Advance Program

ISOM/ODS'08

International Symposium on Optical Memory and Optical Data Storage

Topical Meeting and Tabletop Exhibit

July 13-17, 2008
Hilton Waikoloa Village
Waikoloa, Hawaii

Postdeadline Paper Submission Deadline:
June 16, 2008
Pre-Registration Deadline: June 23, 2008
Hotel Reservation Deadline: June 12, 2008

Sponsored by:
SPIE
IEEE/Lasers and Electro-Optics Society
Optical Society of America
The Japan Society of Applied Physics
The Magnetics Society of Japan
Optoelectronic Industry and Technology Development Association

In Cooperation with:
The Institute of Electronics, Information and Communication Engineers
The Chemical Society of Japan
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The Institute of Electrical Engineers of Japan
The Institute of Image Electronics Engineers of Japan
The Institute of Image Information and Television Engineers
The Japan Society of Precision Engineering
The Laser Society of Japan

http://spie.org/events/ods
http://www.isom.jp

Foreword

The Joint International Symposium on Optical Memory and Optical Data Storage 2008 (ISOM/ODS'08) will be held on "The Big Island" of Hawaii 13-17 July 2008.
Reflecting the international nature of the interest and work in optical memory and optical data storage, these two conferences are held jointly every third year.
The unparalleled setting of this conference provides an outstanding opportunity to share the latest information in this dynamic field with your international colleagues.
New developments in holographic, three-dimensional, near-field, super-resolution and hybrid recording technologies for the fourth-generation systems will be the main focus at this conference.
Special sessions on **"Nano-Photonics"** and **"Applications"** are also planned.
In addition to the technical sessions, on Sunday 13 July 2008, a series of short courses will be presented on the latest developments in the field of optical memory and optical data storage.
Industry representatives will also be on hand to exhibit their latest developments in equipment and materials.
The official conference language will be English.

Topics

Topics to be covered:

- Basic Theory
- Testing and Characterization
- Media
- Components
- Coding and Signal Processing
- Drive Technologies
- Systems and Applications
- Holographic Recording
- Three-Dimensional Processing
- Near-Field Recording
- Super-Resolution
- Hybrid Recording
- New or Related Technologies

Invited Speakers

Keynote Session

MA1: Nanophotonics and Application to Future Storage Technology
Motoichi Ohtsu, Univ. of Tokyo
MA2: Can future storage technologies benefit from the existing/emerging nano-tools and techniques?
Masud Mansuripur, College of Optical Sciences/The Univ. of Arizona

General Sessions

MB1: Terabyte Recorded in Two-Photon 3D Disk
Edwin Walker, Call/Recall, Inc.
MB3: Micro-Holographic Storage and Threshold Recording Materials
Brian Lawrence, GE Global Research
TuA1: Readout-Signal Amplification by Homodyne Detection Scheme
Hideharu Mikami, Hitachi Ltd.
TuA2: System Technology for Achieving 200GB Drive with 5-Layer Disc
Kyunggeun Lee, Samsung Electronics Co., Ltd.
TuB1: Liquid Crystal Active Optics and Its Application to Optical Pickups
Nobuyuki Hashimoto, Citizen Technology Center Co., Ltd.
TuB5: The Challenges of Heat Assisted Magnetic Recording Head Integration
Cal Hardie, Seagate Technology LLC
WA1: Fundamental Exploration of the Solutions for Ultra-High Density Optical Recording
Luping Shi, Data Storage Institute
WB1: Challenge to Snap Shot Structural Visualization of the Phase Change
Masaki Takata, RIKEN Harima Institute
WB6: Applications of ODS Technology to Lithography
Tom Milster, Univ. of Arizona
ThB1: Linear Signal Processing for a Holographic Data Storage Channel Using Coherent Addition
Masaaki Hara, Sony Corp.
ThB3: Development of a Coaxial Holographic Data Recording System
Atsushi Fukumoto, Sony Corp.

ThC5: Optical Super-Resolution through Super-Oscillations
Nikolay Zheludev, Univ. of Southampton

Special Session: Nano-Photonics

MC1: Recent Progress in Photonic Crystals for Manipulation of Photons
Susumu Noda, Kyoto Univ.
MC2: Nano Optics
Marko Loncar, Harvard Univ.
MC3: Optical manipulation of microscopic containers for chemistry with single molecules
Kristian Helmerson, National Institute of Standards and Technology
MC4: Applications of C-Apertures to Optical Data Storage
Lambertus Hesselink, Stanford Univ.
MC5: Nanophotonics-Based Optical Data Storage
Min Gu, Swinburne Univ. of Technology

Special Session: Applications

TuC1: Toward Adoption of Optical Disks for Preservation of Digitized Cultural Heritage
Kunimaro Tanaka, Teikyo Heisei Univ.
TuC2: Trends in the Digital Home: Why 'IMG0064.jpg' is the New Blinking 12:00
Tim Rausch, Seagate Technology
TuC3: Applications for 4th Generation Optical Storage
Tuviah Schlesinger, Carnegie Mellon Univ.
TuC4: DVD Download
Shoji Taniguchi, Pioneer Corp.
TuC5: Optical Storage in 2008: Where is the competition heading?
Barry Schechtman, Information Storage Industry Consortium

Short Courses

Four Short Courses are planned for July 13, 2008. Get the latest training from top experts. Advance your knowledge of key issues in optical memory and optical data storage.

SC917: Holographic Storage: Advanced Systems and Media
Time: **8:30 AM-12:30 PM**
Place: **Kona Room**
Instructor: **Kevin R. Curtis, InPhase Technologies Inc.**
Member Price **$225** | Non-member Price **$300**
Course Level: **Intermediate**
CEU: **0.35**

SC918: Heat Assisted Magnetic Recording (HAMR)
Time: **1:30 PM-5:30 PM**
Place: **Kona Room**
Instructor: **James A. Bain, Carnegie Mellon Univ.**
Member Price **$225** | Non-member Price **$300**
Course Level: **Intermediate**
CEU: **0.35**

SC919: Basics of Servo Technology for Optical Disk
Time: **8:30 AM-12:30 PM**
Place: **Kona Room**
Instructor: **Kiyoshi Ohishi, Nagaoka Univ. of Technology**
Member Price **$225** | Non-member Price **$300**
Course Level: **Intermediate**
CEU: **0.35**

SC920: Near-Field Recording Technology (The title is tentative.)
Time: **1:30 PM-5:30 PM**
Place: **Kona Room**
Instructor: **Thomas D. Milster, College of Optical Sciences/The Univ. of Arizona**
Member Price **$225** | Non-member Price **$300**
Course Level: **Intermediate**
CEU: **0.35**

SC917: Holographic Storage: Advanced Systems and Media

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Course Details

This short course addresses the fundamental principles and design issues pertaining to digital holographic data storage (HDS). The fundamental principles of holography, including formation of and diffraction from thick diffraction gratings, are explained. Multiplexing techniques for thick gratings based on Bragg, momentum, or correlation techniques are discussed and explained with an introduction to k-space analysis.

The system architecture of phase conjugate polytopic-angle based systems is presented and their key design issues explained. The monocular architecture version of angle-polytopic is also explained. The metrics used to determine basic system performance and limitations are discussed. Write strategies and record scheduling for achieving high capacity in HDS systems are described. The concepts and issues with mastering and replication of holographic media are also explained. For angle multiplexing based systems, the servo systems and tolerances are discussed. These include thermal compensation and disk position and tilts. Key system component (laser, SLM (Spatial Light Modulator), optical design, and detector) requirements for high performance HDS systems are discussed.

The data channel for HDS systems is particularly different than conventional optical storage systems. The key issues such as over-sampled detection, interleaving, and error correction are presented.

HDS media requirements are explained and related to drive performance. Techniques for testing basic media parameters are also presented.

Learning Outcomes

This course will enable you to:

- explain and use the basic principles of HDS
- estimate achievable performance of basic HDS systems and media
- design basic HDS systems including servo systems and data channel
- list the key issues, limitations, and tradeoffs in HDS system design
- list the key issues, limitations, and tradeoffs in HDS media design
- test basic media parameters
- summarize the latest results in HDS performance
- compare HDS against conventional optical data storage systems

Intended Audience

This course is intended for engineers and scientists interested in high density optical data storage systems. Attendees are expected to have a Bachelors degree in engineering or science, or equivalent experience, and to have familiarity with optics concepts and optical storage systems. Rudimentary knowledge of holography or holographic recording materials is helpful, but not required.

Instructor

Kevin Curtis is Chief Technology Officer and founder of InPhase Technologies in Longmont, Colorado. In this role, Kevin manages and provides the technical direction for the advanced research and development of InPhase's holography-based technologies and products for storage. Prior to founding InPhase, Kevin was a member of the technical staff at Bell Laboratories where he directed the efforts of the holographic storage program upon which InPhase was founded. This included business development and raising the Series A investments to start InPhase. Kevin has worked at Caltech, Northrop and Bell Labs on holographic optical systems for over 17 years. Dr. Kevin Curtis received his B.S., M.S., and Ph.D. degrees in electrical engineering in 1990, 1992 and 1994, respectively, all from the California Institute of Technology, Pasadena, California. He has authored 70+ publications and talks and has

over 50 U.S. Patents awarded on holographic storage.

SC918: Heat Assisted Magnetic Recording (HAMR)

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Instructor: **James A. Bain, Carnegie Mellon Univ.**
Member Price **$225** | Non-member Price **$300**
Course Level: **Intermediate**
CEU: **0.35**

Course Details
This course provides attendees with a working knowledge of heat assisted magnetic recording and the main technical constraints in developing a commercially viable system. The focus of this course will be on the thermo-magnetic aspects of HAMR - essentially the recording physics. The discussion will be developed by first looking at issues of system design from the standpoint of areal density and the thermal stability of magnetic bits. The various HAMR topologies (wide heat, narrow field vs narrow heat, wide field) will then be examined, and the viability of each discussed. Finally, the resulting requirements for HAMR small thermal spots will discussed, along with how they can be generated. Supplementary material will be covered on the other important aspects of HAMR systems vis a vis traditional recording, such as lubrication, optical delivery, etc. The course will conclude with a review of the current research agenda for future HAMR systems.

Learning Outcomes
This course will enable you to:

- explain the main design drivers for heat assisted magnetic recording systems
- estimate parameters of the system that are consistent with a particular areal density
- compute required spot sizes and thermal parameters for a HAMR system
- identify recording systems issues in HAMR systems beyond thermo-magnetic physics
- summarize novel approaches to HAMR that are under development

Intended Audience
This material is intended for those with some familiarity with magnetic or optical recording, but without detailed familiarity with the design drivers and constraints in the implementation of HAMR.

Instructor
James Bain is a Professor of Electrical and Computer Engineering at Carnegie Mellon University, where he is the Associate Director of the Data Storage Systems Center. Prof Bain has over 100 refereed publications in magnetic and electronic devices for data storage. He has been active in HAMR recording for the last decade and is a member of the IEEE Magnetics Society.

SC919: Basics of Servo Technology for Optical Disk

Time: **8:30 AM-12:30 PM**
Place: **Kona Room**
Instructor: **Kiyoshi Ohishi, Nagaoka Univ. of Technology**
Member Price **$225** | Non-member Price **$300**
Course Level: **Intermediate**
CEU: **0.35**

Course Details
This course provides attendees with a basic knowledge of tracking servo control design for optical disk drive systems. The course concentrates on the theory and structure of feedback control, robust control, feedforward control and disturbance observer for optical disk drive systems. Many practical and useful examples are included throughout. You will become fluent with how one designs tracking servo controllers for many varied applications.

Learning Outcomes
This course will enable you to:

- gain a basic knowledge of servo control design for your application
- design feedback control, robust control, feedforward control and disturbance observer
- construct the robust feedforward control for optical disk drive system

- construct the sudden disturbance observer for optical disk drive system

Intended Audience
This course is intended for anyone who needs to learn how to design tracking servo control. Those who either design their own controller or who work with servo designers will find this course valuable.

Instructor
Kiyoshi Ohishi is a full professor at Nagaoka University of Technology in Japan, and has been involved in tracking servo control design and engineering for over 25 years. He received the B.E., M.E., and Ph.D. degrees in electrical engineering from Keio University, Yokohama, Japan, in 1981, 1983, and 1986, respectively. He received the Outstanding Paper Award at IECON'85 and Best Paper Awards at IECON'02 and IECON'04 from the IEEE Industrial Electronics Society, as well as the Best Paper Award from the Institute of Electrical Engineers of Japan in 2002. Dr. Ohishi is a member of IEEE and IEEJ.

SC920: Near-Field Recording Technology
(The title is tentative.)

Time: **1:30 PM-5:30 PM**
Place: **Kona Room**
Instructor: **Thomas D. Milster, College of Optical Sciences/The Univ. of Arizona**
Member Price **$225** | Non-member Price **$300**
Course Level: **Intermediate**
CEU: **0.35**

More information on this course will be available soon at http://spie.org/events/ods.

Agenda of Sessions

Monday, July 14

8:45am-9:00am	Opening Remarks	
9:00am-10:00am	MA	Keynote Session
10:00am-10:30am	Coffee Break	
10:30am-12:30pm	MB	3D Storage
12:30pm-2:00pm	Lunch Break	
2:00pm-3:30pm	MP	Poster Session I
3:30pm-4:30pm	MC	Special Session: Nano-Photonics
4:30pm-5:00pm	Coffee Break	
5:00pm-6:30pm	MC	Special Session: Nano-Photonics

Tuesday, July 15

8:30am-10:00am	TuA	Drive Technologies
10:00am-10:30am	Coffee Break	
10:30am-12:30pm	TuB	Components and Hybrid Recording
12:30pm-2:00pm	Lunch Break	
2:00pm-3:30pm	TuP	Poster Session II
3:30pm-4:30pm	TuC	Special Session: Applications
4:30pm-5:00pm	Coffee Break	
5:00pm-6:30pm	TuC	Special Session: Applications
7:00pm-8:30pm	Reception	

Wednesday, July 16

8:30am-10:00am	WA	New and Related Technologies
10:00am-10:30am	Coffee Break	
10:30am-12:30pm	WB	Media and Applications

Thursday, July 17

8:30am-10:00am	ThA	Coding and Signal Processing
10:00am-10:30am	Coffee Break	
10:30am-12:30pm	ThB	Holographic I
12:30pm-2:00pm	Lunch Break	
2:00pm-4:00pm	ThC	Holographic II and Super Resolution
4:00pm-4:30pm	Coffee Break	
4:30pm-5:30pm	ThD	Postdeadline Session
5:30pm-6:00pm	Closing Remarks	

Technical Program

Monday 14 July

[Opening Remarks]

Monarchy Ballroom, 8:45 to 9:00 am
ODS General Chairs: **Tim Rausch**, Seagate Technology LLC (USA); **Kimihiro Saito**, Sony Corp. (Japan)
ISOM Organizing Committee Chair: **Koichi Ogawa**, The Univ. of Tokyo (Japan)
ISOM Steering Committee Chair: **Itaru Fujimura**, Ricoh Co., Ltd. (Japan)

[SESSION MA: Keynote Session]

Monarchy Ballroom, 9:00 to 10:00 am
Session Chair: **Kevin R. Curtis**, InPhase Technologies Inc. (USA); **Haruki Tokumaru**, NHK Science & Technical Research Labs. (Japan)

MA1 9:00 am: **Nanophotonics and application to future storage technology** *(Invited Paper)*, Motoichi Ohtsu, Univ. of Tokyo (Japan) [TD05-01]
This paper describes the principles and history of nanophotonics, which utilizes the energy transfer of a virtual exciton–polariton. The true nature of this field of study is to realize "qualitative innovation" in optical technology, including photonic devices, fabrications, and information storage. Application to optical near-field magnetic-hybrid recording at a 1-Tb/inch2 density is reviewed. For the future development of storage technology, two directions are proposed: one follows the technical roadmap to increase the storage density to 1-Pb/inch2 utilizing nanophotonic devices, while the other deviates from the roadmap. High-security information transfer is one example of the latter.

MA2 9:30 am: **Can future storage technologies benefit from the existing/emerging nano-tools and techniques?** *(Invited Paper)*, Masud Mansuripur, College of Optical Sciences/The Univ. of Arizona (USA) [TD05-02]
Certain ideas and techniques are being developed outside the field of optical/magnetic/electronic recording, but the storage community could benefit from these developments once we become sufficiently familiar with the new concepts and methodologies. Aside from nano-photonics, which is the subject of Professor Ohtsu's keynote address, developments in the areas of bio-photonics, fluorescence microscopy, quantum-dots, optical tweezers, micro- and nano-fluidic systems, femto-second fiber lasers, etc., have the potential to influence future generations of data storage systems.

[Coffee Break]

Queen's Ballroom, 10:00 to 10:30 am

[SESSION MB: 3D Storage]

Monarchy Ballroom, 10:30 am to 12:30 pm
Session Chair: **Kimihiro Saito**, Sony Corp. (Japan); **Yoshimasa Kawata**, Shizuoka Univ. (Japan)

MB1 10:30 am: **Terabyte recorded in two-photon 3D disk** *(Invited Paper)*, Edwin P. Walker, Call/Recall, Inc. (USA); Alexander S. Dvornikov, Call/Recall, Inc. and Univ. of California/Irvine (USA); Kenneth D. Coblentz, Call/Recall, Inc. (USA); Peter M. Rentzepis, Univ. of California/Irvine (USA)

[TD05-03]
1TB has been recorded in 200 layers in one of our two-photon 120mm diameter x 1.2mm thick form factor 3D disks utilizing our very stable and efficient two-photon materials. Each layer contains 5GB of information.

MB2 11:00 am: **Multi-layer 400 GB optical disk**, Ayumi Mitsumori, Takanobu Higuchi, Takuma Yanagisawa, Masakazu Ogasawara, Satoru Tanaka, Tetsuya Iida, Pioneer Corp. (Japan) [TD05-04]
We confirmed the feasibility of a multi-layer 400 GB optical ROM disk by using a wide range spherical aberration compensator and low absorption reflective materials.

MB3 11:15 am: **Micro-holographic storage and threshold holographic recording materials** *(Invited Paper)*, Brian L. Lawrence, Victor P. Ostroverkhov, Xiaolei Shi, Kathryn L. Longley, Eugene P. Boden, GE Global Research (USA) [TD05-06]
The limits of micro-holographic storage using standard holographic materials are demonstrated. New threshold holographic materials are being developed to overcome these limits, and preliminary threshold micro-hologram recording results are presented.

MB4 11:45 am: **Direct servo error signal detection method from recorded micro-reflectors**, Hirotaka Miyamoto, Hisayuki Yamatsu, Kimihiro Saito, Norihiro Tanabe, Toshihiro Horigome, Goro Fujita, Seiji Kobayashi, Hiroshi Uchiyama, Sony Corp. (Japan) [TD05-07]
A novel tracking servo error signal detection method for a micro-reflector drive is proposed. The method realizes better performance regarding recording medium interchangeability.

MB5 12:00 pm: **Microholographic data storage towards dynamic disk recording**, Susanna Orlic, Enrico Dietz, Sven Frohmann, Jonas Gortner, Alan Guenther, Jens Rass, Technische Univ. Berlin (Germany) [TD05-08]
Dynamic recording of microholographic reflection gratings is reported. The current development status and operation of our microholographic drive system is presented.

MB6 12:15 pm: **Three-dimensional recording with electrical beam control**, Ryuichi Katayama, Shin Tominaga, Yuichi Komatsu, Mizuho Tomiyama, NEC Corp. (Japan) [TD05-09]
A concept of an optical storage system without mechanics having high-reliability and low-power-consumption characteristics was proposed and demonstrated by using liquid crystal beam control elements.

[Lunch Break]
12:30 to 2:00 pm

[SESSION MP: Poster Session I]
Queen's Ballroom, 2:00 to 3:30 pm
Session Chairs: **Luping Shi**, Data Storage Institute (Singapore); **Takashi Kikukawa**, TDK Corp. (Japan); **Yun-Sup Shin**, LG Electronics Inc. (South Korea)

MP1 Properties of new fluorinated holographic recording material for collinear holography, Kazuyuki Satoh, Daikin Industries, Ltd. (Japan) and Toyohashi Univ. of Technology (Japan); Kazuko Aoki, Makoto Hanazawa, Nami Matsuda, Takashi Kanemura, Daikin Industries, Ltd. (Japan); Pang-Boey Lim, Mitsuteru Inoue, Toyohashi Univ. of Technology (Japan) [TD05-60]

This paper reports the evaluation results of the properties of a new fluorinated holographic recording material for Collinear Holography.

MP2 Holographic recording with blue colorated diarylethene dye doped PMMA, Xinan Liang, Xuewu Xu, Minghua Li, Sanjeev Solanki, Minghui Hong, Chong-Tow Chong, Data Storage Institute (Singapore) [TD05-61]
Blue light illuminated diarylethene dye B1536 doped PMMA were investigated for holographic recording. High sensitivity and refractive index change were achieved.

MP3 ZrO_2 nanoparticle-polymer composite media for volume holographic recording, Toshihiro Nakamura, Sokoh Koda, Kohji Ohmura, Yasuo Tomita, The Univ. of Electro-Communications (Japan); Kentaro Ohmori, Motohiko Hidaka, Nissan Chemical Industries, Ltd (Japan) [TD05-62]
Volume holographic recording in highly transparent zirconia nanoparticle-polymer composite media is described. Recording sensitivity enhancement and hologram multiplexing are also presented.

MP4 Improved photopolymer for holographic data storage, Yuxia Zhao, Xiaojun Wan, Feipeng Wu, Technical Institute of Physics and Chemistry (China); Huanyong Wang, Pengfei Liu, Shiquan Tao, Beijing Univ. of Technology (China) [TD05-63]
Improved photopolymer for holographic data storage containing a novel broad-band absorption photosensitizer was developed for both 457 nm and 532 nm application.

MP5 Holographic correlator for video image files, Eriko Watanabe, Reiko Akiyama, Kashiko Kodate, Japan Women's Univ. (Japan) [TD05-64]
We have proposed a video identification system using holographic correlator. Taking advantage of fast data processing capability of FARCO, we examined high speed recognition system by registering the optimized video image file. We demonstrate that the processing speed of our optical holographic calculation is remarkably higher than that of the conventional digital signal processing architecture.

MP6 Polarization and random phase modulated reference beam for high-density holographic recording with 2D shift-multiplexing, Sanjeev Solanki, Xuewu Xu, Minghua Li, Xinan Liang, Chong-Tow Chong, Data Storage Institute (Singapore) [TD05-65]
Shift-multiplexing with polarization modulated reference beam is reported with recording of 4kbits data with media shift of 1/2.5 micron along x/y axis.

MP7 Rotational random phase multiplexing, Shih-Hsin Ma, Xuan-Hao Lee, Ye-Wei Yu, Tun-Chien Teng, Ching-Cherng Sun, National Central Univ. (Taiwan) [TD05-66]
An out-of-plane rotational random phase multiplexing is proposed. The rotational sensitivity is enhanced and can be tuned over a large range.

MP8 Parallel realization of two-dimensional discrete Walsh transform in volume holographic storage system, Qiang Ma, Kai Ni, Qingsheng He, Liangcai Cao, Guofan Jin, Tsinghua Univ. (China) [TD05-67]
As an application of the volume holographic storage system, a method that can parallelly perform 2D discrete Walsh transform is theoretically and experimentally described.

MP9 Phase-only correlation for high speed image retrieval

in holographic memories, Satoshi Honma, Akiyoshi Katsumata, Shinzo Muto, Univ. of Yamanashi (Japan); Tohru Sekiguchi, NEC Corp. (Japan) [TD05-68]
We focus on that it is possible to record the phase distribution in the holographic memories and propose a new image matching system.

MP10 Selective erasure of multiplexed holograms using beam amplification by mutually-pumped phase conjugate mirror, Takayuki Sano, Atsushi Okamoto, Hokkaido Univ. (Japan); Kunihiro Sato, Hokkai-Gakuen Univ. (Japan) [TD05-69]
We propose a novel selective erasure using MPPCM. We show the effective selective erasure can be realized by amplified phase conjugate beams due to MPPCM.

MP11 Spatial resolution of phase-modulated signal detection method using photorefractive two-wave mixing for holographic data storage, Masanori Takabayashi, Atsushi Okamoto, Hokkaido Univ. (Japan) [TD05-70]
A spatial resolution of the phase-modulated signal detection using photorefractive two-wave mixing is considered. We confirmed the operation of a few hundreds micrometers of pixel.

MP12 Micro-integrated r/w-head for WORM-type holographic data storage, Matthias Gruber, Udo Vieth, Univ. of Hagen (Germany) [TD05-71]
The micro-integration of setups for write-once-read-many-type volume holographic data storage is discussed and a particular r/w-head architecture based on planar integration is proposed.

MP13 Simulation technique for diffraction efficiency characteristics in holographic data storage system based on FFT-BPM, Junya Tanaka, Atsushi Okamoto, Motoki Kitano, Hokkaido Univ. (Japan) [TD05-72]
We propose a new simulation method based on FFT-BPM to analyze for diffraction efficiency characteristics in holographic data storage system and visualize an angular selectivity.

MP14 Numerical simulation of retrieving characteristics in holographic data storage by two-wave encryption, Motoki Kitano, Atsushi Okamoto, Takayuki Sano, Hokkaido Univ. (Japan) [TD05-73]
We estimate the effective key space and the shift tolerance to the random phase mask in two-wave encryption and discuss the security and the practicality.

MP15 Analysis of diffraction characteristics of photopolymers by using beam propagation method, Shuhei Yoshida, Manabu Yamamoto, Tokyo Univ. of Science (Japan) [TD05-74]
In this study, we simulated formation of holographic grating in photopolymer based on diffusion model, and analyzed diffraction characteristics by using beam propagation method.

MP16 Modeling and detection of linear and threshold microholograms, Fergus J. Ross, Victor P. Ostroverkhov, Xiaolei Shi, Kenods Welles, Brian L. Lawrence, GE Global Research (USA) [TD05-75]
Linear and threshold material microholographic storage tradeoffs are investigated by simulation. Kogelnik's plane-wave diffraction formula at thickness Zo/2 accurately predicts microholographic diffraction efficiency.

MP17 Optical characterization of photopolymer materials for microholographic data storage, Timo Feid, Enrico Dietz, Sven Frohmann, Christian Mueller, Jens Rass, Susanna Orlic,

Technische Univ. Berlin (Germany) [TD05-76]
Different photopolymer materials are investigated for microholographic storage to optimize the interaction between the material itself and the write/read system. Media tester system is presented.

MP18 Data recovery from severely damaged optical media using wavelet transforms, Swetha Kannan, Y. Li, Sashi K. Kasanavesi, Pramod K. Khulbe, Thomas D. Milster, Warren L. Bletscher, Delbert Hansen, College of Optical Sciences/The Univ. of Arizona (USA) [TD05-77]
Wavelet-transform-based algorithms are developed that increase by at least a factor of two the quality of the recovered signals from badly damaged media.

MP19 Laser diode feedback signal for position sensing using self-mixing interference, Meng-Yen Tsai, Tzong-Shi Liu, National Chiao Tung Univ. (Taiwan); Tuviah E. Schlesinger, Carnegie Mellon Univ. (USA) [TD05-78]
We utilize laser diode (LD) package as sensor mounted on DVD pickup. Smaller rotation driven by tilting coil in DVD pickup makes feedback signal distinct.

MP20 High resolution semiconductor inspection by using solid immersion lenses, Jun Zhang, College of Optical Sciences/The Univ. of Arizona (USA); Yullin Kim, Infrared Labs., Inc. (USA); Thomas D. Milster, College of Optical Sciences/The Univ. of Arizona (USA); David M. Dozor, Infrared Labs., Inc. (USA) [TD05-79]
A subsurface (100μm) microscope is presented with NA=2.45 by using a silicon SIL. The application is IC inspection. Gap and tilt servo are also discussed.

MP21 Photochromic memory with electronic functions II, Tsuyoshi Tsujioka, Osaka Kyoiku Univ. (Japan) [TD05-80]
Various aspects of photochromic memory with electronic function is introduced. Combination of electrical carrier separation and isomerization via hole transportation would achieve high recording sensitivity.

MP22 Chalcogenide layers for optically guided mechanical recording-readout, Mihail Trunov, Uzhgorod National Univ. (Ukraine); Peter Nagy, Erika Kalman, Chemical Research Ctr. (Hungary); Viktor Takats, Sandor J. Kokenyesi, The Univ. of Debrecen (Hungary) [TD05-81]
The giant negative photoplastic effect (giant photosoftening) in amorphous chalcogenide layers was observed and applied to the optically guided nanoindentation experiments. Results can be used in a Millipede-type data recording device.

MP23 Online face recognition system using holographic optical correlator, Reiko Akiyama, Sayuri Ishikawa, Eriko Watanabe, Kashiko Kodate, Japan Women's Univ. (Japan) [TD05-82]
We have proposed and improved a face recognition system based on the algorithm for the Fast Face Recognition Optical Correlator system (FARCO).

MP24 Characteristic of the tracking error signal of a novel multi-level read-only disc, Mingming Yan, Jing Pei, Longfa Pan, Yi Tang, Tsinghua Univ. (China) [TD05-83]
The uniformity and symmetry of the DPD signal of the novel ML-RLL disc by using signal wave-shape modulation is better than the former ML-RLL disc.

MP25 Symmetric driving coils design for three-axis actuator

with low interference force, Buqing Zhang, Jianshe Ma, Longfa Pan, Xuemin Cheng, Hua Hu, Yi Tang, Tsinghua Univ. (China) [TD05-84]
A novel magnetic circuit consisting of symmetric driving coils is developed. This configuration reduces the crosstalk forces in the main moving directions, and improves the driving sensitivity of the actuator used in super multi DVD drive.

MP26 Off axis astigmatic reflector for compact optical pickup, Ya-Ni Su, Cheng-Huan Chen, National Tsing Hua Univ. (Taiwan) [TD05-85]
An optical pickup with all its components stacked up layer by layer and based mostly on reflective optical components has been proposed as a compact and high efficiency solution.

MP27 Inorganic reflective achromatic quarter-waveplate for OPU applications, Kim L. Tan, Karen D. Hendrix, Curtis R. Hruska, Nada A. O'Brien, JDSU Corp. (USA) [TD05-86]
An all-inorganic reflective QWP that is achromatic for the three laser wavelengths of an OPU is designed and demonstrated. Implementation into an OPU is described.

MP28 Estimation method of the archival lifetime for optical recordable disks, Mitsuru Irie, Osaka Sangyo Univ. (Japan); Yoshihiro Okino, Kansai Univ. (Japan); Takahiro Kubo, T. Kubo Engineering Science Office (Japan) [TD05-87]
This paper presents a simple estimating method for the archival life expectancy of optical disks in order to apply a rough clarification of archival grade disks.

MP29 Super-trellis-based noise predictive detection for high-density optical storage, Xiao-Ming Chen, Oliver Theis, Deutsche Thomson oHG (Germany) [TD05-88]
Super-trellis based noise prediction was investigated for high density optical storage.
Performance gain obtained by the proposed detector increases as storage density increases.

MP30 Channel coding and signal detection for multi-level DVD player system, Hua Hu, Yi Tang, Haibo Yuan, Longfa Pan, Tsinghua Univ. (China) [TD05-89]
Channel coding and signal detection for multi-level DVD player system are introduced, including error correction code, modulation code, timing recovery and adaptive PRML detection.

MP31 Error-correcting coded indices for multimode balanced conservative codes for holographic storage, Yongguang Zhu, Ivan J. Fair, Univ. of Alberta (Canada) [TD05-90]
We present two error-correcting coding schemes for providing error protection for the control array indices required in multimode balanced conservative codes for holographic storage.

MP32 An improved chase decoder for turbo product codes over partial-response channels, Zhiliang Qin, Songhua Zhang, Kui Cai, Xiaoxin Zou, Data Storage Institute (Singapore) [TD05-91]
An improved Chase decoder is proposed based on the concept of local search neighborhood for turbo product codes over partial-response channels.

MP33 Two-dimensional 5:8 modulation code for holographic data storage, Jinyoung Kim, Bongil Lee, Jaejin Lee, Soongsil Univ. (South Korea) [TD05-92]
The proposed two-dimensional 5:8 modulation code is very simple and removes all the isolated 2D ISI patterns.

MP34 Hybrid image processing for holographic data storage system, Jang Hyun Kim, Hyun-Seok Yang, Jin-Bae Park, Young-Pil Park, Yonsei Univ. (South Korea) [TD05-93]
In this paper, we propose hybrid image processing method in holographic data storage system.

MP35 Gaussian sum approximation approach to Blu-ray disk channel equalization, Gyuyeol Kong, Hyunmin Cho, Sooyong Choi, Yonsei Univ. (South Korea) [TD05-94]
A new equalization method is proposed, which incorporates the Gaussian Sum Approximation into a Kalman filtering framework to mitigate inter-symbol interference in optical recording channels.

MP36 One-dimensional PRML detection with two-dimensional equalizer for holographic data storage, Jinyoung Kim, Donghyuk Park, Jaejin Lee, Soongsil Univ. (South Korea) [TD05-95]
We present a partial response maximum likelihood (PRML) detection with two-dimensional equalizer scheme for holographic data storage channel.

MP37 Optical recording channel equalization using a bilinear recursive polynomial system, Hyunmin Cho, Gyuyeol Kong, Sooyong Choi, Yonsei Univ. (South Korea) [TD05-96]
A new equalizer based on bilinear recursive polynomial models is proposed to improve the performance and simplify the structure of the conventional equalizers for high density optical channels.

MP38 Sum-product decoding of multiple-parallel-concatenated single-parity-check codes over partial-response channels, Zhiliang Qin, Xiaoxin Zou, Kui Cai, Songhua Zhang, Data Storage Institute (Singapore) [TD05-97]
We propose an efficient implementation of a serialized sum-product decoding algorithm for multiple-parallel-concatenated single-parity-check (M-PC-SPC) codes over partial-response channels.

MP39 RMTR Constrained Parity-Check Codes for High-Density Blue Laser Disk Systems, Cai Kui, Kees A. S. Immink, Songhua Zhang, Zhiliang Qin, Xiaoxin Zou, Data Storage Institute (Singapore) [TD05-98]
New constrained codes that satisfy the repeated minimum transition runlength (RMTR) constraint and the parity-check (PC) constraint are proposed for high-density blue laser disk systems.

MP40 Parallel multitrack Viterbi detector for 2D optical storage systems, Timothy S. Yao, The Univ. of Texas at El Paso; Lee Yang, Qingyang Wu, Semiconductor Manufacturing International Corp. (China) [TD05-99]
The proposed parallel Viterbi detector can enhance the bit detection performance of the two-dimensional optical system and processing speed. The algorithm can also be applied to the 3D recording system.

MP41 Super-resolution near-field disk with phase-change Sn-doped GST mask layer, Irene Lee, Agency for Science, Technology and Research (Singapore); K. T. Yong, Chee Lip Gan, Nanyang Technological Univ. (Singapore); S. M. Daud, Agency for Science, Technology and Research (Singapore); L. H. Ting, Agency for Science, Technology and Research (Singapore); L. P. Shi, Agency for Science,

Technology and Research (Singapore) [TD05-100]
A new mask layer of Sn7.0Ge20.6Sb20.7Te51.7 was developed and used on Super-resolution near-field phase change optical disks. The thermal and optical properties of the mask layer were investigated. The recording performance of the new structure is discussed.

MP42 Nonlinear modeling of super-resolution near-field structure, Manjung Seo, Sungbin Im, Jaejin Lee, Soongsil Univ. (South Korea) [TD05-101]
This paper presents a nonlinear modeling of Super-RENS (Super-Resolution Near Field Structure) read-out signal using neural networks. The experiment results indicate that the NARX (Nonlinear AutoRegressive eXogenous) model considered in this study is superior to the NLMS (Normalized Least Mean Square) FIR (Finite Impulse Response) adaptive filter, which is one of linear modeling approaches.

Posters: Postdeadline

A selection of post deadline poster papers will be included in the Final Technical Program giving the participants the opportunity to hear new and significant material in rapidly advancing areas.

[SESSION MC: Special Session: Nano-Photonics]

Monarchy Ballroom, 3:30 to 6:30 pm
Session Chair: **Masud Mansuripur**, College of Optical Sciences/The Univ. of Arizona (USA); **Kevin R. Curtis**, InPhase Technologies Inc. (USA)

MC1 3:30 pm: **Recent progress in photonic crystals for manipulation of photons** *(Invited Paper)*, Susumu Noda, Kyoto Univ. (Japan) [TD05-10]
Recent progresses in photonic crystals are reviewed. First of all, ultra-high Q nanocavity and its dynamic control are discussed. Then, a very unique photonic crystal laser operating at blue-violet wavelengths will be described.

MC2 4:00 pm: **Nano optics** *(Invited Paper)*, Marko Loncar, Harvard Univ. (USA) [TD05-11]

[Coffee Break]

Queen's Ballroom, 4:30 to 5:00 pm

MC3 5:00 pm: **Optical manipulation of microscopic containers for chemistry with single molecules** *(Invited Paper)*, Kristian Helmerson, Carlos Mariscal-Lopez, Jianyong Tang, Rani B. Kishore, National Institute of Standards and Technology (USA) [TD05-12]
We detect and perform chemistry with only a few number of molecules confined in submicron-sized water droplets, which can be manipulated with optical tweezers.

MC4 5:30 pm: **Applications of C-apertures to optical data storage** *(Invited Paper)*, Lambertus Hesselink, J. B. Leen, Paul Hansen, Yao-Te Cheng, Xiaobo Yin, Yin Yuen, Stanford Univ. (USA) [TD05-13]
This invited paper describes our latest work towards fully describing the operation of C-aperture light sources and using these sources to write nano-sized marks on optical recording media. During the last decade we have developed and refined a highly efficient nano-sized aperture that, under ideal conditions, increases power throughput by three orders of magnitude compared with round and square apertures producing the same optical spot size. As presented in ODS 2007, these apertures

can be mounted on a solid state laser to produce a very high intensity nano-beam having a size of less than 80 nm [1]. In this paper we discuss the theoretical and practical aspects of applying C-apertures to optical data storage as well as our latest results related to using C-shaped nano apertures for optical data storage.

MC5 6:00 pm: **Nanophotonics-based optical data storage** *(Invited Paper)*, Min Gu, Swinburne Univ. of Technology (Australia) [TD05-14]
This talk will present our recent advance in the nanoparticle-assisted optical data storage technology where the information can be stored in five dimensions.

Tuesday 15 July

[SESSION TuA: Drive Technologies]

Monarchy Ballroom, 8:30 to 10:00 am
Session Chair: **Ryuichi Katayama**, NEC Corp. (Japan); **Kyunggeun Lee**, SAMSUNG Electronics Co., Ltd. (South Korea)

TuA1 8:30 am: **Readout-signal amplification by homodyne detection scheme** *(Invited Paper)*, Hideharu Mikami, Takeshi Shimano, Takahiro Kurokawa, Tatsuro Ide, Jiro Hashizume, Koichi Watanabe, Harukazu Miyamoto, Hitachi, Ltd. (Japan) [TD05-15]
Optical signal amplification by using homodyne detection scheme was newly proposed and demonstrated experimentally. Optical pickup for reliably obtaining amplified optical disk readout-signal was designed.

TuA2 9:00 am: **System technology for achieving 200GB drive with 5-layer disc** *(Invited Paper)*, Kyunggeun Lee, Inoh Hwang, Nakhyun Kim, Hyun-Soo Park, Hui Zhao, Tao Hong, Insik Park, SAMSUNG Electronics Co., Ltd. (South Korea) [TD05-16]
We report the feasibility for achieving 200GB with 40GB per layer and 5-layer disc for the first time. bER of lower than 10-3 were experimentally obtained respectively using this new data reproducing scheme which shows the possibility of reducing one order of bER. With more improvement of media characteristics, less than 10-4 of bER can be achieved.

TuA3 9:30 am: **Stable rotation of optical disks over 15000 rpm**, Tomoharu Mukasa, Naofumi Goto, Takeharu Takasawa, Yoshiyuki Urakawa, Nobuhiko Tsukahara, Sony Corp. (Japan) [TD05-17]
We confirmed high-speed-rotation of disks without vibrations up to 20000 rpm and tracking servo control at 17000 rpm using the double-boosted high-gain servo controller.

TuA4 9:45 am: **A high-density recording by a near-field optical system using a medium with a top layer with a high refractive index**, Ariyoshi Nakaoki, Kimihiro Saito, Takeshi Yamasaki, Tomomi Yukumoto, Tsutomu Ishimoto, Sunmin Kim, Takao Kondo, Takeshi Mizukuki, Osamu Kawakubo, Sony Corp. (Japan); Miwa Honda, Noriyasu Shinohara, Norihiko Saito, JSR Corp. (Japan) [TD05-18]
A coated medium comprised of resin with a high refractive index of 1.83 was examined using a near-field optical disc system of NA 1.84.

[Coffee Break]

Queen's Ballroom, 10:00 to 10:30 am

[SESSION TuB: Components and Hybrid Recording]

Monarchy Ballroom, 10:30 am to 12:30 pm
Session Chair: **Paul J. Wehrenberg**, Apple Computer, Inc. (USA); **No-Cheol Park**, Yonsei Univ. (South Korea)

TuB1 10:30 am: **Liquid crystal active optics and its application to optical pickups** *(Invited Paper)*, Nobuyuki Hashimoto, Citizen Technology Ctr. Co., Ltd. (Japan) [TD05-19]
We describe optical properties of liquid crystals for optical pickups, liquid crystal GRIN lenses and liquid crystals with sub-wavelength structures.

TuB2 11:00 am: **A novel deformable mirror for spherical aberration compensation**, Sunao Aoki, Masahiro Yamada, Tamotsu Yamagami, Sony Corp. (Japan) [TD05-20]
By using conventional MEMS processes, we have successfully developed a high accuracy and easily controllable deformable mirror with simple structure.

TuB3 11:15 am: **Single longitudinal mode blue-violet laser diode for data storage**, Christophe Moser, Ondax, Inc. (USA); Lawrence Ho, Frank Havermeyer, Ondax, Inc (USA) [TD05-21]
Experimental demonstration of a single mode longitudinal TO-can blue-violet laser with over 1 meter coherence length.

TuB4 11:30 am: **Designs and tolerances of two-element NA 0.8 objective lenses for page-based holographic data storage systems**, Yuzuru Takashima, Lambertus Hesselink, Stanford Univ. (USA) [TD05-22]
Two-element NA 0.8 objectives, usable for both holographic and surface recordings, are designed in conjunction with analysis of optical tolerances for holographic removable media systems.

TuB5 11:45 am: **The challenges of heat assisted magnetic recording head integration** *(Invited Paper)*, Cal Hardie, Duane C. Karns, William A. Challener, N. J. Gokemeijer, Tim Rausch, Michael A. Seigler, Edward C. Gage, Seagate Technology LLC (USA) [TD05-23]
The explosion of digital content has created a global demand for storage products that will only increase as the world becomes more digitally oriented and connected. This ever increasing demand for storage capacity has placed significant challenges on the magnetic recording industry. To extend recording densities to beyond 1Tb/in2, the industry must find solutions to the superparamagnetic limit which imposes a signal-to-noise ratio, thermal stability, and writability tradeoff. Heat assisted magnetic recording (HAMR) is a technology for achieving these high areal densities. A successful integration of the HAMR technology will be shown. This integration process is compatible with existing thin film magnetic recording fabrication which includes thin film wafer process, slider lapping, and head/gimbal assembly. A demonstration of 200Gb/in2 areal density will be shown as well as a path to increase the areal density capability of HAMR using Near Field Transducer (NFT) technology.

TuB6 12:15 pm: **HAMR head with spot size converter and triangular aperture**, Masakazu Hirata, Manabu Oumi, Majung Park, Seiko Instruments Inc. (Japan) [TD05-24]
This HAMR head has affinity to conventional HDD head and high throughput integrated optics with spot size converter, triangular aperture and mirror.

[Lunch Break]
12:30 to 2:00 pm

[SESSION TuP: Poster Session II]
Queen's Ballroom, 2:00 to 3:30 pm
Session Chairs: **Tuviah Ed Schlesinger**, Carnegie Mellon Univ. (USA); **Yoshimi Tomita**, Pioneer Corp. (Japan); **Yoshimasa Kawata**, Shizuoka Univ. (Japan)

TuP1 Misalign compensation and equalization for holographic data storage, Haksun Kim, Pilsang Yoon, Joo Youn Park, Heungsang Jung, Daewoo Electronics Corp., Ltd. (South Korea); Gwitae Park, Korea Univ. (South Korea) [TD05-102]
In this paper, misalign compensation and equalization for holographic data storage is developed and evaluated. Experimental results are shown to verify the proposed algorithm's effectiveness.

TuP2 Improvement of bit error rate by FIR filter, Yuichiro Sasa, Hiroshi Oto, Manabu Yamamoto, Tokyo Univ. of Science (Japan) [TD05-103]
This paper studies the effects of FIR filter based on genetic algorithm. It is made clear that the best FIR coefficients can be provided by genetic algorithm.

TuP3 Filter structures of write compensation for holographic data storage systems, Takaya Tanabe, Ryu Suzuki, Iwao Hatakeyama, Ibaraki National College of Technology (Japan) [TD05-104]
High pass filters of write compensation are compared and evaluated in simulations. The write compensation with five-pixel pattern shows the best in SNR.

TuP4 Inter-page cross-talk noise in collinear holographic memory, Tsutomu Shimura, Masaru Terada, Yojiro Sumi, Ryushi Fujimura, Kazuo Kuroda, The Univ. of Tokyo (Japan) [TD05-105]
We revealed that signal-to-noise ratio of multiplexed holographic memory is inversely proportional to square root of the multiplied recorded pages theoretically as well as numerical simulation.

TuP5 Design and test of channel board for holographic data storage, Pilsang Yoon, Daewoo Electronics Corp., Ltd. (South Korea) and Korea Univ. (South Korea); Haksun Kim, Joo Youn Park, Heungsang Jung, Daewoo Electronics Corp., Ltd. (South Korea); Gwitae Park, Korea Univ. (South Korea) [TD05-106]
The hardware channel board for holographic data storage has been designed and implemented with FPGA. A data interface between PC and channel board was adopted in the channel board for data interface. An experiment for real-time recording and reading was performed successfully.

TuP6 Tracking servo control using pole placement based on Luenberger observer for holographic data storage system, Yong Hee Lee, Sang-Hoon Kim, Jang Hyun Kim, Hyun-Seok Yang, Young-Pil Park, Yonsei Univ. (South Korea); Joo Youn Park, Daewoo Electronics Corp., Ltd. (South Korea) [TD05-107]
In this paper, we focus on effects of radial deviation on the disk and propose a tracking error compensation method for the holographic data storage system.

TuP7 Tilt error measurement and compensation method for the holographic data storage system, Sang-Hoon Kim,

Jang Hyun Kim, Yong Hee Lee, Hyun-Seok Yang, Yonsei Univ. (South Korea); Joo Youn Park, DAEWOO Electronics Corp. (South Korea); Young-Pil Park, Yonsei Univ. (South Korea) [TD05-108]
Tilt error measurement system using external photo detector is suggested and measuring experiments are conducted. A servo controller to compensate tilt error is designed and the performance of it is confirmed.

TuP8 Design of a relay Lens with telecentricity in holographic storage system, Yung Sung Lan, National Chiao Tung Univ. (Taiwan); Kuang-Vu Chen, Ping-Jung Wu, Wen-Hung Cheng, Chih-Cheng Hsu, Chin-Tsia Liang, Kuo-Chi Chiu, Tzuan-Ren Jeng, Industrial Technology Research Institute (Taiwan) [TD05-109]
In this paper, we revealed a doubly telecentric Fourier 4f Relay for the holographic recording system, which is including six lenses and a PBS. It provides a zero distortion and the wavefront error within 1/4λ (λ=532 nm).

TuP9 Optimal aperture size for maximizing the capacity of holographic data storage systems, Oliver Malki, Frank Przygodda, Joachim Knittel, Heiko Trautner, Hartmut Richter, Deutsche Thomson oHG (Germany) [TD05-110]
Determination of the optimal spatial filtering of the object beam by an aperture placed in the focal plane in order to optimize the storage capacity of a holographic data storage system.

TuP10 Angular interval scheduling for angle-multiplexed holographic data storage, Nobuhiro Kinoshita, Tetsuhiko Muroi, Norihiko Ishii, Koji Kamijo, Naoki Shimidzu, NHK Science & Technical Research Labs. (Japan) [TD05-111]
We demonstrate an angular interval scheduling for closely stacking holograms. With our scheduling for multiplex number of 300, low bERs across all datapages were obtained.

TuP11 Shift selectivity of the collinear holographic storage system, Ye-Wei Yu, Chih-Yuan Cheng, Shu-Ching Hsieh, Tun-Chien Teng, Ching-Cherng Sun, National Central Univ. (Taiwan) [TD05-112]
The paraxial solution of the shift selectivity of the collinear holographic storage system is proposed, which is a powerful tool for simulation.

TuP12 Isoplanatic lens design for phase conjugate storage systems, Bradley J. Sissom, Alan C. Hoskins, Tolis Deslis, Kevin R. Curtis, InPhase Technologies Inc. (USA) [TD05-113]
A new lens design concept for holographic data storage is introduced that improves phase conjugation and enables relaxed assembly tolerances and asymmetric reader/writer architectures.

TuP13 Focus sensing method using far-field diffracted waves and its application to holographic data discs, Teruo Fujita, Hayato Horikoshi, Fukui Univ. of Technology (Japan) [TD05-114]
A far-filed focus sensor was studied by simulation and experiment. A way to suppress the offset of this sensor and optics implemented with it for holographic discs are proposed.

TuP14 Aberration holograms and multiplexing: how to manage spherical aberration in microholographic data storage, Enrico Dietz, Jonas Gortner, Sven Frohmann, Alan Guenther, Jens Rass, Susanna Orlic, Technische Univ. Berlin (Germany) [TD05-115]
We investigate the impact of spherical aberration on microholographic

storage and present the concept of so-called aberration holograms and experimental results that demonstrate its viability.

TuP15 Ultra-high density holographic search engine using sub-Bragg and sub-Nyquist recordings, Joby Joseph, Indian Institute of Technology Delhi (India); David A. Waldman, DCE Aprilis, Inc. (USA) [TD05-116]
We propose and demonstrate a holographic data storage device meant for search only purposes, having exceptionally huge data density through sub-Bragg and sub-Nyquist holographic recordings.

TuP16 Detection of reproduced image distortion using FFT cross-correlation method in holographic memory, Yuta Kajiwara, Takumi Sano, Manabu Yamamoto, Tokyo Univ. of Science (Japan) [TD05-117]
This paper studies the analysis method of reproduced image distortion. The image distortion was detected by the marker positions in the data area using FFT cross-correlation method.

TuP17 Tilt compensation method for holographic data storage, Sangwoo Ha, Jae-Sung Lee, Na Young Kim, Jeong-Kyo Seo, In-Ho Choi, Byung-Hoon Min, LG Electronics Inc. (South Korea) [TD05-118]
In this paper, we propose the way to detect and compensate the radial/tangential disc tilt. The compensation result by this method is also demonstrated.

TuP18 Dynamic recording and readout of micro-holograms in GE dye-doped thermoplastic, Z. Ren, V. P. Ostroverkhov, X. Shi, M. A. Cheverton, J. Lopez, B. L. Lawrence, M. R. Durling, GE Global Research (USA) [TD05-119]
We have implemented recording and readout of micro-holograms in dye-doped thermoplastic in our new dynamic system that utilizes five-axial servos to compensate rotating tilting/run-out.

TuP19 Subwavelength focus by radial polarization through metallic thin film with annular illumination, Tzu-Hsiang Lan, Chung-Hao Tien, National Chiao Tung Univ. (Taiwan) [TD05-120]
With objective of NA = 0.75 and 85% apodized annular pupil, a non-diffraction focused beam has FWHM of 0.37λ and more than 2λ penetration depth.

TuP20 Surface plasmon antenna nano-source, Haifeng Wang, Baoxi Xu, Chong-Tow Chong, Data Storage Institute (Singapore) [TD05-121]
A 30nm light spot is generated by illuminating a novel surface plasmon optical antenna with a micron sized focused red light with a wavelength of 650nm.

TuP21 Picometer-scale accuracy in position measurements of dots in a 31 G dot/in2 pattern, Donald A. Chernoff, David L. Burkhead, Advanced Surface Microscopy, Inc. (USA) [TD05-122]
Picometer scale accuracy in position measurements using standard commercial AFM and SEM with offline calibration/measurement software. Measured Dot pitch 143.895 ± 0.040 by AFM.

TuP22 Study on transparency mechanism of bimetallic Bi/In film, Qian Liu, Sihai Cao, Chuanfei Guo, Zhuwei Zhang, Yongsheng Wang, Junjie Miao, The National Ctr. for Nanoscience and Technology of China (China) [TD05-123]
Transparent mechanism of Bi/In film as potential storage

medium was investigated. Oxidation and laser ablation were demonstrated to be main reasons for the transparent conversion.

TuP23 Strategies for employing nano-heterostructures in a near-field enhanced super-resolution optical disk, Yang Wang, Qingling Qu, Yiqun Wu, Fuxi Gan, Shanghai Institute of Optics and Fine Mechanics (China) [TD05-124]
Strategies for employing nano-heterostructures in a near-field enhanced super-resolution optical disk was proposed and numerically investigated.

TuP24 Recovery and reconstruction of the intensity distribution of nano-sized light field obtained with NSOM, HongXing Yuan, Baoxi Xu, M. D. Sofian, Chong-Tow Chong, Data Storage Institute (Singapore) [TD05-125]
Deconvolution techniques is adopted to recover and reconstruct the NSOM for correct characterization of nano-sized light field. Deviation with and without correction is also presented.

TuP25 Pupil plane characteristics and filtering for optical data storage using circular polarization, Junyeob Yeo, Moon-Seok Kim, Narak Choi, Jaisoon Kim, Seoul National Univ. (South Korea); Tom D. Milster, College of Optical Sciences/The Univ. of Arizona (USA) [TD05-126]
Pupil plane beam characteristics and filtering at high-NA and circular polarization are investigated in order to achieve readout signal enhancement.

TuP26 Aberration compensation in near field optics for multi-layer data storage, Kwan-Hyung Kim, Jaisoon Kim, Kitak Won, Hyeong-Ryeol Park, Narak Choi, Seoul National Univ. (South Korea); Sam-Nyol Hong, Jeong-Kyo Seo, LG Electronics Inc. (South Korea); Kwang-Sup Soh, Seoul National Univ. (South Korea) [TD05-127]
The electric component and lens systems are investigated in order to apply for multi-layer data storage in NFR system with high NA.

TuP27 GaP solid immersion lens based on diffraction, Youngsik Kim, Jun Zhang, Thomas D. Milster, College of Optical Sciences/The Univ. of Arizona (USA) [TD05-128]
Hybrid solid immersion lens system (SIL) with a spherical lens attached micro gallium phosphide SIL and a diffractive optical element, and its aberration correction mechanisms are discussed.

TuP28 Assembly and evaluation of SIL optical head for high NA cover-layer incident near-field recording, Yong-Joong Yoon, Taeseob Kim, Cheol-Ki Min, Wan-Chin Kim, No-Cheol Park, Young-Pil Park, Yonsei Univ. (South Korea); Tao Hong, Kyunggeun Lee, SAMSUNG Electronics Co., Ltd. (South Korea) [TD05-129]
In this paper, we show the assembly and evaluation results of the SIL optical head with the high refractive index cover layer disc and compare them with simulation ones. Through this research we can improve the effective NA as 1.84 which is the highest NA that has been reported and we can also increase the data recording density per layer such as the surface recording NFR in cover layer incident NFR.

TuP29 Improvement of protection process using observer, Hyun-Woo Hwang, Sang-Hoon Kim, Joong-Gon Kim, Tae-Wook Kwon, Hyun-Seok Yang, No-Cheol Park, Young-Pil Park, Yonsei Univ. (South Korea); Jeong-Kyo Seo, In-Ho Choi, Byeong-Hoon Min, LG Electronics Inc. (South Korea) [TD05-130]

We propose an improved protection process with a mode switching servo method using a Luenberger observer. The protection process based on velocity and gap distance is more powerful than the protection process based only on the gap distance.

TuP30 Improved air gap controller for SIL based near-field recording servo system, Joong-Gon Kim, Min-Seok Kang, Won-Ho Shin, No-Cheol Park, Hyun-Seok Yang, Young-Pil Park, Yonsei Univ. (South Korea) [TD05-131]
This paper describes improved gap controller for near field recording system using an internal model principle and a dead-zone controller. Gap control system is susceptible to disturbances due to small air gap. Therefore, air gap controller should have effective disturbance rejection performance.

TuP31 Effects of surface and mechanical properties of cover-layer on near-field optical recording, Jin-Hong Kim, Jun-Seok Lee, Jungshik Lim, Ki-Chang Song, Jung-Kyo Seo, LG Electronics Inc. (South Korea) [TD05-132]
Several types of cover-layers for NFR media were prepared and characterized.

TuP32 Design of compatible optics for near-field recording and Blu-ray disc using relay lens, Hyun Choi, Jong-Pil Kim, Yong-Joong Yoon, Wan-Chin Kim, No-Cheol Park, Young-Pil Park, Yonsei Univ. (South Korea) [TD05-133]
We designed compatible optics for solid immersion based near-field recording system and Blu-ray disc using the relay lens.

TuP33 Collision between media surface and solid immersion lens in near-field recording, Hyokune Hwang, Jinmoo Park, Sung Hoon Lee, Jung-Kyo Seo, Seung Hun Yoo, In-Ho Choi, Byung-Hoon Min, LG Electronics Inc. (South Korea) [TD05-134]
Harsh collision between media surface and SIL could make permanent deformation causing optical issues. Research to overcome these issues is described in this paper.

TuP34 The near-field optical module and the tilt compensation method of gap servo near-field recording system, Do-Hyeon Son, Bong-Sik Kwak, Mi Hyeon Jeong, In Gu Han, Jeong-Kyo Seo, In-Ho Choi, Byung-Hoon Min, LG Electronics Inc. (South Korea) [TD05-135]
In this paper, we present the latest results of the LGE NF optical module and the tilt compensation method applying for the NF deck system.

TuP35 L10 ordering of (001)-oriented FePt thin films and its possible application in hybrid recording, Bin Ma, Chaolin Zha, Zongzhi Zhang, Qingyuan Jin, Fudan Univ. (China) [TD05-136]
The L10 ordered phase has been formed in FePt films, deposited on heated MgO substrate or on SrTiO3, MgO and a 1 nm-FeOx underlayered Si substrate. FePt/TbFeCo bilayered structure is also discussed.

TuP36 Nano-optical characteristics of double-sided grating structure for HAMR application, Dong-Soo Lim, Hyun-Suk Oh, Young-Joo Kim, Yonsei Univ. (South Korea) [TD05-137]
The surface plasmon phenomenon of double-sided grating structure with nano-slit aperture was studied to understand the enhancement of near-field optical throughput for HAMR application.

TuP37 Magnetic and magneto-optical properties of hybrid recording media on porous alumina underlayer, Junbing Yan,

Zuoyi Li, Fang Jin, K. F. Dong, Gengqi Lin, X. S. Miao, Huazhong Univ. of Science and Technology (China) [TD05-138]
A self-ordered hexagonal array of nanopores has been fabricated by anodizing a thin film of Al on the glass, the hybrid recording media were sputtered on the porous alumina underlayer, the magnetic properties and magneto-optical properties of TbFeCo film on this underlayer were studied as an example.

TuP38 Study of recorded mark width change with laser power in HAMR, Baoxi Xu, HongXing Yuan, M. D. Sofian, Rong Ji, Jun Zhang, Qide Zhang, Chong-Tow Chong, Data Storage Institute (Singapore) [TD05-139]
The dependence of the recorded mark width on the laser power for heat assisted magnetic recording is studied experimentally and theoretically.

TuP39 Near-field optical coupling and enhancement in the surface plasmon assisted HAMR (SPAH) media, Dong-Soo Lim, Young-Joo Kim, Yonsei Univ. (South Korea) [TD05-140]
New structure of 'surface plasmon assisted HAMR (SPAH) media' was studied to increase the near-field optical throughput with metal and dielectric interface in magnetic media.

TuP40 Design and performance evaluation of light delivery for heat-assisted magnetic recording, Sung-Mook Kang, Yonsei Univ. (South Korea); Eun-Hyung Cho, Sung-Dong Suh, Jin-Seung Sohn, Samsung Advanced Institute of Technology (South Korea); Lambertus Hesselink, Stanford Univ. (USA); No-Cheol Park, Young-Pil Park, Yonsei Univ. (South Korea) [TD05-141]
we present a description of the design, fabrication and evaluation of light delivery using a C-shaped nano-aperture for heat assisted magnetic recording

TuP41 Patterning for ultra-high density multi-dimensional multi-level ROM storage, Jia Y. Sze, Luping Shi, Data Storage Institute (Singapore); Diana N. Sutanto, Nanyang Technological Univ. (Singapore); Chun Yang Chong, Jianming Li, Gaoqiang Yuan, Lung Tat Ng, Data Storage Institute (Singapore); Chee Lip Gan, Nanyang Technological Univ. (Singapore); Chong-Tow Chong, Data Storage Institute (Singapore) [TD05-142]
The paper examined the patterning methodology using phase change materials for forming multi-depth pits. The design and fabrication of multi-depth pit for multi-dimensional multi-level ROM disc was also investigated.

TuP42 Application of polynomial regression and re-sampling method to estimate life time of optical disk, Kunimaro Tanaka, Keisuke Fujiwara, Teikyo Heisei Univ. (Japan) [TD05-143]
Re-sampling and linear regression is used for optical disk life estimation. However, Arrhenius plot bends sometimes. Experimental result of application of polynomial regression is reported.

TuP43 Crystallization kinetics and recording mechanisms of a-Ge/Ni bilayer for write-once blue-ray disk, Yung-Chiun Her, Jyun-Hung Chen, National Chung Hsing Univ. (Taiwan) [TD05-144]
The crystallization kinetics and recording mechanism of a-Ge/Ni bilayer recording film for write-once blue ray disk were studied.

TuP44 Preparation and optical storage properties of novel metal hydrazone organic materials for recordable Blu-ray

disc, Yiqun Wu, Zhimin Chen, Shanghai Institute of Optics and Fine Mechanics (China) and Heilongjiang Univ. (China); Donghong Gu, Yang Wang, Fuxi Gan, Shanghai Institute of Optics and Fine Mechanics (China) [TD05-145]
New metal hydrazone organic materials as recording media for recordable blu-ray disc have been presented. Optical, thermal and recording properties were involved.

TuP45 Crystallization and melting kinetics of Zn-doped fast-growth Sb70Te30 phase-change recording films, Yung-Sung Hsu, National Chung Hsing Univ. (Taiwan) [TD05-146]
In order to obtain sufficiently high recording sensitivity and archival stability, while maintain adequate initialization ability for the rewritable optical memories, the optimum Zn concentration in Sb70Te30 recording film should be located between 5.3 and 17.9 at.%.

TuP46 Crystallization time dependence on SbTe based phase change films measured by rotating disc techniques, Robert E. Simpson, Paul Fons, Alexander Kolobov, Masashi Kuwahara, Junji Tominaga, National Institute of Advanced Industrial Science and Technology (Japan) [TD05-147]
Dynamic measurements of growth dominated and nucleation dominated materials are presented as a function of mark length and film depth. Bismuth doping of these films is found to increase the crystallization rate of the growth dominated materials through a corresponding decrease in the material's viscosity.

TuP47 Cyclability improvement on super-resolution BD-like ROM disks based on the high-contrast semiconductor InSb, Joseph Pichon, Fabien Laulagnet, Marie-Françoise Armand, Olivier Lemonnier, Bérangère Hyot, Bernard André, Commissariat à l'Energie Atomique (France) [TD05-148]
We present our recent improvements of InSb-based Super-Resolution BD-like ROM disks in terms of cyclability, as investigated by dynamic and static testing.

TuP48 Improvement of aerodynamic stability in flexible optical disk system with cylindrically concaved stabilizer, Yasunori Sugimoto, Shozou Murata, Yasutomo Aman, Masaru Shinkai, Nobuaki Onagi, Ricoh Co., Ltd. (Japan); Daiichi Koide, Yohimichi Takano, Haruki Tokumaru, Japan Broadcasting Corp. (Japan) [TD05-149]
The effects of both disk thickness and material were investigated in order to improve aerodynamic stability in flexible optical disk system with cylindrically concaved stabilizer.

TuP49 Multi-level read-only DVD using signal waveform modulation, Yi Tang, Jing Pei, Longfa Pan, Hua Hu, Haibo Yuan, Buqing Zhang, Mingming Yan, Tsinghua Univ. (China) [TD05-150]
A novel multi-level read-only DVD using signal waveform modulation is proposed and implemented on DVD platform. A raw BER of less than 1e-4 is achieved.

Posters: Postdeadline

A selection of post deadline poster papers will be included in the Final Technical Program giving the participants the opportunity to hear new and significant material in rapidly advancing areas.

[SESSION TuC: Special Session: Applications]

Monarchy Ballroom, 3:30 to 6:30 pm

Session Chair: **Susanna Orlic**, Technische Univ. Berlin (Germany); **Mitsuru Irie**, Osaka Sangyo Univ. (Japan)

TuC1 3:30 pm: **Toward adoption of optical disks for preservation of digitized cultural heritage** *(Invited Paper)*, Kunimaro Tanaka, Teikyo Heisei Univ. (Japan) [TD05-25]
Digital archive is important for preservation and usage of present culture. Recent status and requirement for optical disks for this purpose is described.

TuC2 4:00 pm: **Trends in the digital home: why 'IMG0064.jpg' is the new blinking 12:00** *(Invited Paper)*, Tim Rausch, S. Iren, D. Seekins, Ernest P. Riedel, Seagate Technology LLC (USA) [TD05-26]
Technology has become more ubiquitous and accessible than ever before, but it still remains out of reach of many everyday individuals. People struggle with technology and content management in the home on a regular basis. Using design research techniques, we went into the homes of families and spent time with them, observing their successes and failures with digital data. As a result of the study we identified several trends in the digital home and barriers between individuals and their technology.

[Coffee Break]
Queen's Ballroom, 4:30 to 5:00 pm

TuC3 5:00 pm: **Applications for 4th generation optical storage** *(Invited Paper)*, Tuviah E. Schlesinger, Bruch H. Krogh, Tsuhan Chen, Carnegie Mellon Univ. (USA) [TD05-27]
Optical data storage provides inexpensive, removable, easily replicated medium. Only applications requiring these will use optical storage. Advanced imaging and control systems are applications that could require the next generation of optical data storage systems.

TuC4 5:30 pm: **DVD-download** *(Invited Paper)*, Shoji Taniguchi, Pioneer Corp. (Japan) [TD05-28]
DVD-Download provides a new distribution channel of DVD-Video discs via internet download and centralized production. This paper describes its distribution models and format outline.

TuC5 6:00 pm: **Optical storage in 2008: Where is the competition heading?** *(Invited Paper)*, Barry H. Schechtman, Information Storage Industry Consortium (USA) [TD05-29]
Optical storage applications are discussed, and the status and outlook are reviewed for other technologies that compete with optical storage for these applications.

Wednesday 16 July

[SESSION WA: New and Related Technologies]
Monarchy Ballroom, 8:30 to 10:00 am
Session Chair: **Thomas D. Milster**, College of Optical Sciences/The Univ. of Arizona (USA); **Jooho Kim**, SAMSUNG Electronics Co., Ltd. (South Korea)

WA1 8:30 am: **Fundamental exploration of the solutions for ultra-high density optical recording** *(Invited Paper)*, Luping Shi, Chong-Tow Chong, Boris S. Luk'yanchuk, Jianming Li, Haifeng Wang, Gaoqiang Yuan, Jia Y. Sze, Data Storage Institute (Singapore) [TD05-30]
The possible solutions to achieve ultra-high density optical recording are explored fundamentally, including the ways further reducing spot size to overcome diffraction limit,

volumetric recording using real space, imagine space and parameter spaces, and making use of the interaction effect of light and matters. The challenges and limitations are discussed.

WA2 9:00 am: **Plasmonic nano-structures for optical data storage**, Masud Mansuripur, College of Optical Sciences/The Univ. of Arizona (USA); Aramais R. Zakharian, Andrey Kobyakov, Corning, Inc. (USA); Jerome V. Moloney, College of Optical Sciences/The Univ. of Arizona (USA) [TD05-31]
We describe a method of optical data storage that relies on the small dimensions of metallic nano-structures and/or nano-particles to achieve high storage densities. The resonant behavior of these particles (as individuals and in small clusters) in the presence of ultraviolet, visible, and near-infrared light may be used to retrieve pre-recorded information using far-field spectroscopic optical detection.

WA3 9:15 am: **Towards femto-Joule nanoparticle phase-change optical memory**, Nikolay I. Zheludev, Kevin F. MacDonald, Andrey I. Denisyuk, Univ. of Southampton (United Kingdom) [TD05-32]
Phase-change functionality in gallium nanoparticles offers an innovative conceptual basis for the development of high density, low energy, non-volatile optical memories.

WA4 9:30 am: **Nanophotonic hierarchical hologram: demonstration of the physical hierarchy**, Naoya Tate, Wataru Nomura, The Univ. of Tokyo (Japan); Takashi Yatsui, Japan Science and Technology Agency (Japan); Makoto Naruse, National Institute of Information and Communications Technology (Japan) and The Univ. of Tokyo (Japan); Motoichi Ohtsu, The Univ. of Tokyo (Japan) [TD05-33]
We experimentally demonstrated the concept of proposed "nanophotonic hierarchical hologram" which works both in optical far-fields and near-fields. The hierarchy is attributed to near-fields interactions.

WA5 9:45 am: **Higher sensitivity for the analysis of bio-entities with changes in thicknesses of multilayered BioDVD structure**, Gopinath Subash Chandra Bose, Awazu Koichi, Kumar K. R. Penmetcha, Junji Tominaga, National Institute of Advanced Industrial Science and Technology (Japan) [TD05-34]
Increased the sensitivity of optical based detection of bio-molecular interactions on BioDVD surfaces with manipulations of multilayered structure.

[Coffee Break]

Queen's Ballroom, 10:00 to 10:30 am

[SESSION WB: Media and Applications]

Monarchy Ballroom, 10:30 am to 12:30 pm
Session Chair: **Rie Kojima**, Matsushita Electric Industrial Co., Ltd. (Japan); **Chong-Tow Chong**, Data Storage Institute (Singapore)

WB1 10:30 am: **Challenge to snap shot structural visualization of the phase change** *(Invited Paper)*, Yoshito Tanaka, The Institute of Physical and Chemical Research (Japan); Yoshimitsu Fukuyama, Nobuhiro Yasuda, Jungeun Kim, Haruno Murayama, Shigeru Kimura, Japan Synchrotron Radiation Research Institute (Japan); Kenichi Kato, The Institute of Physical and Chemical Research (Japan); Shinji Kohara, Japan Synchrotron Radiation Research Institute (Japan); Yutaka Moritomo, Tsukuba Univ. (Japan); Toshiyuki Matsunaga, Rie Kojima, Noboru Yamada, Matsushita Electric

Industrial Co., Ltd. (Japan); Hitoshi Tanaka, Japan Synchrotron Radiation Research Institute (Japan); Masaki Takata, The Institute of Physical and Chemical Research (Japan) [TD05-35]
The first time-resolved structure investigation of phase change process of DVD materials was achieved by SR diffraction experiment coupled with simultaneous photo reflectivity measurement.

WB2 11:00 am: **What is the origin of activation energy in phase-change film?**, Junji Tominaga, Takayuki Shima, Paul Fons, Masashi Kuwahara, Alexander Kolobov, Robert E. Simpson, National Institute of Advanced Industrial Science and Technology (Japan) [TD05-36]
We reveal and discuss the origin of the activation energy, which initiates the transition from the amorphous to crystalline state, based on a GeSbTe-superlattice model by ab-initio local density approximation.

WB3 11:15 am: **Reliable measurement of optical constants for molten phase-change thin film**, Daisuke Eto, Kazuhiko Aoki, Shuichi Ohkubo, NEC Corp. (Japan) [TD05-37]
We found out optical constants of molten InSb thin film are nearly independent of thickness and interface layer material, while melting point depends on thickness.

WB4 11:30 am: **A two-color photopolymer system for high-capacity multilayer optical data storage**, Benjamin A. Kowalski, Robert R. McLeod, Timothy F. Scott, Univ. of Colorado at Boulder (USA) [TD05-38]
A novel two-color photopolymer system is demonstrated, which suppresses polymerization at the periphery of recording while maintaining high writing sensitivity at the focus. This enables both increased storage density and increased signal via suppression of out-of-focus exposure.

WB5 11:45 am: **Phase aberration limits to three-dimensional optical data storage in homogeneous media**, Robert R. McLeod, Univ. of Colorado at Boulder (USA) [TD05-39]
An analytic expression for the phase aberrations of multi-layer optical storage disks is derived and used to calculate a limit on the total number of layers.

WB6 12:00 pm: **Applications of ODS technology to lithography** *(Invited Paper)*, Thomas D. Milster, College of Optical Sciences/The Univ. of Arizona (USA) [TD05-40]

Thursday 17 July

[SESSION ThA: Coding and Signal Processing]

Monarchy Ballroom, 8:30 to 10:00 am
Session Chair: **Satoru Higashino**, Sony Corp. (Japan); **Seiji Kobayashi**, Sony Corp. (Japan)

ThA1 8:30 am: **Signal-readout system for optical pickup with homodyne detection scheme**, Takahiro Kurokawa, Hideharu Mikami, Tatsuro Ide, Koichi Watanabe, Harukazu Miyamoto, Hitachi, Ltd. (Japan) [TD05-41]
We developed a signal-readout system for optical pickups using a homodyne detection scheme. By using the system, a signal amplification rate of 3.6 was obtained.

ThA2 8:45 am: **Turbo equalization with RLL (1,9) and LDPC code for SuperRENS ROM discs with 60nm minimum mark length**, Oliver Theis, Xiao-Ming Chen, Dietmar Hepper, Gael Pilard, Deutsche Thomson oHG (Germany) [TD05-42]
Low complexity super-trellis detection for an enhanced (1,9)

RLL modulation code with application to turbo equalization for next generation optical discs is presented

ThA3 9:00 am: **Study of ITR-PLL with linearly constrained adaptive pre-filter for high-density optical disc**, Yoshiyuki Kajiwara, Junya Shiraishi, Shoei Kobayashi, Tamotsu Yamagami, Sony Corp. (Japan) [TD05-43]
Digital Phase Lock Loop with Linearly Constraint Adaptive Pre-Filter has studied to improve qualities of phase error calculation by adaptive equalized signal with enough stability.

ThA4 9:15 am: **Adaptive writing strategy based on bits-indexed writing parameters**, Hui Zhao, Hyun-Soo Park, Inoh Hwang, Kyunggeun Lee, Insik Park, SAMSUNG Electronics Co., Ltd. (South Korea) [TD05-44]
A new bits-indexed writing parameters organization method and an adaptive writing strategy are proposed. The performance is proved by 40GB Blu-ray Disc experiment.

ThA5 9:30 am: **Reduced state sequence estimation with level adaptation (RESSELA) for high density disc**, Hyun-Soo Park, Hui Zhao, Inho Hwang, Kyunggeun Lee, Insik Park, SAMSUNG Electronics Co., Ltd. (South Korea) [TD05-45]
We report the new data reproducing scheme for high density over 40GB with a commercial Blu-ray recordable disc. bER of 1x10-6 and 1.3x10-4 and 2.6x10-3 and 9x10-3 with 40GB, 45GB, 47.5GB and 50GB were experimentally obtained respectively using this new data reproducing scheme which shows the possibility of achieving 50GB with a commercial single-layer Blu-ray disc.

ThA6 9:45 am: **Analysis on SNR improvement by multi-tone demodulation**, Atsushi Kikukawa, Hiroyuki Minemura, Hitachi, Ltd. (Japan) [TD05-46]
SNR improvement by using multi-tone demodulation was theoretically investigated. The input bandwidth and the ADC clock jitter are the major factors that limit the efficiency

[Coffee Break]
Queen's Ballroom, 10:00 to 10:30 am

[SESSION ThB: Holographic I]
Monarchy Ballroom, 10:30 am to 12:30 pm
Session Chair: **Lambertus Hesselink**, Stanford Univ. (USA); **Tsutomu Shimura**, The Univ. of Tokyo (Japan)

ThB1 10:30 am: **Linear signal processing for a holographic data storage channel using coherent addition** *(Invited Paper)*, Masaaki Hara, Kazutatsu Tokuyama, Kenji Tanaka, Kazuyuki Hirooka, Atsushi Fukumoto, Sony Corp. (Japan) [TD05-47]
A linear channel model and linear signal processing are available for a holographic data storage channel when coherent addition is applied in a reproduction process.

ThB2 11:00 am: **Homodyne detection of holographic data pages**, Mark R. Ayres, Kevin R. Curtis, InPhase Technologies Inc. (USA) [TD05-48]
A method for homodyne detection of holographic data pages is presented. The optical phase-matching problem is solved algorithmically, rather than optically.

ThB3 11:15 am: **Development of a coaxial holographic data recording system** *(Invited Paper)*, Atsushi Fukumoto, Sony Corp. (Japan) [TD05-49]
Based on our recent progress in high-density and high data-transfer-rate recordings using coaxial holographic recording

testers, the prospects for performance improvement in future systems are discussed.

ThB4 11:45 am: **A reflective counter-propagating holographic setup**, Joachim Knittel, Oliver Malki, Frank Przygodda, Hartmut Richter, Heiko Trautner, Deutsche Thomson-Brandt GmbH (Germany) [TD05-50]
We present a reflective counter-propagating holographic setup for optical data storage that makes efficient use of the laser light.

ThB5 12:00 pm: **Practical holography**, Ken E. Anderson, Edeline Fotheringham, Friso Schlottau, Paul C. Smith, Keith W. Farnsworth, Jason R. Ensher, Kevin R. Curtis, InPhase Technologies Inc. (USA) [TD05-51]
We review the evolution of InPhase Technologies' holographic storage drive and discuss technical obstacles that we have overcome to bring our product to market.

ThB6 12:15 pm: **Material consumption and crosstalk characteristics of different holographic storage concepts**, Frank Przygodda, Joachim Knittel, Oliver Malki, Heiko Trautner, Hartmut Richter, Deutsche Thomson-Brandt GmbH (Germany) [TD05-52]
Three holographic data storage concepts (plane wave, collinear, counter-propagating beam setup) are investigated by numerical simulations regarding their material consumption, diffraction efficiency and crosstalk characteristics.

[Lunch Break]
12:30 to 2:00 pm

[SESSION ThC: Holographic II and Super Resolution]
Monarchy Ballroom, 2:00 to 4:00 pm
Session Chair: **Robert R. McLeod**, Univ. of Colorado at Boulder (USA); **Satoru Tanaka**, Pioneer Corp. (Japan)

ThC1 2:00 pm: **Wobble alignment for angularly multiplexed holograms**, Mark R. Ayres, Alan C. Hoskins, Paul C. Smith, John Kane, InPhase Technologies Inc. (USA) [TD05-53]
A method for dynamic alignment adjustment in an angle-multiplexed holographic storage system is presented. A wobble servo corrects readout beam angle, pitch, and wavelength.

ThC2 2:15 pm: **Three-dimensional Fourier optics analysis of holographic optical data storage systems**, George Barbastathis, Massachusetts Institute of Technology (USA) [TD05-54]
A theoretical method for analysis and design of holographic memories is presented. The memory is expressed as a 3D pupil in an imaging system. It is shown how practical memory performance metrics, such as interpage---intrapage crosstalk and defocus tolerance, can be understood and optimized using this approach.

ThC3 2:30 pm: **Intra-signal modulation in holographic memories**, Mark R. Ayres, InPhase Technologies Inc. (USA); Robert R. McLeod, Univ. of Colorado at Boulder (USA) [TD05-55]
An analysis of intra-signal noise in volume holography is presented. Estimates of the coherent and incoherent limiting cases are derived for ASK and PSK modulation.

ThC4 2:45 pm: **Sparse modulation codes for channel with media saturation**, Lakshmi D. Ramamoorthy, Vijayakumar

Bhagavatula, Carnegie Mellon Univ. (USA) [TD05-56]
Channel model with media saturation was built to simulate data pages. We observed a trade off between the relative write transfer rates and bit error rate.

ThC5 3:00 pm: **Optical super-resolution through super-oscillations** *(Invited Paper)*, Nikolay I. Zheludev, Univ. of Southampton (United Kingdom) [TD05-57]
Invited: To achieve optical sub-wavelength concentrations of light beyond the near-field, the concept of super-oscillations recently flagged by Berry and Popescu, and demonstrated by our group using a quasi-crystal array of holes, provides a viable and less technologically challenging alternative to the approach based on negative-index super-lenses exploiting recovery of the evanescent fields.

ThC6 3:30 pm: **Comparison of a semiconductor and a phase-change material for application in a super-resolution ROM disk**, Gael Pilard, Larisa Pacearescu, Herbert Hoelzemann, Christophe Féry, Deutsche Thomson oHG (Germany) [TD05-58]
Super-resolution ROM disks based on InSb or AIST were manufactured. A bER of 1e-3 was found with InSb on random patterns having 40nm channel bit length. We demonstrate why the decoding with AIST is not possible.

ThC7 3:45 pm: **Super resolution media with significantly high read stability**, Shuichi Ohkubo, Kazuhiko Aoki, Eiji Kariyada, Daisuke Eto, NEC Corp. (Japan) [TD05-59]
Read stability of 1e+6 times has been confirmed with Super-Resolution ROM media with phase change mask layer by developing new protective and inter-face layers.

[Coffee Break]

Queen's Ballroom, 4:00 to 4:30 pm

[SESSION ThD: Postdeadline Session]

Monarchy Ballroom, 4:30 to 5:30 pm
Session Chair: **Barry H. Schechtman**, Information Storage Industry Consortium (USA); **Junji Tominaga**, National Institute of Advanced Industrial Science and Technology (Japan)

A selection of post deadline oral papers will be included in the Final Technical Program giving the participants the opportunity to hear new and significant material in rapidly advancing areas.

[Closing Remarks]

Monarchy Ballroom, 5:30 to 6:00 pm
ODS General Chairs: **Kevin R. Curtis**, InPhase Technologies Inc. (USA); **Luping Shi**, Data Storage Institute (Singapore)
ISOM Program Committee Chair: **Haruki Tokumaru**, NHK Science & Technical Research Labs. (Japan)

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Ishikawa, Sayuri	[TD05-82] MP23
Ishimoto, Tsutomu	[TD05-18] TuA4

J

Jeng, Tzuan-Ren	[TD05-109] TuP8
Jeong, Mi Hyeon	[TD05-135] TuP34
Ji, Rong	[TD05-139] TuP38
Jin, Fang	[TD05-138] TuP37

Jin, Guofan [TD05-67] MP8
Jin, Qingyuan [TD05-136] TuP35
Joseph, Joby [TD05-116] TuP15
Jung, Heungsang [TD05-102] TuP1
[TD05-106] TuP5

K

Kajiwara, Yoshiyuki [TD05-43] ThA3
Kajiwara, Yuta [TD05-117] TuP16
Kalman, Erika [TD05-81] MP22
Kamijo, Koji [TD05-111] TuP10
Kane, John [TD05-53] ThC1
Kanemura, Takashi [TD05-60] MP1
Kang, Min-Seok [TD05-131] TuP30
Kang, Sung-Mook [TD05-141] TuP40
Kannan, Swetha [TD05-77] MP18
Kariyada, Eiji [TD05-59] ThC7
Kasanavesi, Sashi K. [TD05-77] MP18
Katayama, Ryuichi [TD05-9] MB6
Kato, Kenichi [TD05-35] WB1
Katsumata, Akiyoshi [TD05-68] MP9
Kawakubo, Osamu [TD05-18] TuA4
Khulbe, Pramod K. [TD05-77] MP18
Kikukawa, Atsushi [TD05-46] ThA6
Kim, Haksun [TD05-102] TuP1
[TD05-106] TuP5
Kim, Jaisoon [TD05-126] TuP25
[TD05-127] TuP26
Kim, Jang Hyun [TD05-93] MP34
[TD05-107] TuP6
[TD05-108] TuP7
Kim, Jin-Hong [TD05-132] TuP31
Kim, Jinyoung [TD05-92] MP33
[TD05-95] MP36
Kim, Jong-Pil [TD05-133] TuP32
Kim, Joong-Gon [TD05-130] TuP29
[TD05-131] TuP30
Kim, Jungeun [TD05-35] WB1
Kim, Kwan-Hyung [TD05-127] TuP26
Kim, Nakhyun [TD05-16] TuA2
Kim, Na Young [TD05-118] TuP17
Kim, Sang-Hoon [TD05-107] TuP6
[TD05-108] TuP7
[TD05-130] TuP29
Kim, Sunmin [TD05-18] TuA4
Kim, Taeseob [TD05-129] TuP28
Kim, Wan-Chin [TD05-129] TuP28
[TD05-133] TuP32
Kim, Young-Joo [TD05-137] TuP36
[TD05-140] TuP39
Kim, Youngsik [TD05-128] TuP27
Kim, Yullin [TD05-79] MP20
Kimura, Shigeru [TD05-35] WB1
Kinoshita, Nobuhiro [TD05-111] TuP10
Kishore, Rani B. [TD05-12] MC3
Kitano, Motoki [TD05-72] MP13
[TD05-73] MP14
Knittel, Joachim [TD05-110] TuP9
[TD05-50] ThB4
[TD05-52] ThB6
Kobayashi, Seiji [TD05-7] MB4
Kobayashi, Shoei [TD05-43] ThA3
Kobyakov, Andrey [TD05-31] WA2

Koda, Sokoh [TD05-62] MP3
Kodate, Kashiko [TD05-64] MP5
[TD05-82] MP23
Kohara, Shinji [TD05-35] WB1
Koichi, Awazu [TD05-34] WA5
Koide, Daiichi [TD05-149] TuP48
Kojima, Rie [TD05-35] WB1
Kokenyesi, Sandor J. [TD05-81] MP22
Kolobov, Alexander [TD05-147] TuP46
[TD05-36] WB2
Komatsu, Yuichi [TD05-9] MB6
Kondo, Takao [TD05-18] TuA4
Kong, Gyuyeol [TD05-94] MP35
[TD05-96] MP37
Kowalski, Benjamin A. [TD05-38] WB4
Krogh, Bruch H. [TD05-27] TuC3
Kubo, Takahiro [TD05-87] MP28
Kui, Cai [TD05-98] MP39
Kuroda, Kazuo [TD05-105] TuP4
Kurokawa, Takahiro [TD05-15] TuA1
[TD05-41] ThA1
Kuwahara, Masashi [TD05-147] TuP46
[TD05-36] WB2
Kwak, Bong-Sik [TD05-135] TuP34
Kwon, Tae-Wook [TD05-130] TuP29

L

Lan, Tzu-Hsiang [TD05-120] TuP19
Lan, Yung Sung [TD05-109] TuP8
Laulagnet, Fabien [TD05-148] TuP47
Lawrence, Brian L. [TD05-6] MB3
[TD05-75] MP16
[TD05-119] TuP18
Lee, Bongil [TD05-92] MP33
Lee, Irene [TD05-100] MP41
Lee, Jaejin [TD05-92] MP33
[TD05-95] MP36
[TD05-101] MP42
Lee, Jae-Sung [TD05-118] TuP17
Lee, Jun-Seok [TD05-132] TuP31
Lee, Kyunggeun [TD05-16] TuA2
[TD05-129] TuP28
[TD05-44] ThA4
[TD05-45] ThA5
Lee, Sung Hoon [TD05-134] TuP33
Lee, Xuan-Hao [TD05-66] MP7
Lee, Yong Hee [TD05-107] TuP6
[TD05-108] TuP7
Leen, J. B. [TD05-13] MC4
Lemonnier, Olivier [TD05-148] TuP47
Li, Jianming [TD05-142] TuP41
[TD05-30] WA1
Li, Minghua [TD05-61] MP2
[TD05-65] MP6
Li, Y. [TD05-77] MP18
Li, Zuoyi [TD05-138] TuP37
Liang, Chin-Tsia [TD05-109] TuP8
Liang, Xinan [TD05-61] MP2
[TD05-65] MP6
Lim, Dong-Soo [TD05-137] TuP36
[TD05-140] TuP39
Lim, Jungshik [TD05-132] TuP31
Lim, Pang-Boey [TD05-60] MP1

Lin, Gengqi [TD05-138] TuP37
Liu, Pengfei [TD05-63] MP4
Liu, Qian [TD05-123] TuP22
Liu, Tzong-Shi [TD05-78] MP19
Loncar, Marko [TD05-11] MC2
Longley, Kathryn L. [TD05-6] MB3
Lopez, James [TD05-119] TuP18
Luk'yanchuk, Boris S. [TD05-30] WA1

M

Ma, Bin [TD05-136] TuP35
Ma, Jianshe [TD05-84] MP25
Ma, Qiang [TD05-67] MP8
Ma, Shih-Hsin [TD05-66] MP7
MacDonald, Kevin F. [TD05-32] WA3
Malki, Oliver [TD05-110] TuP9
[TD05-50] ThB4
[TD05-52] ThB6
Mansuripur, Masud [TD05-2] MA2
[TD05-31] WA2
Mariscal-Lopez, Carlos [TD05-12] MC3
Matsuda, Nami [TD05-60] MP1
Matsunaga, Toshiyuki [TD05-35] WB1
McLeod, Robert R. [TD05-38] WB4
[TD05-39] WB5
[TD05-55] ThC3
Miao, Junjie [TD05-123] TuP22
Miao, X. S. [TD05-138] TuP37
Mikami, Hideharu [TD05-15] TuA1
[TD05-41] ThA1
Milster, Thomas D. [TD05-77] MP18
[TD05-79] MP20
[TD05-128] TuP27
[TD05-40] WB6
Min, Byeong-Hoon [TD05-130] TuP29
Min, Byung-Hoon [TD05-118] TuP17
[TD05-134] TuP33
[TD05-135] TuP34
Min, Cheol-Ki [TD05-129] TuP28
Minemura, Hiroyuki [TD05-46] ThA6
Mitsumori, Ayumi [TD05-4] MB2
Miyamoto, Harukazu [TD05-15] TuA1
[TD05-41] ThA1
Miyamoto, Hirotaka [TD05-7] MB4
Mizukuki, Takeshi [TD05-18] TuA4
Moloney, Jerome V. [TD05-31] WA2
Moritomo, Yutaka [TD05-35] WB1
Moser, Christophe [TD05-21] TuB3
Mueller, Christian [TD05-76] MP17
Mukasa, Tomoharu [TD05-17] TuA3
Murata, Shozou [TD05-149] TuP48
Murayama, Haruno [TD05-35] WB1
Muroi, Tetsuhiko [TD05-111] TuP10
Muto, Shinzo [TD05-68] MP9

N

Nagy, Peter [TD05-81] MP22
Nakamura, Toshihiro [TD05-62] MP3
Nakaoki, Ariyoshi [TD05-18] TuA4
Naruse, Makoto [TD05-33] WA4
Ng, Lung Tat [TD05-142] TuP41
Ni, Kai [TD05-67] MP8
Noda, Susumu [TD05-10] MC1

Nomura, Wataru [TD05-33] WA4

O

O'Brien, Nada A. [TD05-86] MP27
Ogasawara, Masakazu [TD05-4] MB2
Oh, Hyun-Suk [TD05-137] TuP36
Ohkubo, Shuichi [TD05-37] WB3
[TD05-59] ThC7
Ohmori, Kentaro [TD05-62] MP3
Ohmura, Kohji [TD05-62] MP3
Ohtsu, Motoichi [TD05-1] MA1
[TD05-33] WA4
Okamoto, Atsushi [TD05-69] MP10
[TD05-70] MP11
[TD05-72] MP13
[TD05-73] MP14
Okino, Yoshihiro [TD05-87] MP28
Onagi, Nobuaki [TD05-149] TuP48
Orlic, Susanna [TD05-8] MB5
[TD05-76] MP17
[TD05-115] TuP14
Ostroverkhov, Victor P. [TD05-6] MB3
[TD05-75] MP16
[TD05-119] TuP18
Oto, Hiroshi [TD05-103] TuP2
Oumi, Manabu [TD05-24] TuB6

P

Pacearescu, Larisa [TD05-58] ThC6
Pan, Longfa [TD05-83] MP24
[TD05-84] MP25
[TD05-89] MP30
[TD05-150] TuP49
Park, Donghyuk [TD05-95] MP36
Park, Gwitae [TD05-102] TuP1
[TD05-106] TuP5
Park, Hyeong-Ryeol [TD05-127] TuP26
Park, Hyun-Soo [TD05-16] TuA2
[TD05-44] ThA4
[TD05-45] ThA5
Park, Insik [TD05-16] TuA2
[TD05-44] ThA4
[TD05-45] ThA5
Park, Jin-Bae [TD05-93] MP34
Park, Jinmoo [TD05-134] TuP33
Park, Joo Youn [TD05-102] TuP1
[TD05-106] TuP5
[TD05-107] TuP6
[TD05-108] TuP7
Park, Majung [TD05-24] TuB6
Park, No-Cheol [TD05-129] TuP28
[TD05-130] TuP29
[TD05-131] TuP30
[TD05-133] TuP32
[TD05-141] TuP40
Park, Young-Pil [TD05-93] MP34
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[TD05-130] TuP29
[TD05-131] TuP30
[TD05-133] TuP32
[TD05-141] TuP40

Pei, Jing	[TD05-83] MP24
	[TD05-150] TuP49
Penmetcha, Kumar K.	[TD05-34] WA5
Pichon, Joseph	[TD05-148] TuP47
Pilard, Gael	[TD05-42] ThA2
	[TD05-58] ThC6
Przygodda, Frank	[TD05-110] TuP9
	[TD05-50] ThB4
	[TD05-52] ThB6

Q

Qin, Zhiliang	[TD05-91] MP32
	[TD05-97] MP38
	[TD05-98] MP39
Qu, Qingling	[TD05-124] TuP23

R

Ramamoorthy, Lakshmi D.	[TD05-56] ThC4
Rass, Jens	[TD05-8] MB5
	[TD05-76] MP17
	[TD05-115] TuP14
Rausch, Tim	[TD05-26] TuC2
Ren, Zhiyuan	[TD05-119] TuP18
Rentzepis, Peter M.	[TD05-3] MB1
Richter, Hartmut	[TD05-110] TuP9
	[TD05-50] ThB4
	[TD05-52] ThB6
Riedel, Ernest P.	[TD05-26] TuC2
Ross, Fergus J.	[TD05-75] MP16

S

Saito, Kimihiro	[TD05-7] MB4
	[TD05-18] TuA4
Saito, Norihiko	[TD05-18] TuA4
Sano, Takayuki	[TD05-69] MP10
	[TD05-73] MP14
Sano, Takumi	[TD05-117] TuP16
Sasa, Yuichiro	[TD05-103] TuP2
Sato, Kunihiro	[TD05-69] MP10
Satoh, Kazuyuki	[TD05-60] MP1
Schechtman, Barry H.	[TD05-29] TuC5
Schlesinger, Tuviah E.	[TD05-78] MP19
	[TD05-27] TuC3
Schlottau, Friso	[TD05-51] ThB5
Scott, Timothy F.	[TD05-38] WB4
Seekins, D.	[TD05-26] TuC2
Sekiguchi, Tohru	[TD05-68] MP9
Seo, Jeong-Kyo	[TD05-118] TuP17
	[TD05-127] TuP26
	[TD05-130] TuP29
	[TD05-135] TuP34
Seo, Jung-Kyo	[TD05-132] TuP31
	[TD05-134] TuP33
Seo, Manjung	[TD05-101] MP42
Shi, L. P.	[TD05-100] MP41
Shi, Luping	[TD05-142] TuP41
	[TD05-30] WA1
Shi, Xiaolei	[TD05-6] MB3
	[TD05-75] MP16
	[TD05-119] TuP18
Shima, Takayuki	[TD05-36] WB2
Shimano, Takeshi	[TD05-15] TuA1
Shimidzu, Naoki	[TD05-111] TuP10

Shimura, Tsutomu [TD05-105] TuP4
Shin, Won-Ho [TD05-131] TuP30
Shinkai, Masaru [TD05-149] TuP48
Shinohara, Noriyasu [TD05-18] TuA4
Shiraishi, Junya [TD05-43] ThA3
Simpson, Robert E. [TD05-147] TuP46
[TD05-36] WB2
Sissom, Bradley J. [TD05-113] TuP12
Smith, Paul C. [TD05-51] ThB5
[TD05-53] ThC1
Sofian, M. D. [TD05-125] TuP24
[TD05-139] TuP38
Soh, Kwang-Sup [TD05-127] TuP26
Sohn, Jin-Seung [TD05-141] TuP40
Solanki, Sanjeev [TD05-61] MP2
[TD05-65] MP6
Son, Do-Hyeon [TD05-135] TuP34
Song, Ki-Chang [TD05-132] TuP31
Su, Ya-Ni [TD05-85] MP26
Subash Chandra Bose, Gopinath [TD05-34] WA5
Sugimoto, Yasunori [TD05-149] TuP48
Suh, Sung-Dong [TD05-141] TuP40
Sumi, Yojiro [TD05-105] TuP4
Sun, Ching-Cherng [TD05-66] MP7
[TD05-112] TuP11
Sutanto, Diana N. [TD05-142] TuP41
Suzuki, Ryu [TD05-104] TuP3
Sze, Jia Y. [TD05-142] TuP41
[TD05-30] WA1

T

Takabayashi, Masanori [TD05-70] MP11
Takano, Yoshimichi [TD05-149] TuP48
Takasawa, Takeharu [TD05-17] TuA3
Takashima, Yuzuru [TD05-22] TuB4
Takata, Masaki [TD05-35] WB1
Takats, Viktor [TD05-81] MP22
Tan, Kim L. [TD05-86] MP27
Tanabe, Norihiro [TD05-7] MB4
Tanabe, Takaya [TD05-104] TuP3
Tanaka, Hitoshi [TD05-35] WB1
Tanaka, Junya [TD05-72] MP13
Tanaka, Kenji [TD05-47] ThB1
Tanaka, Kunimaro [TD05-143] TuP42
[TD05-25] TuC1
Tanaka, Satoru [TD05-4] MB2
Tanaka, Yoshito [TD05-35] WB1
Tang, Jianyong [TD05-12] MC3
Tang, Yi [TD05-83] MP24
[TD05-84] MP25
[TD05-89] MP30
[TD05-150] TuP49
Taniguchi, Shoji [TD05-28] TuC4
Tao, Shiquan [TD05-63] MP4
Tate, Naoya [TD05-33] WA4
Teng, Tun-Chien [TD05-66] MP7
[TD05-112] TuP11
Terada, Masaru [TD05-105] TuP4
Theis, Oliver [TD05-88] MP29
[TD05-42] ThA2
Tien, Chung-Hao [TD05-120] TuP19
Ting, L. H. [TD05-100] MP41

Tokumaru, Haruki [TD05-149] TuP48
Tokuyama, Kazutatsu [TD05-47] ThB1
Tominaga, Junji [TD05-147] TuP46
[TD05-34] WA5
[TD05-36] WB2
Tominaga, Shin [TD05-9] MB6
Tomita, Yasuo [TD05-62] MP3
Tomiyama, Mizuho [TD05-9] MB6
Trautner, Heiko [TD05-110] TuP9
[TD05-50] ThB4
[TD05-52] ThB6
Trunov, Mihail [TD05-81] MP22
Tsai, Meng-Yen [TD05-78] MP19
Tsujioka, Tsuyoshi [TD05-80] MP21
Tsukahara, Nobuhiko [TD05-17] TuA3

U
Uchiyama, Hiroshi [TD05-7] MB4
Urakawa, Yoshiyuki [TD05-17] TuA3

V
Vieth, Udo [TD05-71] MP12

W
Waldman, David A. [TD05-116] TuP15
Walker, Edwin P. [TD05-3] MB1
Wan, Xiaojun [TD05-63] MP4
Wang, Haifeng [TD05-121] TuP20
[TD05-30] WA1
Wang, Huanyong [TD05-63] MP4
Wang, Yang [TD05-124] TuP23
[TD05-145] TuP44
Wang, Yongsheng [TD05-123] TuP22
Watanabe, Eriko [TD05-64] MP5
[TD05-82] MP23
Watanabe, Koichi [TD05-15] TuA1
[TD05-41] ThA1
Welles, Kenods [TD05-75] MP16
Won, Kitak [TD05-127] TuP26
Wu, Feipeng [TD05-63] MP4
Wu, Ping-Jung [TD05-109] TuP8
Wu, Qingyang [TD05-99] MP40
Wu, Yiqun [TD05-124] TuP23
[TD05-145] TuP44

X
Xu, Baoxi [TD05-121] TuP20
[TD05-125] TuP24
[TD05-139] TuP38
Xu, Xuewu [TD05-61] MP2
[TD05-65] MP6

Y
Yamada, Masahiro [TD05-20] TuB2
Yamada, Noboru [TD05-35] WB1
Yamagami, Tamotsu [TD05-20] TuB2
[TD05-43] ThA3
Yamamoto, Manabu [TD05-74] MP15
[TD05-103] TuP2
[TD05-117] TuP16
Yamasaki, Takeshi [TD05-18] TuA4
Yamatsu, Hisayuki [TD05-7] MB4
Yan, Junbing [TD05-138] TuP37

Yan, Mingming	[TD05-83] MP24
	[TD05-150] TuP49
Yanagisawa, Takuma	[TD05-4] MB2
Yang, Hyun-Seok	[TD05-93] MP34
	[TD05-107] TuP6
	[TD05-108] TuP7
	[TD05-130] TuP29
	[TD05-131] TuP30
Yang, Lee	[TD05-99] MP40
Yao, Timothy S.	[TD05-99] MP40
Yasuda, Nobuhiro	[TD05-35] WB1
Yatsui, Takashi	[TD05-33] WA4
Yeo, Junyeob	[TD05-126] TuP25
Yin, Xiaobo	[TD05-13] MC4
Yoo, Seung Hun	[TD05-134] TuP33
Yong, K. T.	[TD05-100] MP41
Yoon, Pilsang	[TD05-102] TuP1
	[TD05-106] TuP5
Yoon, Yong-Joong	[TD05-129] TuP28
	[TD05-133] TuP32
Yoshida, Shuhei	[TD05-74] MP15
Yu, Ye-Wei	[TD05-66] MP7
	[TD05-112] TuP11
Yuan, Gaoqiang	[TD05-142] TuP41
	[TD05-30] WA1
Yuan, Haibo	[TD05-89] MP30
	[TD05-150] TuP49
Yuan, HongXing	[TD05-125] TuP24
	[TD05-139] TuP38
Yuen, Yin	[TD05-13] MC4
Yukumoto, Tomomi	[TD05-18] TuA4

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Zakharian, Aramais R.	[TD05-31] WA2
Zha, Chaolin	[TD05-136] TuP35
Zhang, Buqing	[TD05-84] MP25
	[TD05-150] TuP49
Zhang, Jun	[TD05-139] TuP38
Zhang, Jun	[TD05-79] MP20
	[TD05-128] TuP27
Zhang, Qide	[TD05-139] TuP38
Zhang, Songhua	[TD05-91] MP32
	[TD05-97] MP38
	[TD05-98] MP39
Zhang, Zhuwei	[TD05-123] TuP22
Zhang, Zongzhi	[TD05-136] TuP35
Zhao, Hui	[TD05-16] TuA2
	[TD05-44] ThA4
	[TD05-45] ThA5
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Zheludev, Nikolay I.	[TD05-32] WA3
	[TD05-57] ThC5
Zhu, Yongguang	[TD05-90] MP31
Zou, Xiaoxin	[TD05-91] MP32
	[TD05-97] MP38
	[TD05-98] MP39

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Have all contact information (full names, affiliations, addresses, phone numbers, and emails) for your coauthors ready

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Presentations will be deleted from the conference room workstations at the end of each day as a security measure.

Guidelines for presenting using your Laptop

If you plan to use your personal laptop, please bring it to the conference room to confirm display compatibility with the supplied LCD projector. The LCD projectors have a native SXGA+ resolution 1400x1050 and accept standard VGA 15pin input.

Optional Audiovisual Equipment

Three weeks prior to the meeting SPIE will send an email or fax to all oral presenters giving information, and an optional audiovisual request form.

To assist you with your oral presentation requirements, SPIE needs to be notified of your optional audiovisual needs. Please send your optional audiovisual requests

prior to the deadline to assess availability of requested equipment and receive approval. Requests can be sent to AVStaff@SPIE.org

Audio - Video - Recording

Due to copyright restrictions, strictly no recordings of any kind are permitted without prior written consent of the presenter in any conference session, short course or posters session. Consent forms are available at the SPIE Registration Desk and anyone wishing to record must have a written consent form signed and filed for each presenter being recorded. Individuals not complying with this policy will be asked to leave a given session and asked to surrender their film or recording media.

Poster Presentation

Poster presentations provide an opportunity for papers to be presented in greater visual detail and should facilitate vivid discussions with interested attendees.

There will be two separate poster sessions from 2:00 to 3:30 pm on Monday and Tuesday. Please check the program for the exact date of specific presentations. Authors must remain in the vicinity of the poster board for the duration of the session to answer questions on their presentation day.

In order to ensure a high quality presentation, all poster materials must be in printed form (handwritten text will not be accepted). Note that poster papers are not supplied with any audiovisual equipment.

Poster Presentation Guidelines

Display Area

- 45 inches x 45 inches (114cm x 114cm). Push pins will be provided to hang your poster.

Your poster presentation should include:

- The paper title and all authors at the top of the poster.
- A brief introduction, goals, experimental detail, conclusions, and references (make sure this information is presented in a logical and clear sequence).
- Explanations for graphs, pictures, and tables.

Set Up

Poster authors may display their posters beginning at morning coffee break on the day of their presentation. Posters not displayed by the beginning of the poster session at 2:00 pm will be considered a no-show.

Removal

Posters must be removed at the end of the day after the oral sessions. Posters not removed by 7:00 pm will be considered unwanted and will be discarded.

Awards

The ISOM/ODS Awards will be presented to the best paper, the best student paper, the best academic paper and the best technical paper in the Award Ceremony during the Closing Remarks. Each of the best papers will receive a certificate and a prize.

Publication of Conference Papers

In addition to the Technical Digest available at the conference, conference papers will be published as a special issue of the Japanese Journal of Applied Physics (JJAP) in March, 2009. The authors who will have, by themselves, presented papers at ISOM/ODS'08 will be allowed and strongly encouraged to submit their papers for publication in this special issue.

Each author will be requested to download author's kits including an application form and a copyright form for the paper at http://www.isom.jp after the notification of acceptance. The deadline for submission of manuscripts is August 31, 2008. Submitted papers will be reviewed based on the JJAP standard.

Tabletop Exhibits

An informal exhibit of small tabletop displays featuring pertinent equipment, materials and literature will be held in conjunction with the conference. Ample time will be allowed for all attendees to visit the exhibits and speak with representatives from industry.

Exhibition Hours
Monday 14 July | 10 am to 12 pm; 1:30 to 5 pm
Tuesday 15 July | 10 am to 12 pm; 1:30 to 5 pm
Wednesday 16 July | 10 am to 12 pm

Exhibition Place
Queen's Ballroom

Become an Exhibitor
To become an Exhibitor, please access the ISOM/ODS'08 Exhibition Contract at http://spie.org/events/ods or contact:

Diane Cline
SPIE
PO Box 10, Bellingham, WA 98227-0010
Tel: +1-360-685-5462
Email: diane@spie.org

Welcome Reception

Join your colleagues at the welcome reception for refreshments and networking.

Date: Tuesday 15 July
Time: 7:00 PM - 8:30 PM

Registration

Conference Registration Fees

The registration fee includes admission to all technical sessions, the tabletop exhibit, one ticket to the Welcome Reception, refreshment breaks, and print and CD versions of the Technical Digest.

Member Type	Before/On 23 June 2008	After 23 June 2008
Regular Member (SPIE/IEEE/OSA/JSAP/ MSJ)	$580	$680
Regular Nonmember	$680	$780
Student Member (SPIE/IEEE/OSA/JSAP/ MSJ)	$220	$270
Student Nonmember	$270	$320

Short Course Registration Fees

Conference attendees can add courses, priced separately.

Member Type	Before/On 23 June 2008	After 23 June 2008
Member	$225	$275
Nonmember	$300	$350

How to Register

Online
Complete the online registration process at http://spie.org/events/ods and pay online by credit card.

Mail or Fax
Send your PDF registration form with check or credit card payment to:

SPIE
PO Box 10, Bellingham, WA 98227-0010
Tel: +1-360-676-3290

Fax: +1-360-647-1445
Email: customerservice@spie.org

Refund Policy for Registration

There is a $35 service charge for processing refunds. A letter requesting the refund should state the preregistrant's name and to whom the check should be made payable. Requests for preregistration must be received no later than 4pm PST, 3 July 2008. All registration fees will be forfeited after this date.

Hotel Reservation

A block of rooms at special conference rates has been reserved at the Hilton Waikoloa Village Hotel for conference attendees. The conference rates cannot be guaranteed after the room block has been filled and will not be honored after the cut-off date of June 12, 2008.

Hotel

Hilton Waikoloa Village Hotel
69-425 Waikoloa Beach Drive
Waikoloa, Hawaii 96738
Tel: +1-808-886-1234
Fax: +1-808-886-2900

Rates

Room Type	Rate
Golf Garden Mountain	$205
Partial Ocean	$255
Deluxe Ocean	$275
1-Bedrm Bay Suite	$295

* Single/Double + tax 11.41%
* STUDENT Rate: See below.

Important Considerations

- Highspeed Internet in guest rooms: $14.95 one day plan
- Cancellation Policy: Notify hotel at least 72 hours prior to arrival date to avoid a penalty fee.

- Early departure fee of $50 applies unless hotel is notified before or at check-in.

Make a Reservation

To secure a room reservation, requests must be received with a credit card guarantee or a check in the amount of the first night's room plus tax (11.41% tax is subject to change). Problems or delays with your payment may affect your hotel request.
Reservations can be made directly with the hotel. To make a Reservation online, please access http://spie.org/events/ods. To make a Reservation via Telephone, Fax or Mail, please use the PDF Hotel Reservation Form.

Student Reservations

A LIMITED block of rooms has been set aside for STUDENTS ONLY @$135 per night + tax per room, up to 4 persons per room. All student reservations must be made directly with SPIE - please email marilynT@spie.org or call +1-360-685-5461. Students CANNOT book via the web or with the hotel directly and obtain this rate. In order to book, students must provide a letter from their adviser as proof they are registered as full time students. This letter can be emailed to marilynT@spie.org or faxed Attention MarilynT to +1-360-647-1445. As well, students must show official Student Identification at check-in. All reservations must be guaranteed with a credit card at the time of booking. Although the cut-off date is June 12, 2008, you are advised to BOOK EARLY. These rooms will be filled very quickly.

Transportation

About Waikoloa

The Hilton Waikoloa Village presides majestically over 62 spectacular oceanfront acres along the sunny Kohala Coast of Hawaii's Big Island. Gracing the magnificent black shoreline like a plantation, the Hilton Waikoloa Village lets you experience breathtaking

tropical gardens, abundant wildlife, award-winning dining, world-class shopping, art and culture, and an array of activities ranging from golf and tennis to an interactive dolphin program and the Kohala Sports Club & Spa.
For more information about Waikoloa, visit their website at http://www.waikoloahi.com

Flying to Waikoloa

Hawaii's Big Island is served with daily direct flights into Kona International Airport. Major air carriers from Canada, the U.S. and Japan fly directly into Kona. All major carriers fly into Honolulu International Airport which is a mere 35-minute hop via an inter-island carriers to Kona.
Kona International Airport (KOA) is conveniently located 17 miles of Waikoloa.

Car Rental

Hertz Car Rental has been selected as the official car rental agency for this conference. To reserve a car, identify yourself as a conference attendee using the Hertz Meeting Code CV# 029B0011. Note: When booking from International Hertz locations, the CV # must be entered with the letters CV before the number, i.e. CV029B0011.

Hertz

- In the United States call 1-800-654-2240.
- In Canada call 1-800-263-0600, or 1-416-620-9620 in Toronto.
- In Europe and Asia call the nearest Hertz Reservation Center or travel agent.
- Outside of these areas call 1-405-749-4434.

Driving Directions to Hilton Waikoloa

When departing the Kona International Airport, turn left (north) onto the highway for approximately 20 minutes. At the first traffic light, turn left (Waikoloa Beach Drive). Follow drive approximately 2 miles, hotel entrance will be on the left.

Hilton Waikoloa Parking Information

- Self parking: $12 per day
- Valet parking: $19 per day

Shuttle and Taxi Service from the Airport

Please visit http://www.hiltonwaikoloavillage.com /services/transportation.asp.

Contact Us

For questions concerning ISOM/ODS'08, please contact:

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Conference Programs Coordinator
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Email: SandyH@spie.org

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