th ADVANCE PROGRAM 6 International Conference on Optics-photonics Design & Fabrication (co-located with OPTO Taiwan 2008)



"ODF '08, Taipei" June 9-11, 2008



Taipei International Convention Center (台北國際會議中心) Taipei, Taiwan

Organized by

The Optical Engineering Society, Taiwan NCU (National Central University / Taiwan) ODG (Optics Design Group of OSJ / Japan) Co-organized by Industrial Technology Research Institute Photonics Industry & Technology Development Association National Tsing Hua University National Chiao Tung University Sponsored by The Optical Engineering Society, Taiwan NSC (National Science Council / Taiwan) The National Education Program on Image Display, Taiwan Optical Society of Japan (Japan Society of Applied Physics) In Cooperation with International: ICO (International Commission for Optics) · EOS (European Optical Society) • OSK (Optical Society of Korea) • OSA (Optical Society of America) • SPIE (The International Society for Optical Engineering) • Taiwan: Taiwan Optics/Optronics Manufacturers' Association • The Physical Society of ROC • Chinese Institute of Engineers • Japan: Applied Optics Meeting in Kansai • IEICE (The

Institute of Electronics, Information and Communication Engineers) • IIEEJ (The Institute of Image Electronics Engineers of Japan) • JIEP

(Japan Institute of Electronics Packaging) • JOEM (Japan Optomechatronics Association) • JOMA (Japan Optical Measuring Instruments 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)

Technical Co-sponsor

IEEE/LEOS (The IEEE Lasers and Electro-Optics Society)



Post-Deadline Paper Submission by April 23, 2008 http://www.odf08.tw

TIME TABLE

June 9 (Mon.)		June 10 (Tue.)			
09:00	Opening Session	08:30	Optical T Optical mea	echnolo Isureme Proces	ogy (1) ents,
09:10	Plenary Session		Biomedical Other Tech	Photon nology	ics,
10:25	Coffee Break	10:05	Coff	ee Brea	k
10:45	Symposium on Lighting Optics	10:25	Optical Technology (2) Optical measurements, Information Processing, Biomedical Photonics, Other Technology		
12:00	Lunch	11:50	Lunch		
13:00	Optical Design / Simulation(1) Lens Design, Optical System Design, Optical	12:50 14:00	Optical Technology (3) Optical measurements, Information Processing, Biomedical Photonics, Other Technology		
	Simulation, Lens Design Software	14:20	Optical C Dev DOEs, HOE	Compon vices (1) Es. Mici	nents /) rooptics.
15:05 15:25	Coffee Break Optical Design / Simulation (2) Lens Design, Optical System Design, Optical	16.10	Thin Film, Waveguide, Optical Communication, Lasers, MEMS, Optical Fabrication and Testing, Other Components		
	Simulation,	16.10	Snecial		
	Lens Design Software	10.40	Session for LED Lighting	17:00	
17:30	Break	18:25	Optics		Poster
18:00 20:00	Reception		· •	20:00	

Registration Hours 08:00- Registration Hours 08:00-

June 11 (Wed.)		June 12 (Thu.)
08:30	Optical Components / Devices (2) DOEs, HOEs, Microoptics, Thin Film, Waveguide, Optical Communication, Lasers, MEMS, Optical Fabrication and Testing, Other Components	Optional Tour National Palace Museum (09:00~17:30)
10:05	Coffee Break	
10:25	Optical Components / Devices (3) DOEs, HOEs, Microoptics, Thin Film, Waveguide, Optical Communication, Lasers, MEMS, Optical Fabrication and Testing, Other Components	
11:45	Optical System (1) Microscopes, Cameras, Optical Lithography, Optical memory, Other system	
12:10	Lunch	
13:10	Optical System (1) Microscopes, Cameras, Optical Lithography, Optical memory, Other system	
14:10	Coffee Break	
14:30	Optical System (2) Microscopes, Cameras, Optical Lithography, Optical memory, Other system	
16:05	Break	
16:20	Optical System (3) Microscopes, Cameras, Optical Lithography, Optical memory, Other system	
17:55 18:20	Closing Session	

Registration Hours 08:00-

TECHNICAL PROGRAM

June 9, 2008 (Monday)

Opening Session (9:00-9:10)

Presiders:

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

Opening Remarks

L. C. Lee (National Central Univ. / Taiwan) K. Tatsuno (Hitachi / Japan)

Plenary Session (9:10-10:25)

Presiders:

C. C. Lee (National Central Univ. / Taiwan) K. Tatsuno (Hitachi / Japan)

9PL-01 (Invited)

(9:10) Advances in Interferometric Surface Measurement

J. Millerd, N. Brock, J. Hayes, B. Kimbrough, M. North-Morris, J. C. Wyant (Univ. of Arizona / USA)

The use of a micropolarizer phase-shifting array for simultaneously obtaining several phase-shifted interferograms is described. The application of these techniques for the testing of optical components in the presence of vibration is discussed.

9PL-02 (Invited)

(9:35) Nonlinear Ultra-fast Focal-point Optics for 3-D Microscopy of Organic and Inorganic Substances

K. Itoh (Ôsaka Univ. / Japan)

When ultra-fast laser pulses are tightly focused, nonlinear phenomena readily occur at the focal point almost independently from the material types and phase matching conditions. We utilized these phenomena for novel nonlinear-optical microscopy.

9PL-03 (Invited)

(10:00) Thin Film Design for Liquid Crystal Displays (Plenary Paper)

P. Yeh (Univ. of California / USA)

This paper reviews some of the most important developments in the design of birefringent optical thin films including polarizers, uniaxial and biaxial compensators for improving the viewing quality of various modes of liquid crystal displays.

Coffee Break (10:25-10:45)

Symposium on Lighting Optics (10:45-12:00) Presiders:

J. L. Chern (National Chiao Tung Univ. / Taiwan) J. Y. Chang (National Central Univ. / Taiwan)

9SY-01 (Invited)

(10:45) White-light LED modeling and lighting design

C. C. Sun, W. T. Chien, T. X. Lee, S. H. Ma (National Central Univ. / Taiwan)

In this paper, an optical modeling algorithm for the verification in mid filed is introduced. We apply the algorithm to model various LEDs, including white-light LED with single chip and multi chips. The modeled LEDs can be precisely simulated for the light patterns in mid filed and far filed. Based on the precise optical model, we present several kinds of lighting design.

9SY-02 (Invited)

(11:10) Free-Form Optics for Illumination

J. C. Miñano (Universidad Politécnica de Madrid / Spain), P. Benitez (LPI / USA)

Illumination optics has been the first to benefit from advances in free-form tooling mainly because its less tight requirements. The available free-form design tools are reviewed with special attention to the most powerful: 3DSMS design method.

9SY-03 (Invited)

(11:35) Lighting Optics: from street light, indoor lighting to handyphone flashlight

J. L. Chern (National Chiao Tung Univ. and Foxsemicon Integrated Tech. / Taiwan)

Several lighting optical approaches to LED illumination design are illustrated with real-field examples that developed in FITI. Examples included outdoor light, indoor light and consumer optics, such as street light, T-bar light, and handyphone flashlight.

Lunch (12:00-13:00)

Optical Design/Simulation (1) (13:00-15:05) Presiders:

C. H. Chen (Natiomal Tsing-Hua Univ. / Taiwan) K. Araki (Canon / Japan)

9S1-01 (Invited)

(13:00) Zoom Lenses: A Continuing Evolution

E. Betensky (Light Capture / Canada) Zoom lenses have been most desired for many imaging applications. Until recently quality and the cost of achieving high quality have limited their use. Now, small sensors and aspherical surfaces improvements have enhanced their acceptance.

9S1-02

(13:25) History and Present Technologies of Optical Design for the Broad Focal Range Zoom Lenses

S. Sakuraba (Tamron / Japan)

This document relates to an evolution in the past 15 years since 1992 and current trend of Tamron's optical design since its inception of the first generation of zoom lenses with broad focal length ranges.

9S1-03

(13:40) Optical solutions for multy-pixels digital cameras for optics-information applications.

I. L. Livshits, I. G. Bronchtein, V. N. Vasiliev (Saint Petersburg State Univ. of Information Technologies / Russia)

Progress in multi-pixel cameras requires diffraction-limited objectives. Existing objectives not always satisfy scientific and industrial demands. Simulation method and lenses examples for digital cameras with resolution over 5 Mpxl are given.

9S1-04 (Invited)

(13:55) Slope Error Tolerances for Optical Surfaces

J. R. Rogers (Optical Research Associates / USA)

We examine, as possible methods of specifying tolerances for aspheric surfaces, the effect of RMS surface error and peak slope error on the performance of the system, in terms of MTF and Strehl Ratio.

9S1-05

(14:20) Software Lens Compensation Applied to Athermalization of Infrared Imaging Systems

H. Y. Sung, S. S. Yang (National Tsing Hua Univ. / Taiwan), H. Chang (Industrial Technology Research Institute / Taiwan)

We propose a design methodology of computational MWIR imaging lens. The PSF is almost invariant to temperature change. Consequently, the constant blur can be removed by simple digital signal processing. We refer that as software lens compensation.

9S1-06

(14:35) Off-axis Performance Analysis of Wavefront Coded Imaging System

C. C. Chang, C. C. Lee (National Central Univ. / Taiwan), L. Angot, H. Y. Tsao, C. W. Chang (Industrial Technology Research Institute / Taiwan),

Point spread functions at different field angles and phase deviations of the cubic mask are used for image restoration to analyze the off-axis performance of wavefront coded imaging system.

9S1-07

(14:50) The Optical Design of the Catadioptric Super-Telescope Having Self-Corrective Structures to be Tolerant of Temperature Changes

Y. Kobayashi, W. Teshima (Prime Optics / Japan), A. Kojima (Konan Medical / Japan)

We achieved an optical design of the catadioptric super-telescope which has stable performance under the huge changes of ambient temperature by assigning the suitable power and material for each element comprising the optical system.

Coffee Break (15:05-15:25)

Optical Design/Simulation (2) (15:25-17:30) **Presiders:**

I. Livshits (Saint-Petersburg State Univ., / Russia) H. F. Shih (Chung-Hsing Univ., Taiwan)

9S1-08 (Invited)

(15:25) Wide-angle Optical System for Slim Rear Projectors

M. Kuwata, T. Sasagawa (Mitsubishi Electric / Japan) With the unprecedented wide-angle projection optical systems developed in recent years, rear projectors are rapidly getting slimmer and slimmer. This paper describes the technical trends of a wide-angle projection optical system for slim rear projectors.

9S1-09

(15:50) Three-Dimensional Design of a Wide-Angle Reflective System with Spiral Optical Axis

T. Nakano, Y. Matsumoto, Y. Tamagawa (Mithsubishi Electric / Japan)

A design method of asymmetric three-mirror system with spiral optical axis is proposed. An example system of F/2 and 30x24 degrees field-of-view is designed and fabricated for infrared imaging applications.

9S1-10

(16:05) Design of Double Cassegrain Reflective Mirrors for Optical System Of Infrared Cameras

S. W. Wang (Jenteh Junior College of Medicine, Nursing and Management / Taiwan), R. S. Chang, P. H. Chien (National Central Univ. / Taiwan), C. H. Lin (Hua Shia College of Technology and Commerce / Taiwan)

Design of double Cassegrain reflective mirrors for infrared cameras is presented. Initial results show that this system is better than Cassegrain reflectors in aberration correction and image resolution, but less than Petzval doublets in price.

9S1-11

(16:20) Technique to manage polarization aberrations

N. Kita (Nikon / Japan)

In this paper we propose a technique, which is effective to manage polarization aberrations in optical systems. This technique is constructed by naturally extending a concept of the scalar imaging theory to vector imaging theory.

9S1-12 (Invited)

(16:35) New Mechanical Configurations to Maximize Dynamic Range and Optimize Resolution of Optical Instruments

C. K. Lee (National Taiwan Univ. and Industrial Technology Research Institute / Taiwan), S. S. Lee (National Taiwan Ocean Univ. / Taiwan), T. D. Cheng, C. K. Chang (National Taiwan Univ. / Taiwan)

New mechanical configurations which combine various optical techniques have been designed to maximize dynamic range and optimize resolution of optical instruments. In our new configuration, we adopted and integrated devices such microscopic, as а an electronic speckle interferometer, an pattern interferometer, and a photon tunneling microscope. These new innovative integrated optomechanical configurations can be shown to enhance the performance of optical metrology systems.

9S1-13

(17:00) Design of an Objective Lens for Optical Disc Systems Employing a Blue Laser by Scalar Diffraction Simulation

N. Yamagata, S. Takeuchi, K. Yamanaka, D. Koreeda, K. Maruyama (HOYA / Japan)

We have designed an HD DVD/DVD/CD compatible objective lens via a multiple diffractive structure. We have reduced the influence of noise light during the playback of each disc by the simulation of playback performance of the discs.

9S1-14

(17:15) High Efficiency Collimator for HD-DVD Pick-Up Head

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

We present a novel design on collimator for highly efficient pick-up head with a horizontal beam expander by using two methods. One is to use two cylindrical lenses, the other is to use two prisms.

Break (17:30-18:00)

Reception (18:00-20:00)

June 10, 2008 (Tuesday)

Optical Technology (1) (8:30-10:05) Presiders:

F. J. Kao (National Yang-Ming University, Taiwan) E. Okada (Keio Univ. / Japan)

10S2-01 (Invited)

(8:30) Scattering suppression for imaging through diffuse medium - Clear transcutaneous fluorescent imaging of small animals -

K. Shimizu (Hokkaido Univ. / Japan)

With near-infrared light we can obtain transillumination image or transcutaneous fluorescent image of animal body. Image blurring due to diffuse scattering can be effectively suppressed by the extraction of near-axis scattered component and by PSF-deconvolution.

10S2-02 (Invited)

(8:55) Digital Holographic Microscopy (DHM) applied to metrology and biomedical applications

C. Depeursinge (Ecole Polytechnique Fédérale de Lausanne / Switzerland)

Digital Holographic Microscopy (DHM) is an imaging technique offering high accuracies and resolution allied to rapidity and robustness. It appears a an innovative imaging modality in metrology and in biomedicine by providing absolute phase contrast microscopy.

10S2-03

(9:20) Cell Culture Device using Spatial Light Modulator

C. J. Ou (Hsuiping Institute of Technology / Taiwan), C. I. Shen, H. L. Su (National Chung Hsing Univ. / Taiwan) Spatial light modulator is introduced for cell culturing and related bio-experiment. Advantages and drawbacks for two different approaches are discussed, and the guiding of the HMC cell is demonstrated to prove the feasibilities of the concept.

10S2-04

(9:35) CT imaging of diffuse medium by time-resolved measurement of backscattered light - Evaluation of spatial resolution with biological tissue –

T. Namita, Y. Kato, K. Shimizu (Hokkaido Univ. / Japan) For cross-sectional imaging of an animal body, the technique using backscattered light and repetitive inverse solution was developed. With a block of meat, the applicability and the spatial resolution of the proposed technique were examined.

10S2-05

(9:50) Three-dimensional imaging using computergenerated holograms synthesized from 3-D Fourier spectra

T. Yatagai (Univ. of Tsukuba and Utsunomiya Univ. / Japan), K. Miura, Y. Sando, M. Itoh (Univ. of Tsukuba / Japan)

Computer-generated holograms synthesized from projection images of real existing biological objects are proposed. The 3-D Fourier spectrum of the object is calculated and its Fresnel CGH is synthesized.

Coffee Break (10:05-10:25)

Optical Technology (2) (10:25-11:50) Presiders:

A. Kamshilin (Univ. of Kuopio / Finland) T. Shimura (The Univ. of Tokyo / Japan)

10S2-06 (Invited)

(10:25) Surface Plasmonic Microscopy for Live Cell Membrane Imaging

S. J. Chen (National Cheng Kung Univ. / Taiwan)

This study presents a surface plasmon-enhanced total internal reflection fluorescence microscopy (TIRFM) and a surface plasmon polariton (SPP) phase microscopy techniques to image living cell membranes simultaneously. The developed microscopy technique is successfully applied to observe the thrombomodulin proteins on living cell membranes in real time.

10S2-07

(10:50) Validation of Diffusion Approximation for the Calculation of Light Propagation in the Realistic Adult Head Model

Y. Oki, H. Kawaguchi, E. Okada (Keio Univ. / Japan) Light propagation in the realistic adult head model is calculated by the finite element method based on diffusion approximation and the results are validated by Monte Carlo method.

10S2-08

(11:05) Transmission type angle deviation microscopy

M. H. Chiu, C. W. Lai, C. T. Tan, C. F. Lai (National Formosa Univ. / Taiwan)

A new microscopy technique named transmission type angle deviation microscopy (TADM) is presented. The method has some merits, such as high axial resolution (\sim 1nm), non-destruct and non-contact measurement, larger measure ranges(\pm 80um) can perform without conductivity and pre-treatment.

1082-09

(11:20) Non-invasive Investigation of InGaN LEDsby Two-photon OBIC and PL Laser Scanning Microscopy

P. T. Chou, S. B. Huang (Industrial Technology Research Institute / Taiwan), Y. F. Lin, C. S. Weng (National Sun Yat-sen Univ. / Taiwan), F. J. Kao (National Sun Yat-sen Univ. and National Yang-Ming Univ. / Taiwan)

We have implemented two-photon laser scanning microscopy to investigate InGaN based LEDs. The microscopy mapping on the LEDs is conducted through photoluminescence(PL) and optical-beam induced current (OBIC). In this way, non-destructive analysis can be effectively conducted.

10S2-10

(11:35) Optical Properties of Gold Evaporated Porous Alumina Plate

T. Tani, Y. Tomaru, M. Naya (Fujifilm / Japan)

Optical sensor using gold evaporated porous alumina plate is investigated. Numerical simulation result indicates localized surface plasmon resonance and micro cavity resonance affect each other in this plate.

Lunch (11:50-12:50)

Optical Technology (3) (12:50-14:00) Presiders:

A. Asundi (Nanyang Tech. Univ. / Singapore) M. Itoh (Univ. of Tsukuba / Japan)

10S2-11 (Invited)

(12:50) Statistics of dynamic speckles in application to distance measurements

A. A. Kamshilin, D. V. Semenov, E. Nippolainen (Univ. of Kuopio / Finland)

Statistics of dynamic speckles generated with a scanning laser beam differs from that of created by a moving surface. Proper analysis of the correlation parameters allows us to optimize performance of the speckle distance sensor.

10S2-12

(13:15) Depth-Resolved Visualization of Stress-Induced Anisotropy inside Bent Optical Fibers by Use of Four-Wave Mixing Microscopy

Y. Ozeki, T. Kawasumi, K. Itoh (Osaka Univ. / Japan)

Stress-induced anisotropy is successfully visualized with a depth resolution by four-wave mixing (FWM) microscopy. We confirm that the changes in FWM intensity have different signs for the two polarizations and are proportional to applied stress.

10S2-13

(13:30) Photonic-Crystal-Fiber-Based Frequency Shifter with a 1.2-2.2-µm Tuning Range

M. C. Chan, S. H. Chia, T. M. Liu, T. H. Tsai, M. C. Ho (National Taiwan Univ. / Taiwan), A. A. Ivanov (Russian Academy of Sciences / Russia), A. M. Zheltikov (M. V. Lomonosov Moscow State Univ. / Russia), J. Y. Liu, H. L. Liu (National Taiwan Normal Univ./ Taiwan) Chi-Kuang Sun (National Taiwan Univ. and Academia Sinica / Taiwan),

A widely tunable femtosecond light source based on a Cr: Forsterite laser and a nonlinear photonic-crystal-fiber is reported. With a 910nm tuning range, this simple, easily-tunable, and low-cost source could be widely applicable for many applications.

10S2-14

(13:45) Multiplexing of multimode optical fiber sensor by using vectorial wave mixing in CdTe: V photorefractive crystal

S. D. Girolamo, A. A. Kamshilin (Univ. of Kuopio / Finland), R. V. Romanshko, Y. N. Kulchin (Institute of Automation & Control Processes / Russia), J. C. Launay (Univ. Bordeaux / France)

We propose novel multiplexing system of strain sensors in which multimode optical fibers are used as sensitive elements. High sensitivity and low cross-talk is achieved via vectorial wave mixing in CdTe:V crystal in reflection geometry.

Coffee Break (14:00-14:20)

Optical Components/Devices (1) (14:20-16:25) Presiders:

M. L. Wu (National Central Univ./ Taiwan) R. Sawada (Kyushu Univ. / Japan)

10S3-01 (Invited)

(14:20) Advances in Optical Microelectromechanical Systems and Nanophotonics

C. Lee (National Univ. of Singapore and Institute of Microelectronics, A*STAR / Singapore)

In this review, technology fusion of optical MEMS and nanophotonics is reported. Tunable optical filters, modulators, add/drop, switches have been highlighted, while feasibility of nanophotonics as physical and bio/chemical sensors has been evaluated.

10S3-02 (Invited)

(14:45) Application of Fiber-optic Technology for PCB-based Optical Interconnection Systems

H. H. Park, T. W. Lee, D. W. Kim, S. H. Hwang, S. K. Kang (Information and Communications Univ. / Korea) We present optical interconnection schemes and packaging solutions based on the fiber-optic technology. Silica fibers were used to fabricate optical PCBs and 90°-deflection connectors, employing ferrule-type guide pins for passive assembling of the connectors and transceiver modules.

1083-03

(15:10) Generation of Periodic Sawtooth Optical Intensity by Phase-Shifting Mask

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

Phase-shifting mask was designed to launch multiple diffraction beams so that resultant interference pattern fit torequired optical intensity profile. Fine surface-relief pattern on mask was fabricated, and sawtooth optical intensity profile wasdemonstrated.

10S3-04

(15:25) Design and fabrication of an electrooptic frequency shifting multiplier based on a domain engineering of a LiTaO₃ crystal

S. Hisatake, T. Konishi, T. Nagatsuma (Osaka Univ. / Japan), T. Kobayashi (Osaka Univ. / Japan)

10-GHz-order frequency shifting multiplier has been fabricated. The multiplication is based on the successive Bragg diffraction from a traveling-wave-phase-grating, which is realized by slant periodic damain inversion in a traveling-wave electrooptic phase modulator.

10S3-05

(15:40) Different Emission Spectra of Plasmonic Thermal Emitter with Hexagonal and Squared Lattice

Y. T. Chang, C. F. Chan, D. C. Tzuang, S. R. Tsai, Y. T. Wu, Y. H. Ye, J. W. Jiang, S. C. Lee (National Taiwan Univ. / Taiwan)

The tri-layer Ag/SiO2/Ag plasmonic thermal emitter with hexagonal lattice generates only one specific (1, 0) Ag/SiO2 emission peak, no surface (1, 0) Ag/air plasmon polariton was observed, whereas a similar thermal emitter with squared lattice generates both (1, 0) Ag/SiO2 and (1, 0) Ag/air emission peaks.

10S3-06

(15:55) Amplitude-Phase Modulation Technique using Phase-Only Filter for Optical Intensity Equalizer

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

We propose a direct amplitude-phase modulation technique using phase-only filter for our proposed optical intensity equalizer. We fabricate a phase-only filter based on this technique and demonstrate its validity in the proposed optical intensity equalizer.

Break (16:10-16:40)

Special Session for LED Lighting Optics (16:40-18:25) Presiders:

J. C. Miñano (Universidad Politécnica de Madrid / Spain) C. C. Sun (National Central Univ. / Taiwan)

10SS-01

(16:40) A New Approach to Predict Spectra of White LEDs

H. Ohno (Toshiba / Japan), M. Toda (Toshiba Lighting & Technology / Japan)

Based on the optical diffusion equation, we constructed a new method to predict spectra of white LEDs composed of a blue LED and down-conversion yellow phosphors. The calculated spectra agreed well with experimental results.

10SS-02

(16:55) Patterning periodical motif on substrates by monolayer of microspheres: Application on GaN LEDs

C. H. Chan, C. H. Hou, H. T. Chien, S. J. Jeng, J. W. Yan, C. C. Chen (National Central Univ. / Taiwan), C. K. Huang, K. H. Hsieh (National Taiwan Univ. / Taiwan) We demonstrate a method by using polystyrene spheres to pattern the GaN substrate. It was found the total lighting output of the sphere patterned GaN LED to be enhanced to 37%.

10SS-03

(17:10) Microcavity Top-Emitting OLEDs Integrated With Micro-Particle Diffusers: Simultaneous Enhancement of Efficiencies and Color Performances

C. C. Liu, S. H. Liu, C. J. Yang, C. K. Chang, K. C. Tien, T. Y. Cho, C. C. Wu (National Taiwan Univ. / Taiwan)

In this paper, we show that by integrating top-emitting OLEDs with diffuser films, efficiencies and color performances can be simultaneously enhanced, angular dependence becomes more like Lambertian distribution and simpler fabrication, making it attractive for OLED applications.

10SS-04

(17:25) Theoretical and experimental demonstration of enhanced light extraction efficiency in III-nitride-based micro-array light-emitting diodes

P. S. Lee, Y. C. Lee, C. H. Kuo, J. Y. Chang, M. L. Wu (National Central Univ. / Taiwan)

The mechanism of enhanced light extraction efficiency in III-nitride-based light-emitting diodes (LEDs) with microstructures is demonstrated numerically and experimentally. The analysis of the mechanism is aimed at the photonic behavior to enhance light extraction effectively.

10SS-05

(17:40) Characteristics of InGaAs Sub-monolayer Quantum-Dot Photonic-Crystal LEDs in the 980nm Range

H. P. D. Yang, J. Y. Chi (Industrial Technology Research Institute / Taiwan), R. Xuan (Industrial Technology Research Institute and National Chiao Tung Univ. / Taiwan), Z. E. Yeh, H. C. Kuo (National Chiao Tung Univ. / Taiwan)

InGaAs sub-monolayer quantum-dot photonic-crystal light-emitting diode for fiber-optic communications in 980 nm range is reported. The device is consisted of top and bottom DBRs, and SML QD active region, with PhC structure for light extraction.

10SS-06

(17:55) New collection systems for multi LED light engine

J. W. Pan, S. H. Tu, C. M. Wang, J. Y. Chang (National Central Univ. / Taiwan), Y. C. Lee (Chung Yuan Christian Univ. / Taiwan)

The Light emitting diodes (LEDs) are used for back light source which includes limitations of the étendue, the small light valve. In this paper, three collimator lenses are proposed to improve such shortages.

10SS-07

(18:10) Nonspherical LED Packaging Lens for Uniformity Improvement

Y. C. Chang, Y. S. Tsai, F. S. Juang (National Formosa Univ. / Taiwan), C. J. Ou (Hsiuping Institute 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. A great improvement on the uniformity from 28.4% to 64% is demonstrated.

Poster Session (17:00-20:00)

10PS-001 Design and Analysis of Optical Unit Used to Compress Light for Guiding System

C. C. Wang, C. M. Yu, Y. Y. Chen, J. W. Whang (National Taiwan Univ. of Science and Technology / Taiwan)

We design and analyze an optical unit which can be used for indoor illumination. The unit is made up of right-angle prisms which are cascaded to constitute a structure and provide light "compression".

10PS-002 Design and Analyis of Light Pipe Based Parabola Solar Concentrator for Sunlight Collection and Transmission

W. Huang, C. H. Chuang, Y. Y. Chen, J. W. Whang (National Taiwan Univ. of Science and Technology / Taiwan)

We design a light pipe based parabola solar concentrator for sunlight collection and transmission. The system utilizes natural light as the illumination source, which can be applied on indoors illumination.

10PS-003 The Analysis of Ray Path in Secondary Optics Design of LED for Die-Imaging Phenomena

Y. Y. Chen, L. T. Chen, I. J. Chen, J. W. Whang (National Taiwan Univ. of Science and Technology / Taiwan)

Secondary optics design, TIR (Total Internal Reflection) lens, of LED has had two serious issues, the die-imaging phenomena and the yellow halo. We discuss the die-imaging phenomena and focus on imaging power of TIR lens.

10PS-004 Innovative Collimator Design Based on Array Structure

Y. Y. Chen, C. Y. Liu, J. W. Whang (National Taiwan Univ. of Science and Technology / Taiwan)

We present a collimator system for changing the inclined sunlight to vertical direction. The collimating unit of this system is cylindrical and can be array dependent on the orbit of sun for the most efficiency.

10PS-005 Coma Compensation of O-Ring Driven Liquid-Filled Lens

D. Shaw, C. W. Lin (National Tsing Hua Univ. / Taiwan)

In this study, the bi-convex o-ring driven liquid-filled lens is composed of two single o-ring driven liquid-filled lenses, and the coma compensation analysis of this new design is carried.

10PS-006 Design of 1XN Cascaded Asymmetric Hollow Optical Waveguide Couplers

A. A. Ehsan, S. Shaari (Institute of Microengineering and Nanoelectronics / Malaysia), M. K. Abd. Rahman (Universiti Teknologi MARA / Malaysia)

A large core 1XN asymmetric hollow waveguide coupler has been designed using a combination of asymmetric Y-junction splitter and linear taper. Simple cascading technique and variation of the tap width enable high-level hollow coupler construction.

10PS-007 The Design, Fabrication and Alignment of Laser Collimation through the Concept of Pre-point Source

Z. Liu, Y. Fu, Y. Hu, Z. Wang (Changchun Univ. of Science and Technology / China)

In the laser collimation system, the laser source could be taken as pre-point source for design. The relationship among design, fabrication and the alignment errors are simulated in this paper. The errors from the design and fabrication can be compensated through the alignment. The collimation accuracy can meet micro-radian angle, and the control accuracy can also meet micro-radian angle according to different optical systems.

10PS-008 Error Compensation in Reflection Type Centering Error Testing

C. C. Chang, C. C. Lee (National Central Univ. / Taiwan), Y. L. Wu (Industrial Technology Research Institute / Taiwan)

Compensate the error caused from unwanted surfaces when using single autocollimator reflection type centering error testing. And compare the result with commercial equipment just like OptiCentric build by TRIOPTICS GmbH using double concave lens.

10PS-009 Lens thickness search algorithm at starting point selection stage

M. A. Pashkovsky, I. L. Livshits, S. C. Stafeev, M. V. Sukhorukova, P. Erokhin (St. Petersburg State Univ. of Informational Technologies Mechanics and Optics / Russia)

This algorithm analyses dependence merit function on the distances between optical surfaces and is used at starting point selection stage for parametrical synthesis of OS. It provides global minimum of merit function. Algorithm is developed for pinholes.

10PS-010 High Directivity Direct LED Backlight Unit with Double-Triangular Structure

R. J. Chen, Y. L. Liao, Y. H. Fan (Chung Yuan Christian Univ. / Taiwan)

Brightness uniformity of 86%, color uniformity of 0.0059 and 59% on-axis brightness increase for 22" direct LED BLU with a thickness of 20mm with double-triangular structure that control the directivity of the light was obtained.

10PS-011 Optical Design of Bent Rib Waveguide with MOS Cross-section

C. T. Shih, Z. W. Zeng, Y. C. Chang, S. Chao (National Tsing Hua Univ. / Taiwan)

We provide a single-mode bent MOS rib waveguide design with 0.9dB/cm bending loss at 25um bending radius. The maximum position of the TE-like mode was tuned to the gate oxide around which the most carriers are accumulated for optimizing the free-carrier dispersion effect.

10PS-012 Simulating the illuminance and the efficiency of the LED and fluorescent lights used in interior lighting design

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

In this study we simulate the illuminance and efficiency of four different parabolic reflector LED and fluorescent light sources for interior illumination. We compare the calculated results and cost benefits for our simulations and real situations.

10PS-013 Grating shape analysis versus wavelength for the transparent dielectrics in the resonance domain

T. Hoshino, S. Banerjee, M. Itoh, J. B. Cole (Univ. of Tsukuba / Japan), T. Yatagai (Univ. of Tsukuba and Utsunomiya Univ. / Japan)

A triangular grating is compared with a rectangular one to investigate the effect of shape and wavelength on the reflectivity and angular distribution. We found that the triangular grating had the least the wavelength dependence.

10PS-014 Spiral Search Method for Designing a Wide Angular Broadband Visible Antireflection Coating

Y. Y. Liou, Z. W. Wei, L. R. Wang, C. C. Liu, C. C. Kuo (Chienkuo Technology of Univ. / Taiwan), C. C. Jaing (Minghsin Univ. of Science and Technology / Taiwan), C. C. Lee (National Central Univ. / Taiwan)

A spiraling search method is applied to design a wide angular visible antireflection coating with an incident angle up to 50 degree from the normal. The maximum visible reflectivity can be reduced to below 1.26 percentages.

10PS-015 Broadband Near Zero Ultra Flattened Dispersion Single Mode Holey Fiber

N. H. Hai, Y. Namihira, S. Kaijage, T. Kinjo (Univ. of the Ryukyu / Japan)

A Novel silica index guiding holey fibers (IGHFs) design are proposed utilizing a new defect structure that is composed of defected innermost structures exhibits remarkable chromatic dispersion properties such as nearly zero and flattened dispersion over a wide spectral range and single mode guidance along with low confinement loss of less than 10^{-6} dB/m.

10PS-016 Design of a Wedge Plate for Polarization-Preserving Angular Shifter

Y. K. Cheng (National Chiao Tung Univ. / Taiwan), J. L. Chern (National Chiao Tung Univ. and Foxsemicon Integrated Technology / Taiwan)

We propose a wedge plate design and show that by using such wedge plate, the incident direction of light propagation can be rotated as necessary while still preserving beam polarization. Simulation verification is also provided.

10PS-017 Numerical Studies of Surface Plasmon Resonanceunder Different Subwavelength Grating Types

P. T. Chou, D. Z. Lin, C. K. Lee (National Taiwan Univ.and Industrial Technology Research Institute / Taiwan), T. D. Cheng (National Taiwan Univ. / Taiwan), J. T. Yeh (Industrial Technology Research Institute / Taiwan)

We use rigorous coupled wave analysis and effective medium theory to examine and compare the behaviors of electromagnetic field of subwavelength gratings with different profiles and materials.

10PS-018 The Best Doublet Design

W. S. Sun, C. H. Chu (National Central Univ. / Taiwan) We discuss a method for selecting the most suitable types of glass for a doublet using the equation for an achromatic. The Spherical aberration and the coma are focused to reduce the ray fan area.

10PS-019 Sunlight Effects and Applications of LED Irradiance Device

J. Li, D. Li (Harbin Institute of Technology / China) The function distance of LED irradiance device is more than 1.5km without sunlight influence. The narrow interference filter before camera lens may availably suppress sunlight effects and has importance meaning for extending LED's applications.

T. C. Chen, C. H. Lai, T. H. Huang (National Defense Univ. / Taiwan), S. F. Tang (Chung-Shan Institute of Science and Technology / Taiwan)

The research is mainly investigated for realizing the strain effects on the optical properties of self-assembled InAs QDs embedded in $In_{0.1}Ga_{0.9}As/GaAs$ spacer layer incorporated with the three-dimensional (3D) Schrödinger equation and solved by using finite element method (FEM).

10PS-021 U-type 2X Zoom Projector Lens Design for 1080P DLP Projector

J. H. Sun, Y. C. Fang, B. R. Hsueh (National Kaohsiung First Univ. of Science and Technology / Taiwan)

In this research, a newly developed optical design is proposed for 1080p DLP projector with extremely high MTF at high spatial frequencies. The design comprises of U-type of lens with two prisms assembled in a non-coaxial optical system. Traditionally, projector zoom lens has its high performance with the assistance of multiple zoom cam curves handled by complicated mechanical design. But in this design, only two groups among the lens are droved by step motor inclusive of focus function; in addition, this lens design takes advantage of optics with 20% overall length cut and more compact overall volume size. Results show the great performance that meets the specification required.

10PS-022 TE-polarized extraordinary resonant optical properties of coupled metallic grating

C. C. Chao, J. Y. Chang (National Central Univ. / Taiwan), C. M. Wang, Y. C. Chang, D. P. Tsai (Academia Sinica / Taiwan)

The *TE*-polarized extraordinary resonant of a multilayer structure, which is composed of metallic grating, dielectric cavity layer and metallic film, is observed theoretically. Two extraordinary resonant dips in reflection spectrum behave angular-independently.

10PS-023 Sun Light Modeling for Solar Energy System

C. J. Ou, S. L. Young (Hsuiping Institute of Technology / Taiwan), C. M. Ou (Kainan Univ./ Taiwan), Y. C. Jang, F. S. Juang (National Formosa Univ. / Taiwan) Construction the sun light model with ecliptic movement is demonstrated. With reverse ray tracing and scattering model, variations on the energy flux of the moving Helios is presented, shows the feasibility of present methodology.

10PS-024 Ultrashort Pulse Propagation and Compression in Dispersion Increasing Silicon Nanowire Waveguides

C. H. Lin, S. D. Yang, W. C. Chiu, M. C. M. Lee (National Tsing Hua Univ. / Taiwan)

Ultrashort pulse propagation through silicon nanowire with longitudinally increasing normal dispersion is found (in theory) to be able to produce a broad spectrum without sidelobe, which is attractive for low-power, high-quality, stable pulse compression.

10PS-025 Characterization of Cubic Phase Modulation for Extended Depth of Field Imaging

H. Y. Tsao, L. Angot, C. W. Chang (Industrial Technology Research Institute / Taiwan)

Image restoration performance is analysed for a wavefront coded system. Different cubic coefficients of the phase mask are used for image restoration to validate the effectiveness of the extended depth of field of an imaging system.

10PS-026 Simulation Study of a Wavefront Coded Compact Camera Lens System

Y. L. Chen, K. V. Chen, H. Y. Tsao, C. W. Chang (Industrial Technology Research Institute / Taiwan) A wavefront coded compact camera lens is designed. On-axis and off-axis point spread functions are used for image restoration to investigate the effectiveness of the space invariant in a coded imaging system.

10PS-027 Artificial biaxial media by using periodic birefringent layered structures with alternating isotropic and uniaxial materials

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

Form birefringence of the periodic birefringent layered structure with alternating isotropic and uniaxial medium is investigated by use of 4x4 matrix method. In the long wavelength spectral regime, the structure behaves like a biaxial medium.

10PS-028 Visual Characteristics of Colored LED Light in Dense Fog

B. A. Kurniawan, Y. Nakashima, M. Takamatsu, K. Sendai, H. Sawa (Univ. of Toyama)

Investigation the brightness of colored LED light on traffic information board in foggy condition is an important practical consideration, because LEDs becomes fainter and reduces contrast. To prevent this problem, it is necessary to study the fog effect in human visibility. The result will contribute to land traffic safety and to prevent accident in foggy condition.

10PS-029 Optical Design and Simulation for Novel Light Guide Plate with Different Zoned Microstructure

P. Han, W. S. Cheng (National Chung Hsing Univ. / Taiwan)

A novel light guide plate with different zoned microstructure which can provide high vertical directivity and luminance without usage the optical films are proposed. The simulation analysis validates the concept of the design.

10PS-030 Study of Binocular Colour Fusion Limit in Retinal Fovea

X. Qin, M. Takamatsu, Y. Nakashima (Univ. of Toyama / Japan), K. Sassa (Yamatake / Japan), Y. Fukuda (Meijo Univ. / Japan)

We measured the wavelength difference limit for binocular colour vision. The following results were obtained: (a) the binocular colour fusion ceases when the colour difference introduced between the left and right eyes exceeds a certain threshold value. The range is less than $10 \sim 80$ nm. (b) The limit becomes smaller with the increases of the brightness of the stimulus.

10PS-031 350X Zoom Lens Design with Diffractive Optical Element

Y. C. Fang, T. K. Liu, H. C. Lin (National Kaohsiung First Univ. of Science and Technology / Taiwan), C. M. Tsai (Kun Shan Univ. / Taiwan)

In this research, optics was optimized by least damping square and genetic algorism mutually then concludes the best location for DOE (Diffractive Optical Element) element by HTGA (Hybrid Taguchi-Genetic Algorithm).

10PS-032 Optimizing Miniature Optical Zoom Lens Design with Liquid Lens Elements by Genetic Algorithm

C. M. Tsai (Kun Shan Univ. / Taiwan), Y. C. Fang, C. L. Chung (National Kaohsiung First Univ. of Science and Technology / Taiwan), C. C. Hu (ITRI-South / Taiwan) An innovative developmental 3X zoom optical design with liquid lens element is proposed to derive the best solution by Genetic Algorithm. The preliminary experiment points out that some successes are achieved in the optical design.

10PS-033 High-power RGB LED for LCD projector

W. T. Chien, M. Y. Han, C. C. Sun (National Central Univ. / Taiwan)

In this paper, we study to use RGB LED as the light source in the projection system based on LCD panel. We start from the calculation of etendue to make the power management and then design the first-optics element. Monte Carlo ray tracing is applied to optimize detailed design and verify the system performance. The power efficiency of the design is compared with the real system and we obtain system efficiency around 6%.

10PS-034 Optical Design of a Desktop Lamp based on Multi-chip White LED

Y. C. Lo, C. Y. Tsai, H. Y. Ho, C. C. Sun (National Central Univ. / Taiwan)

In the study, we study the optical design of the LED lamp based on multi-chip white LED. We first make an optical model of the LED, and verify the model in the mid field. Then a precise optical model is achieve. Based on the optical model, we design a multi-segment reflector to perform very uniform illumination. The system efficiency is 80% and the central illumination is 600 lux at a distance from the exit pupil.

10PS-035 Modeling Phosphor for Application of White Light-Emitting Diodes

T. X. Lee, H. Y. Ho, J. Y. Chen, C. C. Chen, C. C. Sun (National Central Univ. / Taiwan)

Phosphors in white light-emitting diodes (LEDs) play an important role to generate white light emission. In this paper, using Monte-Carlo ray tracing method combined with Mie theory, the phosphor model that possesses of optical and colour properties is developed successively. According to this model, we can calculate the optical performance of white LEDs effectively, and be able to design the package configuration to achieve requirements such high brightness and uniform pattern issue.

10PS-036 Visual Characteristics of Elderly under LED-typed Auxiliary Light Conditions

M. Takamatsu, Y. Nakashima, T. Fujita (Univ. of Toyama / Japan), S. Nakajima (Seiwa Electric MFG / Japan), Z. Katoh (Aichi Mizuho College / Japan) In this experiment, subjects used goggles that simulate the effects of cataracts and determined the color visibilities for object colors on condition of different LED-typed auxiliary light. From the results, it revealed that it was possible to obtain the improvement for the

cataract sufferer's vision by using an auxiliary light.

10PS-037 Study on Visual Characteristics of Dichromatism for LED Traffic Signal Light

Y. Nakashima, M. Takamatsu (Univ. of Toyama / Japan), K. Mima, S. Nakajima (Seiwa Electric MFG / Japan)

In recent years, with the utilization of blue LED (Light Emitting Diode), the LED element is beginning to be actively used in various scenes, and LED is used even for traffic light now. The aim of the present study is to collect the fundamental data for the display of the traffic signal light, which is easy to be recognized also by sense-of-color unusual persons. The results revealed that the optimal brightness of the yellow light from which a sense-of-color unusual person can distinguish the difference between yellow and red, i.e., "visual barrier-free domain", is the area where yellow light is 2.8 times brightness of the red light.

10PS-038 Design of the Far-Field Phase-Shift Patterns Using the Iterative Quantization Methods

Y. W. Chen (National Tsing Hua Univ. / Taiwan), Y. C. Chiu, W. F. Hsu (National Taipei Univ. of Technology / Taiwan)

We propose a method to increase the image quality of the phase-shift patterns, applied to the lithography, generated in the optical far field by using a phase-only diffractive optical element and a Fourier optical system.

10PS-039 Design of the One-Dimensional Far-Field Phase-Shift Patterns by the Detour-Phase Diffractive Optical Elements

W. F. Hsu, I. L. Chu (National Taipei Univ. of Technology / Taiwan)

We propose a method to generate the one-dimensional phase-shift patterns with high diffraction efficiency by the diffractive optical elements containing an array of blazed gratings designed by the detour-phase technique and the simulated annealing algorithm.

10PS-040 Initial simulation of the single-eye stereoscopic camera system with the micro-prism array plate

C. Y. Chen, T. T. Yang (National Yunlin Univ. of Science and Technology / Taiwan)

In our study, a micro-prism array plate is applied to design the single-eye stereoscopic camera. Our design can easily combined with the original CCD camera. Besides, the object height can be increase about 11.6% and the whole length of the CCD camera can be shortened about 33.33% related to the references.

10PS-041 Near-field transmission properties of a system consist of two metal films which have a circular hole on them

C. Y. Lin, K. P. Chiu (National Taiwan Univ. / Taiwan), S. C. Chen (Far East Univ. of Technology, Tainan / Taiwan), D. P. Tsai (National Taiwan Univ., Academia Sinica and Far East Univ. of Technology / Taiwan)

We use 3D-FDTD to simulate the optical response of Au thin film pairs that has a hole on them. The near-field transmission intensity and energy flow of the system will be discussed.

10PS-042 Surface plasmon polariton coupling between nano recording marks and their effect on optical read-out signal

K. P. Chiu, K. F. Lai, S. C. Yen (National Taiwan Univ. and Academia Sinica / Taiwan), D. P. Tsai (National Taiwan Univ., Academia Sinica and National Taiwan Normal Univ. / Taiwan)

We use 3-dimensional finite-difference time-domain method to investigate surface polariton coupling between two nano-recording marks which are of different shapes. The influence of these coupling effects on read-out signal will also be discussed.

10PS-043 Modeling Interface Trapping In Organic Field-effect Transistors

H. L. Kwok (Univ. of Victoria / Canada), Y. L. Wu, T. P. Sun (National Chi-Nan Univ. / Taiwan)

Studies have shown that the "onset" voltage in the rubrene OFET can vary significantly depending on past illumination and bias history. We propose an equivalent-circuit model for the OFET to include mechanism(s) linked to trapping.

10PS-044 Compact Reflective Type Auto-focusing Imaging System with Polymer Deformable Mirror

Č. W. Liu, H. T. Hsieh, G. D. Su (National Taiwan Univ. / Taiwan), S. C. Tseng, A. Y. Cheng (National Yunlin Univ. of Science and Technology / Taiwan), W. Y. Hsu (Instrument Technology Research Center / Taiwan), This paper presents an ultra-thin reflective type

auto-focusing system with $\pm 26^{\circ}$ field of view featuring an organic polymer membrane deformable mirror, which could be incorporated into portable electronic devices.

10PS-045 Three-lens configuration for Donut-like multi-vortex laser beam generation from Laser-Diode pumped solid-state laser system

S. C. Chu (National Cheng Kung Univ. / Taiwan)

A three-lens configuration was proposed to donut-like multi-vortex laser beam from Laser-diode (LD) pumped solid-state laser system with selective excitation of high order Hermite Gaussian mode by "gain region control" mechanism.

10PS-046 First order layout mechanism of inside-out triplet

C. H. Lin, H. Y. Lin (National Taiwan Univ. / Taiwan), H. Chang (Industrial Technology Research Institute / Taiwan)

The inside-out triplet lens has its superior design base than classical form, but we found the inside-out triplet arrangement should satisfy some shape condition or the preferred structure will disappear.

10PS-047 A Study on Reverse Lens Design

H. Chang, C. W. Chang (Industrial Technology Research Institute / Taiwan), C. H. Lin (National Taiwan Univ. / Taiwan)

Reverse lens design is a typical example for showing the theoretical performance of conjugate shift invariant properties. It is helpful for build-up design capability.

10PS-048 Enhanced Light-in Coupling of Solar Cell by Silver Nano-Particles

C. T. Chen, J. Y. Chu, T. J. Wong, M. H. Chiueh, J. T. Yeh (Industrial Technology Research Institute / Taiwan) The effect of silver nano-particles on the front side of the solar cell is investigated in both experiment and simulation. According to our simulation, the silver particles with high scattering efficiency modify the light propagation directions and increase light-in coupling efficiency in the solar cell. Hence, an increase of carrier generation rate of 30-40% in the infrared region can be obtained in our experiment.

10PS-049 System for Measuring Optical Admittance of a Thin Film Stack

S. J. Ma, K. Wu, S. H. Chen, C. C. Lee (National Central Univ. / Taiwan)

Based on the concept of polarization interferometer, we propose a vibration insensitive system for measuring the reflection coefficient and optical admittance of the thin film stack.

10PS-050 Optical design of DLP front projection system

W. S. Sun, L. J. Chen (National Central Univ. / Taiwan), C. L. Tien (Feng Chia Univ. / Taiwan)

We present the DLP front projection system with the non-telecentric and offset projection system. The light uniformity and efficiency on screen are discussed. The optical quality of the projection lens and tolerence analysis are presented.

10PS-051 Reflectivity Calculations of Silicon Nano-Textured Surfaces

C. C. Chen (Department of Photonics and Display Institute / Taiwan), P. Yu, H. C. Kuo (National Chiao Tung Univ. / Taiwan),

Angular and spectral reflectivities of two kinds of nano-scaled textured surfaces, periodic nano-pyramids and random nano-cones are theoretically investigated. The aspect ratio and fill-factor determine the anti-reflective characteristics for periodic and random nano-textures, respectively.

10PS-052 Mach-Zehnder interferometer based on collimation effect of photonic crystal

M. H. Nguyen, S. Rogge, J. Caro, E. van der Drift, H. Salemink (Delft Univ. of Technology / The Netherlands) A Mach-Zehnder interferometer based on photonic crystal is designed utilizing collimation effect and line defects. The device is fabricated by e-beam lithography and cryogenic plasma etching with the aim to realize a switchable band-pass filter for optical telecommunication.

10PS-053 Design of a new Optical Concentrator using Semi-cylindrical Structure

S. B. Šrivastava, N. Agarwal, R. Jindal, G. Nyati, S. Kumar (Moser Baer / India)

The design describes a new optical concentrator using the combination of semi-cylindrical structure and a polygon. This design is for low concentration use in Photovoltaic. The underlying theory of concentrating solar ray is by using refraction through curved surfaces. Optical efficiency, geometrical concentrations have been studied using optical ray simulation software.

10PS-054 Design of night-vision zoom lenses for use with image intensifier tube

C. L. Tien, C. H. Huang (Feng Chia Univ. / Taiwan), H. W. Chen (Feng Chia Univ. / Taiwan), W. S. Sun (National Central Univ. / Taiwan)

Optimization design of zoom lenses for night-vision applications was presented. The lenses design should match the performance of the second generation image intensifier tube. The optical software of ZEMAX is used to achieve the design.

10PS-055 An innovative Design of LEDs Automotive Headlamps

M. S. Huang (National Kaohsiung First Univ. of Science and Technology / Taiwan), Y. C. Fang (National Kaohsiung First Univ. of Science and Technology / Taiwan), Y. L. Chen (National Kaohsiung First Univ. of Science and Technology / Taiwan)

This work proposes an innovative optical system for LEDs automatic headlamps to achieve a high luminance of low and high beams. This advanced headlamp system comprises of a parabolic reflector, three condense lens, a TIR-Prism, a DMD, and two free-formed reflectors. The simulation results reveal that our approach generates 78% luminous efficiency and is superior to conventional methods of merely 60%.

10PS-056 Design of Contact Capsule Endoscopes

M. Ou-Yang, T. W. Huang, W. K. Su, C. Y. Chen, H. M. Feng (National Central Univ., / Taiwan), H. M. Wu (Chung-Shan Institute of Science & Technology / Taiwan)

The annular transparent ring and cone-shaped mirror in "contact capsule endoscope" are designed to observe the images, which are projected on the plane of detector, of annular alimentary canal without changing the former lens specification.

10PS-057 Design and analysis of laser illumination system in projector application

M. Ou-Yang, Y. T. Chen, W. S. Sun (National Central Univ. / Taiwan)

We propose a laser illumination system for projectors. Compared to known lamp illumination system, the laser type is superior than lamp type in this study,.

10PS-058 Fabrication and Design of Galvanometric Scanner For Laser Projector

M. F. Chen, Y. S. Ho, W. T. Hsiao, Y. T. Chen (National Changhua Univ. of Education / Taiwan), S. M. Wang, S. W. Xu, C. W. Hu (Tongtai Machine & Tool / Taiwan)

The investigation is interested in developing the galvanometric scanning system for laser projector with diode laser. The design of galvos, including the rotor, the position detector, and the control system, is discussed and developed in this study.

10PS-059 Simulation Study of Anti-reflective Effects for Different Submicron-structures

H. Y. Tsai, M. T. Lu (National Tsaing Hua Univ. / Taiwan)

Simulation on transmittance for different submicron-structures by finite difference time domain method is studied. Different structures have different transmittance effects; therefore different sizes, shapes, periods and aspect ratios of nanostructures are discussed.

10PS-060 Design of Circular-shape No-loss Bent Lightpipe with a Novel Transformation of Elliptical Form

Y. W. Peng (National Chiao Tung Univ. / Taiwan), J. L. Chern (National Chiao Tung Univ. and Foxsemicon Integrated Technology / Taiwan)

We provide a novel scheme in designing no-loss bent lightpipe with the help of a transformation of elliptical form on equiangular spiral.

10PS-061 Design of cylindrically-distributed LED Street light with rectangular illumination distribution

M. H. Wang (Foxsemicon Integrated Technology / Taiwan)

A dome-like multiple-section Fresenel lens is developed to provide a rectangular-like illumination distribution for a circularly-appeared street light system where LEDs are cylindrically symmetrically distributed.

10PS-062 Effect of the Laser Induced Medium Diffusion in a Multi-electrode-pair Pulse Laser and Numerical Calculation

H. Qiang, X. Li (Nanjing Univ. of Science & Technology / China)

The effect of induced medium diffusion produced by pulse discharge upon the output stabilization in systems of multi-electrode-pair sharing one optical resonance cavity is studied. The minimum separation between each discharge region is 3.5cm.

10PS-063 Fabrication of the binary blazed diffractive lens for controlling the luminous intensity distribution of LED light

A. Motogaito, N. Machida, T. Morikawa, K. Manabe, H. Miyake, K. Hiramatsu (Mie Univ. / Japan)

The binary blazed diffractive lenses for controlling luminous intensity distribution of LED light are fabricated. The luminous intensity distribution can be changed by these lenses with 150-µm focal length.

10PS-064 Realization of High Coupling Efficiency Lens Fiber

Y. C. Lin (Ming Chung Univ. / Taiwan)

A GI (graded index) lens fiber with good optical performances of low divergence angle and high coupling efficiency is demonstrated. The optimum length of GI fiber 425μ m is design with OSLO and verified in experiment.

10PS-065 The Influence of Temperature Variation in CMOS Image Sensors

C. C. Wang, D. L. Lin, C. L. Wei (National Cheng Kung Univ. / Taiwan)

A special designed image sensor is realized with TSMC 0.15 μ m CMOS process technology. A Peltier junction device and an on-chip heater were utilized to vary the temperature. The results show the influence of temperature variation.

10PS-066 The Influence of Stray Minority Carrier in CMOS Image Sensors

D. L. Lin, C. C. Wang, C. L. Wei (National Cheng Kung Univ. / Taiwan)

A special designed image sensor is realized with TSMC 0.15 μ m CMOS process technology. An nMOS transistor was utilized to generate excess stray minority carriers. The simulation and measurement results demonstrate the influence of stray minority carriers.

10PS-067 Mechanically actuated tunable diffractive grating with soft and flexible silicone polymer

M. Riahi, H. Latifi (Shahid Beheshti Univ. / Iran) Making a tunable grating on soft silicone polymer, has been proposed. By holography, a grating is produced on photoresist and is molded by silicone polymer. Applying mechanical force, the period of the grating change.

10PS-068 Design of thermally actuated grating light valve, using temperature dependent refractive index of water

M. Riahi, H. Latifi (Shahid Beheshti Univ. / Iran) The grooves of a laminar grating is filled with a temperature dependence refractive index liquid. By changing the temperarure, the efficiency of the grating is changed and the first order diffraction is modulated.

10PS-069 Occurrence of oxygen deficiency center on fused-silica surface irradiated by vacuum UV laser H. B. Lü, X. D. Jiang, S. Z. Xu, J. Huang, H. J. Wang, T.

Wang, L. Ye, X. F. Cheng, X. D. Yuan, W. G. Zheng (Research Center of Laser Fusion, CAEP / China) The oxygen deficiency center increased when vacuum UV laser irradiated on the fused-silica substrate surface. This phenomenon was certificated by photoluminescence or X-radial photoelectron spectrogram, And was analyzed by photons absorbed theory.

10PS-070 Refractive index variation of amorphous Ta_2O_5 film fabricated by ion beam sputtering with RF bias power

C. Y. Huang (National Tsing Hua Univ. and Industrial Technology Research Institute / Taiwan), H. M. Ku, Y. P. Tsai, W. K.i Chen, S. Chao (National Tsing Hua Univ. / Taiwan)

 Ta_2O_5 film was fabricated by ion beam sputtering with RF bias applied to the substrate. The refractive index of the film can be controlled to vary linearly with the RF bias power.

10PS-071 Why Columnar Structures Form in Physical Vapor Deposited Thin Films

J. C. Hsu, C. C. Lee (National Central Univ. / Taiwan), M. H. Lee (Tamkang Univ. / Taiwan)

Columnar structures appear frequently in physical vapor deposited thin films. The commonly accepted simulation results have big problems. We give a new explanation for columnar structure formation. Simple simulation follows and columnar structure appears.
10PS-072 Replication Technique of Hologram Using Azobenzene-Containing Polymer Film

K. Harada, T. Tsukahara, D. Sakai, S. Kamemaru (Kitami Institute of Technology / Japan), T. Fukuda (Advanced Industrial Science and Technology / Japan), D. Barada, T. Yatagai (Utsunomiya Univ. / Japan)

We report the replication technique of surface relief hologram and birefringence hologram using azobenzene polymer film. The hologram is precisely copied on a transparent photopolymer. Replication in glass plate is also discussed.

10PS-073 Modified profiles and propagation modes of Si waveguides smoothed by laser reformation

Y. P. Hsieh, E. Z. Liang (Diwan Univ. / Taiwan), S. C. Hung (National Taiwan Univ. / Taiwan)

The modified propagation mode of the transformed waveguide profile after laser reformation is calculated to be only 1% different in the effective refractive index. A finite element model is developed to simulate the modified profile.

10PS-074 Enhanced emission efficiency in polymer light-emitting diodes using BCP as an hole-blocking material

D. W. Zhuang, S. H. Yang (National Kaohsiung Univ. of Applied Sceinces / Taiwan)

Enhanced electroluminescent efficiency of polymer light-emitting diode was obtained using a 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline (BCP) hole blocking layer. Optimum thickness of 30-nm-thick BCP achieved a current efficiency of 0.37 cd/A which was higher than that of device without a BCP layer preparation, 0.19 cd/A.

10PS-075 Improvement of brightness and efficiency in organic light-emitting diode using bczvb as blue light dye

B. C. Hong, S. H. Yang, S. F. Huang (National Kaohsiung Univ. of Applied Sciences / Taiwan) Blue organic light-emitting diodes were obtained based on ITO/NPB (hole-transport layer, 50 nm)/TBADN:bczvb (blue emitting layer, 40 nm)/Alq₃ (electron-transport layer, 10 nm)/LiF (1 nm)/Al (200 nm). It shows a maximum current efficiency of 4.45 cd/A at 5 V. The high luminance of device was 20700 cd/m² by doping optimum concentration of bczvb.

10PS-076 Light coupling of a triangular photonic crystal at its photonic band edge

S. T. Wu), M. S. Li, A. Y. G. Fuh (National Heng Kung Univ. / Taiwan)

This work investigates the refraction and reflection of laser beams which frequency locates at the band edge of two-dimensional triangular photonic crystal. The incident light primary excites into four waves and has their dominant plane waves. The refraction angles and efficiencies change with various incident angles. Equi-frequency surface analysis and finite-difference time-domain method were used to analyze the refraction and reflection of laser beams from the2D hexagonal photonic crystals.

10PS-077 Wideband Wavelength-Tunable Harmonically Mode-Locked Fiber Laser Using a Bismuth-Oxide-Based Erbium-Doped Fiber

Y. Fukuchi, H. Ikeda, M. Matsukawa (Tokyo Univ. of Science / Japan)

We report a harmonically mode-locked fiber laser employing a 151-cm-long bismuth-oxide-based erbium-doped fiber. Near-transform-limited short pulses at 10GHz are obtained with a wavelength tuning range from 1536nm to 1602nm covering both the Cand L-bands.

10PS-078 Theoretical Analysis on Lateral Mode Behavior of High-Power 660-nm InGaP-AlGaInP Laser Diodes

J. R. Chen, Y. C. Wu, T. S. Ko, T. C. Lu, H. C. Kuo, S. C. Wang (National Chiao Tung Univ. / Taiwan), Y. K. Kuo (National Changhua Univ. of Education / Taiwan) Theoretical analysis of lateral-mode hehavior in

AlGaInP laser diodes with different ridge structures is performed. Spatial hole burning effect and relative change of refractive index caused by increasing temperature play important roles in device performance.

10PS-079 Low Temperature Growth of Carbon Nanotubes

H. Ono, T. Yaji, F. Ohtani (Saitama Univ. / Japan) Conditions to enable the low temperature growth of carbon nanotubes (CNTs) were examined. A CNT film was grown using catalytic-chemical vapor deposition at a substrate temperature of 550 °C.

10PS-080 The Light Pattern Correction of InGaN LED by Using with Surface Microstructures

Y. N. Lin, J. Y. Chang, M. L. Wu, C. H. Kuo C. C. Lee (National Central Univ. / Taiwan)

We fabricated surface microstructures on the InGaN light emitting diode, and measured the light intensities by angular-resolved photoluminescence measurement. We got the 4.6-fold emission enhancement and the light pattern could be modulated when its period of surface microstructure was larger than $2\mu m$ as compared with the planner surface.

10PS-081 Low temperature fabrication of dye sensitized solar cells based on discharged TiO₂ nanoparticles

T. Paronyan (National Chiao Tung Univ. / Taiwan and Institute for Physical Research Institute of National Academy Science of Armenia / Armenia), M. C. Lin (National Chiao Tung Univ. / Taiwan and (Emory Univ. of Atlanta / USA)

Nanocrystalline titanium dioxide photoelectrodes were fabricated at low temperatures from discharged nanopartilces. Ammonia was used to discharge the nanoparticles. Dye sensitized solar cells were fabricated based on these photoelectrodes and $\sim 5.5\%$ conversion efficiency was achieved.

10PS-082 Controlling the Spontaneous Emission with the Local Density of States of Honeycomb Photonic Crystals

Y. C. Tsai, C. F. Lin (Feng Chia Univ. / Taiwan), J. W. Chang (National Central Univ. / Taiwan)

The spontaneous emission rate of a radiating dipole embedded in a honeycomb photonic crystal is drastically modified by the local density of states. The results are helpful in locating the active medium for related devices.

10PS-083 Improved Characteristics of GaN-Based Light Emitting Diodes Inserted with AlGaN/GaN Superlattices

C. L. Wang, K. Y. Tsai, J. R. Gong (National Chung Hsing Univ. / Taiwan)

We report the effect of superlattice-inserted structures on the characteristics of GaN-based light emitting diodes (LEDs). It was found that AlGaN/GaN superlattice structures serve as threading dislocation filters so that improved LED characteristics are achieved.

10PS-084 Transient Molecular Behavior of Ferroelectric Liquid Crystal Under an Electric Field

M. Kawaguchi, M. Takei, M. Yamashita (Tokyo Univ. of Science / Japan)

Strong light scattering is exhibited by ferroelectric liquid crystal in a 0.2 ms interval during the alignment transition under 120 V. The light scattering causes the conoscopic figure to become considerably blurred. This behavior is attributed to a particular transient molecular alignment that can only be resolved at short time scales.

10PS-085 WDM Filter Module Consisting of Minimum Elements

S. Ikoma, A. Takada, S. Nagano (TOPCON / Japan) We present wavelength-selective filter modules consist ing of minimum elements which are fibers and lenses with wavelength-selective coat. The fabricated filter mo dules show insertion losses less than 0.7dBand return l osses more than 60dB.

10PS-086 Widely Wavelength Tunable Fiber Laser Based on Self-Injected Fabry-Perot Laser Diode for WDM Applications

C. H. Wang, C. W. Chow (National Chiao Tung Univ. / Taiwan), C. H. Yeh (Industrial Technology Research Institute / Taiwan), F. Y. Shih (Yuan Ze Universit / Taiwan), S. Chi (National Chiao Tung Univ. and Yuan Ze Universit / Taiwan)

We propose a C-band widely-tunable (1535.64-1557.44nm) fiber laser employing a self-injected Fabry-Perot laser diode. High SMSR and stable output power are achieved. It may serve as a colorless and low-cost source for the WDM-PONs.

10PS-087 Holographic Recording in Glass and Direct Reconstruction by Visible Wavelength Laser Beam

D. Sakai, K. Harada, S. Kamemaru (Kitami Institute of Technology / Japan), D. Barada (Utsunomiya Univ. and Advanced Industrial Science and Technology / Japan), F. Sato, T. Fukuda (Advanced Industrial Science and Technology / Japan)

We propose a direct reconstruction method from holographic recording in glass. It is possible to reconstruct optically as diffraction light from general glass plate by visible laser beam.

10PS-088 3D Micron Photofabrication of Conducting Polymers in Transparent Polymer Sheet

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

An aqueous solution containing photo-induced electron transfer system is prepared to obtain polypyrrole by multi-photon sensitized polymerization. Polypyrrole three-dimensional (3D) microstructures can be constructed in the transparent polymer sheet.

10PS-089 Improvement of Emission Efficiency of Si:SiO₂ Sputtered Films by Introducing Two-Dimensional Periodic Structures

K. Miura, T. Hayakawa, O. Hanaizumi (Gunma Univ. / Japan)

 $Si:SiO_2$ two-dimensional photonic crystals were fabricated by using radio-frequency magnetron sputtering, double-interference exposure, and plasma etching. An enhanced photoluminescence spectrum was observed from a light-emitting Si:SiO₂ co-sputtered film after introducing a periodic structure.

10PS-090 The Solar-Cell Efficiency Improved by the Modification of Acid Etching Process in Multi-crystalline Silicon Wafer

Z. Z. Ye, J. J. Ho (National Taiwan Ocean Univ. / Taiwan), C. Y. Chen (Fortune Institute of Technology / Taiwan), S. Y. Tsai, W. W. Z. Lee (Industrial Technology Research Institute / Taiwan)

This paper is to study acid-etch process for the multi-crystal silicon solar cells. The optimal values of reflectance and efficiency are 21.96% and 12.61%, respectively, in the 400nm~700nm, which are better than those of alkaline etching (28.8% and 11.26%).

10PS-091 Low-bias Operation for Dual-Band Thermal Imaging Based on In(Ga)As/GaAs Quantum Dot Infrared Photodetector Focal Plane Array

S. F. Tang, C. D. Chiang (Chung-Shan Institute of Science and Technology / Taiwan), C. H. Lai, T. C. Chen (National Defense Univ. / Taiwan)

This paper presents dual-band spectral quantum dot infrared photodetector (QDIP) grown by solid-source molecular beam epitaxy (MBE) and based on 30-stacked (5nm)In_{0.1}Ga_{0.9}As/(3ML)InAs/(1nm)In_{0.1}Ga_{0.9}As/(30nm)GaAs quantum dot matrix under the low bias of -0.7V and at the cryogenic temperature of 80 K.

10PS-092 Influence of Post-treatment on the Electrical Characteristic of ZnO TFT

P. T. Liu, S. Y. Tsai (National Chiao Tung Univ. / Taiwan), Y. T. Chou, Y. L. Huang (National Chiao-Tung Univ. / Taiwan)

The influence of post-treatment on ZnO TFT has been investigated. Zinc atom interstitial and oxygen vacancy of ZnO dominated the conducting characteristic. The physical mechanism of electrical characteristics has been inferred further in this work.

10PS-093 A New Compensation Circuit Based on Organic Thin Film Transistor for AMOLED Display Applications

P. T. Liu (National Chiao Tung Univ. / Taiwan), L. W. Chu, P. L. Liu, L. F. Teng (National Chiao Tung Univ. / Taiwan)

We propose a AMOLED pixel circuit to effectively reduce the current non-uniformity is also suitable for the OTFT-based circuitry with low carrier mobility and a new external driving method reduce the number of transistors.

10PS-094 Study on Manufacturing Process of Free-Form Cubic Phase Plate

C. C. Hsu, W. H. Cheng, C. T. Liang, C. W. Chang (Industrial Technology Research Institute / Taiwan)

A manufacturing method for Free-Form surface using a post-processing program of spiral manufacturing for transferring curve date to ultra-precision machine is presented. High form accuracy can be achieved without the need of an additional compensation.

10PS-095 The Designs of XOR Logic Gates Based on Photonic Crystals

K. Y. Lee, J. M. Lin, Y. C. Yang, Y. B. Yang, J. S. Wu, Y. T. Huang, Y. J. Lin, K. C. Lin, W. Y. Lee (China Institute of Technology / Taiwan)

We propose a XOR logic gate based on photonic crystal with cylindrical silicon structure. The simulation results confirm the optical logic gate can show their capabilities. This device is potentially applicable for photonic integrated circuits.

10PS-096 A CAE Tool-Assisted Injection Molding Technique for Large Diameter Aspheric Plastic Lens

L. K. Wang (National Kaohsiung Univ. of Applied Sciences / Taiwan), J. Y. Shieh (National Formosa Univ. / Taiwan), S. Y. Ke (Glory Science / Taiwan)

A computer aided engineering(CAE) tool-assisted technique, using Moldex3D and aspheric analysis utility(AAU) software in polycarbonate injection molding design, is proposed to manufacture large diameter aspheric plastic lens. An experiment is conducted to verify the applicability of the proposed technique.

10PS-097 Enhanced birefingence of MgF_2 thin film at 193nm by serial bideposition

M. C. Liu, C. C. Lee, C. J. Chiang (National Central Univ. / Taiwan), C. C. Jaing (Minghsin Univ. of Science & Technology / Taiwan)

Magnesium fluoride films were coated by serial bideposition with varying number of sub-deposited layers. When the number of layers was 100, the difference between the refractive indices for S-polarized and P-polarized light up to 0.082.

10PS-098 Design of Wavelength Adjustable Lasers with Photonic Crystal Based FP-Etalon for Applications in WDM-PON Systems

Y. J. Hung, S. L. Lee, Y. T. Pan (National Taiwan Univ. of Science and Technology / Taiwan)

We proposed a novel wavelength adjustable laser for upstream transmission in ONUs of WDM-PON system. The relative simple fabrication, high SMSR, and wavelength-tunable characteristics make this approach attractive for future access network applications.

10PS-099 *Tetra*-chromatic White OLED for solid state lighting with tuneable ability

C. S. Chang, P. T. Liu (National Chiao Tung Univ. / Taiwan), M. H. Ho, C. H. Chen (National Chiao Tung Univ. / Taiwan)

A highly efficient and improved color rendering index white OLED device with a "*tetra*-chromatic" emission system was fabricated. The device achieved a CRI of 87, and is tuneable from the twilight to daylight sky color.

10PS-100 Improvement of Color Gamut and Color temperature by using Xenon Lamps on 1080P Home-theater Projector

H. C. Chen (De Lin Institute of Technology / Taiwan), C. C. Lee (National Central Univ. / Taiwan), J. J. Huang (Delta Electronics / Taiwan)

Xenon lamp was used to improve the color gamut and color temperature on a 1080P home-theater projector. Xenon lamps showed much better than UHP lamps in color gamut, brightness uniformity, contrast ratio and color temperature in the 1080P home-theater projector.

10PS-101 Combo-optical pick-up head

W. S. Sun, H. C. Tsai, M. Ou-Yang (National Central Univ. / Taiwan)

We present a novel design for a combo-optical pick-up head which uses two rhomboid prisms in parallel with three laser diodes. The holographic optical element is used to refract light into a photoelectric sensor device.

10PS-102 Wide-angle beam scan lens for indoor wireless optical LAN

K. Kagawa, J. Tanida (Osaka Univ. / Japan), T. Miyawaki, J. Ohta, M. Nunoshita (Nara Institute of Science and Technology / Japan)

A reverse-telephoto-type wide-angle beam scan lens for indoor wireless optical LANs was fabricated. Experimental results showed the scanning range of around 120 degrees and transmission of more than 50% with a collimated VCSEL light.

10PS-103 Optical and Structural Properties of Circular Polarization Reflector with Helical Films Prepared by Glancing Angle Deposition

Y. J. Park, K. M. A. Sobahan, Chang Kwon Hwangbo (Inha Univ. / Korea)

This paper reports on optical and structural properties of circular polarization reflectors realized as a cascade of helical films. These helical films are prepared by glancing angle deposition (GLAD) technique.

10PS-104 Efficiency enhancement of GaN based FC-LEDs by geometric sapphire shaping structure

B. S. Cheng, C. E. Lee, C. S. Yen, M. R. Tsai, T. C. Lu, H. C. Kuo, S. C. Wang (National Chiao Tung Univ. / Taiwan)

The sapphire shaping structure is formed on the bottom side of sapphire substrate by chemical wet etching technique for light extraction purpose. The light output power of sapphire shaping FC-LEDs was increased 55 % (@ 350 mA current injection) compared to that of conventional FC-LEDs.

10PS-105 Effects of Thermal Annealing on Titanium Oxide Films Prepared by Ion-Assisted Deposition

C. C. Jaing(Minghsin Univ. of Science and Technology / Taiwan), H. C. Chen (De Lin Institute of Technology / Taiwan), C. C. Lee (National Central Univ. / Taiwan) Titanium oxide films were prepared at the substrate temperature of 250 degrees centigrade by electron-beam evaporation and ion-assisted deposition. The effects of thermal annealing processes on the optical and mechanical properties of films were investigated.

10PS-106 Displacement Measured by Algorithms of Phase Shifting Interferometry

C. C. Jaing, Y. L. Shie (Minghsin Univ. of Science and Technology / Taiwan), C. J. Tang (National Central Univ. / Taiwan), Y. Y. Liou (Chienkuo Technology of Univ. / Taiwan)

The relationship between applied voltages and displacement of piezoelectric transducer devices was accurately measured by both using analyses of phase shifting interferometry algorithms and setting up a Twyman-Green interferometer.

10PS-107 TANDEM ORGANIC SOLAR CELLS WITH A HYBRID DEVICE STRUCTURE

C. H. Lin, W. C. Huang, F. C. Chen (National Chiao Tung Univ. / Taiwan)

We have demonstrated organic tandem solar cells by stacking polymer and small-molecular subcells with one novel connecting structure. High open circuit voltage (1.21 V) and power conversion efficiency (1.81 %) has been achieved.

10PS-108 Analysis of Current Spreading Layer in a GaN/Sapphire LED Chip

G. J. Sheu, J. C. Chen (National Central Univ. / Taiwan), F. S. Hwu (National Central Univ. and Nanya Institute of Technology / Taiwan), J. K. Sheu (National Cheng Kung Univ. / Taiwan)

The current distributions of LEDs are investigated by our proposed numerical model. In order to enhance the LEDs performance, a better resistivity of current spreading layer is evaluated to obtain the more uniform current spreading.

10PS-109 Direct Welding between Transparent Cyclo-Olefin Polymer Substrates by the Ultrafast Laser Microwelding Technique

Y. Ozeki, H. Yamaguchi, K. Itoh (Osaka Univ. / Japan), T. Tamaki (Osaka Univ. and Nara National College of Technology / Japan)

Transparent substrates of cycloolefin polymer, which has superior optical characteristics, are successfully bonded with our microwelding technique using focused femtosecond laser pulses. The result proves a possible application to the assembly of polymer-based micro-optical components.

10PS-110 Preparations of optical substrate with surface roughness below 3 nm

M. S. Hsu, C. C. Chang, Y. Ouyang (R.O.C. Military Academy / Taiwan), Y. C. Wang (Nan Jeon Institute of Technology / Taiwan)

Optical silica substrates with near the atomic scale roughness were synthesized by sol-gel process from tetraethylorthosilicate, methanol and deionized water in the presence of ammonia catalyst through the pH value and temperature controlled.

10PS-111 Photochromism and Antibacterial Performace of Nanoscale TiO₂

C. C. Chang, M. S. Hsu, Y. Ouyang (R.O.C. Military Academ / Taiwan), Y. C. Wang (Nan Jeon Institute of Technology / Taiwan)

In the present study, we doped Ag nanoparticles on the TiO_2 thin film surface. Colour change is found upon irradiation with solar light and fluorescent lamp. Due to this photochromic effect, the ability of photocatalyst of TiO_2 could extend to fulltime, and furthermore the antibacterial performance rate against Escherichia coli was also 90% in the dark environment.

10PS-112 Glass-imprinting process using WC mold

T. Hidaka, J. Nakamura (Nihon Yamamura Glass / Japan), H. Kasa, N. Kitamura, K. Fukumi, J. Nishii (National Institute of Advanced Industrial Science and Technology / Japan)

Two-dimensional periodic structure with 400 nm period formed on a WC mold was transferred to the surface of phosphate glasses with high refractive index. The structure effectively suppressed the surface reflection of the glass.

10PS-113 Influence of Annealed in Air and Vacuum on the Optical and Electric Properties of Al-Doped ZnO Films Deposited by DC Magnetron Sputtering

C. J. Tang (Paragon Technologies / Taiwan), C. C. Jaing (Minghsin Univ. of Science and Technology / Taiwan), H. W. Wang, C. C. Kuo, C. C. Lee (National Central Univ. / Taiwan)

 $ZnO:Al_2O_3$ film, which was prepared by DC magnetron sputtering, have been annealed at 250°C and 450°C in air and vacuum. The optical and electric properties of AZO films can be improved by vacuum annealing.

10PS-114 Phase Shifting Grating-Slit Test Utilizing a Liquid Crystal Display

C. W. Liang, C. F. Ou (National Central Univ. / Taiwan)

A focal plane testing method, phase-shifting Grating-Slit test, is demonstrated. Combined with the micro liquid crystal display, the variable frequency grating is generated and phase-shifted on demand. Preliminary experiment result is shown.

10PS-115 Optical Properties of AlF₃ Thin Films by Magnetron Sputtering of Al Targets with CF₄/O₂ Gas

B. H. Liao, M. C. Liu, C. C. Lee (National Central Univ. / Taiwan)

Aluminum fluoride films have been deposited by magnetron sputtering using aluminum targets and different ratios of CF_4/O_2 gas. AlF₃ thin film coated with CF_4/O_2 (60sccm:12sccm) with the ratio of 5 has the best optical quality.

10PS-116 Graded Index Plastic Optical Fiber Prepared by the Co-extrusion Process

A. Kondo, Y. Yamaki, M. Asai, Y. Koike (Keio Univ. and Japan Science and Technology Agency / Japan), S. Takahashi (Japan Science and Technology Agency / Japan)

We have proposed graded index plastic optical fiber prepared by the dopant diffusion co-extruision process. It was clarified that the refractive index profile of fibers were different by the kind of dopants.

10PS-117 Annealing-induced evolutions of Er doped SiO_x film.

C. C. Kao (Southern Taiwan Univ. / Taiwan), B. Gallas, J. Rivory (Universités Pierre et Marie Curie et Denis Diderot / France)

Photoluminescence and structural evolutions induced by annealing of Er doped SiO_x film were studied. The role of Si nanograins to the excitation of Er ions was investigated using an oxidation procedure for disappearance of Si grains.

10PS-118 Diode-pumped, Electro-optically Internal-Qswitched Nd:MgO:PPLN Laser

Y. H. Chen, Y. C. Chang, T. Y. Chung, C. H. Lin (National Central Univ. / Taiwan)

We demonstrated a diode-pumped, electro-optically internal-Q-switched laser system fabricated using a Nd:MgO:PPLN. We obtained laser pulses of pulse energy >2.45 μ J and pulse width ~28 ns from this internal-Q-switched laser system with 2% output coupling.

10PS-119 Fabrication of optical filter and anti-reflection coating with mixed layers

K. Kikuchi, N. Toyohara, Y. Shinta, Y. Wada, K. Takahashi, K. Kawamata (Olympus / Japan)

In this paper, we describe a simple but effective way of sputtering with shielding mask located between target and substrate. We could succeed in making optical filter and anti reflection coating with mixed layers.

10PS-120 Nonlinear Effects in PPLN Waveguide Resonators

R. Geiss, R. Schiek (Univ. of Applied Sciences Regensburg, / Germany), T. Pertsch, A. Chipouline, O. Egorov, F. Lederer (Friedrich-Schiller-Universität / Germany), V. Quiring, R. Nouroozi, W. Sohler (Universität Paderborn / Germany), A. Tünnermann (Fraunhofer Institute for Applied Optics and Precision Engineering / Germany)

Bistability in Ti:PPLN waveguide resonators was tested experimentally. Power dependent spectra were measured and compared with theory. Parameters necessary for bistable operation have shown to be accessible via temperature and wavelength tuning.

10PS-121 Simultaneous measurement of curvature and bending direction by using side-polished fiber Bragg gratings

H. W. Chen, C. L. Tien, W. F. Liu, T. C. Cheng (Feng Chia Univ. / Taiwan)

We present a new fiber sensor to measure the curvature and bending direction simultaneously by using a side-polished fiber Bragg grating with the bending sensitivity of 23.478 and $-26.856 \text{ nm/cm}^{-1}$ for the concave outward and upward bending directions.

10PS-122 Volume holographic data storage characteristics of a epoxy-resin matrix based photopolymer

S. H. Lin (National Chiao Tung Univ. / Taiwan), Y. N. Hsiao, K. Y. Hsu (National Chiao Tung Univ. / Taiwan) The volume holographic recording characteristics of a new bulk photopolymer, in which a radical photopolymerizable system, HEMA/AA are dispersed in a Poly(BADE-3APTS) epoxy matrix, have been investigated in this research.

10PS-123 Polarization Stability in A WDM/PolSK Fiber Communication System

S. L. Tsao, H. T. Lee, K. C. Tseng (National Taiwan Normal Univ. / Taiwan)

We present a homemade polarization compensator to improve the polarization stability in a WDM/PolSK fiber communication system. The DOPs of encoded points on Ponicare sphere are raised about 20% after the polarization compensator being connected.

10PS-124 Fabrication of Microstructures by a Combined Plating Process

H. T. Hsu, T. J. Yang (Feng Chia Univ. / Taiwan), C. H. Lin (Industrial Technology Research Institute / Taiwan) Micro-imprint lithography of microstructures for patterning on UV-curable resin/PET was demonstrated. The replication is successfully performed by electroless nickel plating and film thickness is increased by a nickel electroplating process.

10PS-125 Self-Organized InGaN Nanotips Grown by Metal-Organic Chemical Vapor Deposition System

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

In this work, we reported the investigation on the characteristics of InGaN with various indium contents and the fabrication of self-organized InGaN nanotips will also be discussed. Using a temperature ramping growth method, self-organized InGaN nanotips were formed vertically protruding above the sample. These self-organized InGaN nanotips will result in a red shift in PL spectrum indicating that In droplets act as indium source to form an InGaN intermediate layer near the heterointerface.

10PS-126 In-doped AlGaN 310nm Ultra-Violet Metal-Insulator-Semiconductor Sensors

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

Indium-doped Al_{0.25}Ga_{0.75}N 310nm solar blind (UV) metal-insulator-semiconductor Ultra-Violet (MIS) sensors with different SiO₂ cap layer thickness were successfully fabricated. With appropriate SiO₂ layer thickness, the dark current of In:AlGaN sensors could be notably suppressed, and the photo-generated carriers still could reach the electrodes by tunneling through the thin SiO_2 layer under the illumination. A UV-to-visible rejection ratio more than 1 orders of magnitude can be found from the MIS photodetector with SiO₂ layers. It can be seen clearly that cut-off occurred at around 300/310 nm while the responses above the bandgap were flat.

10PS-127 The research of oblique deposition of gadolinium fluoride thin films at 193nm

We. H. Cho (National Applied Research Laboratories and National Central Univ. / Taiwan), M. C. Liu, C. C. Lee (National Central Univ. / Taiwan)

Oblique deposition of gadolinium fluoride thin films was prepared by thermal resistance evaporation. The characteristics birefringence of gadolinium fluoride thin films at 193nm have been investigated. The difference between Np and Ns were inverse when deposition angles were large than 45 degree. The refractive index at 193nm of oblique deposition films decreased with the deposition angles was larger than 50 degree.

10PS-128 Enhanced Light Extraction for Blue Light-Emitting Diodes by Periodic Surface Texturing

J. Yi Wu, J. S. Li, R. H. Horng (National Chung Hsing Univ. / Taiwan), D. S. Wuu (National Chung Hsing Univ. / Taiwan)

Periodic surface texturing (PST) in an ITO/p-GaN layer was used to improve the light extraction efficiency of blue light-emitting diodes (LEDs) by photolithography and inductively coupled plasma reactive ion etching (ICP-RIE) dry etching process. The indium tin oxide (ITO) current-spreading layer is on the p-GaN of PST to achieve light emission from the overall area of LED. The brightness of $1 \times 1 \text{mm}^2$ LED chips with PST for 150 and 300 nm etching depth shows an increase by 7% and 76% as compared with that of LED without PST, respectively. Keywords: Periodic surface texturing (PST), photolithography, dry etching, GaN, LEDs

10PS-129 Unusual refractions in photonic crystals based on polymer-dispersed liquid crystal films

S. T. Wu, M. S. Li, A. Y. G. Fuh (National Cheng Kung Univ. / Taiwan)

This work describes unusual refractive phenomena from a hexagonally close-packed photonic crystal based on a holographic polymer dispersed liquid crystal film. The refracted collimated beams comprise positive and negative refractions, and can be switched to exhibit the negative refraction part only, by changing the incident angle or the wavelength of the incident beam.

10PS-130 Designs of Antireflective Coatings with Ultra-Low Refractive Index Layers for ArF Laser

T. Murata, H. Ishizawa, A. Tanaka (Nikon / Japan) We tried to design antireflective coatings with ultra-low refractive index layers for an ArF laser and confirmed that an ultra-low refractive index was greatly effective to improve the angular antireflective performance of a coating.

10PS-131 III-nitride Based LED with Omni-directional Light Extraction Enhancement

C. C. Hsu, Y. C. Lee, S. P. Yang, P. S. Lee, M. L. Wu, J. Y. Chang (National Central Univ. / Taiwan)

The uniform light pattern with light extraction enhancement in LEDs with microlens-like structures is demonstrated numerically and experimentally. It makes LED light source as a device of spatial-intensity uniformity integrated with GaN-LEDs structure.

10PS-132 Noise Elimination of Intracavity-doubled Solid-state Lasers by Using Volumetric Bragg Grating

S. S. Yang, W. C. Li, Y. H. Lin (National Tsing Hua Univ. / Taiwan)

By using Volumetric Bragg Grating as the output coupler in an intracavity-doubled solid-state laser (Nd:GdVO₄/ KTP), the reduction of the output flucturation can be achieved by enforcing a single mode operation.

10PS-133 Design and Evaluation of Color-Synthesis VPH Grating Using Rigorous Coupled Wave Analysis

A. Inoue, K. Nakajima, K. Kodate (Japan Women's Univ. / Japan)

In this paper, we report on the design and evaluation of a device to create a color-synthesis Volume Phase Holographic (VPH) grating for the three primary colors R,G,B using the rigorous coupled wave analysis (RCWA).

10PS-134 Monolithically Integrated Sub-Wavelength Grating Filter on SOI-based Waveguide for 1310/1550 nm Wavelength-Division Multiplexer

C. C. Chang, H. C. Lan, M. H. Chung, M. L. Wu (National Central Univ. / Taiwan)

Monolithically integrated sub-wavelength grating filter on SOI-based waveguide are demonstrated for replacing hybrid integration of thin-film filter. Ultra-compact size of $2 \times 5 \ \mu\text{m}^2$ and broad stop/pass band of 40 nm are attractive to lightwave network systems.

10PS-135 Exciting the Guided-Mode Resonance by Nanosphere Sedimentation

Y. L. Tsai, C. H. Chan, C. C. Chen, J. Y. Chang (National Central Univ. / Taiwan)

In this paper, the excitation of GMR with nanosphere sedimentation is investigated. The use of nanosphere sedimentation gives an alternative and feasible method for fabricating the necessary coupling layer for exciting the resonance.

10PS-136 High-Performance Optics for Thermal Microscopy

I. Arata, Y. Isobe, T. Ishizuka (Hamamatsu Photonics K.K. / Japan)

We have developed a thermal microscope for semiconductor failure analysis, which has an InSb thermal camera and optics optimized for the camera. Using this system we evaluated maximum resolution and achieved 256 line pairs/mm resolution.

10PS-137 BER Performance of OXADM Hybrid Protection Scheme

M. S. Ab-Rahman (Universiti Kebangsaan Malaysia / Malaysia)

The paper described our recent approach towards advanced of optical restoration device by introducing the new Optical Add and Drop Multiplexer (OADM). It is designed by improving the drawbacks appear in the previous devices with some excellence features added. The OXADM focuses on providing survivability through restoration against failure such as cable cut, power decreased and not functioning EDFA by means of linear protection, multiplex protection and ring protection (also called u turn protection). The paper presents the BER characteristic of OXADM by simulation and experimental approach.

10PS-138 3x Zoom Lens Design for a Mobile Phone

W. S. Sun, I. H. Mou (National Central Univ. / Taiwan) In this study we discuss the design of a 3 mega pixel and 3x zoom lens for a mobile phone. We evaluate the weight of the wavelength, simulate the stray light, and analyze the tolerance.

10PS-139 Utilizing Diffraction Grating Pair to Enhance Real-Time Imaging of Optical Coherence Tomography

J. F. Huang, H. C. Cheng, C. W. Chang (National Cheng Kung Univ. / Taiwan)

We present a new system structure by combining diffraction grating pair to construct Frequency domain OCT. For the broadband source property, we separate the spectrum and stretch the optical pulse in time to produce swept source purpose utilizing diffraction grating pair. It makes the linearly group delay between the different frequencies, promotes the system performance and system acquisition time.

10PS-140 Development of practical performance aberration retrieval method from spot intensity images using inverse analysis

M. Ueshima, K. Amaya (Tokyo Institute of Technology / Japan), K. Kataoka (Katsura Opto Systems / Japan) A new efficient and accurate aberration retrieval method from spot intensity images has been developed. The aberration of DVD optical pickup was analyzed numerically and experimentally, and verified the effectiveness of the present method.

10PS-141 Design of a new fully automated planar wave recording setup and study properties of photoPolymer using this system

N. Lakhotia, K. V. M. Raj, S. Agarwal, S. Dutta, R. Jindal, G. Nyati (MoserBaer / India)

We describe the built up method of a completely automated planar wave bench to study Dynamic Range and sensitivity of Photopolymer using Angular Multiplexing. Properties of photopolymer like Dynamic range and Sensitivity have been studied successfully by such a system.

10PS-142 Improved laser writing system for CGH fabrication

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

We are developing and improving a simple and precise laser writing system which can fabricate 300 mm diameter computer generated holograms (CGH) with 0.8 µm spatial resolution in radial direction.

10PS-143 Practical Method for Obtaining Spectral Responsivity of DSC from Spectral Radiance of Color Checker

S. W. Hsu (ITRI / Taiwan)

Spectral responsivities of RGB channels of DSC are obtained. It is done by constrained least square fittings between the RGB outputs and spectral radiances of several color checker region under various illuminations.

10PS-144 Rotating type miniature camera phone zoom lens system

J. Chen, Y. C. Tseng, K. C. Chuang, J. C. Chen, S. Y. Lin (Chung-Hua Univ. / Taiwan)

We have designed a practically mass production available rotating type miniature camera phone zoom lens system. The compact and short optical length zoom lens, with 2X and 3X magnifications respectively, 1.3 Mega pixels sensor elements and total length shorter than 10.7 mms, is designed and evaluated in detail. Using the Zemax lens design software, we start the design with thin lenses first order layout, spherical lenses, aspherical lenses. The plastic lens materials are used whenever applicable. The beam spot diagrams and the MTF of our design are found satisfactory to the good optical qualities.

10PS-145 High intensity LED array lighting

H. H. Lo, C. C. Lin (EOL/ITRI / Taiwan)

The high intensity LED array lighting is demonstrated. The 3×3 white LED array is used as light source. The combination of light pipes and lens array were converged the angular distribution into 22 degree. The measurement result revealed the same angular distribution as in simulation result. Due to the small tolerance, there are four dark lines inside the light pattern to decrease the uniformity.

10PS-146 Reconstruction of High-Quality Color 3-D Images by Electro-Holography

K. Sato (Univ. of Hyogo / Japan)

Quality deterioration of reconstructed 3-D images in the electro-holography is discussed. Nonlinear characteristics of a LCD panel have significant influences upon the quality of images. New methods are described for improving the quality of images.

10PS-147 Holographic recording in LiNbO₃ using various polarized lights

T. W. Lin, H. S. Chen, J. P. Liu (Feng Chia Univ. / Taiwan), H. F. Chang, H. F. Yau (National Central Univ. / Taiwan)

Holographic recordings in LiNbO₃ using ordinary and extraordinary light in the transmission-type geometry were implemented and compared. It is found that extraordinary light is superior in storage capacity, sensitivity and signal to noise ratio.

10PS-148 Optical Phase Recording Based on Photoinduced Birefringence in Azobenzene Film

D. Barada (Utsunomiya Univ. and National Institute of Advanced Industrial Science and Technology / Japan), T. Fukuda, A. Emoto (National Institute of Advanced Industrial Science and Technology / Japan), K. Tamura, M. Itoh (Univ. of Tsukuba / Japan), T. Yatagai (Utsunomiya Univ. and Univ. of Tsukuba / Japan)

Linearly polarized light including optical phase information was irradiated on an azobenzene copolymer film, and birefringence was induced in the film. The phase information was reconstructed by analyzing the principal axis of the photoinduced birefringence.

10PS-149 Hybrid shifting multiplexing storage in a holographic disk

J. J. Chen, W. C. Su (National Changhua Univ. of Education / Taiwan)

We increase the storage capacity of a holographic disk by using a compact fiber array and a random phase plate. Owing to the random phase generator, the two-dimensional shifting sensitivities of disk are increased and a theoretical area density of 100 bits/ μ m² is achieved.

10PS-150 Study of Grating-Depth Dependence on Fluorescence Enhanced by Grating Coupling Surface Plasmon Resonance

H. Hori, K. Tawa, Y. Tatsu, K. Kintaka, J. Nishii (AIST / Japan)

Fluorescence intensity of material placed on the metal grating was effectively intensified by the grating coupling surface plasmon resonance. The grating-depth dependence was studied in order to develop the sensitive fluorescence microscopy.

10PS-151 Full Field Displacement Measurement with an Instantaneous Phase Interferometer in Nanosecond Regime

H. Kihm, Y. W. Lee (Korea Research Institute of Standards and Science / Korea), V. Venugopalan (Univ. of California Irvine / USA)

Two dimensional displacement sensor using a dual-head pulse laser and a gated CCD camera is introduced for the measurement of reproducible deformations. Spatial phase shifter obtains four phase-shifted interferograms simultaneously for instantaneous measurement.

10PS-152 Design of a reserved block for holographic data storage system

Y. Lim, J. Hahn, B. Lee (Seoul National Univ. / Korea) We present a reserved block, or a fiducial mark, required in detecting an alignment displacement in holographic data storage. Our proposed method is tested through the numerical calculation of the cross-correlation patterns.

10PS-153 Analysis and design of light-ray-flux reproduction type cylindrical three-dimensional image display

S. Hisatake, T. Yasukawa, T. Nagatsuma, T. Kobayashi (Osaka Univ. / Japan)

Cylindrical three-dimensional (3D) image display has been proposed and analyzed. The 3D image is constructed based on light-ray-reproduction method and can be observed around 360-degree viewing angle. Design guideline has been clarified.

10PS-154 Tunable Coherent Photonic Microwave Notch Filter Based on PSFBG with Optical Phase Shifter

C. K. Oh, T. Y. Kim, C. S. Park (Gwangju Institute of Science and Technology / Korea), M. Hanawa (Univ. of Yamanashi / Japan)

A tunable coherent photonic microwave notch filter based on phase shifted FBG is proposed. By changing the optical phase shift inside the filter, notch frequency can be varied continuously keeping its free spectral range.

10PS-155 Spectral Analysis of Scattered Light from Flowers' Petals

A. Ozawa, T. Uehara, F. Sekiguchi, H. Imai (Japan Women's Univ. / Japan)

We have measured the scattered light from flowers' petals to evaluate the absorption spectrum of pigments in the visible wavelength region, and have compared the structural characteristics by using the TEM images. The considered structures of pigments distribute near the front surfaces and their density depends on the color of the petals.

10PS-156 Analysis of Hollow-core Photonic Bandgap Fibers for Evanescent-wave Biosensing

J. Sun, C. C. Chan, Y. F. Zhang, P. Shum (Nanyang Technological Univ. / Singapore)

Hollow-core photonic bandgap fibers based evanescent wave biosensors are demonstrated and analyzed theoretically and experimentally. The measured absorbance for a 30cm long fiber filled with a 0.2μ M Alexa Fluor 700-labeled DNA Oligo solution is 1.06.

10PS-157 Three Dimensional Vector Hologram in Photoreactive Polymer Dissolved Liquid Crystal Composites

T. Sasaki, H. Ono (Nagaoka Univ. of Technology / Japan), N. Kawatsuki (Univ. of Hyogo / Japan)

Three dimensional vector holograms, originating in spatial reorientation distribution of mesogenic molecules, are recorded in azo-dye-doped liquid composites. The observed optical properties are well explained by employing the finite-difference time-domain method.

10PS-158 Modeling of Electron-Nuclear Clusters in a Laser Optical Field by Three-Dimensional Relativistic Molecular Dynamics

Y. C. Wang, L. D. Liao, H. C. Lin, C. C. Hwang (National Cheng Kung Univ. / Taiwan)

The phenomena of laser-cluster interactions at high laser intensities may lead to such a Coulomb explosion, and corresponding released energy is in the regime of kilo to mega eV.

10PS-159 The Hand-Held 3D Skin Imaging System by Full-Colored Optical Coherence Tomography

B. W. Yang, L. M. Chan, K. C. Wang, W. H. Cheng (Ming-Hsin Univ. of Science and Technology / Taiwan) To take place of normal 2D skin camera, new hand-held imaging system is proposed for 3D skin imaging. With 3 original-colored beams applied in optical coherence tomography, full-colored image is achieved for dermatology.

10PS-160 Applications of Reflection Spectroscopy in Skincare and Skin Imaging

B. W. Yang, H. H. Liao (Ming-Hsin Univ. of Science and Technology / Taiwan)

Spectroscopy is applied in dermatology in this study. By fluorescence spectrum, collagen is quantified to explore the effects of skincare product; by reflection spectra, scanned points in dermis are respectively identified to yield non-invasive image.

10PS-161 An Ultra Violet Based Optical Fibre Sensor for Detection of Ammonia in the Agricultural Environment.

H. Manap, E. Lewis, W. Lyons, C. Fitzpatrick, P.Chambers, R. Muda (Univ. of Limerick / Ireland)

An optical fibre sensor to monitor the ammonia gas is reported. The open path optical fibre sensor is used to analyze the absorption lines of ammonia in the Ultra Violet Region. Initial results were compared with the theory and these demonstrate that this method is feasible to identify ammonia.

10PS-162 Characteristics of ZnO Nanaorods Grown by Different Mixtures of ZnO and Graphite Powders

S. Y. Hong, S. H. Yang, C. H. Tsai (National Kaohsiung Univ. of Applied Sciences / Taiwan)

The ZnO nanorods were synthesized on silver coated p-type Si (100) substrate by thermal evaporation and vapor transport methods with a tube furnace in N₂ and O₂ atmosphere. The mixture of ZnO and graphite powders is heated at 1000 $^{\circ}$ C. Characterizations of ZnO nanorods were carried out by X-ray diffraction, scanning electron microscopy and photoluminescence measurements.

10PS-163 Two Axes MEMS Scanning Probe for Endoscopic Optical Coherence Tomography

Y. Xu (National Univ. of Singapore and A*STAR / Singapore), J. Singh, Premachandran. C. S, J. H. S. Teo, A. K. B. Ratmin, K. W. S. Chen (A*STAR / Singapore), N. Chen (National Univ. of Singapore / Singapore), C. J. R. Sheppard (National Univ. of Singapore / Singapore), M. C. Olivo (National Cancer Centre / Singapore)

Two axes MEMS scanning probe for endoscopic optical coherence tomography has been developed using silicon optical bench packaging. MEMS scanner operates with electrothermal actuation featuring 1.3 volt driving voltage and provides 17° maximal mechanical deflection.

10PS-164 Properties of Cataractous Color Vision for Liquid Crystal Displays

T. Fujita, Y. Nakashima, M. Takamatsu (Univ. of Toyama / Japan)

We measured test stimulus light circle sensitivities using cataract experiencing goggle. The results show that sensitivity turned relatively low in the HSV hue region from 210 to 270 degrees in the cataractous vision environment.

10PS-165 Organic Photochromes for Photonics

V. Barachevsky (Russian Academy of Sciences / Russia)

A review of own advances in photonics of the organic photochromic systems and materials for photochromic recording media; light-modulating photochromic materials; photocontrolled optical chemical sensors, is presented. Perspectives for some other applications are discussed.

10PS-166 An Automatic Measurement and Reconstruction Method for BEF Structure

Y. J. Su (Industrial Technology Research Institute / Taiwan)

For the BEF structure, we use the head-rolling white light interferometer to measure the surface with high inclination, and therefore apply an automatic algorithm to adjust the machine deviation and reconstruct the final 3D result.

10PS-167 Spectroscopic measurement of Glucose content in a solution involving the water molecule clusters downsized by ultrasonic cavitations

N. Saiga, K. Matsuda (Yonago National College of Technology / Japan)

In a spectroscopy of Dextrose-water solution, use of ultrasonic cavitations was effective to detect weak glucose signal by returning the solvent to an identical stage and made its density estimated by a statistical method.

10PS-168 Characteristics of bright blue ZnO:W phosphor prepared by solid state reaction

F. Ŝ. Tsai, Ŝ. H. Yang, J. X. Chen (National Kaohsiung Univ. of Applied Sciences / Taiwan)

In this study, the ZnO:W phosphors were prepared by solid state reaction method (SSRM). The influences of doping concentration, sintering time and sintering temperature on the crystal structure, luminescence properties and surface morphologies of ZnO phosphor were studied. The high bright ZnO:W phosphor could be used as high efficiency phosphor for field emission display and plasma display panel applications.

10PS-169 Fast Data Acquisition for Time-domain Diffuse Optical Tomography by using Pseudorandom Bit Sequence

W. Mo, N. Chen (National Univ. of Singapore / Singapore)

Employing high bit rate pseudorandom bit sequence for optical signal modulation and demodulation and high speed avalanche photodiode for diffusing light detection, our novel DOT system achieves faster data acquisition than conventional DOT.

10PS-170 LEDS FOR DYNAMIC DAYLIGHT

N. C. Hu, C. C. Wu (National Taiwan Univ. of Science and Technology / Taiwan)

Dynamic daylight illuminant implemented by a set of LEDs with spectrum-variable and full spectrum properties which are not acquirable for artificial lighting up to date is proposed.

10PS-171 Technology of Color Maintenance for LED Backlight

K. C. Chang, C. C. Yang, H. X. Tsau, Z. X. Huang, F. S. Ho (ITRI / Taiwan)

For maintaining chromaticity of predetermined white, an optical feedback system to detect LED intensity calibrate to new con-dition is necessary. This paper presents a new method to control light intensity of each LED in backlight.

10PS-172 A new arbitrary phase-step digital holography reconstruction approach without blurring using two holograms

W. T. Hsieh, M. K. Kuo (National Defense Univ. / Taiwan), H. F. Yau (National Central Univ. / Taiwan), C. C. Chang (Ming Dao Univ. / Taiwan)

This work presents the working principle for arbitrary phase-step digital holography using two holograms without ambiguity and provides more satisfactory explanations. Using this approach, the object wave front can be numerically reconstructed without twin-image blurring.

10PS-173 Evaluation of the adaptive filter for the extraction of functional brain response from the near-infrared spectroscopy signal

W. Matsui, Y. Niki, E. Okada (Keio Univ. / Japan)

The near-infrared spectroscopy signal including the brain response, cardiac and respiratory fluctuation is modelled to evaluate the effect of the optimisation of the parameters in the adaptive filter for the multi-distance configuration.

10PS-174 Etching Effect of the Autocloning Structure Using Ion-assisted Deposition

Y. W. Yeh, T. H. Chang, S. H. Chen, C. C. Lee (National Central Univ. / Taiwan)

Based on the autocloning technique the photonic crystals were fabricated using E-beam gun evaporation with ion-assisted deposition (IAD). The etching effect of the autocloning photonic crystals was simulated and fabricated on the shaping process.

10PS-175 Measurement of thermal expansion coefficient and biaxial modulus of thin films using Phase-shift Interferometer

S. H. Hsu, S. H. Chen, C. C. Kuo, C. C. Lee, K. S. Lee (National Central Univ. / Taiwan), C. C. Jaing (Ming Hsin Univ. of Science & Technology / Taiwan)

When the thickness ratio is larger than 1%, the Stoney's equation should be modified. The coefficient of thermal expansion (CTE) and biaxial modulus of the thin film have been analyzed using the modified Stoney's equation.

10PS-176 Reduction Effect of SiN layer on Optical Absorption Inhomogeneities of LSI in Optical Annealing process *H. Ohno, Y. Honguh (Toshiba / Japan)*

With RCWA simulations, we calculated the reduction effect of SiN layer on optical absorption inhomogeneities of LSI in optical annealing process. The results indicate that the inhomogeneities can be reduced by about 7%.

10PS-177 Optical Properties of the Monolayer of Nanospheres on Thin-film Solar Cells

H. C. Hsien, C. H. Chan, S. H. Chen, C. C. Chen, C. C. Lee (National Central Univ. / Taiwan)

The monolayer of nanospheres synthesized using sol-gel method was applied to be the texture structure of solar cells. The reflectance and transmittance spectra show the absorption coefficient was improved. The optical enhance was increased about 12%.

10PS-178 Spectral measurement in reflexion on steeply aspheric surfaces

H. Piombini (CEA Le Ripault / France), S. Bruynooghe (Carl Zeiss AG / Germany), P. Voarino (QOL / France) Zeiss and CEA Le Ripault use spectral reflection as mean of measurement, which allows measuring optical coatings on curved parts. Two different devices have been implemented and used.

10PS-179 Legibility and Chromaticity of the Objects Presented on Displays of High Chromatic Performance

K. Sassa (Yamatak / Japan), M. Takamatsu, Y. Nakashima, T. Fujita (Univ. of Toyama / Japan)

For better presentation, improvements of computer displays for high chromatic performance has been realized. We report effects of high chromaticity and number of colors on the task of feature detection for the objects presented.

10PS-180 Development of Birefringence Measurement System

K. Yamanaka, S. Kimura, M. Noguchi (PENTAX / Japan)

We have developed a birefringence measurement system to measure two-dimensional distribution in less time, and have accomplished wide range measurement by improving the calculation algorithm and by using the phase unwrapping algorithm.

10PS-181 Two Beam Interferometric Exposure Tool for Studying Ultimate Resolution of ArF Immersion Lithography

M. Yoshii (Canon. and Utsunomiya Univ. / Japan), Y. Kishikawa, Y. Iwasaki, A. Ohkubo, S. Takeuchi, T. Honda, M. Kawashima (Canon / Japan)

As resolution of optical lithography become higher, there is a growing concern about the resolution of chemically amplified resists. We describe a two-beam interferometric exposure tool for studying ultimate resolution in immersion lithography.

10PS-182 Out-of-plane angular detection with random phase encoding in volume hologram

S. H. Ma, X. H. Lee, T. C. Teng, Y. W. Yu, C. C. Sun (National Central Univ. / Taiwan)

An out-of-plane angular detection scheme with random phase encoding in volume hologram is proposed. The rotational sensitivity can be tuned over a large range from several degrees to ten thousandth degrees.

10PS-183 Wide Ranged In-situ Impurity Concentration Monitoring

B. J. Pong, S. W. Hsu, C. H. Chen, Z. Y. Chung (Industrial Technology Research Institute / Taiwan), C. C. Cheng (National Central Univ. / Taiwan)

In-situ detection of oil and NaCl impurity concentration are achieved by a double beams ultra-violet absorption technique, and a laser interference technique, respectively. The detected concentration is as low as < 0.01%.

10PS-184 Characterization of a Scintillating Fiber-optic Dosimeter for Photon Beam Therapy

K. W. Jang, D. H. Cho, W. J. Yoo, S. H. Shin, B. Lee, J. H. Yi (Konkuk Univ. / Korea), S. Kim (Cheju National Univ. / Korea), H. Cho (Yonsei Univ. / Korea) We have characterized a scintillating fiber-optic

dosimeter for photon beam therapy.

10PS-185 In situ measurement of holographic grating formation using digital holographic microscopy

Y. C. Lin, C. J. Cheng (National Taiwan Normal Univ. / Taiwan)

This work describes a new in situ measurement technique of the light-induced refractive index profile in the holographic recording process by use of digital holographic microscopy (DHM). The analytical and experimental results are presented and discussed.

10PS-186 Study of polarization state in modeless fiber ring laser for OFDR application

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

The relation between the lasing and polarization states of a modeless fiber ring laser was experimentally investigated for OFDR application. Optimising the polarization sate, 200m and 1km fiber lengths were measured with accuracy of 10^{-4} .

10PS-187 Infrared Radiation Thermometer Using a Silver Halide Optical Fiber for Thermal Ablation

W. J. Yoo, J. K. Seo, D. H. Cho, K. W. Jang, S. H. Shin, B. Lee, S. C. Chung, Gy. R. Tack (Konkuk Univ. / Korea)

We have measured an infrared radiation which is transferred by a silver halide optical fiber from a heat source using a thermopile sensor for laser-induced interstitial thermotherapy and radiofrequency ablation.

10PS-188 Doped photopolymers for volume holography applications

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

We propose to fabricate two novel phenanthrenequinone-doped copolymers. The holographic characteristics of different samples, such as dynamic range and sensitivity, have been measured. The experimental results demonstrate that hv modification of the monomers the material properties can be improved.

10PS-189 Deposition of silicon oxynitride films by ion beam sputtering at room temperature

J. C. Hsu, M. H. He, H. L. Chen (Fu-Jen Catholic Univ. / Taiwan)

Silicon oxynitride films, possessing various compounds of SiO_2 and Si_3N_4 , were deposited by ion beam sputtering at room temperature. The optical properties of SiO_xN_y films were measured in this study.

10PS-190 Error evaluation of the mobile phone camera for off-axis MTF measurement using the edge objects.

S. M. Hong, J. H. Jo (Hannam Univ. / Korea), Y. W. Lee, H. Y. Lee, H. S. Yang, I. W. Lee (Korea Research Institute of Standards and Science / Korea), M. W. Hur (Jeewoo tech. Co. / Korea)

We developed the MTF (modulation transfer function) measurement system for the mobile phone camera and investigated the sources of error of the system. This equipment consists of the several different edge objects. When measuring the off-axis used this system with edge object, regarding the effect in MTF result where the edge object and an alignment error.

10PS-191 Optical Properties of High Transmittance Aluminum Oxynitride Thin Films for The Spectral Range from NUV to Visible

Y. H. Lin, J. C. Hsu (Fu Jen Catholic Univ. / Taiwan) Aluminum oxynitride films (AlON) were deposited with ion beam sputtering at room temperature. The optical index can be varied from 2.04 to 1.72 at 300 nm wavelength. The extinction coefficients were also below 1.9×10^{-2} .

10PS-192 Analysis of the Relationship between Probe Spacing and the Amplitude of Brain Signal Detected by Near-Infrared Spectroscopy

Y. Niki, W. Matsui, E. Okada (Keio Univ. / Japan) The brain activity is measured by the multi-distance probe configuration of near-infrared topography. The sensitivity of the probe pair with a 16 mm spacing is less than 40% of that detected with 32 mm spacing.

10PS-193 Theoretical Evaluation of Non-uniform Sensitivity Profile on Spatial Resolution of Near-Infrared Topography

N. Kiryu, H. Kawaguchi, E. Okada (Keio Univ. / Japan)

The influence of non-uniform spatial sensitivity profile on the spatial resolution of NIR topography is theoretically investigated. The spatial resolution of NIR topography can be improved by the double-density probe arrangement and the image reconstruction algorithm using the spatial sensitivity profile.

10PS-194 Study of Frequency-domain Optical Delay Line (FD-ODL) for Phase-Resolved Optical Low Coherence Interferometer

M. Y. Chou, W. H. Huang, S. T. Cheng, W. C. Kuo (National Taiwan Normal Univ. / Taiwan)

In this research, we developed different balanced optical low coherence interferometers to yield phase information by incorporating the frequency-domain optical delay line (FD-ODL) into a Mach-Zehnder interferometer. The phase stability in different configurations was analyzed.

10PS-195 Fast and Accurate Colours Classification Using a Light Source Controlled by Computer

L. Fauch, E. Nippolainen, A. Kamshilin (Univ. of Kuopio / Finland)

We present the experimental study of color-vector representation for accurate and fast analysis of 2D distribution of colours over an object surface, which is performed by use computer controlled light source.

10PS-196 Influence of SNR of Optical Intrinsic Signal on Statistical Analysis

of Spatial Extent of Brain Activation

N. Sakashita, K. Sakaguchi, S. Matsuo (Keio Univ. / Japan), T. Katsura, K. Yamazaki, N. Tanaka, H. Kawaguchi, A. Maki, E. Okada (Hitachi / Japan) Influence of SNR of optical intrinsic signal on

statistical analysis of the spatial extent of the brain activity is investigated. The activated region tends to decrease with decrease in SNR of intrinsic signal.

10PS-197 Nonlinear Optical Response of a Triplet Cylindrical Resonator Including a Nonlinear Resonator

K. Yamaguchi (Anan National College of Technology and The Univ. of Tokushima / Japan), M. Fujii (Toba National College of Maritime Technology / Japan), M. Haraguchi, T. Okamoto, M. Fukui (The Univ. of Tokushima / Japan), M. Kamano, T. Hasegawa (Anan National College of Technology / Japan)

The nonlinear optical response observed 600 fs by two dimension FDTD method with a triplet cylindrical cavity combined with the silica cylindrical cavity and silica cylindrical cavity coated with silica film doped J-aggregates.

10PS-198 A simple method for the roughness measurement of optical surfaces

H. M. Yang, C. L. Tien, S. S. Jyu, Y. Y. Lin (Feng Chia Univ. / Taiwan)

The surface roughness measurement based on fast Fourier transform with a Gaussian filter was presented. The simulation of the roughness measurement is performed by MATLAB. The result has shown the feasibility of the proposed method.

10PS-199 Wavelength sensitivity of optical admittance diagram for multilayer coatings

Y. J. Chen, C. C. Lee (National Central Univ. / Taiwan) The optical monitoring method, Admittance Real-time Monitoring (ARM), based on admittance diagram has great advantage of wavelength-sensitivity when monitoring the growth of films. The analyses show that the admittance diagram is more sensitive than runsheet.

10PS-200 Deterministic Pitch Tool Polishing for the flat surface fabrication

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

We modified the Draper type polishing machine for the deterministic pitch polishing. Particularly, we used a rotating pitch tool to polish the surface rapidly. By changing the rotating speed, we obtained the $100 \sim 150$ rpm as the best speed for the efficient polishing process. Within these speeds range, simulated material removal shapes were matched with experimental results with accuracy of about ninety six percent.

10PS-201 Review and Implementation of Display Characterization Models Using Large LCD TV Monitor

R. Ho (ITRI / Taiwan)

This paper review several characterization models, each tested on nine selected LCD TV monitors available on the market and the performances were evaluated. The display screen sizes were ranging from 32 to 42 inches. The purpose of this article is to describe methodologies and performances of selected models on LCD TV monitors.

10PS-202 Point spread function of a reference pattern with random distributing binary phase modulation of the collinear holographic storage system

Y. W. Yu, S. C. Hsieh, T. C. Teng, C. Y. Cheng, S. H. Ma, X. H. Lee, C. C. Sun (National Central Univ. / Taiwan) We use the paraxial approximating solution to calculate point spread function and show that the point spread function can be enhanced by the reference pattern with random distributing binary phase modulation.

10PS-203 A method for fringe normalization by Zernike polynomial

S. S. Jyu, C. L. Tien, H. M. Yang (Feng Chia Univ. / Taiwan)

A new approach for fringe normalization by Zernike polynomial fitting to cancel background illumination in the interferogram was proposed. This method can overcome the problem of the non-uniformity illumination of fringe patterns.

10PS-204 Comparison of Algorithms to Calculate Cortical Blood Flow of Guinea Pigs by Laser Speckle Method

S. Matsuo, K. Sakaguchi, E. Okada (Keio Univ. / Japan), T. Katsura, K. Yamazaki, H. Kawaguchi, A. Maki (Hitachi / Japan)

The flow rates of a rotating disk and the cortical blood flow are measured by the laser speckle method. The results calculated by the two algorithms are compared and appropriate number of frames for the calculation is discussed.

10PS-205 Evaluation of the Curvature of an Object by Talbot Interferometry

J. H. Chen, C. W. Wu, N. Y. Wu, K. H. Chen (Feng Chia Univ. / Taiwan)

In this paper, a modified method of Talbot interferometry is developed for the evaluation of the curvature of an object. Furthermore, the achievable accuracy is discussed. It is shown that this method is suitable for both transmission and opaque objects with high accuracy.

10PS-206 Modified Dual-wavelength Heterodyne Michelson Interferometer for Absolute Distance Measurement

K. H. Chen, C. C. Wu, W. Y. Chang, J. H. Chen (Feng Chia Univ. / Taiwan)

A modified dual-wavelength heterodyne Michelson interferometer is developed for the absolute distance measurement. The feasibility of this method was demonstrated and the measurement resolution is about $0.28\mu m$.

10PS-207 A simplified single shot measuring method for the 3D radiation pattern of LEDs, optical fibers and laser diodes

I. Moreno (Unidad Academica de Fisica, Universidad Autonoma de Zacatecas / Mexico and National Central Univ. / Taiwan), M. Y. Han, W. T. Chien, T. X. Lee, S. X. Ma, C. C. Sun (National Central Univ. / Taiwan)

We describe a simple imaging technique based on the illumination of a flat diffuse translucent screen that enables a rapid measurement of the light source intensity angular distribution over a significant part of the hemisphere.

10PS-208 Self-Calibration of the Phase-Shifting Adapter for Fizeau Interferometers

Y. Ouyang (Chang Gung Univ. / Taiwan), M. Ou-Yang, H. C. Chou (National Central Univ. / Taiwan)

A self-calibration method of the phase-shifting adapter with three PZTs is proposed. Experiment results show that the deviation of the phase shift error is improved from 3.492 degrees to 0.081 degrees.

10PS-209 FDTD Analysis of the Near Field Generated by a Nano-Aperture in Presence of a Phase-Change Disk Structure

Y. He (Osaka Electro-Communication Univ. / Japan), T. Kojima (Kansai Univ. / Japan)

The near field is calculated by FDTD method for a nano-aperture that is located above a phase change disk structure. The distribution of absorption power in the disk is also discussed.

10PS-210 FDTD study of near field phase-shifting lithography and nano-image profiles precisely fabricated

F. D. Lai, J. M. Hua, W. Y. Li (National Kaohsiung First Univ. of Science and Technology / Taiwan)

The nano-image profiles transferred through near field phase-shifting mask at the various exposure-energy-intensities or the various distances are simulated by FDTD method and precisely fabricated. A nano-pattern of less than 100nm had been developed.

10PS-211 Study and fabrication of maximum operating frequency of SAW filters as using I-line source

J. M. Hua, F. D. Lai (National Kaohsiung First Univ. of Science and Technology / Taiwan), H. M. Huang (National Taiwan Univ. of Science and Technology / Taiwan)

As in I-line photolithography, the maximum operating frequency of SAW filter will be study when the periodicity of the patterns is the same. The near field phase shift photolithography is used to fabricate the nano-gap devices.

10PS-212 Observation Method for Contact State by Total Internal Reflection

H. Sakuma (Tokyo Metropolitan Univ. / Japan)

Observation method for contact state of solid surface is proposed, which based on the total internal reflection is actualized by an elastic sheet, silicone rubber or PET film, between the prism and the test surface.

10PS-213 Interferometric Flatness Measurement of Glass Wafer by Modified Monochromatic Light Source

J. B. Song, H. Y. Lee, J. H. Lee, Y. W. Lee (Korea Research Institute of Standards and Science / Korea) Using a monochromatic light source with sodium vapor lamp and amber LED which have different coherence length each other, the total thickness variation and the surface flatness of glass wafer is

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measured

10PD-01 Estimation of aberration using Field-Zernike function

T. Ujike (Core Technology Center, Nikon Corp / Japan), T. Matsuyama (Precision Equipment Company, Nikon Corp / Japan)

10PD-02 Micro Objective Lens and Optical Pickup Head Design for the Blue-Light Small-Form-Factor Storage System

H.F. Shin, G. D. Lin, C. S. Lu (National ChungHsing Univ. / Taiwan), Yuan-Chin Lee (Industrial Technology Research Institute / Taiwan), Yi Chiu (National Chiao Tung Univ. / Taiwan), Kuo-Yung Hung (MingChi Univ. of Technology / Taiwan)
10PD-03 Design and fabrication of holographic lens for an integrated compact optical pattern recognition system

M. I. Hsieh and H. C. Liao (Institute of Electro-Optical Science and Technology, National Taiwan Normal Univ., Taipei / Taiwan)

10PD-04 Reflective Interference Optical Components fabricated by nanoimprint of Glassy Alloy

Y. Saotome (Institute for Material Research, Tohoku Univ. / Japan), Y. Fukuda (Graduate Student of Gunma Univ. / Japan), A. Inoue (Tohoju Univ. / Japan)

10PD-05 Modeling Multi-Pumped Raman Fiber Amplifiers

Z. Lali-Dastjerdi (Islamic Azad Univ.- Shushtar Branch /Iran), Kroushavi (Sgahid Beheshti Univ. / Iran), M. Hosein Rahmani (Valie Asr Univ. of Rafsanjan / Iran)

10PD-06 The Effect of Ambient Illumination on Perceived Image Quality on Large Display

R. Ho (Industrial Technology Research Institute / Taiwan)

June 11, 2008 (Wednesday)

Optical Components/Devices (2) (8:30-10:05) Presiders:

C. W. Liang (National Central Univ./ Taiwan) Y. Tanaka (Matsushita / Japan)

11S3-08 (Invited)

(8:30) Glass Molding for subwavelength structured surfaces

H. Kikuta (Osaka Prefecture Univ. / Japan), J. Nishii (Advanced Industrial Science and Technology / Japan), Y. Tanaka (Matsushita Electric Industrial / Japan), T. Hatano (Konica Minolta Opto / Japan)

We have worked on a national project to establish glass molding technology for fabricating optical elements with micro and nano structured surface. A form-birefringent phase retarder and an antireflective structured surface were made.

11S3-09 (Invited)

(8:55) Micro-Optics Fabrication and Applications

R. Voelkel, K. J. Weible, M. Eisner (SUSS Micro Optics SA / Swiss)

Demand is growing for micro-optics in 200mm wafer technology. Well-established processes from Semiconductor industry allow cost-efficient manufacturing of almost any micro-optics structure shape.

1183-10

(9:20) Fabrication of Sub-Wavelength Periodic Structures on High-Refractive-Index Glasses by Direct Glass Imprinting Process

T. Mori, K. Hasegawa, T. Hatano (Konica Minolta Opto / Japan), H. Kasa, K. Kintaka, J. Nishii (National Institute of Advanced Industrial Science and Technology / Japan)

Direct glass imprinting has been demonstrated for the precise fabrication of sub-wavelength periodic structures on oxide glasses. The phase retardation between TE- and TM-polarized transmission lights was recognized in the whole visible wavelength region.

11S3-11

(9:35) Monolithic Integration of Diffractive Optical Element on Silicon 45° Microreflector

H. L. Hsiao, H. C. Lan, C. H. Hsu (National Central Univ. / Taiwan), C. M. Wang, M. L. Wu (Academia Sinica / Taiwan)

A monolithically integrated micro-optical element consisting of a diffractive optical element (DOE) and a silicon-based 45° micro-reflector is experimentally demonstrated to facilitate optical alignment of non-coplanar fiber-to-fiber coupling.

11S3-12

(9:50) Development of a High-Speed Inspection Method for Optical Lenses Tilt and Decenter

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

A polarization inspection method for optical lenses with tilt and decenter defects is proposed, and the resolution of planner-spherical lens with 70mm in aperture diameter and 150mm in surface radius is 147.6 seconds per pixel.

Coffee Break (10:05-10:25)

Optical Components/Device (3) (10:25-11:45) Presiders:

P. Lam (Lam Optics / USA) Y. F. Chen (National Chiao Tung Univ. / Taiwan)

11S3-13 (Invited)

(10:25) A dielectric liquid lens and its AF application

J. A. Yeh, C. G. Tsai (Nation Tsing Hua Univ. / Taiwan), L. T. Su, M. H. Ko (Creative Sensor / Taiwan), C. Y. Yang, C. L. Peng (National Tsing Hua Univ. / Taiwan) A dielectric liquid lens was disclosed in last two years. Its driving mechanism is the dielectric force generated on the liquid-liquid interface where electric field acts on. The AF performance also was demonstrated in the pictures shot by the CCD module with liquid lens.

11S3-14 (Invited)

(10:50) Imaging Properties for Subwavelength Metallic Structured Lens

C. Du, C. Zhou, X. Luo (State Key Laboratory of Optical Technologies for Microfabrication, Institute of Optics and Electronics, Chinese Academy of Sciences / China)

The imaging properties of the structured lens formed sub-wavelength square holes array perforated on a metallic film are studied and discussed, including the phase modulation, imaging resolution and transmittance.

1183-15

(11:15) Broad-Area InGaAs Sub-monolayer Quantum- Dot VCSELs in the 980 nm Range

H. P. D. Yang, J. Y. Chi (Industrial Technology Research Institute / Taiwan), R. Xuan (Industrial Technology Research Institute, and National Chiao Tung Univ. / Taiwan), I. C. Hsu, H. C. Kuo (National Chiao Tung Univ. / Taiwan)

Broad-area InGaAs sub-monolayer quantum-dot photonic-crystal VCSEL for fiber-optic communications in the 980 nm range is reported. A maximum CW output power of 12.2 mW has been achieved, with a pulsed output power of 15.8 mW.

11S3-16

(11:30) High Efficiency GaAs Solar Cells Using Nano-Structured Indium-Tin Oxide

C. H. Chang, P. Yu, C. H. Chiu, H. C. Kuo, C. C. Chen (National Chiao Tung Univ. / Taiwan),

An array of conductive Indium-Tin-Oxide nano-rods is deposited on GaAs solar cells using oblique-angle electron-beam deposition. Calculations show that such ITO nano-rods offer superior angular and spectral anti-reflective properties.

Optical Systems (1) (11:45-12:10) Presiders:

B. Hendriks (Philips / Netherlands) S. H. Lin (National Chiou Tung Univ./ Taiwan)

11S4-01 (Invited)

(11:45) Multi-dimensional optical data storage: towards Petabyte storage devices

M. Gu (Swinburne Univ. of Technology / Australia) In this talk, we show that the spectral and polarisation dependence of quantum dots and metallic nanoparticles on the size and shape under two-photon excitation provides a mechanism for five-dimensional optical data storage devices.

Lunch (12:10-13:10)

Optical Systems (1) (13:10-14:10)

Presiders:

B. Hendriks (Philips / Netherlands) S. H. Lin (National Chiou Tung Univ./ Taiwan)

11S4-02

(13:10) All-optical analog-to-digital conversion using a designed spatial coding filter

T. Kato, T. Konishi, T. Nishitani, K. Itoh (Osaka Univ. / Japan)

We propose and demonstrate an all-optical ADC using a spatial coding filter. 3-bit gray codes are successfully output as spatial patterns by using designed spatial coding filter.

11S4-03

(13:25) Recording of Color 3-D Images by One-Shot Digital Holography

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

A new technology of one-shot digital holography is for recording RGB complex-amplitude developed holograms instantaneously. The off-axis digital hologram recorded is once. and the at complex-amplitude hologram is obtained by spatially sampling.

11S4-04

(13:40) Arbitrary Wavelength- and Time-Selective Reconfigurable Optical Add/Drop Multiplexer (ROADM) using Two-Dimensional Time-Space Conversion and a MEMS Optical Switch

R. Itoh, T. Konishi, Y. Yonetani, K. Itoh (Osaka Univ. / Japan)

We experimentally demonstrate the wavelength- and time-selective drop operation of a 333 Gb/s \times 3 channels OTDM/WDM signal for an arbitrary wavelength- and time-selective ROADM in an optical communication band.

11S4-05

(13:55) Two Dimensional Phase Measurement of biological cell Using Phase Locking Technique

E. Watanabe (Japan Women's Univ. and Japan Science and Technology Agency / Japan) M. Hanesaka, J. Mizuno, K. Kodate (Japan Women's Univ. / Japan)

We have constructed a simple phase-measurement system for small-scale structure using phase locking technique. This system allows a two-dimensional measurement with a spatial resolution of $2\mu m$ and axial noise level of 1nm. Using a plastic bead and a hypodermis of an American Bullfrog's tongue as samples, two-dimensional phase map was obtained.

Coffee Break (14:10-14:30)

Optical Systems (2) (14:30-16:05) Presiders:

M. Ou-Yang (National Central Univ./ Taiwan) T. Konishi (Osaka Univ. / Japan)

11S4-06 (Invited)

(14:30) Imaging micropolarimeter

P. Török, C.A. Macías Romero, M.R. Foreman, P.R.T. Munro (Imperial College London / UK)

We designed and built a confocal polarimeter with sensitivity and spatial resolution superior to currently existing practical realisations. With theoretical aspects also considered we discuss possible applications in optical data storage, life sciences and engineering.

11S4-07 (Invited)

(14:55) 100 years of integral imaging – a three-dimensional display technique with full parallax

B. Lee, J. Kim, Y. Kim, Y. Kim (Seoul National Univ. / Korea)

Integral imaging is a promising three-dimensional (3D) display technique with 100 years of history. It can display real-time 3D movies with full color by using a lens array and a two-dimensional display device.

11S4-08

(15:20) Camera with inverted perspective projection view volume array for integral imaging

J. Hahn, Y. Kim, E. H. Kim, B. Lee (Seoul National Univ. / Korea)

We propose a novel camera with inverted perspective projection view volume array suitable for integral imaging. With this camera we pick up the elemental images directly and present the resultant integrated images.

1184-09

(15:35) Compact See-through Eyeglass Display Using an On-axis Optical System

T. Otaki, A. Sugaya, K. Konno (Nikon / Japan)

A newly designed see-through eyeglass display optics has been developed. It has an on-axis optical system with a polarizing beam splitter for combining display images and see-through views. Good full-color display images were confirmed.

11S4-10

(15:50) Implementation of integral floating display system using concave mirror

J. Kim, G. Park, J. H. Jung, Y. Kim, B. Lee (Seoul National Univ. / Korea), S. W. Min (Kyung Hee Univ. / Korea)

Integral floating display using a concave mirror is implemented to enhance the brightness of integral floating display. Its structure is explained and feasibility is verified through experimental results.

Break (16:05-16:20)

Optical Systems (3) (16:20-17:55)

Presiders:

W. Ulrich (Zeiss / Germany) S. J. Chen (National Cheng Kung Univ. / Taiwan)

11S4-11 (Invited)

(16:20) THz Biochip

C. K. Sun (National Taiwan Univ. and Academia Sinica / Taiwan)

We demonstrate a THz-biochip integrated with a compact high-efficiency micro-THz source with tunable THz frequencies for direct, sensitive, localized label-free bio-sensing. The capability to identity different illicit drug powders is successfully demonstrated.

11S4-12 (Invited)

(16:45) Microlithographic Projection Lens for 32nm half-pitch Generation and Beyond

T. Matsuyama (Nikon / Japan)

This paper describes challenges and solutions for realizing a microlithographic projection lens, which is suitable for 32nm half-pitch semiconductor-device patterning.

1184-13

(17:10) Miniaturized two-photon fluorescence and second harmonic generation microscope with a 24Hz frame-rate

T. M. Liu, M. C. Chan, I. H. Chen, S. S. Chia, C. K. Sun (National Taiwan Univ. / Taiwan)

With miniatured tube lenses and two-dimensional scanning asynchronous of the micro-electro-mechanical-system mirror. we 24Hz demonstrated а frame-rate miniaturized two-photon fluorescence/second-harmonic-generation microscope system. Sub-micron transverse resolution of sectioning images can be achieved.

11S4-14

(17:25) Wide-view-angle $\lambda/4$ plates for diagnosing 193-nm lithography tools

Y. Furutono, H. Nomura (Toshiba / Japan)

We developed new quarter-wave plates insensitive to angle of incidence and measure their properties by the Senarmont method. The result shows that change of retardation was mitigated within +20 degrees of incident angle.

1184-15

(17:40) Optical Microscope Observation of Enhanced Fluorescence Excited by Grating Coupling- Surface Plasmon Resonance

K. Tawa, H. Hori, Y. Tatsu, K. Kintaka, J. Nishii, K. Kiyosue (AIST / Japan)

An electromagnetic field of surface plasmon resonance coupled with sub-wavelength grating of a substrate was extremely enhanced. The fluorescence from a labeled cell on the grating supported by surface plasmons was observed by optical microscope.

Closing Session (17:55-18:20) Presiders:

C. C. Sun (National Central Univ. / Taiwan) K. Maruyama (HOYA / Japan)

Best Paper Award and Best Poster Award (17:55)

C. C. Lee (National Central Univ. / Taiwan) K. Tatsuno (Hitachi / Japan)

Closing Remarks

(18:10)

J. Hsu (EOL ITRI / Taiwan) H. Tsuchida (Olympus / Japan)

INTRODUCTION

The 6th International Conference on Optics-photonics Design & Fabrication "ODF'08, Taipei" will be held on June 9-11, 2008 in Taipei, Taiwan. 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'08 is intended to provide an international forum for original paper presentations and discussions of optics-photonics design and fabrication related technological and scientific topics. These topics include theory, design, fabrication, testing, applications and others.

The conference will be held at the Taipei International Convention Center which is near the highest building in the world "Taipei 101 ". ODF'08 is aimed to promote international collaboration among the participants in this field including related companies' exhibition and sight seeing tour.

Collaboration and Competition make progress.

"Join us at ODF'08, Taipei!"

SCOPE OF THE CONFERENCE

ODF'08 is an international forum for the engineers and scientists in field of Optics-photonics Design and Fabrication to exchange their ideas and achievements for the future mutual progress. ODF'08 will be held at the same site as OPTO Taiwan'08, the biggest optics & photonics industrial annual organized by PIDA (Photonics exposition Industrv & Technology Development Association) in Taiwan. The conference will consist of the sessions for optics-photonics design, simulation, optical components, optical systems, and optical technology. These sessions will cover the field of optical theory, fabrication and testing, software, DOE's, micro-optics, nano-optics, photonic crystals, thin films, waveguides, MEMS, Lasers, fiber communications, information optics, optical storage, optical lithography, microscopy, displays, bio-science and others.

INSTRUCTIONS FOR SPEAKERS

All speakers are required to register for participation in ODF'08.

(Oral presentation)

(1) Presentation time

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

(2) Attention (Bell)

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

(3) Equipment

A PC-based data projector will be available at the conference site. Speakers are asked to bring in their own personal computer plus a back-up CD-R or USB Flash Drive (Windows based) with downloaded presentation material.

(Poster presentation)

Poster session will be held from 17:00 to 20:00 on June 10. Each author is provided a 2.5 m height x 1.0 m width bulletin board on which to display his/her summary of the paper. Authors must remain in the vicinity of the bulletin board during the poster session to answer questions of attendees in English.

BEST PAPER AWARD AND BEST POSTER AWARD

Among the contributed papers, the best paper and the best poster will be awarded through the examination by the program committee at the end of conference.

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 Manuscript to the secretariat for ODF'08(<u>pdp@odf08.tw</u>). For the layout of manuscript, please see the Guidelines on the ODF'08 Home Page. Review result will be noticed by May 16, 2008. As well as the regular submission, the copyright of the article published in the ODF'08 Technical Digest is to be transferred to the Optical Engineering Society, Taiwan and the Optical Society of Japan (OSJ). The authors are required to agree to the copyright transfer when the 35-word abstract and the 2-page manuscripts are submitted. The deadline for submission of post-deadline papers is on April 23, 2008.

For inquiries, please contact: Secretariat for ODF'08

Ms. Chao-Yu Kuo National Central University Department of Optics and Photonics No.300, Chung-Da Rd., Chung-Li 32001, Taiwan TEL: +886-3-4227151 ext 57911 FAX: +886-3-4252897 E-mail: pdp@odf08.tw 郭昭佑小姐 國立中央大學光電科學與工程學系 32001 桃園縣中壢市中大路300號 電話: 03-4227151 ext 57911 FAX: 03-4252897 E-mail: pdp@odf08.tw

ODF'08 SPECIAL ISSUE OF OPTICAL REVIEW

The special issue of OPTICAL REVIEW, the journal of the Optical Society of Japan, for ODF'08 will be published in Every authors of ODF'08 March 2009. are strongly encouraged to submit the original papers to the special issue. The deadline for submission is July 15, 2008. Application form for the special issue will be distributed on site. Please note that all the submitted papers will be judged following the policy of OPTICAL REVIEW. editorial For vour information, visit the web-site http://www.ipap.jp/ . The submissions from invited speakers are also welcome.

If you want any further information, please contact, Koichi Maruyama Editor/Secretariat, ODF'08 Special Issue HOYA Corporation E-mail: maruyama@odf.jp

REGISTRATION

• Registration Fee

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

Туре	Before /on May. 6, 2008	After May. 6, 2008
Member [*]	TWD10,000	TWD12,000
General (Non-members)	TWD10,000	TWD13,000
Student	TWD2,000	TWD2,000
Additional copy of	TWD2,000	TWD2,000
Technical Digest		

[*] Member of sponsor and cooperative society TWD: Taiwan dollar

• Registration

Those who wish to attend ODF'08 Taipei should make online registration. The deadline for advanced registration is May 6, 2008. On-site Registration at Conference venue will also be accepted, but early registration is highly recommended. The Online Registration Page will be available at the ODF'08 Home Page.

The conference organization committee requests whoever interested in attending this conference to take advantage of the on-line registration. Due to the size limitation of the conference site, on-site registrations will be accepted on a "first come, first served" basis subject to space availability.

• 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.

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S. Yamaguchi (Konica Minolta Opto / Japan)

CONFERENCE SITE

The Conference Venue, Taipei International Convention Center (TICC) is located in the foothills of eastern Taipei's Hsin-yi District besides many landmark buildings: the Taipei City Hall, Taipei City Council, National Dr. Sun Yat-Sen Memorial Hall, and Taipei 101.

Address: Taipei International Convention Center, No.1, Sec. 5, Hsin-yi Rd., Hsin-yi District, Taipei City 110, Taiwan

From Taoyuan International Airport

(1) Board "Toward You Air Bus" to Hyatt Hotel. The journey time is around 70min. You can walk for 200m from Hyatt Hotel to reach the conference site.

(2) Board "Taiwan Bus Corp. Kuokuang Line" to Taipei Railway Station. The journey time is around 50min. Take the Metro Kunyang-Yongning Line (Blue Line) of the mass rapid transit (MRT) system in Taipei to "Taipei City Hall" station. The journey time is around 15min. From exit, then walking (around 500m) on Keelung Rd. directly, then join onto Hsin-yi Rd. and TICC Main Entrance.

(3) By taxi, it costs around TWD1,500 to travel from Taoyuan International Airport to the conference site. The journey time is around 70min.



OPTIONAL TOUR

On June 12, after all the sessions are closed, an optional tour to visit the Taipei's National Palace Museum is arranged for the participants and accompanying persons as follows. Those who like to join the tour are required to make registration online. The deadline for the optional tour registration is June 6, 2008.

< The National Palace Museum Tour >

Fee: TWD1000 (No food or drinks will be provided. Attendee can find them in NPM's restaurants)

Date: June 12 (Thu.)

Assemble time and place: Lobby of Taipei International Convention Center AM 09:00

< Schedule >

Transport: by bus

AM 09:00 -- Gathering at the lobby of Taipei International Convention Center

PM 16:30 -- The end of the visiting of National Palace Museum

PM 17:30 -- Come back to Taipei International Convention Center

"National Palace Museum"

The National Palace Museum in Taiwan ranks with Louvre in Paris, the British Museum in London and the Metropolitan Museum of Art in New York, as the four most top famous museums in the world. The collection of cultural artifacts held by the National Palace Museum is composed of an enormous treasure trove of objects inherited from the previous Sung, Yüan, Ming and Ch'ing dynasties. The holdings from the Palace Museum included 46,100 antiquities, 5,526 paintings and calligraphic works and 545,797 rare books and archival documents.

HOTEL RESERVATION

• Hotel

The Accommodation service for our attendees is combined with OPTO Taiwan 2008 exhibition. For more information, refer to the hotel information page of the ODF'08 Home Page. The website will re-direct to the accommodation service page of OPTO Taiwan 2008 exhibition.

http://opto.display-all.com/opto2007/en/opto_visitor_hotel.html

Hotel	Contact
Grand Hyatt Taipei	Tel : 886-2-2720.1200 Fax : 886-2-2720.1105 Website : <u>www.taipei.grand.hyatt.com</u>
Miramar Garden Taipei	Tel : 886-2-7702-5124 Fax : 886-2-7702-5159 Website : <u>www.miramargarden.com.tw</u>
Agora Garden	Tel : 886-2-8780-1999 Fax : 886-2-8780-5600 Website : <u>www.agoragdn.com.tw</u>
Howard Plaza Hotel	Tel : 886-2-2700-2323 Fax : 886-2-2708-2376 Website : <u>www.howard-hotels.com</u>
San Want Hotel	Tel : 886-2-2781-7009 Fax : 886-2-2781-7022 Website : <u>www.sanwant.com</u>
Royal Best Suites	Tel : 886-2-2729-5533 Fax : 886-2-2729-0469 Website: <u>www.royalbest.com.tw</u>

Map of Hotel Location



Map of Taipei International Convention Center





Taipei International Convention Center Floor map





Deadlines

Post Deadline Papers: Advance Online Registration: Online Registration: Optional Tour: On-site Registration : April 23, 2008 May 6, 2008 June 6, 2008 June 6, 2008 June 9-11, 2008

For information mail ODF'08 Taipei Secretariat

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