semiconductor-metal ultraviolet photodetectors with AlN cap layers were fabricated and characterized. High performance detectors with reduced leakage current, higher UV to visible rejection ratio and normalized detectivity can be achieved using AlN cap layers.

20PSa-36 Acrylic and Metal Based Y-Branch POF Splitter with Optical NOA63 Polymer Waveguide Taper Region

A. A. Ehsan, S. Shaari (Universiti Kebangsaan Malaysia / Malaysia), and M. K. A. Rahman (Universiti Teknologi MARA / Malaysia)

Acrylic and metal-based Y-branch POF splitter has been designed and fabricated using CNC machining technique and utilizing optical NOA63 polymer material. The POF splitter has an insertion loss of $8 \text{ dB} \pm 0.5 \text{ dB}$.

20PSa-37 Fabrication of 1x2 Asymmetric Plastic Optical Fiber Coupler for Portable Optical Access-card System

A. A. Ehsan, S. Shaari (Universiti Kebangsaan Malaysia / Malaysia), and M. K. A. Rahman (Universiti Teknologi MARA / Malaysia)

Asymmetric plastic optical fiber coupler for a portable access-card system has been fabricated based on metallic hollow structure. The TOFR vs tap width of the coupler shows the same linear characteristic as the simulated devices.

20PSa-38 Emission Enhancement in Tri-Layer Ag/SiO₂/Ag Plasmonic Thermal Emitter with Hexagonal Dimple Array

Y. T. Chang, S. R. Tsai, H. H. Chen, Y. T. Wu, H. F. Huang, P. E. Chang, C. W. Yu, and S. C. Lee (National Taiwan Univ. / Taiwan)

A new design tri-layer Ag/SiO₂/Ag plasmonic thermal emitter with circular and square hole shape at top silver film arranged in hexagonal dimple array exhibits emission intensity enhancement and FWHM fall down.

20PSa-39 Fiber-Optic Humidity Sensor Based on an Air-Gap Long Period Fiber Grating

G. R. Lin, C. H. Yang, Y. L. Wang, H. J. Sheng, W. F. Liu, C. W. Wu (Feng Chia Univ. / Taiwan), and M. Y. Fu (Air Force Academy / Taiwan)

This study proposed a novel high-sensitivity fiber-optic humidity sensor based on the calcium-chloride thin-film coated on an air-gap long-period fiber grating whose fabrication is the combination of the fiber side-polishing and the fiber etching techniques.

20PSa-40 Curvature Losses Of Slab Waveguides Using Analytical and FEM Analysis

J. Torres, A. Baptista, and V. M. Machado (Technical Univ. of Lisbon / Portugal)

A new approach to analyse optical ring resonators is presented. The field distribution, propagation constant and curvature losses are evaluated using analytical and FEM models. Novel results are compared with Marcatili's analytical approach.

20PSa-41 Integrated Process Chain for Glass Moulding of Freeform Surfaces

F. Klocke, O. Dambon, D. Hollstegge (Fraunhofer Inst. of Production Technology IPT / Germany), and B. Bresseler (Aixtooling GmbH / Germany)

Abstract: High accuracy freeform optics are used in advanced optical systems for reduction in size and improved function. To exploit all advantages of the glass moulding technology, a fast process chain was established for freeform micro-optics.

20PSa-42 Cut-off "Temperature of Operation" of Directly Digitally modulated Zero-Biased Uncooled Semiconductor Laser Diodes

M. S. A. Rahman, M. R. Hassan (Univ. kebangsaan Malaysia / Malaysia), and M. D. Zan (Shibaura Inst. of Tecnology / Japan)

Cut-off "temperature of operation" is the value of temperature of operation above which the turn-on delay of laser source becomes longer than the width of input electrical pulse that results in inoperable case of laser source.

20PSa-43 The Glass-molding Process of Planar-integrated Micro-optical Component

C. Y. Huang, J. R. Sze, K. C. Huang, C. H. Kuo, and S. F. Tseng (National Applied Research Laboratories / Taiwan), and C. P. Chou (National Chiao Tung Univ. / Taiwan)

This paper presents a precision glass-molding processing for planar-integrated micro-optical component (PIMOC) which is applied to micro projection display system. The PIMOC is designed based on wave propagation theory.

20PSa-44 Er-doped superfluorescent fiber source for navigation-grade IFOG

A. Pizzarulli, A. Moretti, and G. Crescenti (GEM ELETTRONICA / Italy)

We report an Er-doped superfluorescent fiber source with ± 1 ppm mean-wavelength stability. This goal was achieved with a double pass forward configuration (DPF), using a WDM to protect laser diode from backward spontaneous emission.

20PSa-45 6-port Polarization-independent Optical Circulator

K. H. Chen, J. H. Chen, F. H. Hsu, Y. T. Chang, and H. Y. Hsieh (Feng Chia Univ. / Taiwan)

A design of polarization-independent 6-port optical circulator is proposed. A prototype of 6-port optical circulator was fabricated and tested with insertion losses of 1.1~1.5 dB, return losses of 27.7 dB, and isolations of 25~51 dB.

20PSa-46 High Efficient Photonic Crystal Power Splitter for 1.3 Micrometer Wavelength

H. Kaatuzian and S. Foghani (Amirkabir Univ. of Tech. / Iran)

In this paper a high efficient two dimensional T-shape photonic crystal power splitter is proposed. The mentioned splitter transmits 94% (47% from each branch) of the input light in the wavelength of 1.3 micrometer.

20PSa-47 Characteristics improvements in an npn Heterostructural Optoelectronic Switch

D. F. Guo, and M. Y. Fu (Air Force Academy / Taiwan)

In order to achieve high optical sensitivity and low holding power, a wide-gap carrier confinement layer was introduced into the collector region of an npn heterostructural optoelectronic switch. A similar device without the confinement layer was also fabricated to demonstrate the performance improvements. Both devices were found to have bistable electrical states: a high impedance OFF state connected to a low-impedance ON state by a region of negative differential resistance (NDR). The functional characteristics were based on the avalanche multiplication.

20PSa-48 Optoelectronic Switching in Double Heterostructure-Emitter Bipolar Transistors

D. F. Guo, and M. Y. Fu (Air Force Academy / Taiwan)

The behaviors of optoelectronic switching are examined in GaAs-AlGaAs double heterostructure-emitter bipolar transistors with an exposed p⁺-GaAs surface, n-GaAs surface, and N-AlGaAs passivated surface. Due to the symmetric structures with respect to the base layers, the devices operate as bi-directional switches resulted from the avalanche multiplication and transistor action. The devices also show optical functions related to the potential barrier heights and breakdown voltages controllable by incident light. Moreover, the device with an N-AlGaAs passivated surface exhibits a highest optical sensitivity and a lowest holding power among the studied devices because of the effective decrease of the surface recombination current.

20PSa-49 Polarization independent race track resonator based on sub-micron Si waveguide

H. Okayama and H. Yaegashi (Oki Electric Industry Co., Ltd. / Japan)

We report design of race track resonator using sub-micron Si waveguide configured to achieve polarization independence for the directional coupler, effective refractive index and the resonator waveguide.

20PSa-50 Optical Addressing in Polymer-Dispersed Cholesteric Liquid Crystals

A. Y. G. Fuh, J. H. Li, and K. T. Cheng (National Cheng Kung Univ. / Taiwan)

This work presents a method of optical addressing in polymer-dispersed cholesteric liquid crystals. UV-cured polymer films can destroy the surface-treated alignment layer, and generate patterns on substrate. It can be used as smart cards.

20PSa-51 Self-imaging in diffraction engineered multimode waveguides

S. Y. Tseng (National Cheng Kung Univ. / Taiwan)

We show that the self-imaging length of multimode waveguides can be engineered by computer-generated planar holograms. Using eigenanalysis and the coupled-mode theory, the relation between the self-imaging length and refractive index modulation is analyzed.

20PSa-52 Stable and Ultra-Wideband Wavelength-Tunable High-Repetition-Rate Short Pulse Generation from a Rational Harmonic Mode-Locked Short-Cavity Fiber Ring Laser Using a Bismuth-Oxide-Based Erbium-Doped Fiber and a Bismuth-Oxide-Based Highly Nonlinear Fiber

Y. Fukuchi and J. Maeda (Tokyo Univ. of Science / Japan)

We demonstrate a rational harmonic mode-locked short-cavity fiber ring laser employing a 151cm-long bismuth-based erbium-doped fiber and a 250cm-long bismuth-based highly nonlinear fiber. Stable and ultra-wideband wavelength-tunable short pulses up to 40GHz are obtained.

20PSa-53 Large Optical Glass for Subaru HSC Project with Excellent Refractive Index Homogeneity

Y. Kawashima, N. Goto (OHARA Inc. / Japan), T. Matsuda, M. Suzuki, H. Yokota (Canon Inc. / Japan), Y. Komiyama, and H. Karoji (National Astronomical Observatory of Japan / Japan)

We have developed very large optical glasses for Subaru Telescope HSC project with excellent refractive index homogeneity. These glass blanks are of such a high homogeneity and high quality as to improve the observational performance of Subaru Telescope.

20PSa-54 A constant-period patterning demonstration on a concave curved surface by an UV holographic exposure system based on the spherical-wave

A. Mizutani, S. Takahira, H. Kikuta (Osaka Prefecture Univ. / Japan)

An UV spherical-wave interferometer has been developed to make a subwavelength structured surface with a constant period on a concave curved surface. The change in period could be reduced from 30 nm to 12 nm.

20PSa-55 Synthesis of silver-silica core-shell nanocomposites by a novel and fast microwave method

N. M. Bahadur, Y. Hoshi, S. Watanabe, F. Kurayama, T. Furusawa, M. Sato and N. Suzukia (Utsunomiya Univ. / Japan)

Silica coated silver nanoparticles were prepared by a novel and fast microwave method. The coated particles were characterized by UV-visible spectroscopy and transmission electron microscopy. Silica shell was formed within 2 min of microwave irradiation.

20PSa-56 Pressure and temperature characteristics of tunable bandpass filter using microbend LPFG

K. Nishio and H. Sakata (Shizuoka Univ. / Japan)

We present an all-fiber bandpass filter based on a microbend long-period fiber grating (MLPFG) in a double cladding fiber. The bandpass filter response is examined by applying the pressure and temperature onto the MLPFGs.

20PSa-57 All-optical Demultiplexer for mode division multiplex communication technique with a multimode optical fiber

A. Okamoto, T. Oda, and K. Morita (Hokkaido Univ. / Japan)

We propose an all-optical spatial demultiplexer based on volume holographic type dynamic diffraction device and phase conjugator aiming at establishing mode division multiplex communication technique, and experimentally show its basic operation with a photorefractive material.

20PSa-58 Inner-Base Optoelectronic System for the Control of Linear Displacements

K. G. Arakantsev, I. A. Konyakhin, and A. N. Timofeev (Univ. of Information Technologies / Russia)

The principle of inner-base optoelectronic system for the control of objects linear displacements is considered. The ways for improvement of measurements accuracy are pointed out.

20PSa-59 Concatenation of Chirped Fiber Bragg Gratings for large stretching of femtosecond pulses for PW class lasers

H. Coïc, N. Péraud (CEA/CESTA / France), and L. Quétel (IDIL Fibres Optiques / France)

We present a fiber stretcher for Chirped Pulse Amplification (CPA) based on Concatenated Chirped Fiber Bragg Gratings (CBFG) on Polarisation Maintaining (PM) fibers. We use UV-trimming technique to reduce modulations on the spectral reflectivity profile.

20PSa-60 Control of Resonant Modes Using a Defect Region in a Random Structure

H. Fujiwara, T. Ikeda and K. Sasaki (Hokkaido Univ. / Japan)

A simple method for manipulating resonant modes using a “defect” region in random structures is proposed. We numerically examine the resonant properties of long-lived modes at the defect region by changing the structure parameters.

20PSa-61 Photonic Crystal LED Surface Optimization Assisted by the Reciprocity Principle

O. T. A. Janssen and H. P. Urbach (Delft Univ. of Technology / The Netherlands)

Using the reciprocity principle, we efficiently simulate the radiation patterns of photonic crystal LEDs. In addition, the reciprocity principle yields an efficient expression for optimizing the extraction efficiency.

20PSa-62 Phase-Shifting Mask Design Using Phase-Conjugate Waves for Interference Exposure of Chirp Blazed Grating

S. Ura, H. Awazu, Y. Awatsuji (Kyoto Inst. of Technology / Japan), K. Kintaka (National Inst. of Advanced Industrial Science and Technology / Japan), and J. Nishii (Hokkaido Univ. / Japan)

Phase-shifting mask was designed to launch multiple diffraction beams so that resultant interference pattern formed periodic sawtooth optical intensity profile with chirp in period. Design algorithm is proposed and discussed in terms of phaseconjugate waves.

20PSa-63 A Study of Integrated Method of Electrochemical-Etching and Electroplating for Porous Silicon Fabrication

J. C. Lin, M. K. Hsu, T. C. Chiu (St. John's Univ. / Taiwan), and H. T. Hou (Tamkang Univ. /Taiwan)

An experimental study of integrated process of electrochemical-etching and electroplating for porous silicon formation is performed. All experimental results including manufacturing procedure, etching profile optical properties and photoluminescence characteristics of fabricated devices are discussed.

20PSa-64 Optical Properties Of Photonic Crystals Based On Two-dimensional Holographic Polymer-Dispersed Liquid Crystals

M. S. Li, S. T. Wu, S. Y. Huang, H. C. Lin, and A. Y. G. Fuh (National Cheng Kung Univ. / Taiwan)

Two-dimensional (2-D) square lattice (SL) photonic crystals (PCs) are fabricated and their optical properties are studied. The PCs are based on polymer-dispersed liquid crystals that are formed using two-beam interference with double-exposures.

20PSa-65 Ultra-Fast Operation of All-Optical Gate Switches Using the Cascaded Second-Order Nonlinear Effect in Quasi-Phase Matched Lithium Niobate Devices

S. Tasaki, T. Tsuchida, and Y. Fukuchi (Tokyo Univ. of Science / Japan)

We analyze characteristics of all-optical gate switches using cascade of second harmonic generation and difference frequency mixing in quasi-phase matched lithium niobate devices, and show possibility of efficient ultra-fast operation as fast as 1Tbps.

20PSa-66 High-Stable All-Fiber Dispersion Compensation-Free Ultrashort Ytterbium Laser

P. Zhang, W. Fan, X. Wang, and Z. Lin (Chinese Academy of Sciences / China)

We report on an all-fiber dispersion compensation-free Ytterbium laser mode-locked by nonlinear polarization evolution (NPE) along with spectral filtering. Stable and self-starting pulses were achieved with pulse energies of 3.7 nJ at 1053 nm.

20PSa-67 Flattening of LED light intensity using wavefront transformation by diffractive optical element

S. Maeda, J. Tokuda, T. Nishiki (IDEC Corp. / Japan), H. Goto, M. Kitsunai, R. Nishikawa, T. Konishi, and K. Itoh (Osaka Univ. / Japan)

LEDs have potential for long life and low power consumption, however, flattening of a diffuser has a disadvantage of low transmittance. We studied high-efficiency light intensity flattening using wavefront transformation by diffractive optical element.

20PSa-68 All-optical gate switching by cross-phase modulation in AlGaAs photonic crystal slab waveguide

H. Oda (Chitose Inst. of Science and Technology / Japan), A. Yamanaka, N. Ikeda, Y. Sugimoto, K. Asakawa (National Inst. for Material Science / Japan)

We have examined all-optical gate switch based on frequency shift by cross-phase modulation around 1550nm in AlGaAs photonic crystal slab waveguide. As a result, we obtained a good on-off ratio.

20PSa-69 Quadrature Phase-shifting Interferometer using Spatial Carrier

T. Kiire, T. Yatagai (Utsunomiya Univ. / Japan), S. Nakadate, and M. Shibuya (Tokyo Polytechnic Univ. / Japan)

Two quadrature phase-shifted data extracted from the interferograms with spatial carrier which are acquired before and after a change of an interferometer. Phases can be calculated with these phase-shifted data using the QPI method proposed.

20PSa-70 All-Optical Method of Developing a Half-Subtractor by the use of Phase Encoding Principle

B. Chakraborty (Bankura Christian College / India), and S. Mukhopadhyay (The Univ. of Burdwan / India)

In this paper the authors proposed an all-optical half subtractor using phase encoding technique. Optical switches are absent in the main processing part so real time performance is expected.

20PSa-71 Analysis of SOI-Based Optical Waveguide Switch with MEMS Evanescent Coupler

M. Inamoto, T. Maruyama, and K. Iiyama (Kanazawa Univ. / Japan)

An SOI optical waveguide switch with a MEMS evanescent coupler is presented. We simulated this switch to use FEM software. Analytical results show that the switching can be achieved at applied voltage of 4.5 V.

20PSa-72 Calibration of Ultra-short Pulse Contrast Measurement

X. Ouyang, W. Shen, W. Chen, H. Zhang, L. Bao, B. Zhu, Z. Lin, and J. Zhu (Chinese Academy of Sciences / China)

Abstract: We study on the calibration of ultra-short pulse contrast measurements by residual reflection from a mirror, to verifying dynamic range of pulse contrast measurements. It is analysed in theory and validated by experiment.

20PSa-73 Fabrication and Verification of the Prism-Type Holographic Optical Element for the Small-Form-Factor Optical Pickup Head

H. F. Shih, C. S. Lu (National ChungHsing Univ. / Taiwan), Y. Chiu, and J. C. Chiou (National ChiaoTung Univ. / Taiwan)

Abstract: A prism-type holographic optical element (PT-HOE) was fabricated by using the combination of lithographic fabrication technology and novel dicing procedures. This device could be applied to the application of the small-form-factor (SFF) optical pickup head (OPH).

20PSa-74 Dynamic process of photo-induced birefringence and orientation of azo dye molecules

C. I. Chuang, Y. N. Hsiao, S. H. Lin, and Y. F. Chao (National Chiao Tung Univ. / Taiwan)

The orientation of azo dye molecules will change due to photo-induced trans-cis isomerization process. The mechanism can be confirmed through the measurement of photo-induced birefringence by phase modulated polarimetry in real time.

20PSa-75 GaN Ultra-Violet Schottky Barrier Photodetectors with ZrO₂ or SiO₂ insulators

C. H. Chen (Cheng Shiu Univ. / Taiwan)

GaN Ultra-Violet (UV) Schottky barrier photodetectors (PDs) with ZrO₂ or SiO₂ layer were successfully fabricated. With appropriate ZrO₂ layer thickness, the dark current of Schottky barrier PDs could be notably suppressed, and the photo-generated carriers still could reach the electrodes by tunneling through the thin ZrO₂ layer under the illumination. A UV-to-visible rejection ratio more than 1 order of magnitude can be found from the MIS photodetector with ZrO₂ layers. It can be seen clearly that cut-off occurred at around 360 nm while the responses above the bandgap were flat.

20PSa-76 Organic Light-Emitting Diodes with Carrier Balance Structures insulators

C. H. Chen (Cheng Shiu Univ. / Taiwan)

The organic light-emitting devices (OLEDs) with high luminance efficiency and low driving voltage were successfully fabricated by using the NPB/LiF multiple structure. In this device, these NPB/LiF multiple structures helped to enhance the hole tunneling injection. The luminance and transport efficiency were both enhanced with the increase of the pair numbers of NPB/LiF multiple structure. We can attribute the improvement to the better carrier balance at the devices interface.

20PSa-77 New polyfunctional photo-thermo-refractive glasses for photonics applications

N. Nikonorov, V. Aseev, A. Ignatiev, and Z. Zlatov (St. Petersburg State Univ. of ITMO / Russia)

New polyfunctional photo-thermo-refractive glass has been developed for the first time. The glass combines characteristics of laser and holographic media. New DOEs and laser devices based on the glass have been developed for photonic applications.

20PSa-78 Rare-earth doped lead-fluoride nano-glassceramics for photonic applications

V. Aseev, A. Klement'eva, E. Korchagin, K. Moskaleva, N. Nikonorov (St. Petersburg State Univ. of ITMO / Russia), and E. Kolobkova (Saint-Petersburg State Technological Inst. / Russia)

Lead-fluoride nano-glassceramics doped with rare-earth ions have been developed and synthesized. Spectral and luminescence properties of nano-glassceramics have been investigated. RE-doped nano-glassceramics are promising candidates for different photonics applications, sensors, fiber and waveguide lasers.

New Technologies (3) (for Optical Design and Fabrications) (10:40-12:30)

Presiders:

T. Omatsu (Chiba Univ. / Japan)

T. Shimura (The Univ. of Tokyo / Japan)

20S2-11(Invited)

(10:40) Five-dimensional optical storage using gold nanorods

J. W. M. Chon, P. Zijlstra, and M. Gu (Swinburne Univ. of Technology / Australia)

The five-dimensional optical recording requires media to be orthogonally recordable in three spatial, spectral, and polarization dimensions. Surface Plasmon resonance of gold nanorods meet such criteria and five-dimensional optical storage is demonstrated on them.

20S2-12(Invited)

(11:05) Design and Fabrication of Plasmonic Metamaterials

T. Tanaka (Riken and JST PRESTO / Japan)

The electro-magnetic properties and design strategy of the plasmonic metamaterials are theoretically investigated. The fabrication techniques for the three-dimensional metamaterials are also proposed. Three-dimensional nano-scale silver or gold structures are demonstrated.

20S2-13

(11:30) 100 Times-Enhanced Fluorescence Detected on a Metal-coated Grating Biochip

K. Tawa (AIST / Japan) and J. Nishii (Hokkaido Univ. / Japan)

A silver-coated grating biochip was fabricated to observe enhanced fluorescence images of labeled-proteins. Using enhanced excitation field and reverse coupling mode, more than 100 times-enhanced fluorescence was detected comparing with that on a glass slide.

20S2-14

(11:45) Size-/Shape-dependent Optical Enhancement Effect of Large Printed Nanoparticle Cluster Arrays for Surface-Enhanced Raman Scattering

H. H. Chen, H. Y. Lin, C. H. Huang, and H. C. Chui (National Cheng Kung Univ. / Taiwan)

The nanoparticle cluster arrays provide strong and reproducible SERS signals have been fabricated on a thin gold film using template-guided self-assembly. This approach provides precise control of the structural parameters in the arrays.

20S2-15

(12:00) Shape-dependent Optical Enhancement Effect of Gold Nanoparticle-modified Core Shells with RHO6G Dyes

Y. Y. Cheng, H. Y. Lin, C. H. Huang, and H. C. Chui (National Cheng Kung Univ. / Taiwan)

Gold nanospheres, nanorods and nanoprisms are used to form distinct nanoshells on silica nanoparticles in which are embedded RHO6G organic dyes. These nanoshells provide the broad-band tunability of plasmon resonances, even in surface-enhanced spectroscopic detections.

20S2-16

(12:15) Stress Accumulation inside BK7 Glass Caused by Internal Planar Microprocessing with Femtosecond Laser Pulses

M. Matsumoto, Y. Ozeki, K. Itoh (Osaka Univ. / Japan), and H. Yamamoto (NEC SCHOTT Components Corp. / Japan)

Internal stress as much as ~600 MPa is accumulated inside BK7 glass after planar microprocessing, which is used in the femtosecond laser microwelding technique. The stress can be substantially reduced by increasing the line spacing.

Lunch (12:30-13:30)

Optical Components/Devices (1) (13:30-15:20)

Presiders:

S. H. Park (Yonsei Univ. / Korea)

K. Maru (Gunma Univ. / Japan)

20S3-01(Invited)

(13:30) **High-Performance Fiber-Optic Gyroscope Technology**

H. C. Lefevre (iXCore and iXSea / France)

First used for medium performance, the fiber-optic gyroscope has now reached a very high precision which fulfills the requirements of the most demanding applications as, for example, submarine navigation or satellite attitude control.

20S3-02

(13:55) **WDM C-Band-Shift-Free Optical Phase Conjugator Using Sagnac Interferometer Based on Highly-Nonlinear Photonic Crystal Fiber**

P. Rangsee and P. Kaewplung (Chulalongkorn Univ. / Thailand)

This paper reports, for the first time, the simultaneous bandwidth-shift-free phase-conjugation of 15x10 Gb/s WDM signal on 11.15-nm bandwidth with Q factor larger than 7 using optical phase conjugator based on Sagnac fiber interferometer.

20S3-03

(14:10) **Low Loss Liquid Crystal Photonic Bandgap Fiber in the Near-infrared Region**

L. Scolari, L. Wei, A. Bjarklev (Technical Univ. of Denmark / Denmark), S. Gauza, and S. T. Wu (Univ. of Central Florida / USA)

We infiltrate a photonic crystal fiber with a perdeuterated liquid crystal, which has a reduced infrared absorption. The lowest loss ever reported (about 1 dB) in the middle of the near-infrared bandgap is achieved.

20S3-04(Invited)

(14:25) VLSI Photonics: A Platform for Nanophotonic Integration

E. H. Lee (Inha Univ. / South Korea)

This paper presents an overview of our work on the theory, design, fabrication, and integration of micro/nano-scale optical wires and devices as applicable for all-optical generic and application-specific VLSI photonic integrated circuits.

20S3-05

(14:50) Polarization Alignment Free Interconnection by Dynamically Reconfigurable Double Phase Conjugation

Y. Wakayama, A. Okamoto (Hokkaido Univ. / Japan), and A. A. Grabar (Uzhgorod National Univ. / Ukraine)

We demonstrated polarization-alignment-free optical interconnection with a photorefractive Sn₂P₂S₆: Sb crystal for a photonic crystal fiber, and showed 40 to 90-fold improvement of coupling efficiency compared with conventional double phaseconjugation.

20S3-06

(15:05) Study on stabilized generation of optical nonlinear effect by using highly accurate SPM-based all-optical limiter

K. Kawanishi, T. Konishi, H. Goto, and K. Itoh (Osaka Univ. / Japan)

We demonstrate accurate wavelength conversion by using a highly accurate SPM-based all-optical limiter with preventing influences of input intensity fluctuation as a representative example of stabilized generation of optical nonlinear effect.

Coffee Break (15:20-15:40)

Poster Session (2) (14:00-16:00)

Optical Systems

New Technologies

(for Optical Design and Fabrications)

20PSp-01 Development of Scanning System for RGB Laser Projector

B. T. Tsai, M. F. Chen, Y. S. Ho, W. T. Hsiao, and C. K. Chung (National Changhua Univ. of Education / Taiwan)

This study focuses on the developing the scanning system for laser projector using red-green-blue diode laser. The performance of laser projector, consists of scanning control system, colour control system and position detector, is also discussed.

20PSp-02 12-inch reference silicon wafer fabrication by using direct laser writer

H. G. Rhee, J. B. Song, Y. W. Lee (Korea Research Inst. of Standards and Science / South Korea), D. I. Kim (Korea Basic Science Inst. / South Korea) S. K. Hong, and J. H. Jo (Hannam Univ. / South Korea)

We propose a new method based on direct laser writing to fabricate reference chromium patterns on a silicon wafer to calibrate the coordinate of a wafer defect inspection machine.

20PSp-03 Holographic Projection Photolithography

S. N. Koreshev (St. Petersburg State Univ. of ITMO / Russia), and V. P. Ratushnyi (HoloGrate / Russia)

The realized methods of holographic projection photolithography are discussed. They are based on Fresnel and focused image types of surface relief-phase reflective holograms. Their convenience for practical using in electronic devices manufacturing is shown.

20PSp-04 An All-Optical Method for Obtaining Polarization Encoded Data Bit from Intensity Encoded Data Bit and Vice Versa

D. Samanta and S. Mukhopadhyay (The Univ. of Burdwan / India)

Here the authors propose an optical method to get polarization encoded data bit from intensity encoded data bit and vice versa with the use of optical nonlinear material and half wave plate.

20PSp-05 Design of a New Type Small-displacement Sensing System Based on The Total-internal Reflection Theory

S. F. Wang, C. Y. Liu, R. H. Yeh, W. Lai, and M. F. Hsieh (Ching Yun Univ. / Taiwan)

A small-displacement sensing system is designed by a prism assembly and a displacement probe. Its resolution can reach 0.85 nm. The system has some merits, e.g., a simple optical setup, high resolution and rapid measurement.

20PSp-06 Design of an Electro-Optical Biosensor Based on the Surface Plasmon Resonance Technology in Heterodyne Interferometry

S. F. Wang, R. H. Yeh, W. Lai, C. Y. Liu, and H. C. Cheng (Ching Yun Univ. / Taiwan)

An electro-optical biosensor is designed by a parallelogram prism with two long side surfaces coated with two layers of metal films. Its resolution can reach 0.0000005 refractive index unit. And its feasibility is demonstrated.

20PSp-07 Development of Optical Fiber Based Respiration Sensors for Non-invasive Respiratory Monitoring

W. J. Yoo, D. H. Cho, K. W. Jang, J. K. Seo, J. Y. Heo, B. Lee, S. C. Chung (Konkuk Univ. / Korea), J. H. Moon (Dongguk Univ. / Korea), B. G. Park (Soonchunhyang Univ. / Korea), and S. Kim (Cheju National Univ. / Korea)

In this study, we have fabricated the nasal cavity and abdomen attached fiber-optic respiration sensors for non-invasive respiratory monitoring. And, the respiration signals of the fiber-optic sensors are compared with those of the BIOPAC® system.

20PSp-08 A New design system for panel lighting Application

T. L. Tai, C. C. Lin, H. H. Lo, L. P. Chung, and T. Y. Chen (Industrial Technology Research Inst. / Taiwan)

In this work, a new design system for panel lighting is proposed. The thickness about this panel lighting is only 2mm, it also has Uniform Surface Lighting and no disability glare. The most important originality of this new system for panel lighting is that we can change the light direction from the Light-emitting surface in order to lighting the area that we want to.

20PSp-09 Simulating the illuminance and the Efficiency of Daylight/LED Hybrid Illuminating System used in Interior Lighting Design

C. H. Tsuei and W. S. Sun (National Central Univ. / Taiwan)

A study by simulating and calculating the illuminance and efficiency of daylight/LED hybrid illuminating used in interior lighting design. This study could easily simulate and calculate the real situation and compare with its economic benefits.

20PSp-10 Increasing the Luminance of LCD with a Half-Wave Plate

R. S. Chang, W. T. Yu (National Central Univ. /Taiwan), S. W. Wang (Jen-Teh Junior College of Medicine, Nursing and Management / Taiwan), C. H. Huang (AU Optronics / Taiwan), and J. C. Chang (Kainan Univ. / Taiwan)

Rotating the direction of the maximal analyzed intensity for partially polarized output light from LCD's backlight module with a half-wave plate to align it with transmitting axis of LCD's down-side polarizer will increase LCD's luminance.

20PSp-11 Challenges in Digital Holography in Microlens Characterization

Y. Hao, A. Asundi (Nanyang Technological Univ. / Singapore), and T. Ailing (Xian Technological Univ. / China)

In this paper the capability and challenges of DHM for microlens measurement, including diameter and pitch in lateral direction, microlens height distribution and focal length measurement in axial direction, will be discussed and demonstrated.

20PSp-12 Three-dimensional color object recognition by digital holography

H. Y. Tu and Y. C. Cho (St. John's Univ. / Taiwan)

Multi-wavelength phase-shifting digital holograms completely record the complex wavefront containing threedimensional object shape and color features simultaneously. Three-dimensional color object recognition is achieved in real-time by the binary representations of multi-channel correlations of digital holograms.

20PSp-13 An Instrument Designed for Tilt and Decenter Measurements of Lenses Produced on Production Line

C. Y. Chang, C. C. Ma (National Taiwan Univ. / Taiwan), K. C. Huang (National Applied Research Laboratories / Taiwan), and S. F. Tseng (National Chiao Tung Univ. / Taiwan)

This paper presents an instrument for measuring tilt and decenter in lens modules. This instrument measures 17 mm diameter lens modules with 8 μm resolution, and inspection time for one complete measurement is 0.78 seconds.

20PSp-14 Optical Considerations for a Multi-Finger 3d User Interface

M. Nishino, Y. Okuda, Y. Inoue, T. Kosugi, and I. Fujieda (Ritsumeikan Univ. / Japan)

Right design of the light source and elimination of room light relieve the computational load. Touching fingers can be identified by analyzing pixel-intensity profile of a finger, enabling clicking and scrolling actions.

20PSp-15 Diffraction of Laser Light for a Liquid Crystal Display without Color Filters

Y. Okuda, M. Nishino, and I. Fujieda (Ritsumeikan Univ. / Japan)

We propose to form a lattice-patterned spots of laser light by diffraction so that each spot corresponds to a sub-pixel of a liquid crystal display panel. This configuration eliminates color filters and increases light utilization.

20PSp-16 Effect of Diffraction in an Imaging Device Based on Dihedral Corner Reflectors Array

S. Yokoyama, K. Nitta, O. Matoba (Kobe Univ. / Japan), and S. Maekawa (National Inst. of Information and Communications Technology / Japan)

Characteristics of three dimensional imaging by use of an imaging optics with corner reflectors array are analyzed. In the numerical analysis, point spread function is estimated. This analysis is useful to design the device for various applications.

20PSp-17 Study on Photon Counting Fourier Transform

K. Sakiori, K. Nitta, O. Matoba (Kobe Univ. / Japan)

Photon counting Fourier transform is investigated in terms of parallel processing with effective power consumption. Optical Fourier transform is one of the fundamental operations for various applications. It is experimentally and numerically verified that characteristics of target signals are extracted with less energies than conventional optical processing.

20PSp-18 Hand-held Full-colored 3D Skin Imaging System by RGB LED in Optical Coherence Tomography

B. W. Yang, X. C. Chen, and Y. S. Chang (Ming-Hsin Univ. of Science and Technology / Taiwan)

New hand-held model is proposed for non-invasive and colorful 3D skin imaging. Employing red, green and blue LEDs in fiber-based OCT, full-colored image can be derived for inspection of deep 3D structure.

20PSp-19 The Micro-interaction between Red Blood Cells and the Three Stages in Coagulation by Optical Tweezers

B. W. Yang, Z. Li, Y. A. Lin, J. L. Wu, Y. H. Mu, K. T. Huang (Ming-Hsin Univ. of Science and Technology / Taiwan)

Optical tweezers are configured to explore the mechanism of blood coagulation and the effects of coagulants and anti-coagulants. The coagulation can be divided into three stages by the degree of interaction between red blood cells.

20PSp-20 The Effects of Collagen and Ascorbic Acid on Aging Skin by Fluorescence and Reflection Spectroscopy

B. W. Yang, H. H. Liao, Y. S. Chang, X. C. Chen (Ming-Hsin Univ. of Science and Technology / Taiwan)

A non-invasive scheme is proposed to measure the amount of collagen absorbed to skin by fluorescence spectrum. Collagen and L-ascorbic acid of specific formula were found most efficient for skin absorption and wrinkles removing.

20PSp-21 Optimizing the Efficiency of Evanescently Excited Fluorescence Biosensor

R. Y. Tsai, C. W. Chu, S. C. Chung, C. T. Shih, B. Li, Y. C. Pu, and C. F. Chiou (Industrial Technology Research Inst. / Taiwan)

An integrated biosensor based on the evanescently excited fluorescence using a prism coupled single-mode planar waveguide with a core layer of Nb₂O₅ 100 nm thick is designed and optimized.

20PSp-22 Transmission microholographic data storage in an optical disk with angular multiplexing

K. J. Wu (Univ. of Education / Taiwan) and W. C. Su (National Changhua Univ. of Education / Taiwan)

We propose a technique of angular multiplexing in a transmission micro-holographic data storage system. High data storage densities can be achieved by combining angular multiplexing and multilayer storage techniques.

20PSp-23 Sequence formation of light pulses for information transmission at speeds of over 30 Tb/s

A. A. Drozdov, A. N. Tsykin, and S. A. Kozlov (Saint-Petersburg State Univ. of ITMO / Russia)

It is shown that a temporal sequence of light pulses forms in interaction of phase-modulated femtosecond laser pulses outside the nonlinear medium. Using this sequence for data transmission at speeds over 30 terabytes/c is demonstrated.

20PSp-24 Optimization for Phase-lock Mueller matrix Polarimetry

H. M. Tsai, T. H. Tsai, and Y. F. Chao (National Chiao Tung Univ. / Taiwan)

Using a phase lock technique we perform a Mueller matrix polarimetry. This polarimetry has been optimized according to the error analysis. Its figure of merit in spatial and temporal phase of the components is investigated.

20PSp-25 F-theta lens module for large area scan tiling lithography

W. F. Chen, C. L. Yang, Y. F. Hsieh, C. H. Chen (National Tsing Hua Univ. / Taiwan), Y. C. Lin, M. K. Lee, S. H. Liu (Industrial Technology Research Inst. South / Taiwan), and K. L. Huang (Ming Dao Univ. / Taiwan)

Patterned laser beam can be tiled up to perform large area lithography. Commercial f-theta lens module can be used for scan tiling by adding additional lens element to correct embedded distortion. Optical simulation shows a pattern deviation less than 5 μ m over the whole scanning field of 50mm x 50mm.

20PSp-26 A Compact After-Market Head-Up Display System for Vehicles

Y. F. Wang, C. Y. Chen, H. W. Ho (National Yunlin Univ. Science and Technology / Taiwan), W. C. Su, K. J. Wu, and K. F. Liu (National Changhua Univ. of Education / Taiwan)

In this paper, a compact head-up display (HUD) system for vehicles is designed and fabricated. The dimension of the system is only 18cm x 10cm x 5cm. The projected virtual image of the system is located at around 160cm in the front of the windshield glasses of the vehicles.

20PSp-27 Tetrahedral Reflector Elements for Three-Axis Angular Autocollimator

I. A. Konyakhin (Saint-Petersburg State Univ. of ITMO / Russia)

The new features of the tetrahedral and trihedral optical reflector elements with facets in the form of the cone segments are presented. The autocollimator with the tetrahedral reflector measures the three-axis angular position for monitoring angular displacements.

20PSp-28 Optoelectronic system for roll angles measurements on the base of the anamorphosis element

I. A. Konyakhin, A. D. Merson, and A. N. Timofeev (Saint-Petersburg State Univ. of ITMO / Russia)

The new method for roll angles measuring is developed. Optical scheme for the measurement system and anamorphosis element is proposed. Equation for the static characteristic of the system and its graphical representation are shown.

20PSp-29 Optics Design of Strip Pixelized Backlighting for LCD System

P. C. Chen, C. H. Chen (National Tsing Hua Univ. / Taiwan), C. H. Lee, and C. H. Liao (Industrial Technology Research Inst. / Taiwan)

A strip pixelized illumination for color-separation LCD backlights has been designed. The system uses an angularly positioned light source and a cylindrical lens array on a light guide to generate red, green, and blue stripes on respective color sub-pixels. A gain factor of transmission efficiency three times than that of conventional color filters is expected.

20PSp-30 Plane Inclination Detection Based on the Patterns Variation for the Collinear Holography Data Storage Systems

Z. H. Lin and S. Cheng (National Chiao-Tung Univ. / Taiwan)

This paper proposes a new detection method for the disc inclination effect towards holographic data storage system, and locates the patterns variation in shape and intensity that are recorded around the data page.

20PSP-31 Influence of THz broadband pulse radiation on some biotissues

V. G. Bespalov, A. A. Gorodetsky, Y. V. Grachev, S. A. Kozlov, and O. A. Smolyanskaya (Saint-Petersburg State Univ. of ITMO / Russia)

In the present paper we present research results of broadband THz radiation influence in a range 0.1÷2 THz on some biological tissues. Theoretical modeling of THz radiation propagation through the fat sample is performed. Experimental absorption spectra of vegetable oil, nail, skin tissue, blood are obtained. Spectra of this tissues differ. Also they depend on water content. From within this samples vegetable oil has the best transmission.

20PSP-32 Holographic processor for fuzzy logic: on the approximation of modulation transfer function

A. M. Alekseev, A. V. Pavlov, and V. N. Vasilev (Saint-Petersburg State Univ. of ITMO / Russia)

The task of fuzzy logic implementation by holographic processor needs new method for modulation transfer function of the device approximation. The method that is adequate to the logic is discussed and verified experimentally.

20PSP-33 Comparison of the Computer Aided Alignment Algorithm Application to Korsch Telescope: Merit Function Regression and Differential Wavefront Sampling

Y. Kim, H. S. Yang (Univ. of Science and Technology / Korea), Y. W. Lee (Korea Research Inst. of Standards and Science / Korea), and S. W. Kim (Yonsei Univ. / Korea)

We compared two existing computer aided alignment algorithm -merit function regression and differential wavefront sampling -utilizing Zernike polynomial coefficients, in case of measurement error and its influence to alignment accuracy of the Korsch telescope.

20PSp-34 Effect of Astigmatism on Tight Focusing of Partially Coherent LG Beam

R. K. Singh (The Univ. of Electro-Communications / Japan), P. Senthilkumaran, and K. Singh (Indian Inst. of Technology Delhi / India)

Effect of astigmatism on a tightly focused Laguerre-Gaussian beam has been studied using vectorial Debye-Wolf integral and coherence matrix. Results of intensity distribution, degree of polarization, and degree of coherence at the focal plane are presented for partially coherent LG beam for circular polarization in aberration-free and aberrated cases.

20PSp-35 Fast Incident Light Field Rendering Using Projective Texturing to Different Planes with the Consideration of Projected Directions

K. Hashimoto, I. Fujiwara, N. Tsumura, and T. Nakaguchi (Chiba Univ. / Japan)

We propose a method for Incident Light Field acquisition and rendering by projecting orthographs to the different planes according to their directions. The high quality rendering can be achieved with short rendering time.

20PSp-36 Use of Confocal Optical System for Altitude Measurement

K. Hori, T. Dohi (OptiWorks, Inc. / Japan), and J. Cohen-Sabban (STIL SA / France)

Confocal optical system provides unique imaging information which differs from conventional imaging optics. This paper shows application for focus depth altitude measurement with various objective selections.

20PSp-37 Optimized Free-Form Phase Mask for Extension of Depth of Field in Wavefront-Coded Imaging: Experimental Results and Discussions

H. Kudo, Y. Yoneda, T. Shakushio, R. Obana, and S. Komatsu (Waseda Univ. / Japan)

We examine the performance of the wavefront-coded imaging system adopting the optimized free-form phase mask (FPM) from various angles. Computer simulation and experimental results show that the FPM has a better performance than conventional imaging on an extended depth of field.

20PSp-38 Encrypting optical image using arbitrary two phase-step digital holography

W. T. Hsieh, M. K. Kuo (National Defense Univ. / Taiwan), and C. C. Chang (Ming Dao Univ. / Taiwan)

This work presents a simple encryption system based on the arbitrary two phase-step DH with a lenticular lens array sheet as a phase modulator and therefore provides the satisfactory results of decryption.

20PSp-39 3-D Measurement for Internal Organ Surface Using Kaleidoscope

T. Namae, G. Okada, T. Nakaguchi, N. Tsumura (Chiba Univ. / Japan)

We present a method that reconstructs internal organ surfaces for a laparoscopic surgical navigation system. A kaleidoscope is used to project structured light inside of a body so that a projection device can be minimized.

20PSp-40 Optimization of Angle-Multiplexing Holographic Data Storage in the 90 Degree Geometry

J. P. Liu (Chia Univ. / Taiwan)

Abstract: We proposed an algorithm to find an optimized set of the angular separations for a holographic angle-multiplexing storage system in the 90 degree geometry. A minimum crosstalk-dominating noise to signal ratio is achieved.

20PSp-41 Polarization holographic gratings in azo-dye-doped liquid crystal films with different liquid-crystal surface alignment direction

W. C. Su and H. C. Chen (National Changhua Univ. of Education / Taiwan)

Abstract: Polarization holographic gratings are recorded in azo-dye-doped liquid crystal films. Different alignment direction for liquid crystal on the surface will cause different diffraction efficiency.

20PSp-42 Waveform Measurement of High Speed Vibration Using Fiber Optic Interferometer with LN Phase Modulator

T. Sakurai, Y. Tanaka, and T. Kurokawa (Tokyo Univ. of Agriculture and Technology / Japan)

We propose a novel measurement method of high-speed vibration waveform using a polarization maintaining fiber interferometer with LN phase modulator. The principle is experimentally confirmed.

20PSp-43 Improvement in Accuracy and Speed of Distance Displacement Measurement based on Two-Photon Absorption of Si-APD

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

This paper experimentally investigates the accuracy of the distance displacement measurement using the two-photon absorption process in a Si-APD and demonstrates high-speed measurements.

20PSp-44 Predicting the Nanolithography Pattern of Confined Block Polymer

S. K. Kim, H. K. Oh, Y. D. Jung, and I. An (Hanyang Univ. / Korea)

The top-down approaches such as the extremely ultraviolet (EUV) technique and the double patterning technology (DPT) under development may be cover 32 nm and 22 nm technologies. However, those technologies are getting more severe and expensive for 12 nm feature size. An alternative technology such as the combination of the top-down lithography with bottom-up assembly can extend lithography patterning beyond current resolution limits. The block copolymer lithography offers a costeffective and simple route to access various nano-technological applications. However, for a process of nanolithography patterning, its technology is required to extract the process parameters. In this presentation, a lithography process of the directed self-assembly is introduced. By using a self-consistent field theory (SCFT) and a density functional theory (DFT), the impacts of process parameters on the block copolymer domain order are discussed.

20PSp-45 Measurements of spectral responses for developing fiber-optic pH sensor

J. Y. Heo, W. J. Yoo, D. H. Cho, K. W. Jang, J. K. Seo, B. Lee (Konkuk Univ. / Korea), J. H. Moon (Dongguk Univ. / Korea), B. G. Park (Soonchunhyang Univ. / Korea), and S. Kim (Cheju National Univ. / Korea)

In this study, we have fabricated a fiber-optic pH sensor which is composed of plastic optical fibers, a pH sensing probe, a light source and a spectrometer.

20PSp-46 Plastic optical fiber sensor using a thermochromic material for monitoring the temperature of the water

J. K. Seo, W. J. Yoo, D. H. Cho, K. W. Jang, J. Y. Heo, B. Lee (Konkuk Univ. / Korea), J. H. Moon (Dongguk Univ. / Korea), B. Gi Park (Soonchunhyang Univ. / Korea), and S. Kim (Cheju National Univ. / Korea)

In this study, we describe the feasibility of developing a plastic optical fiber sensor using a thermochromic material for monitoring the temperature of the water.

20PSp-47 Study of photorefractive gain spectra due to two beam coupling of the coupled unidirectional photorefractive ring resonators

M. K. Maurya, T. K. Yadav, and R. A. Yadav (Banaras Hindu Univ. / India)

The dependence of parametric gain due to the two-beam coupling on the crystal thickness of the coupled unidirectional photorefractive ring resonators has been studied under the assumptions of the plane-wave approximation.

20PSp-48 Simulation Study on the Detection of Size, Shape of Different Scatterers Using Non-standard Time Domain Time Inverse Algorithm

K. Chakrabarti and J. B. Cole (Univ. of Tsukuba / Japan)

Inverse method has wide application on medical diagnosis. Back scattered waves generated from the forward moving waves has information about its geometry [1]. We investigated different geometries of the object by NSFD Time Inverse algorithm.

20PSp-49 Simulation Study on the Effect of Back Scattered Noise from Detectors on the Quality of Medical Images Using Non-standard Time Domain Time Inverse Algorithm

K. Chakrabarti and J. B. Cole (Univ. of Tsukuba / Japan)

Inverse method has wide range of utilities on medical diagnosis. We investigated how noise from the detector intermixing with back scattered wave effects on the quality of medical imaging by a high accuracy NSFD Time Inverse algorithm.

20PSp-50 Dynamic Modulation Transfer Functions of LCD Displays Obtained by Pursuit Camera Method

S. W. Hsu, C. Y. Chang, Z. Y. Chung, and K. N. Wu (ITRI / Taiwan)

Dynamic modulation transfer functions of LCD Displays were obtained. They were measured from images captured by pursuit camera on moving edge patterns, and analyzed by slanted edge, improved wavelet denoise, and FFT analysis methods.

20PSp-51 Correlations of Image Quality Metrics of Display Studied by Systematically Distorted Videos

S. W. Hsu, B. J. Pong, S. T. Kuo (Industrial Technology Research Inst. / Taiwan), and Yu-Ta Chen (National Central Univ. / Taiwan)

By systematically distorted videos, the power-law dependences between several image quality metrics have been found and analyzed. The exponents and intercepts of the power-law dependences are significantly related with distortion type and content of videos.

20PSP-52 Development of a Dual-Wavelength Optical Phase Measurement Instrument

R. C. Twu, H. Y. Hou, and Y. H. Lee (Southern Taiwan Univ. / Taiwan)

A novel homodyne metrology is demonstrated to simultaneously measure the dual-wavelength optical phase variations. The homodyne light sources are produced by launching the different incident lights into a same lithium niobate Zn-indiffused phase modulator. The LabVIEW-based instrument provides flexible signal processing and real-time data display for the measured results.

20PSP-53 Z-propagation Lithium Niobate Electro-Optic Modulator for Optical Heterodyne Metrology

R. C. Twu, Y. H. Lee, and H. Y. Hou (Southern Taiwan Univ. / Taiwan)

We have successfully demonstrated a z-propagation Zn-indiffused lithium niobate electro-optic modulator used for the optical heterodyne metrology. In comparison with a commercial buck-type modulator, the proposed waveguide-type modulator has a lower driving voltage and smaller phase variation while measuring at visible wavelengths.

20PSP-54 A Novel Numbering Exposure System Using a Light-Emitting-Diode Array

J. Iwasaki and T. Horiuchi (Tokyo Denki Univ. / Japan)

A novel technology is proposed to print serial numbers and two dimensional code marks on semiconductor wafers and liquid crystal display panels using a violet or ultra-violet light-emitting-diode (LED) matrix array as a light source.

20PSP-55 Critical angle method for 3D surface profile measurement

C. T. Tan, Z. C. Lin, Y. S. Chan, and M. H. Chiu (National Formosa Univ. / Taiwan)

This paper proposes a new method for the three-dimension profile measurement of a transparent specimen. The method is based on the linear transform from angular deviation to reflectance of a prism in critical angle theorem.

20PSP-56 Fingerprint classification using wavelet modified generic Fourier descriptor and their recognition using hybrid correlator

R. B. Yadav, M. Takeda (Univ. of Electro-Communications / Japan) and A. K. Gupta (Instruments Research and Development Establishment / India)

We report fingerprint classification using wavelet modified generic Fourier descriptor technique and their recognition employing hybrid correlator method. These techniques applied to a dataset consisting of 5 different classes and each consist 60 fingerprints.

20PSP-57 Spatial Resolution of Conductive Polymer 3D Microstructures Photofabricated in Transparent Polymer Sheet

K. Yamada, A. Kyoya, J. Sone, and J. Chen (Tokyo Polytechnic Univ. / Japan)

The processing accuracy for polypyrrole 3D microstructures photofabricated in the transparent sheet was evaluated by surface and cross sectional observations. Relationship between the illumination condition and the spatial resolution of the obtained 3d microstructures was studied in this work.

20PSp-58 Design of a Novel Dual Function Lens for Dark-Field Condenser and Microscope Objective

C. L. Tsai, L. Hsu, K. Y. Hsu (National Chiao Tung Univ. / Taiwan), and K. L. Huang (Ming Dao Univ. / Taiwan)

A novel dual function lens has been designed and can be utilized as a dark-field condenser lens with low energy loss and as a microscope objective lens with large entrance pupil and high NA.

20PSp-59 Formation of Induced Structures in LiTaO₃ Using Femtosecond Laser Pulses

M. Kumatoriya, T. Fujii (Murata Manufacturing Co., Ltd. / Japan), M. Nakabayashi, K. Miura, and K. Hirao (Kyoto Univ. / Japan)

We investigated structures induced in LiTaO₃ using femtosecond laser pulses and their optical properties as potential waveguides. The refractive index change of the structure strongly depended on the pulse energy and pulse width. Transmitted beam near-field measurement showed that the maximum change was $\sim 7.0 \times 10^{-4}$.

20PSp-60 Light Reflection Properties of Skin with Pores: The Effect of Applying Cosmetic Powders

M. Motoda, T. Okamoto (Kyushu Inst. of Technology. / Japan) T. Igarashi, and K. Nakao (Kao Corp. / Japan)

The spectrum and spatial intensity distribution of light reflected from skin with pores covered with powder particles have been evaluated. It is found that the appearance of skin is greatly affected by the particle size.

20PSp-61 Gauge Block Measurement Using the Central Fringe Identification Technique

W. T. Wu, H. C. Hsieh, Y. L. Chen, W. Y. Chang, and D.C. Su (National Chiao-Tung Univ. / Taiwan)

A simple method for measuring a gauge block is presented with the central fringe identification technique and a precision translation stage. It has some advantages such as easy operation, high resolution, and wide measurable range.

20PSp-62 Radiation Photonics: A Case of Metal-Nanoparticle Composites

O. A. Plaksin (A. I. Leypunsky Inst. of Physics and Power Engineering, and Obninsk State Univ. for Nuclear Power Engineering / Russia), Y. Takeda, K. Kono, H. Amekura, and N. Kishimoto (National Inst. for Materials Science / Japan)

Optical measurements during heavy-ion implantation of insulators helped to obtain the non-equilibrium phase diagrams necessary for efficient fabrication of the photonic structures based on metal-nanoparticle composites.

20PSp-63 Radiative Properties of Butt-Ring Gold Nanoantennas Array

H. M. Lee and J. C. Wu (National Changhua Univ. of Education / Taiwan)

Nanoantennas array composed of butted half rings are numerically studied by finite element method. The far-field spectra resonances and the near-field enhancement of the nanoantennas are investigated in the visible range for two orthogonal polarizations.

20PSp-64 Detection of the Security Thread Embedded in Paper Sheets by Optical Coherence Tomography

K. Fujiwara (GLORY LTD. / Japan) and O. Matoba (Kobe Univ. /Japan)

Nondestructive detection of a security thread embedded in valuable paper sheets such as gift coupons for security purposes has been demonstrated by using a spectral domain optical coherence tomography system.

20PSp-65 Aluminium oxide films fabricated with ion-assisted deposition by using sulphur hexafluoride and oxygen working gases

Y. Y. Chen, J. C. Hsu, L. Y. Yen, H. L. Chen (Fu-Jen Catholic Univ. / Taiwan), P. W. Wang (Bradley Univ. / USA), and H. L. Liu (National Taiwan Normal Univ. / Taiwan)

The Al₂O₃ thin films fabricated by electron-beam evaporation with ion-assisted deposition at room temperature were investigated by varying deposition parameters. A 20% packing density increase was obtained when the SF₆ was used as working gas.

20PSp-66 Optical Properties of Magnesium Fluoride Thin Films Deposited by Ion-Beam Sputtering with Various Ion-Beam Voltage

J. C. Hsu, J. C. Chen, Y. H. Lin, H. L. Chen, Y. D. Yao (Fu-Jen Catholic Univ. / Taiwan), and Hsiang-Lin Liu (National Taiwan Normal Univ. / Taiwan)

This study is related to MgF₂ film deposited by ion-beam sputtering. Our object is to understand relationship between the ion-beam voltage and optical properties of the film, and to find out the optimum deposition condition.

20PSp-67 The invariant optical schemes in control optical-electronic systems of the objects spatialposition

A. G. Anisimov and A. A. Gorbachyov (Saint-Petersburg State Univ. of ITMO / Russia)

Abstract: Principal features of optical schematic construction of optic-electronic systems with a matrix analysis field, invariant to unregistered displacement and turns are considered.

20PSp-68 Singularity of the Light Sources Radiation Parameters Changing Effect upon Illuminated Object Colors Representation by Optical Detector

A. N. Chertov, E. V. Gorbunova, and V. V. Korotaev (Saint-Petersburg State Univ. of ITMO / Russia)

Some singularity research results of the light sources radiation energy and spectral distribution changing effect upon color coordinates of the investigated object's characteristic regions represented by optical detector are represented in this article.

20PSp-69 Alignment Control Optical-Electronic System

A. G. Anisimov, V. V. Korotaev, and A. V. Krasnyashchikh (Saint-Petersburg State Univ. of ITMO / Russia)

Design, implementation and test of the optical-electronic measurement system for positioning control of the turbine unit's elements are discussed. System accuracy approved experimentally; total error did not exceed 0.1 mm at a distance of 20m.

20PSp-70 Active / passive combination of IR and THz surveillance

V. V. Korotaev (Saint-Petersburg State Univ. of ITMO / Russia), G. S. Melnikov, V. M. Samkov, and Y. I. Soldatov (Federal State Unitary Enterprise "NPK GOI im. SI Vavilov" / Russia)

In the course of the research carried out search of breakthrough technology and design solutions, development of new components and technology base, improving the software, optimizing the mass and size characteristics and cost parameters of onboard equipment systems of passive and active surveillance in the infrared and THz ranges of electromagnetic waves.

20PSp-71 Design of multimatrix optic-electronic modules for distributed measuring systems

V. V. Korotaev and S. N. Yaryshev (Saint-Petersburg State Univ. of ITMO / Russia)

The design of optical and electronic parts of multimatrix measuring modules is presented. Four equal optical channels in optical scheme are used. Correction algorithms for sensitivity and mutual declination of matrix photo detectors are presented. The practical realization of multimatrix measuring module is presented.

20PSp-72 Studies of Human Vision Model Recognition and Application

B. W. Wu (Yuanpei Univ. / Taiwan) and Y. C. Fang (Kaohsiung First Univ. of Science and Technology / Taiwan)

This study is the image recognition application of artificial intelligence. By using MTF curve evaluation recognition capability on all the models, the optimum model most compatible with the physiology of the human eye is found.

20PSp-73 Gap Plasmon Modes of Infinite High Gaps Measured in layered silver structures by ATR

F. Michael, M. Haraguchi, and T. Okamoto (The Univ. of Tokushima / Japan)

A Layered silver structures can work as infinite high gap to guide gap plasmon modes. The optical response was measured by ATR and calculated consistent to previous publications with transfer matrix method.

20PSp-74 Holographic implementation of a linear predictor for stochastic processes: factors to be considered while fabricating the optical device

Z. S. Bekyasheva, A. V. Pavlov, and V. N. Vasilev (Saint-Petersburg State Univ. of ITMO / Russia)

Optimization of holographic recording media transfer functions for the model of linear predictor conditions to be met by holographic implementation of the predictor is discussed.

20PSp-75 Required Variation Range of the Order in the Encryption Method Based on the Fractional Fourier Transform

H. Yoshimura and R. Iwai (Chiba Univ. / Japan)

The tolerance of our encryption method based on the fractional Fourier transform (FRT) to attacks by adversaries has been analyzed. We found that the required variation range of the FRT's order is 3.0 to 4.0.

20PSp-76 Measurements and Removals of Cerenkov Lights Generated in Scintillating Fiber-optic Dosimeter Induced by High Energy Electron Beams using Spectrometer

K. W. Jang, D. H. Cho, W. J. Yoo, J. K. Seo, J. Y. Heo, B. Lee (Konkuk Univ. / Korea), J. H. Moon (Dongguk Univ. / Korea), B. G. Park (Soonchunhyang Univ. / Korea), Y. H. Cho (Catholic Univ. of Daegu / Korea), and S. Kim (Cheju National Univ. / Korea)

In this study, we have measured scintillating and Cerenkov lights generated in a scintillating fiber-optic dosimeter induced by high energy electron beams using a spectrometer.

20PSp-77 Measurement of Relative Dose using a Scintillating Fiber-optic Dosimeter for Co-60 Radiotherapy

K. W. Jang, W. J. Yoo, J. K. Seo, B. Lee (Konkuk Univ. / Korea), and S. H. Shin (Korea Inst. of Radiological & Medical Sciences / Korea)

In this study, the γ -rays generated from a Co-60 machine are measured using a SFOD and percent depth dose (PDD) curves are obtained according to the different depths of water phantom.

20PSp-78 Measurements and Comparisons of Percentage Depth Doses Using Fiber-optic dosimeter and Conventional Dosimeters Irradiated by High Energy Photon Beams

D. H. Cho, K. W. Jang, W. J. Yoo, J. K. Seo, J. Y. Heo, B. S. Lee (Konkuk Univ. / Korea), S. Kim (Cheju National Univ. / Korea), J. H. Moon (Dongguk Univ. / Korea), B. G. Park (Soonchunhyang Univ. / Korea), and Y. Cho (Catholic Univ. of Daegu / Korea)

In this study, we have fabricated a fiber-optic dosimeter using an organic scintillator and a plastic optical fiber for measuring percentage depth doses with high energy photon beams. The scintillating light generated in organic sensor probe embedded in a solid water phantom is guided by 20 m plastic optical fiber to the light-measuring device such as a photodiode-amplifier system. Using a fiber-optic dosimeter, an ion chamber and a GafChromic EBT film, percentage depth doses are measured with 6 and 15 MV energies of photon beams whose field sizes are $2\text{ cm} \times 2\text{ cm}$ and $10\text{ cm} \times 10\text{ cm}$.

20PSp-79 Near-field Optical Imaging of Polarization-/Distance-dependent Optical Enhancement in Metal Nanoparticle pairs

H. Y. Lin, C. H. Huang, H. H. Chen, Y. Y. Cheng, S. Shy, C. H. Fan, and H. C. Chui (National Cheng Kung Univ. / Taiwan)

The plasmonic coupling effect in gold nanoparticle pairs was investigated by a near-field scanning optical microscope. Results manifest the plasmonic mode of localized hot spots is strongly dependent on the interparticle distance and incident polarization.

20PSP-80 Near-field Optical Imaging of Higher Order Plasmonic Resonances in Metal Nanoparticle Arrays

C. H. Huang, H. Y. Lin, Y. Y. Cheng, H. H. Chen, S. Shy, C. H. Fan, and H. C. Chui (National Cheng Kung Univ. / Taiwan)

Dipole and quadrupole localized plasmon resonances were directly investigated by a near-field scanning optical microscope. Results manifest the correlation of oblique incident polarizations and responded higher order plasmon resonances under 488-nm and 633-nm laser excitations.

20PSP-81 Photoreduction Mechanism of Silver Nanoparticles for Active Surfaceenhanced Raman Substrate by Femtosecond Laser

S. Shy, H. Y. Lin, C. H. Huang, and H. C. Chui (National Cheng Kung Univ. / Taiwan)

An effective approach to fabricate SERS substrate in one-step was reported. The nanoparticles were formed by photoreduction effect by femtosecond laser pulses. This technique provides the opportunity to integrated functional microchip for active SERS substrate.

20PSP-82 Rapid Light Transport Acquisition by the Compressive Sensing with GPU Computing

Y. Itakura, M. Sawabe, N. Tsumura, and T. Nakaguchi (Chiba Univ. / Japan)

Recently, compressive sensing has attracted much attention in the area of the computer graphics. However, it's needs large amount of computational cost. Therefore, we accelerate the processing of the compressive sensing with GPU Computing.

20PSp-83 Near-infrared Supercontinuum Generation in Conventional Single Mode Fiber Used in Optical Sensor

C. H. Fan, C. H. Huang, H. Y. Lin, and H. C. Chui (National Cheng Kung Univ. / Taiwan)

The near-infrared supercontinuum light was generated in a single mode fiber by femtosecond pulse from an unamplified Ti:sapphire laser. This tunable and broadband similar supercontinuum light was suitable for used in nanostructure based optical sensor.

20PSp-84 Automatic LCD Panel Alignment System based on Moiré and Wavelet Transform Technology

R. S. Chang, J. H. Gau (National Central Univ. / Taiwan), and K. L. Huang (Ming Dao Univ. / Taiwan)

A novel automatic LCD panel alignment method, based on Moiré and wavelet transform technique has been developed. This real time online technique can achieve a sensitivity angle of 0.1 degree.

Optical Components/Devices (2) (15:40-17:15)

Presiders:

C. W. Liang (National Central Univ. / Taiwan)

H. Miyajima (Olympus / Japan)

20S3-07(Invited)

(15:40) Stretchable displays and electronics

T. Someya and T. Sekitani (The Univ. of Tokyo / Japan)

We have fabricated large-area, flexible integrated circuits (ICs) using printed organic field-effect transistors (FETs). Elastic conductors using single-walled carbon nanotubes (SWNTs) have been developed to realize the stretchability of ICs. The measured conductivity of elastic conductors is as high as 57 S/cm.

20S3-08

(16:05) Fabrication of a Rewritable Holographic Optical Element by Ti:Sapphire Laser

T. Takimoto, K. Tosa, T. Kakue, Y. Awatsuji, K. Nishio, S. Ura (Kyoto Inst. of Technology / Japan), and T. Kubota (Kubota Holography Laboratory Corp. / Japan)

We demonstrated a rewritable holographic optical element recorded on a photo-conductor plastic hologram plate using a Ti:Sapphire laser operated at 800nm. We confirmed the stability for at least 10-time rewritability and around 5% diffraction efficiency.

20S3-09

(16:20) Reduced Complexity Hybrid Optimization Algorithm for the Design of Fresnel Domain Computer Generated Holograms

J. A. Domínguez-Caballero, S. Takahashi (Massachusetts Inst. of Technology / USA), S. J. Lee (Samsung Electronics Co. Ltd. / South Korea), and G. Barbastathis (Singapore-MIT Alliance for Research and Technology Centre / Singapore)

A reduced complexity hybrid optimization algorithm for the design of Fresnel domain computer generated holograms is proposed. The optimized holograms are applied to high-resolution holographic lithography. Numerical and experimental results are presented.

20S3-10(Invited)

(16:35) Optical Design of High Efficiency Organic Light Emitting Devices

A. Mikami (Kanazawa Inst. of Technology / Japan)

Light extraction efficiency has been enhanced by using high refractive index substrate and micro-lens array coupled with weak micro-cavity structure. Phosphorescent green light emitting device designed by wave optics showed an external quantum efficiency of 57% and power efficiencies over 200-lm/W.

20S3-11

(17:00) Polarization Engineering of Thermal Radiation by Utilizing Fabry-Pèrot Type Surface Plasmon Polariton

P. E. Chang, Y. W. Jiang, Y. H. Ye, Y. T. Wu, Y. T. Chang, H. H. Chen, H. F. Huang, and S. C. Lee (National Taiwan Univ. / Taiwan)

A multi-spectral polarized MIM plasmonic thermal emitter is demonstrated. Using metallic rectangle-patch array as top metal layer, the Fabry-Pèrot resonances underneath can be excited and function as a half-wave dipole antenna.

Break (17:15-17:30)

Optical Components/Devices (3) (17:30-19:05)

Presiders:

H. P. Herzig (EPFL / Switzerland)

H. Kikuta (Osaka Pref. Univ. / Japan)

20S3-12(Invited)

(17:30) Optical Microsystems for new-generation biophotonics

H. Zappe (Univ. of Freiburg / Germany)

Liquid lenses, lens arrays, tunable achromatic compound lenses, and polymer membrane-based micro-lenses and mirrors for use in biophotonic systems such as blood oxygen monitors and endoscopic optical coherence tomography will be presented.

20S3-13

(17:55) Ultra-thin Liquid Crystal Lens

M. Ye, B. Wang, M. Uchida, S. Yanase, S. Takahashi, S. Sato (Akita Research Inst. of Advanced Technology / Japan), and M. Yamaguchi (Mitsubishi Materials Electronic Chemicals Co., Ltd. / Japan)

An ultra-thin and ultra-lightweight liquid crystal lens of 1.8 mm aperture is reported. Its driving voltages are below 24 V_{rms} and for one liquid crystal layer the cell thickness is as thin as only 230 μm.

20S3-14

(18:10) Dielectrically Tunable Liquid Microlens

C. C. Yang, C. G. Tsai, and J. A. Yeh (National Tsing Hua Univ. / Taiwan)

This study focuses on a dielectrically tunable liquid microlens. The characterization of liquid microlens was observed from comparisons of experiment and simulation. Microlens with a 500 μm diameter was tunable and well positioned in device.

20S3-15(Invited)

(18:25) Optical resonant nanostructures for light manipulation

B. Bai (Tsinghua Univ. / China and Univ. of Joensuu / Finland)

Periodically engineered nanostructures with dimensions comparable with optical wavelength exhibit many intriguing properties due to the resonant excitation of surface or guided Bloch waves, enabling the efficient manipulation of polarization, propagation, and localization of light.

20S3-16

(18:50) ZnO/Ti/Ag structured surface plasmon sensor chip irradiated by ultraviolet rays

N. Saiga and S. Adachi (Yonago National College of Technology / Japan)

Surface plasmon resonance in a multi-layer chip consisting of Ag, Ti and ZnO films was investigated by irradiating UV rays. The Ti film was seen to be important to increase the density of free electrons.

April 21, 2010 (Wednesday)

Optical Systems (1) (8:30-10:20)

Presiders:

W. Ulrich (Zeiss / Germany)

M. Shibuya (Tokyo Polytech. Univ. / Japan)

21S4-01(Invited)

(8:30) Control of Periodic Spatial Coherence by Fly-eyes in the Mask Inspection System

A. Takada (Topcon Corp. / Japan)

Ghost images arise from spatial coherence periodicity on a mask plane, which is due to periodic and discrete arrangements of fly-eye elements in mask inspection optics. In this paper, a new condition of suppressing ghost images is proposed, and its validity is verified with numerical calculations.

21S4-02(Invited)

(8:55) A review of lightpipe design for projection displays

F. R. Fournier (Univ. of Central Florida / USA), W. J. Cassarly (Optical Research Associates / USA), J. P. Rolland (Univ. of Rochester and Univ. of Central Florida / USA)

We present a review of lightpipe design with an emphasis on LED-based projection displays. We address design strategies for typical requirements such as spatial and angular uniformity, beam shape conversion, and polarization conversion.

21S4-03

(9:20) Implementation of Source-Mask Optimization for ArF Scanners

N. Kita, Y. Mizuno, T. Matsuyama (Nikon Corp. / Japan)

In this paper we discuss the feasibility of the source and mask optimization tool and the method to achieve complicated source shapes on immersion scanner.

21S4-04

(9:35) **Fabrication and Readout of High Density Optical ROM Disc with Super-Resolution Near-field Structure**

K. Nakai, M. Ohmaki, N. Takeshita, M. Shinoda (Mitsubishi Electric Corp. / Japan), I. Hwang, Y. Lee, H. Zhao, J. Kim (Samsung Electronics Co., Ltd. / Korea), B. Hyot, B. Andre, L. Poupinet (CEA-LETI, MINATEC / France), T. Shima, T. Nakano, and J. Tominaga (National Inst. of Advanced Industrial Science and Technology / Japan)

We fabricated a high density optical read only memory (ROM) disc with super-resolution near-field structure (super-RENS). Readout characteristics of the super-RENS ROM disc with InSb active layer were described. Carrier-to-noise ratio (CNR) beyond 40dB was obtained with monotone data pattern with pit length of 75nm at read power higher than 1.7mW. Bit Error rate (bER) of the order of 10^{-5} satisfying the criterion of 3.0×10^{-4} was obtained. Furthermore, playback performance of high definition video content from the super-RENS disc was successfully confirmed.

21S4-05

(9:50) **Optical image stabilization with a liquid lens**

E. Simon, B. Berge, H. Gaton, O. Jacques-Sermet, F. Laune, J. Legrand, M. Maillard, D. Moine, and N. Verplanck (Varioptic / France)

We present an optical image stabilization system (OIS) using a liquid lens component. We give a theoretical estimation of the performances and we describe experimental set-up with a 5Mpix 1/3" sensor camera module.

21S4-06**(10:05) Optical Design and Prototyping of All-round Observable Endoscope Optics with Tele-centric Coaxial Epi-illumination Functions**

Y. Kobayashi, W. Teshima, and A. Kojima (: PrimeOptics. Co.Ltd. / Japan)

We achieved optical designs of all-round observable endoscope optics suitable for defect inspections of inner surfaces of metal tubes or holes, and the prototype has made out the effectiveness of its tele-centric epi-illumination function.

Coffee Break (10:20-10:40)**Optical Systems (2) (10:40-12:05)****Presiders:**

E. Okada (Keio Univ. / Japan)

R. Katayama (NEC / Japan)

21S4-07(Invited)**(10:40) Incoherent Lensfree Cell Holography for Global Health Applications**

A. Ozcan (Univ. of California / USA)

We present an on-chip cytometry platform that utilizes cost-effective and compact components to digitally recognize and image cells with sub-cellular resolution over a large field-of-view without using any lenses, lasers, or other bulky optical components.

21S4-08**(11:05) In Situ Three-dimensional Imaging by Digital Holographic Microscopy**

C. J. Cheng, Y. C. Lin (National Taiwan Normal Univ. / Taiwan), and H. Y. Tu (St. John's Univ. / Taiwan)

We present a novel technique for in situ measuring three-dimensional morphology of transparent specimen using phase-shifting digital holographic microscopy, which is applied to investigate the light-induced refractive index grating formation and the living cell diagnosis.

21S4-09**(11:20) One-shot digital holography using spatial heterodyne modulation**

K. Sato and K. Maejima (Univ. of Hyogo / Japan)

One-shot digital holography is developed for instantaneous recording of the complex-amplitude in-line hologram by applying spatial heterodyne modulation. Bandwidth of the hologram is enlarged up to the theoretical limit.

21S4-10**(11:35) Quality-Improvement Algorithm for the Images Reconstructed from Holograms Recorded by Parallel Four-Step Phase-Shifting Digital Holography**

T. Kakue, Y. Moritani, K. Ito, Y. Shimozato, Y. Awatsuji, K. Nishio, S. Ura (Kyoto Inst. of Technology / Japan), T. Kubota (Kubota Holography Laboratory Corp. / Japan), and O. Matoba (Kobe Univ. / Japan)

We propose a quality-improvement algorithm that applies the calculation method of parallel two-step phase-shifting digital holography to the hologram recorded by parallel four-step technique. We confirmed the validity of the proposed algorithm by numerical simulation.

21S4-11**(11:50) Robust Control Design and Implementation for a LED Lighting System**

F. C. Wang, C. W. Tang, and B. J. Huang (National Taiwan Univ. / Taiwan)

This paper applies robust control techniques to a red-green-blue (RGB) light-emitting diode (LED) lighting system. The experimental results show the effectiveness of the controllers in providing steady luminous intensity and color for RGB LED lighting.

Lunch (12:05-13:05)

Optical Systems (3) (13:05-14:25)

Presiders:

S. H. Lin (National Chiao Tung Univ. / Taiwan)

T. Milster (Univ. of Arizona / USA)

21S4-12(Invited)

(13:05) Design and fabrication of 3D optics: Diffractive and subwavelength

G. Barbastathis (Massachusetts Inst. of Technology / USA and Singapore-MIT Alliance for Research and Technology Centre / Singapore)

We present design, fabrication and testing results for three-dimensional optical elements in the diffractive (volume holographic) and sub-wavelength (metamaterial) regime. Applications include novel imaging elements for fluorescent 3D imaging without scanning and ultra-thin cameras.

21S4-13(Invited)

(13:30) Optical signal processing diversified by optical signal form conversion

T. Konishi (Osaka Univ. / Japan)

This talk reviews opportunities of optical signal form conversion as typified by time-space conversion in optical signal processing. Several applications of typical ultra-fast optical signal processing using optical signal form conversion are described.

21S4-14

(13:55) Optical Carrier Reused for Chromatic Dispersion Monitoring in Coherent PSK Systems

*Y. Zhou (National ICT Australia Limited / Australia),
A. Nirmalathas, and K. L. Lee (The Univ. of Melbourne / Australia)*

A new chromatic dispersion (CD) monitoring technique is proposed for phase-modulated signals in coherent detection communication systems incorporating optical carrier reuse. The incurred CD is being monitored based on the phase rotation of the I/Q constellations.

21S4-15

(14:10) High Speed Optical Millimeter Wave Sweeper using Laser Diode with Direct Current Modulation and MZ interferometer

D. Meguro, K. Kashiwagi, Y. Tanaka, T. Kurokawa (Tokyo Univ. of Agriculture and Technology / Japan)

We demonstrate a novel optical millimeter wave sweeper using direct current modulation of a LD with a MZ interferometer. The sweep speed of 5000THz/s is experimentally obtained, which agrees with a theoretical prediction.

Coffee Break (14:25-14:45)

Special Session:

Reflection Control by Nano-structures (14:45-16:50)

Presiders:

P. Urbach (Delft Univ. of Tech. / Netherlands)

R. Katayama (NEC / Japan)

21SS-01(Invited)

(14:45) PhlatLight: Big-Chip Photonic Lattice LEDs

Y. S. Choi and M. Lim (Luminus Devices, Inc. / USA)

PhlatLight is an innovative, large-format, ultra-bright solid state lighting source. Photonic lattice is one of elements coalesced into PhlatLight technology for the mastery of reflection and extraction. We will discuss general principles, implementation and application.

21SS-02(Invited)

(15:10) Review on functional materials inspired from butterflies

D. Zhang (Shanghai Jiao Tong Univ. / China)

Functional replica (for light harvesting and photonic crystals) can be prepared using a simple chemical method with natural butterfly wings as templates. The morphologies of original butterflies are preserved, with composition replaced by desired oxides.

21SS-03(Invited)**(15:35) New Antireflective Coatings with Porous Nanoparticle Layers**

T. Murata (Nikon Co. / Japan)

Recently, requirements for antireflective coatings are becoming higher in various technical fields. We examined a sol-gel method to form a porous layer and succeeded in developing a unique process to form coatings with superior performances.

21SS-04(Invited)**(16:00) Development of Subwavelength Structure Coating (SWC) and its application to camera lenses**

T. Okuno and T. Nakai (Canon Inc. / Japan)

We have developed a high performance anti-reflection coating with subwavelength structures. The principle and characteristics of the new anti-reflection coating as well as its application to camera lenses are reported.

21SS-05(Invited)**(16:25) Molded glass lens with anti-reflective structure**

T. Tamura, Y. Tanaka (Panasonic Corp. / Japan), and J. Nishii (Hokkaido Univ. / Japan)

Using glass molding, we fabricated an anti-reflective structure (ARS) on a convex spherical glass lens. The ARS was fabricated using electron beam (EB) lithography and reactive ion etching. The EB focus was adjusted along the lens mold curvature.

Break (16:50-17:00)**Closing Session (17:00-17:20)****Presider:**

K. Araki (Canon and Utsunomiya Univ. / Japan)

Best Paper Award**(17:00)**

K. Kodate (Japan Women's Univ. / Japan)

Closing Remarks**(17:10)**

H. Tsuchida (Olympus / Japan)

INSTRUCTIONS FOR SPEAKERS

All speakers are required to register for participation in ODF'10.

(Oral presentation)

(1) Presentation time

	Presentation	Discussion	Total
Plenary	20min.	5min.	25min.
Invited in Special Session	20min.	5min.	25min.
Invited Papers	20min.	5min.	25min.
Contributed Papers	12min.	3min.	15min.

(2) Attention bell

	1st bell	2nd bell End of Speech	3rd bell End of Discussion
Plenary	15min.	20min.	25min.
Invited in Special Session	15min.	20min.	25min.
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-ROM or USB memory (Windows based) with downloaded presentation material.

(Poster presentation)

Poster presentation will be held at the following date.

	Time	Date
Poster Session(1) Optical Design/Simulation Optical Components/Devices	10:00-12:00	April 20
Poster Session(2) Optical Systems New Technologies(for Optical Design and Fabrications)	14:00-16:00	April 20

For poster sessions, each author is provided a 210cm high x 90cm bulletin board on which to display a summary of the paper. Authors must remain in the vicinity of the bulletin board for the duration of the session (120 minutes) to answer questions in English.

To start the session on time each author must complete the preparation 15minutes before. Poster number will be displayed at upper left side on the bulletin board

BEST PAPER AWARD

The best paper among the contributed papers will be awarded through the examination by the program committee at the Closing Session.

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 e-mail your 35-word Abstract & 2-page Manuscripts to the secretariat for ODF'10 (odf10@odf.jp). For the layout of manuscript, please see the Guidelines on the ODF'10 website.

The deadline for submission of post-deadline papers is on February 26, 2010.

Review result will be noticed by March 31, 2010.

As well as the regular submission, the copyright of the article published in the ODF'10 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.

For inquiries, please contact: Secretariat for ODF'10

Tsuyoshi Hayashi
Proactive Inc.
85-1 Edo-machi, Chuo-ku, Kobe 650-0033, Japan
TEL: +81-78-332-2505 FAX: +81-78-332-2506
E-mail: odf10@odf.jp
Office hours: 9:00-18:00(JST; weekdays only)

林 剛志
株式会社 プロアクティブ
〒650-0033 神戸市中央区江戸町 85-1
ベイ・ウイング神戸ビル 10F
電話:078-332-2505 FAX:078-332-2506
E-mail: odf10@odf.jp

ODF'10 SPECIAL ISSUE OF OPTICAL REVIEW

The special issue of OPTICAL REVIEW, the journal of the Optical Society of Japan, for ODF'10 will be published in January 2011. Every authors of ODF'10 are strongly encouraged to submit the original papers to the special issue. The deadline for submission is May 31, 2010. 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 submissions from invited speakers are also welcome.

If you need further information, please contact,
Dr. Keisuke Araki
Editor/Secretariat, ODF'10 Special Issue
Canon, Utsunomiya Univ. / Japan
E-mail: araki@odf.jp

REGISTRATION

● Registration Fee

The registration fee includes admission to technical sessions and one copy of Technical Digest and Compact Disc (Student participants can get only Compact Disc). All participants can join in the reception.

Type	Before / on March 19, 2010	After March 19, 2010
Member[*1]	JPY 45,000	JPY 50,000
Non-Member	JPY 48,000	JPY 55,000
Student	JPY 12,000	JPY 15,000
Additional copy of technical digest	JPY 10,000	JPY 10,000
Accompanying persons[*2]	JPY 10,000	JPY 10,000

[*1] Member of sponsor and cooperative society.

[*2] Accompanying persons registration fee includes
Reception ONLY.

JPY : Japanese Yen

● Registration

Those who wish to attend ODF'10 Yokohama should make on-line registration. The deadline for advanced registration is March 19, 2010. On-site registration at the conference site will also be accepted, but early registration is highly recommended. The on-line registration page will be available at the ODF'10 web site.

● Accompanying persons

Participants can register accompanying persons. Accompanying persons are his/her family members.

● Cancellation Policy

There will be no refunds for the registration fee.

EXECUTIVE COMMITTEE MEMBERS

General Chair: K. Kodate (Japan Women's Univ. / Japan)

Advisory Board

- E. Betensky (EBC / Canada)
- J. Braat (Delft Univ. of Technol. / Netherlands)
- A. Friberg (KTH / Sweden)
- J. Hsu (EOL ITRI / Taiwan)
- Y. Ichioka (Osaka Univ. Prof. Emeritus / Japan)
- M. Isshiki (Isshiki Opt. / Japan)
- Y. Ito (Tokyo Metropolitan College of Industrial Technology /
Japan)

- B. Y. Kim (KAIST / Korea)
- C. C. Lee (National Central Univ. / Taiwan)
- S. Minami (ODG Advisory / Japan)
- D. T. Moore (Univ. of Rochester / USA)
- Y. P. Park (Yonsei / Korea)
- R. Shannon (Univ. of Arizona / USA)
- K. Singh (IIT / India)
- K. Tatsuno (Hitachi / Japan)
- K. Thompson (ORA / USA)
- T. Tsuruta (Nikon / Japan)
- K. Yamamoto (KM OptLab / Japan)
- B. Zhou (Tsinghua Univ. / China)

Organizing Committee

Chair : H. Ooki (Nikon / Japan)

Members:

- Y. Arakawa (The Univ. of Tokyo / Japan)
- B. Berge (Varioptic / France)
- F. Bociort (Delft Univ. Technology / Netherlands)
- J. Burge (Univ. of Arizona / USA)
- T. Dohi (Opti Works Inc. / Japan)
- N. Dubreuil (Institut d'Optique / France)
- M. Haruna (Osaka Univ. / Japan)
- K. Itoh (Osaka Univ. / Japan)
- K. Kuroda (The Univ. of Tokyo / Japan)
- T. Kurokawa (Tokyo Univ. of Agriculture & Tech. / Japan)
- B. Lin (TSMC / Taiwan)
- Y. S. Liu (National Tsing Hua Univ. / Taiwan)
- R. Magnusson (Univ. of Connecticut / USA)
- K. Maruyama (HOYA / Japan)
- H. Miyamae (Konica Minolta Opto / Japan)
- T. Murakami (Toshiba / Japan)

R. Ogawa (HOYA / Japan)
K. Okamoto (UC Davis / USA)
Y. Ono (Ritsumeikan Univ. / Japan)
J. Rolland (Univ. of Central Florida / USA)
H. Suzuki (Topcon / Japan)
M. Takeda (The Univ. of Electro-Communications / Japan)
M. Tanaka (Nikon / Japan)
J. Tokumitsu (Canon / Japan)
R. Y. Tsai (EOL ITRI / Taiwan)
D. Williamson (NRCA / USA)
T. Wilson (Oxford / UK)
M. Wu (UCB / USA)
T. Yatagai (Utsunomiya Univ. / Japan)
P. Urbach (Delft Univ. of Tech. / Netherlands)
J. Zhu (SIOM / China)

Program Committee

Chair : K. Araki (Canon, Utsunomiya Univ. / Japan)

Members:

Y. Aono (Nikon / Japan)
D. Erickson (Cornell Univ. / USA)
J. Gluckstadt (Tech. Univ. of Denmark / Denmark)
M. Gu (Swinburne Univ. of Tech. / Australia)
D. Hasenauer (ORA / USA)
B. Hendriks (Philips / Netherlands)
H. P. Herzig (EPFL / Switzerland)
Y. Honguh (Toshiba / Japan)
M. Itoh (Univ. of Tsukuba / Japan)
A. Kamshilin (Univ. of Kuopio / Finland)
R. Katayama (NEC / Japan)
M. Kato (Canon / Japan)
H. Kikuta (Osaka Pref. Univ. / Japan)
T. Konishi (Osaka Univ. / Japan)
P. Lam (Lam Optics / USA)
C. W. Liang (National Central Univ. / Taiwan)
S. H. Lin (National Chiao Tung Univ. / Taiwan)
I. Livshits (St. Petersburg State Univ. of ITMO / Russia)
K. Maru (Gunma Univ. / Japan)
T. Milster (Univ. of Arizona / USA)
H. Miyajima (Olympus / Japan)
E. Nishigohri (Cybernet Systems / Japan)
E. Okada (Keio Univ. / Japan)
S. H. Park (Yonsei Univ. / Korea)

H. Sato (Konica Minolta Opto / Japan)
M. Saori (HOYA / Japan)
R. Sawada (Kyushu Univ. / Japan)
M. Shibuya (Tokyo Polytech. Univ. / Japan)
T. Shimura (The Univ. of Tokyo / Japan)
C. C. Sun (National Central Univ. / Taiwan)
W. S. Sun (National Central Univ. / Taiwan)
T. Tanaka (RIKEN / Japan)
Y. Tanaka (Panasonic / Japan)
W. Ulrich (Zeiss / Germany)
S. Ura (Kyoto Inst. Tech. / Japan)
S. Yamaguchi (Konica Minolta Opto / Japan)
T. Yamanashi (Panavision / USA)
Y. Wang (Beijing Inst. of Tech. / China)
A. Wood (Qioptiq / UK)

Steering Committee

Chair : H.Tsuchida (Olympus / Japan)

Members:

K. Adachi (Olympus / Japan)
T. Akiyama (Cybernet Systems / Japan)
K. Ichihashi (Panasonic / Japan)
H. Ishikawa (Fuji Film / Japan)
H. Kawano (Mitsubishi Electric / Japan)
K. Kimura (Sony / Japan)
S. Kogo (Konica Minolta Opto / Japan)
M. Kuwata (Mitsubishi Electric / Japan)
H. Morishima (Canon / Japan)
A. Obama (Nikon / Japan)
M. Saika (Topcon / Japan)
T. Shibatoko (NEC / Japan)
T. Shimano (Hitachi Maxell / Japan)
H. Takamine (Toshiba / Japan)
S. Takeuchi (HOYA / Japan)
H. Tatsuno (Ricoh / Japan)
M. Utsuno (Optronics / Japan)
Y. Wada (Olympus / Japan)
E. Watanabe (Japan Women's Univ. / Japan)

CONFERENCE SITE

The PACIFICO YOKOHAMA is located in the Yokohama Minato Mirai District besides many landmark buildings: the, Queen's Square Yokohama and Yokohama Landmark Tower.

● Address

1-1-1 Minato Mirai, Nishi-ku, Yokohama 220-0012, Japan
Transportation Guide: TEL +81-45-221-2166
Information: TEL +81-45-221-2155
<http://www.pacifico.co.jp/english/facility/index.html>

● Access

From Narita International Airport

Take the JR Narita Express Train to JR Yokohama Station or the Airport Limousine Bus to YCAT (Yokohama City Air Terminal). The journey time is around 90 minutes.

YCAT is connected with Yokohama Station in the underground passage(5-minutes walk).

From JR Yokohama Station

(1) JR Keihin-Tohoku Line

Take the JR Keihin-Tohoku Line to JR Sakuragicho Station (3-minutes). 12-minutes walk, 7 minutes by bus to the conference site.

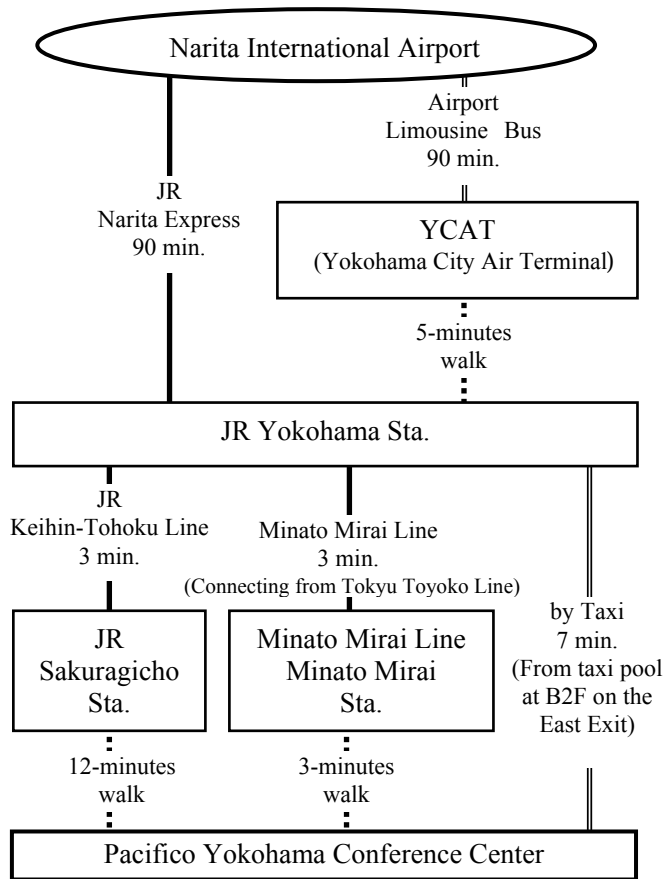
(2) Minato Mirai Line

Take Minato Mirai Line to Minato Mirai Station (3-minute). You can walk for 200 m to reach the conference site.

(3) Taxi

By taxi, it costs around JPY 1,500 to reach the conference center Main Entrance. The journey time is around 7 minutes.

<http://www.pacifico.co.jp/english/facility/accessmap.html>



HOTEL RESERVATION

● Hotel

Accommodation information will be available in our website. Some hotels in Yokohama area are arranged for ODF'10 participants. Online hotel reservation system (JTB) will be also available in our website.

Name of Hotel (Check-in/out)	Rates (JPY)		Address
	Single	Twin	
Intercontinental Yokohama The Grand (14:00 / 11:00)	19,950 – 30,450	12,600 – 21,000	1-1-1 Minatomirai, Nishi-ku, Yokohama, Kanagawa, 220-8522 Tel: +81-45-223-2222 Fax: +81-45-221-0650
Pan Pacific Yokohama Bay Hotel Tokyu (14:00 / 11:00)	21,000 – 31,500	10,500 – 17,850	2-3-7 Minatomirai Nishi-ku, Yokohama, Kanagawa, 220-8543 Tel: +81-45-682-2222 Fax: +81-45-682-2223
Yokohama Royal Park Hotel (14:00 / 11:00)	21,000 – 30,450	13,650 – 21,000	2-2-1-3 Minato Mirai, Nishi-ku, Yokohama, Kanagawa, 220-8173 Tel: +81-45-221-1111 Fax: +81-45-224-5153
Yokohama Sakuragicho Washington Hotel (14:00 / 10:00)	9,975 – 14,280	8,085 – 12,705	1-101-1 Sakuragi-cho, Naka-ku Yokohama, Kanagawa, 231-0062 Tel: +81-45-683-3111 Fax: +81-45-683-3112
APA Hotel Yokohama-Kannai (15:00 / 11:00)	9,000	-	3-37-2 Sumiyoshi-cho, Naka-ku, Yokohama, Kanagawa, 231-0013 Tel:+81-45-650-6111 Fax: +81-45-683-3112
Comfort Hotel Yokohama Kannai (15:00 / 10:00)	7,500	6,000	3-33 Sumiyoshi-cho, Nakaku, Yokohama, Kanagawa, 231-0013 Tel:+81-45- 650-4711 Fax:+81-45- 650-4712
Hotel Route Inn Yokohama Bashamichi (15:00 / 10:00)	6,900	6,100	4-53-1, Bentendori, Naka-ku, Yokohama, Kanagawa, 231-0007 Tel:+81-45-227-8911 Fax:+81-45-227-8912

*For accommodation details, please check the hotel list displayed on the reservation screen.

*Rates are valid for the stay from April 17 to 21, 2010.

*The hotel rates are per person, per night, including breakfast, service charge and consumption tax.

*Room rates are different from day to day. Please confirm it in online hotel registration system

● **Cancellation Policy**

In case of cancellation, your deposit will be refunded after deducting the cancellation fees as follows.

*JTB shall make the corresponding refund within the 7th day from the next day of cancellation, when effecting refund before tour departure.

*Please revise and/or cancel your reservation by logging-in to your 'My Page' in online hotel registration system.

*Cancellation fee when notice is given:

4 days or more days prior to the first night of stay:

No charge

1 to 3 days before the first night of stay:

20% of total room charge

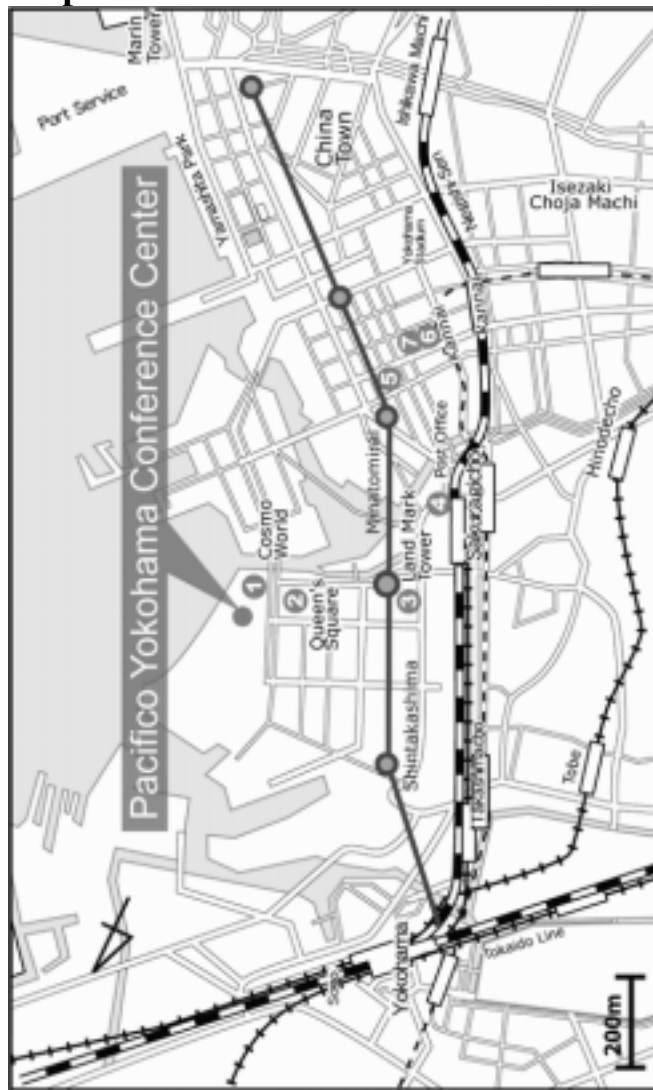
On the first night of stay:

50% of total room charge

After the first night of stay or no notice given:

100% of total room charge

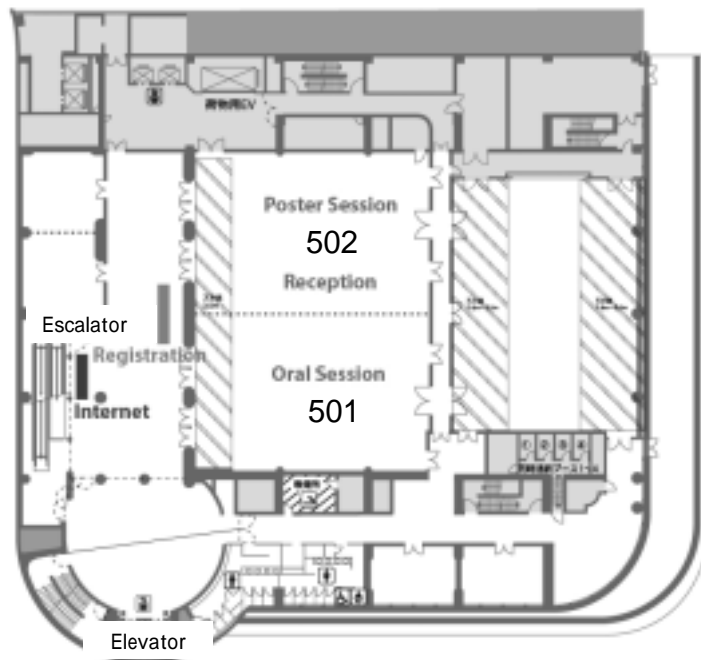
Map of Hotel Location



1. Intercontinental Yokohama The Grand
2. Pan Pacific Yokohama Bay Hotel Tokyu
3. Yokohama Royal Park Hotel
4. Yokohama Sakuragicho Washington Hotel
5. Hotel Route Inn Yokohama Bashamichi
6. Comfort Hotel Yokohama Kannai
7. APA Hotel Yokohama-Kannai

Conference Center Floor Map (5F) Room 501 and 502

Date	Room 501	Room 502	Registration
April 19 (Mon)	Oral (9:00-18:15)	Reception (18:30-20:00)	8:00-19:00
April 20 (Tue)	Oral (8:30-19:05)	Poster (1) (10:00-12:00) Poster (2) (14:00-16:00)	8:00-19:00
April 21 (Wed)	Oral (8:30-16:50)		8:00-16:00



5F 平面図

Floor plan of the 5th floor

Deadlines

Post Deadline Papers:	February 26, 2010
Hotel Reservation:	March 17, 2010
Discount Registration:	March 19, 2010
Online Registration:	March 30, 2010
On-site Registration :	April 19-21, 2010

**For information mail to
ODF'10 Secretariat**

Tsuyoshi Hayashi

Proactive Inc.

85-1 Edo-machi, Chuo-ku, Kobe 650-0033, Japan

TEL: +81-78-332-2505 FAX: +81-78-332-2506

E-mail: odf10@odf.jp

林 剛志

株式会社 プロアクティブ

〒650-0033 神戸市中央区江戸町 85-1

ベイ・ウイング神戸ビル 10F

電話:078-332-2505 FAX:078-332-2506

E-mail: odf10@odf.jp