

ADVANCE PROGRAM



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WITH

The Institute of
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Optical Society of
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The International
Society for Optical
Engineering (SPIE)

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Engineers

The Japan Society of
Precision
Engineering

The Laser Society of
Japan

INTERNATIONAL SYMPOSIUM ON OPTICAL MEMORY 2007

PAN PACIFIC HOTEL
SINGAPORE
OCTOBER 21-25, 2007

SPONSORED BY

- The Japan Society of Applied Physics (JSAP)
- The Magnetics Society of Japan (MSJ)
- Optoelectronic Industry and Technology Development Association (OITDA)
- Data Storage Institute, Singapore (DSI)

DEADLINES:

Post-deadline Papers: August 22, 2007

Pre-registration: September 21, 2007

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

Symposium Schedule

Oct. 21 Sunday	Oct. 22 Monday	Oct. 23 Tuesday
9:00 – 16:30 Registration	Session Mo-A 8:30-9:10 Opening Remarks & Keynote	Session Tu-E 8:30-10:00 Drive Technologies
	Session Mo-B 9:10-10:00 Media	
	<i>10:00-10:30 Break</i>	<i>10:00-10:30 Break</i>
	10:30-11:50 Media	Session Tu-F 10:30-12:15 Components
	<i>11:50-13:20 Lunch</i>	<i>12.15-13.45 Lunch</i>
	Session Mo-C 13:20-15:35 Basic Theory and New World	Session Tu-G 13:45-15:50 High Density Recording II
13:30-15:00 Short Course I		
<i>15:00-15:30 Break</i>	<i>15:35-16:05 Break</i>	<i>15:50-18:00 City Tour</i>
15:30-17:00 Short Course II	Session Mo-D 16:05-18:10 High Density Recording I	<i>18:00-19:00 Transport to Orchard Hotel</i>
	<i>18:30- Cocktail Reception</i>	<i>19:00- DSI Anniversary Banquet</i>

<p style="text-align: center;">Oct. 24 Wednesday</p>	<p style="text-align: center;">Oct. 25 Thursday</p>
<p>Session We-H 8:30-10:00 Special Session: Hybrid Recording</p>	<p>Session Th-K 8:30-10:15 High Density Recording III</p>
<p><i>10:00-10:30 Break</i></p>	<p><i>10:15-10:45 Break</i></p>
<p>10:30-11:30 Hybrid Recording</p>	<p>10:45-11:45 High Density Recording III</p>
<p><i>11:30-13:00 Lunch</i></p>	<p><i>11:45-13:15 Lunch</i></p>
<p>Session We-I 13:00-14:45 Poster Session I</p>	<p>Session Th-L 13:15-14:15 Post-deadline</p>
<p><i>14:45-15:45 Break</i></p>	<p>14:15-14:35 Awards & Closing</p>
<p>Session We-J 15:45-17:30 Poster Session II</p>	<p>15:00- Technical Tour</p>
<p>18:00- Night Safari Tour</p>	

WELCOME TO ISOM'07

WELCOME STATEMENT FROM THE ORGANIZING COMMITTEE CHAIRPERSON

The 17th International Symposium
on Optical memory (ISOM'07)
will be held in Singapore
October 21-25, 2007.



It is our great pleasure to have the 17th International Symposium on Optical Memory (ISOM) meeting in Singapore. Since the first ISOM(SOM) meeting was held in 1985 in Tokyo, remarkable progresses on optical memory technologies and products have been made over 20 years. Total amount of optical drives and media shipments all over the world in 2006 were assumed to be 230M units and 12B pieces, respectively. Optical drives and media are now inevitable for our daily life. Major technologies supporting the current optical memory industry have been presented in the past ISOM meetings. The progress of the optical memory industry has been strongly supported by the progress of ISOM meetings.

Last year was the starting year of the third generation optical drives and media using blue laser diodes. Higher storage capacity and data rate will provide us with completely new surroundings for entertainment and information technologies. Cooperated with digital broadcasting, Internet and the large screen flat panel TV, a new digital entertainment world will be created. Research and development for the fourth generation optical memories have become more popular these few years. Last year ISOM Optical Memory Roadmap was reported and indicated the milestones and breakthrough technologies for the fourth generation optical memory. Holography, Multi-layer recording, Near-Field recording, and other high density recordings have been actively investigated as promising candidates for the fourth generation optical memories. Both third and fourth generation optical memories and even other technologies will be discussed in the coming ISOM'07 meeting. ISOM'07 meeting will be held on October 21st to 25th, 2007 at Pan Pacific Hotel in Singapore. Welcome to ISOM'07 meeting in Singapore and the ISOM Committees hope that all of you will enjoy the meeting.

Yoshito Tsunoda

Yoshito Tsunoda

Organizing Committee, Chairperson ISOM'07

INTRODUCTION

The 17th International Symposium on Optical Memory (ISOM) will be held from October 21-25, 2007 at Pan Pacific Hotel in Singapore. The purpose of the symposium is to provide a forum for information exchange on a broad range of topics covering science and technology in optical memories. In 2006, ISOM Optical Memory Roadmap final report highlighted the milestones and breakthroughs in next generation optical data storage research namely holographic recording, multi-layer recording, two-photon, Super-RENS and near-field technologies. The interface specifications between future technologies and elemental technologies were also discussed. Participants of ISOM'07 can look forward to the exciting developments of these future technologies. Theoretical studies, conceptual ideas for high density optical data storage technology and discussion on future directions in the field of optical data storage are encouraged.

The symposium venue, Pan Pacific Hotel, is centrally located in the heart of the city overlooking the magnificent views of the city skyline and harbour. At close proximity are the Esplanade, Orchard Road and Boat Quay. Esplanade is Singapore's main performing arts centre for plays and musicals. Orchard Road is Singapore premier and buzzing shopping district. Boat Quay's which is along Singapore River is popular for its night entertainment. There are other sightseeing places in Singapore such as beautiful Sentosa island, thrilling Night Safari, and iconic Merlion Park.

SCOPE OF THE SYMPOSIUM

ISOM'07 will discuss the current status of optical memory system design and applications, together with new developments in the areas of media, lasers, basic theory including computer simulation, system sub-components, and a range of future technologies. In ISOM'07 a new topic "Hybrid Recording" is added to High Density Recording. In addition to ordinary contributed papers, a number of invited papers will be presented. Topics to be covered in this symposium include, but are not restricted to:

1. Basic Theory

- Diffraction, Polarization
- Analysis of Mark Formation

- Computer Simulation
- Near-Field Optics
- Structure Analysis

2. Media

- Rewritable, Write-Once, Read-Only Media
- Characterization, Recording and Readout Mechanisms
- Manufacturing Technology
- Substrates, Mastering
- Super Resolution Media
- Photochromic and Photorefractive Materials, Other Materials
- Tribology

3. Drive Technologies

- Drive Integration
- Drive Optics, Mechanics and Electronics Design
- Servo and Accessing Methods
- Read Write Channels, Error Correction
- Modulation Code
- Copy Protection

4. Components

- Optical Heads, Actuators, MEMS Fabrication
- Lenses, Diffractive Optics, Detectors
- Light Sources
- Integrated Optical Heads and Components
- Modulators, Image Sensors

5. Testing Methods and Devices

- Testing and Evaluation Methods for Drives, Media and Components
- Drive Testers, Media Testers

6. Optical Storage Systems and Applications

- Rewritable, Write-Once, Read-Only, Partial-ROM Systems
- Archival Applications, System Applications, Security Systems
- Mobile Applications

7. High Density Recording

- Holography
- Volumetric Storage, Multi Layer Recording
- Scanning Probe and Near-Field Recording
- Multiwavelength Recording and Bistable Devices
- Multi Level Recording
- Hybrid Recording
- Other Future Technologies

8. New World – Other Future Science and Technology Available to Information Storage

REGISTRATION

Advance Registration

The symposium registration information and form can be obtained from the ISOM website (<http://www.isom.jp/>).

Hotel Reservations

Hotel reservation forms can be obtained from the ISOM website.

On-Site Registration

The registration desk will be located at the Pacific Ballroom Entrance and is opened from Sunday to Wednesday during the following hours.

Oct 21:	9:00 – 16:30
Oct 22:	8:00 – 16:30
Oct 23:	8:00 – 15:30
Oct 24:	8:00 – 15:30

Speaker and Presider Check-In

All speakers and presidors are requested to check in at the session registration desk (SRD) which will be located at the Pacific Ballroom Entrance.

Registration Fees

Type	Before / On Sep 21, 2007	After Sep 21, 2007
Regular (Oct 22 – 25)	SGD\$800	SGD\$960
Student (Oct 22 – 25)	SGD\$240	SGD\$320
Short Courses (Oct 21)	SGD\$160	SGD\$240

The registration fee for the symposium includes admission to all the technical sessions, and a copy of the technical digest. For those who register under Student type, the registration fee only includes the admission to all technical sessions. For those who register only for the short courses, the registration fee only includes the admission to the short courses.

Registration and Payment

Those who wish to attend ISOM'07 should access the ISOM website (<http://www.isom.jp/>), where the procedure of the registration is described. Advance registration is highly recommended. You can register by submitting the registration form via e-mail or facsimile. Registration before or on September

21 will enjoy a lower registration fee and the registration website will be opened until October 12. After October 12, registration has to be done on-site during the conference.

All rates quoted are in Singapore Dollars, and are **inclusive of 7% Goods and Services Tax**. Credit cards such as VISA and Master Card are accepted. All banking charges will be borne by the participants. No personal check will be accepted.

On-site payment should be made in Singapore dollars only, either by credit cards or by cash.

Registration Cancellation

For cancellation of registration, please e-mail or fax your cancellation request to ISOM07@dsi.a-star.edu.sg. The amount of fee to be refunded will be subjected to an administration charge of SGD\$200. No refund shall be given for cancellation of short courses and/or optional tour(s). No cancellations will be accepted after **October 12, 2007**. All registrations and/or cancellations are based on Singapore date and time.

INSTRUCTION FOR SPEAKERS

ORAL PRESENTATIONS

- Time assigned for:

Type	Total	Presentation	Discussion
Keynote	(30 min)	30 min	---
Invited	(25 min)	20 min	5 min
Contributed	(20 min)	15 min	5 min

- Speakers are requested to report themselves to the Session Registration Desk (SRD) at least 30 min before their session starts. The SRD will be located at the Pan Pacific Ballroom Entrance.
- All speakers are requested to get in touch with the presider 15 min before their session starts.
- The conference room will contain an LCD projector, a laptop, a podium microphone, a screen and a laser pointer. Speakers may use their own laptop. Please note that conference room

equipment will not include a 35 mm slide projector or an overhead projector.

- If speakers use their own laptop, they will be requested to confirm its connection with the projector in the conference room during break time or in the morning. We recommend all speakers to have this check the day before their presentation.
- If speakers don't use their own laptop, they are requested to upload their presentation materials in a USB memory at the podium at least one hour prior to their presentation.
- We recommend all speakers to use more than 16-point font. The audience expects well-prepared presentations with clearly visible figures and captions, as well as a good conclusion.

POSTER PRESENTATIONS

Your session code will be indicated on the panel board. You will be provided with the material to mount your poster onto the board.

- Each author is provided with a 120 cm high x 150 cm wide poster space on which a summary of the paper is to be displayed on the board.
- All authors are requested to affix their posters on the day of the poster session. The time is as follows: from 12:30-13:00 (POSTER SESSION I) and from 15:15 – 15:45 (POSTER SESSION II). Posters are to be removed immediately after the session ends.
- Authors must remain in the vicinity of the poster board at least for the duration of the assigned session (1 hr 45 min). The papers are divided into two sessions: POSTER SESSION I (13:00 – 14:45) and POSTER SESSION II (15:45 – 17:30).
- The session presiders will check all authors during the assigned session time.

Any papers which are not presented during the Oral or Poster session will be regarded as “CANCELLED”.

POST-DEADLINE PAPERS

A limited number of papers will be accepted for presentation of significant results obtained after the deadline. A delegated author has to fill in the paper submission form including a 35-word abstract following the instruction for submission at the ISOM website (<http://www.isom.jp/>), and then a 2-page PDF summary should be submitted through the website. ISOM web submission service does not accept any PDF file including 2-byte characters (for example, Japanese, Chinese and Korean characters). The local fonts should be removed from the text body and figures before submission.

- **Submission Website is open from August 1 to August 22, 2007.**

Authors will be notified about the middle of September 2007 whether their papers are accepted. The best four post-deadline papers are allowed as oral presentations in the final session. Other post-deadline papers (but limited numbers) will be presented in the poster session.

PUBLICATION OF SYMPOSIUM PAPERS

In addition to the Technical Digest available at the conference, the conference papers will be published as a special issue of the Japanese Journal of Applied Physics (JJAP) in July, 2008. The authors who will have, by themselves, presented papers at ISOM'07 will be allowed and strongly encouraged to submit their papers for publication in this special issue. The authors will be requested to download author's kits including an application form and a copyright form for the paper at the ISOM website ([http://www.isom.jp.](http://www.isom.jp/)) The deadline for submission of manuscripts is November 30, 2007. Submitted papers will be reviewed based on the JJAP standard. .

Cancelled papers because of no presentation will NOT be submitted for publication in the JJAP special issue. .

SPECIAL PROGRAM

1) Short Courses

Short Courses (SC I & II) are offered during the first day of the conference and is targeted to expand your knowledge with

technical information on the current state of research and developments in optical memories.

Pre-registration using the online registration form can be done together with the conference registration. The procedures for conference registration are available on the ISOM website (<http://www.isom.jp/>). On-site registration is only available subjected to the vacancies. You are advised to pre-register due to limited class size.

Date & Time: Sunday, October 21 13:30-17:00
Place: Pan Pacific Hotel, Pacific Ballroom 1,
Level 1
Fee: Before 21 September
SGD\$160 (for regular or student)
After 21 September
SGD\$240 (for regular or student)
Language: English

SCI 13:30 - 15:00

Volumetric Multilayered Optical Memory for High Density Data Storage

Prof. Yoshimasa Kawata (Shizuoka University, Japan)

Abstract

Recent progress on volumetric optical data storage for terabyte data storage is reviewed. Optical systems for volumetric storage, highly sensitive materials, and the comparison with other techniques are presented.

Instructor Biography

Professor Kawata received his Ph.D. from Department of Applied Physics, Osaka University in 1992 and is a professor of Department of Mechanical Engineering, Shizuoka University. His research is in nonlinear optical microscopy, three-dimensional optics, photo-fabrications, and two-photon optical memories.

15:00 - 15:30 Coffee Break

SCII 15:30 - 17:00

Optical Pick-up and Key Components for Optical Memory

Shuichi Ichiura (Sanyo, Japan)

Abstract

Optical pick-up is key device for optical memory. Current trends and future development of optical pick-ups, optical components such as semiconductor laser and objective lens and other key components will be presented.

Instructor Biography

Dr. Ichiura joined SANYO Electric Co., Ltd. in 1981. From 1990, he belonged to the R&D H.Q and was involved in the research and development of high density optical disk and optical pick-up. From 2007, he is engaged in the commercialization of optical pick-ups at Optical Device Division.

2) Social Programs

▪ Cocktail Reception

All regular and student are invited to the Cocktail Reception.

Date & Time: Monday, October 22 18:30-
Place: Pan Pacific Hotel, Foyer and
Pacific Ballroom 1, Level 1
Fee: Free

▪ DSI Anniversary Banquet

All regular and students are invited to the Banquet. Transport will leave from Pan Pacific Hotel for Orchard Hotel at 18:00.

Date & Time: Tuesday, October 23 19:00-
Place: Orchard Hotel
Fee: Free for all of registered regular and students.
Registered partner will have to pay SGD\$100.

3) Technical Exhibition

Technical Exhibition is organized. The optical disc drives, media, components and application software from the leading companies and laboratories will be presented.

Date & Time: Monday, October 22 09:00-16:30
Tuesday, October 23 09:00-16:30
Wednesday, October 24 09:00-16:30
Thursday, October 25 09:00-14:00
Place: Pan Pacific Hotel,
Foyer, Level 1

4) Technical Tour to Data Storage Institute

An hour guided tour to Data Storage Institute, Singapore is arranged for ISOM'07 participants. The tour will cover an introduction to Data Storage Institute and a tour of the laboratories. All regular and students are to indicate their attendance during registration. On-site registration is subjected to vacancy.

Date & Time: Thursday, October 25 15:00-17:00
Place: Data Storage Institute
Fee: Free

Two-way transport is arranged for all participants. Transport will leave for Data Storage Institute from Pan Pacific Hotel at approximately 15:00. Please see ISOM website for more information.

5) City Tour

An orientation tour of various tourist attractions around Singapore is arranged for all ISOM'07 participants and their partners. It begins with a tour to the Padang, Cricket Club, historic Parliament House, Supreme Court and City Hall.

There will be a stop over at the Merlion Park for great views of the Marina Bay and a perfect picture-taking opportunity with the Merlion, a mythological creature that is part lion and part fish.

There will also be a visit Thian Hock Keng Temple, one of Singapore's oldest Buddhist-Taoist temples, before coming to the end of the journey by driving past Chinatown.

Date & Time: Tuesday, October 23 15:50-18:00
Pickup Place: Pan Pacific Hotel
Fee: SGD\$35 / Person

6) Night Safari Tour

The world's first Night Safari, set in 40 hectares of secondary jungle, will unfold the mystery and drama of the topical jungle after dusk with stunning effects.

The participants will roam the jungle in the complete safety and comfort of a Tram which takes you through the East and West Loop. Pass by a large reservoir and weave through selected habitats designed specifically to replicate the natural environment from the Himalayan Foothills to the southeast Asian Rainforest and Indian Subcontinent. This special program is opened to all ISOM'07 participants and their partners.

Date & Time: Wednesday, October 24 18:00 onwards
Pickup Place: Pan Pacific Hotel
Fee: SGD\$85 / Person (Inclusive of dinner)

The technical tour, city tour and night safari tour is subjected to a minimum participation of 30 people.

HOTEL ACCOMMODATIONS

A block of rooms has been reserved by Pan Pacific Hotel (<http://singapore.panpacific.com/>) for the convenience of the participants. The rooms are to be reserved on first-come first-served basis.

Those who wish to make hotel reservations should access the ISOM website (<http://www.isom.jp>), where the hotel reservation forms can be downloaded. Early reservation is highly recommended and no later than Sep 21 because of the high occupancy rate during the Symposium period. The hotels' reservation deadline is on **Oct 1, 2007**.

Hotel Name	Type	Rate SGDS	Single/Twin	Smoking/Non-smoking	Internet Facilities
Pan Pacific Singapore Conference Hotel	Deluxe Room	250+++	Single/Twin	Non-smoking	Available
	Deluxe Balcony Room	280+++	Single/Twin	Smoking/Non-smoking	
Marina Mandarin Singapore 5 mins from conference site	Deluxe Room	250+++	Single/Twin	Smoking/Non-smoking	Available
Carlton Hotel, Singapore 15 mins from conference site	Deluxe Room	215+++	Single/Twin	Smoking/Non-smoking	Available
Peninsula Excelsior Singapore 20 mins from conference site	Deluxe Room	150+++	Single/Twin	Smoking/Non-smoking	Available

- (+++) refers to additional charges imposed by the hotel such as 7% government tax and any prevailing hotel service charge.

- Reservation of hotel room must be made directly with the hotel through e-mail or facsimile.
- Breakfast is not included but can be requested from the hotel.

Payment

Payment must be completed in Singapore Dollars when you make reservations by credit card. (For details, refer to hotel reservation forms)

Hotel Cancellations

Cancellation must be made directly to the hotel. In case of cancellation of hotel reservation, the cancellation charge will be borne by the participants (please refer to the hotel reservation forms for the hotels' terms & conditions).

GENERAL INFORMATION

1) Official Language

The official language of ISOM'07 is English.

2) Message Board

Official Information Board and Message Board will be set near the Registration Desk. Message will be taken during registration hours on Sunday through Wednesday and posted on the Message Board. Please check the bulletin board daily to receive your messages. Messages for participants at the meeting should be directed to ISOM'07 Registration Desk.

3) VISA Requirement

You may be requested to show your visas upon entry to Singapore. Please check with your government agency.

4) Lunches

Lunches will be served by the ISOM'07 Pan Pacific Hotel Ballroom 2.

5) Others

Attendees will have access to limited free Internet service during the week of the Symposium in the conference site. To receive further information about ISOM'07, please refer to ISOM website.

ATTENTION

PHOTO TAKING AND VIDEO OF ANY PRESENTATION MATERIALS ARE NOT ALLOWED DURING ISOM'07.

TECHNICAL PROGRAM

October 22, 2007 (Monday)

Opening and Keynote Session (8:30-9:10)

Presiders : H. Tokumaru (NHK, Japan)

Program Committee, Chairperson

Mo-A-01

(8:30) Opening Remarks

Y. Tsunoda (Hitachi Maxell, Japan)

Organizing Committee, Chairperson

Mo-A-02 (Keynote)

(8:40) The Status, Challenges and Future Trends of Data Storage Technologies

T. C. Chong (DSI, Singapore)

The status, challenges and future trends of current mainstream data storage technologies including optical-storage, magnetic-storage, solid state memory, and network-storage are reviewed and explored. Possible solutions after these technologies reach their physical limitations are discussed.

Media (9:10-11:50)

Presiders : C. Davies (Plasmon Data Systems, UK)

R. Tamura (Hitachi Maxell, Japan)

Mo-B-01 (Invited)

(9:10) Highly Sensitive Two-photon Absorption Recording Materials for Volumetric Optical Data Storage Media

M. Akiba, H. Takizawa, Y. Inagaki (Fujifilm, Japan)

Novel materials for two-photon absorption (TPA) three-dimensional optical data storage media have been developed based on our new material design concept. A molecular design strategy for obtaining sensitive TPA dyes will also be discussed.

Mo-B-02 (Invited)

(9:35) Low Threshold Photothermal Recording of Phase-change Media Doped with Metallic Nanorods

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

In this paper, we demonstrate the photothermal recording and priming of phase change optical recording media ($\text{Ge}_2\text{Sb}_2\text{Te}_5$) doped with gold NRs and show that the recording efficiency can be greatly improved.

Coffee Break (10:00-10:30)

Mo-B-03

(10:30) Bit-Error-Rate Based Evaluation of Energy-Gap-Induced Super-Resolution (EG-SR) ROM Disc in Blu-ray Disc Optics

H. Tajima, H. Yamada, T. Hayashi, M. Yamamoto, Y. Harada, G. Mori, J. Akiyama, S. Maeda, Y. Murakami, A. Takahashi (Sharp, Japan)

We evaluated super-resolution readout characteristics of an EG-SR ROM disc in 40 GB capacity disc conditions. It was confirmed that the readout power margin was about ± 1 mW in bER characteristics with PR(12221)ML method.

Mo-B-04

(10:50) Super-Resolution ROM Disc with a Semi-Conductive InSb Active Layer

B. Hyot, F. Laulagnet, O. Lemonnier, A. Fargeix (CEA Léti, MINATEC, France)

Using InSb material as a readout layer, we have achieved bER of $2 \cdot 10^{-3}$ level at 46 GB on pre-recorded super-resolution disk. The readout stability of the medium is more than 10^4 cycles.

Mo-B-05

(11:10) Readout Mechanism by Local Thermal Expansion in Super-resolution Optical Disks

J. M. Li, L. P. Shi, X. S. Miao, J. Y. Sze, W. D. Song, H. X. Yang, K. G. Lim, T. C. Chong (DSI, Singapore)

The paper proposes the readout mechanism by local thermal expansion in super-resolution optical disks. Through simulations and experiments, this readout mechanism is able to explain the super-resolution effect in all kinds of optical disks.

Mo-B-06

(11:30) Thermo-optical Origins of the Super-Resolution Effect: Real-time Characterization of the Huge and Reversible Optical Nonlinearity of InSb

J. Pichon, M. -F. Armand*, F. Laulagnet*, B. Hyot*

(MPO International, France, *CEA Léti, MINATEC, France)

We report a real-time characterization of the incredibly huge and reversible optical nonlinearity of InSb which makes possible the obtention of a bit error rate of $2 \cdot 10^{-3}$ from random sequences of Super-Resolution BD ROM disks.

Lunch (11:50-13:20)

Basic Theory & New World (13:20-15:35)

Presiders : D. P. Tsai (Nat'l Chiao Tung Univ., R. O. C.)

N. Yamada (Matsushita, Japan)

Mo-C-01 (Invited)

(13:20) Designing New Phase Change Materials by Quantum Computations and Experiments

M. Wuttig (RWTH Aachen, Germany)

A small group of covalent semiconductors with octahedral coordination encompasses high optical and electrical contrast and fast crystallization kinetics which characterize phase change materials. The origin of this behaviour will be explained by advanced computations and various experiments.

Mo-C-02 (Invited)

(13:45) The Role of Ge Switch in Phase Transition - An Approach Using Atomically Controlled [GeTe/Sb₂Te₃] Superlattice

J. Tominaga, T. Shima, P. Fons, A. Kolobov,

L. P. Shi*, R. Zhao*, T. C. Chong*

(AIST, Japan, *DSI, Singapore)

We analyze "melting" due to Ge-switching in the phase transition of GeSbTe based on thermochemistry, and discuss the mechanism on the point of view of interface diffusion from atomically controlled superlattices of [GeTe/Sb₂Te₃]_n.

Mo-C-03

(14:10) Readout Signals Enhancements of Subwavelength Recording Marks via Random Nanostructures

T. C. Chu, W. -C. Liu*, D. P. Tsai**, Y. Kawata

(Shizuoka Univ., Japan, *Nat'l Taiwan Normal Univ., R. O. C., **Nat'l Taiwan Univ., R. O. C.)

The readout waveform of near-field optical disks with random nanoapertures are derived analytically by

angular spectrum representations. Averaged readout waveforms show that signals beyond diffraction limits can be retrieved by random nanoapertures.

Mo-C-04

(14:30) XAFS and HX-PES Analysis of Phase-Change Recording Material Using Actual Media

T. Nakai, M. Yoshiki, Y. Satoh, S. Ashida
(Toshiba, Japan)

The influence of the interface layer to the local atomic arrangement, electrical and chemical structure of a phase-change material, GeBiTe, was investigated using both XAFS and HX-PES method on the actual rewritable HD DVD media.

Mo-C-05 (Invited)

(14:50) Ultimate Memory Capacity of Phase-change Recordings

K. Tanaka (Hokkaido Univ., Japan)

The minimal mark size of phase-change recordings has been investigated using electrical scanning probe microscopy. Interestingly, both amorphous and crystalline marks in crystalline and amorphous Ge₂Sb₂Te₅ films have minimal sizes of ~10 nm in diameter. The size may be available in future PRAMs.

Mo-C-06

(15:15) Developing a Platform for Detecting Bio-molecules

S. C. B. Gopinath, T. Arai, H. Mizuno, P. K. R. Kumar, K. Awazu, J. Tominaga (AIST, Japan)

Using biological molecules such as DNA, RNA and Protein a novel detecting biosensor was envisioned. The attached bio-molecules on multilayered structure of Bio-DVD were detected based on reflection intensity as the new detection platform.

Coffee Break (15:35-16:05)

High Density Recording -I (16:05-18:10)

**Presiders : T. Shimura (The Univ. of Tokyo, Japan)
S. Yagi (NTT, Japan)**

Mo-D-01 (Invited)

(16:05) Recording Capacity Enhancement of Micro-reflector Recording

T. Horigome, K. Saito, H. Miyamoto, K. Hayashi, G. Fujita, H. Yamatsu, N. Tanabe, S. Kobayashi,

T. Kudo, H. Uchiyama (Sony, Japan)

We have proposed Micro-reflector recording which can achieve large storage capacity at low cost by virtual-multilayer in a bulk medium. In this paper, we will present our recent progresses focusing on recording capacity.

Mo-D-02

(16:30) Linear Reproduction of a Holographic Storage Channel Using Coherent Addition of Optical DC Components

M. Hara, K. Tanaka, K. Tokuyama, M. Toishi, K. Hirooka, A. Fukumoto, K. Watanabe (Sony, Japan)

A holographic storage channel is normally a nonlinear channel. However, using coherent addition of DC components in the reproduction process and calculating the square root of intensity, we can retrieve a linearly reproduced signal.

Mo-D-03

(16:50) High Density Recording of 270 Gbits/inch² in a Coaxial Holographic Storage System

K. Tanaka, H. Mori, M. Hara, K. Hirooka, A. Fukumoto, K. Watanabe (Sony, Japan)

We employ a high NA (0.85) and high data capacity (135 Kbits) optical setup into our coaxial holographic storage system. We experimentally evaluate the multiplexed recording performance, achieving the raw data density of 270 Gbits/inch².

Mo-D-04

(17:10) Two-Dimensional Clock Extraction Method for Data Pixel Synchronization in Holographic Data Storage

K. Hirooka, M. Hara, K. Tanaka, S. Seko, A. Fukumoto, K. Watanabe (Sony, Japan)

A robust method to determine the position of data pixel in a reproduced image is presented for holographic data storage. This uses the whole edge information in a page, regardless of sync or user data.

Mo-D-05

(17:30) Two-dimensional Analysis of Simulation for Holographic Data Storage Medium Considering Monomer Diffusion and Non-local Polymerization

M. Toishi, T. Takeda, K. Tanaka, T. Tanaka, A. Fukumoto, K. Watanabe (Sony, Japan)

We propose a new analysis model for photopolymer recording processes and calculate two-dimensional refractive index distribution of the multiplexed holograms. The time response of the multiplexed hologram recording process in the photopolymer can be estimated.

Mo-D-06

(17:50) A New Organic/Inorganic-Hybrid Photoreactive Material for Holographic Data Storage Media

N. Hayashida, A. Kosuda, J. Yoshinari (TDK, Japan)

A new photopolymer for holographic data storage was developed. We used organically modified-metal oxide as a matrix, in which photoreactive monomer was dispersed. Due to hybrid-like composition, high refractive index modulation and M/# were attained.

Cocktail Reception (18:30-)

October 23, 2007 (Tuesday)

Drive Technologies (8:30-10:00)

Presiders : C. D. Wright (Univ. of Exeter , UK)

H. Miyamoto (Hitachi, Japan)

Tu-E-01 (Invited)

(8:30) Tera Byte Optical Data Storage Demonstration of Advanced SVOD (Stacked Volumetric Optical Disks)

A. Inaba, H. Ido, H. Kishi, H. Yamanaka, S. Osawa, M. Tani, T. Uchida, Y. Watanabe, S. Arai, M. Yoshihiro, T. Iida, H. Awano, N. Ota, T. Yoshida*, Y. Abe*, K. Yoshida* (Hitachi Maxell, Japan, *Hitachi, Japan)

In the SVOD (Stacked Volumetric Optical Disks) system, the results of several kinds of feasibility test will be shown.

Tu-E-02 (Invited)

(8:55) Servo Technologies in a Near-field Optical Disk Drive System

T. Ishimoto, S. M. Kim, K. Saito, T. Kondo, N. Ariyoshi, O. Kawakubo (Sony, Japan)

We have developed a near-field optical disc drive system (NFDD) with a solid immersion lens. Nano-control technologies are essential to the NFDD. The servo technologies to realize the stable near-field operation are introduced and their effects are discussed.

Tu-E-03

(9:20) High-Speed Recording up to 15000 rpm Using Thin Optical Disk

D. Koide, Y. Takano, H. Tokumaru, N. Onagi*, Y. Aman*, S. Murata*, Y. Sugimoto*, K. Ohishi** (NHK, Japan, *Ricoh, Japan, **Nagaoka Univ. of Tech., Japan)

We successfully developed a ZPET-FF tracking servo at 15000 rpm and recorded 252 Mbps data on a thin optical disk. These results enable broadcast-use VCR video signals to be recorded over the whole disk area.

Tu-E-04

(9:40) Analysis of Disturbance on DPP Tracking with Dual Layer Disc

M. Itonaga, H. Eguchi, K. Sakurauchi, T. Saito (Victor, Japan)

Disturbance of DPP tracking with dual layer disc is the most severe problem for stable read back. Our analysis reveal that combination of disc conditions and optical layout causes the disturbance.

Coffee Break (10:00-10:30)

Components (10:30-12:15)

**Presiders : T. Milster (Univ. of Arizona, USA)
M. Itonaga (JVC, Japan)**

Tu-F-01 (Invited)

(10:30) Magneto-optic Spatial Light Modulators for Collinear Holography

M. Inoue (Toyohashi Univ. of Tech., Japan)

Owing to their high speed operation, magneto-optic spatial light modulators (MOSLMs) are attractive SLMs for collinear holographic memories. In this talk, various types of MOSLMs for modulating intensity or phase of light in a pixel image are introduced mainly based upon our works.

Tu-F-02

(10:55) Optical Head Using Single Objective Lens for BD, HD DVD, DVD and CD

R. Katayama, Y. Komatsu (NEC, Japan)

A relay lens unit for correcting the spherical aberration and a functional and wavelength-selective aperture for controlling the numerical aperture have realized a single-objective-lens optical head design which is suitable for high-speed recording and reading.

Tu-F-03

(11:15) Applying Liquid Crystal Panel for SA Compensation in NFR Multi-layer System.

J. Y. Lee, S. N. Hong, Y. S. Shin, K. T. Lee, K. W. Park, J. K. Seo, I. H. Choi, E. S. Ko, B. H. Min
(LG Electronics, Korea)

We applied liquid crystal panel (LCP) to compensate SA induced by inter-layer jumping in multi-layer gap servo NFR system.

Tu-F-04

(11:35) Design of a Catadioptric Lens with Servo Optical Mechanism in a Holographic Recording System

Y. S. Lan, W. -H. Cheng, P. -J. Wu, C. -M. Lin,
T. -R. Jeng (ITRI, R.O. C.)

A new holographic storage system has a servo mechanism, which uses the central area of the Cassegrain-like lens that is completely achromatic and Dc gain-diminished.

Tu-F-05

(11:55) Compact and High-power Mode-locked Fiber Laser for Three-Dimensional Optical Memory

M. Tsuji, N. Nishizawa*, Y. Kawata

(Shizuoka Univ., Japan, *Osaka Univ., Japan)

We have developed the compact and high-power fiber ring laser. The fiber laser is very promising as a light source for three-dimensional optical memory.

Lunch (12:15-13:45)

High Density Recording -II (13:45-15:50)

Presiders : I. Park (Samsung, Korea)

T. Kikukawa (TDK, Japan)

Tu-G-01 (Invited)

(13:45) Three-dimensional Multilayered Fluorescent Optical Disk

T. Tanaka, S. Kawata (Riken, Japan)

A novel recording medium for three-dimensional multi-layered memory is proposed. 3D structured multilayered disk and the dynamic properties of the two-photon induced bit recording and confocal fluorescent reading are also presented.

Tu-G-02

(14:10) Interlayer Crosstalk Reduced Multilayer Disk with Wide Fabrication Margin

A. Hirotsune, J. Ushiyama, Y. Miyauchi*, N. Endo*,

T. Shintani, T. Kurokawa, T. Sugiyama*, Y. Anzai,

H. Miyamoto (Hitachi, Japan, *Hitachi Maxell, Japan)

Interlayer crosstalk reduction method by controlling backward reflectivity of information layers was proposed. Suppression of influence of ghost spot was confirmed even for the disks designed with the same spacer layer thickness.

Tu-G-03

(14:30) Perspectives of Normal-Resolution Cross-Talk Cancellation to Reduce Random Data Bit Error Rate in Super-Resolution Readout

T. Shintani, S. Eto, H. Minemura, Y. Anzai

(Hitachi, Japan)

The concept, the importance, and the schemes of Normal-Resolution Cross-Talk Cancellation techniques are explained. Their effects, roles and perspectives to achieve the data capacity of 500 GB/disc are discussed.

Tu-G-04

(14:50) Dynamic Two-Photon Recording and Readout of Over 100 Layers of Data

O. M. Alpert, A. N. Shipway, Y. Takatani, K. Nakao, O. Eytan, D. Leigh, M. Arise (Mempile, Israel)

Over 100 randomly accessed data layers were recorded at 6 m/s and read at 12 m/s on Mempile TeraDisc™. A servo based testing platform showed layer independent CNR, demonstrating the commercial potential of the system.

Tu-G-05

(15:10) Super-Resolution Readout in Near-Field Optical System

J. K. Lee, A. S. Jeong, J. H. Shin, M. D. Ro, J. H. Kim, K. G. Lee, J. G. Kim*, N. C. Park*, Y. P. Park*

(Samsung Electronics, Korea, *Yonsei Univ., Korea)

We investigated the feasibility of NFSR by confirming the CNR threshold phenomenon according to readout power at wavelength 405nm (NA 1.84) with pit length 37.5nm ROM disc, which is below resolution limit 55nm.

Tu-G-06

(15:30) Recording Characteristics of an Advanced SIL System of High NA for the Near Field Optical Storage with Cover Layer Media

J. U. Lee, Y. S. Shin, G. Kim, I. G. Han, J. K. Seo, I. H. Choi, B. H. Min (LG Electronics, Korea)

We report the results of recording experiment to a BD-like ewritable disc using the advanced OL-SIL assembly to reach a disc capacity of over 500GB on removable media in a practical optical system.

City Tour (15:50-18:00)

Bauquet and DSI 15th Anniversary (19:00-)

October 24, 2007 (Wednesday)

Special Session : Hybrid Recording (8:30-11:30)

Presiders : T. C. Chong (DSI, Singapore)

K. Ueyanagi (JST, Japan)

We-H-01 (Invited)

(8:30) Review of Heat Assisted Magnetic Recording (HAMR)

M. H. Kryder (Carnegie Mellon Univ., USA)

Progress toward developing a Heat Assisted Magnetic Recording (HAMR) system that can extend the areal density of hard disk drives by a factor of 5-10 beyond that achievable with perpendicular recording will be reviewed.

We-H-02 (Invited)

(8:55) Hybrid Recording on Bit-patterned Media by Using a Near-field Optical Head

T. Nishida, T. Matsumoto, F. Akagi, H. Hieda*, A. Kikitsu*, K. Naito*, T. Koda**, N. Nishida***, H. Hatano***, M. Hirata[†] (Hitachi, Japan, *Toshiba, Japan, **Hitachi Maxell, Japan, ***Konica Minolta Opto, Japan, [†]Seiko Instruments, Japan)

Near-field optical hybrid recording on Co/Pd-multilayer bit-patterned media was achieved with beaked plasmon-probe. Magnetization of single dots in 20-nm-diameter and 30-nm-period nanodots was confirmed. Light delivery using solid-immersion optics or optical fiber was also demonstrated.

We-H-03

(9:20) Lens-less Surface Plasmon Head with 1Tbit/inch² Recording Density

T. Watanabe, K. Hongo (Sony, Japan)

We present the new surface plasmons head for magneto-optical hybrid recording. The head structure to achieve areal density of over 1Tb/in² and to put the head on a pico-slider without a lens is reported.

We-H-04

(9:40) Thermally Assisted Magnetic Recording on a Bit-patterned Magnetic Medium Using a Near-field Optical Head with a Beaked Metallic Plate

T. Matsumoto, K. Nakamura, T. Nishida, H. Hieda*, A. Kikitsu*, K. Naito*, T. Koda** (Hitachi, Japan, *Toshiba, Japan, **Hitachi Maxell, Japan)

A near-field optical head with a beaked metallic plate was used to write marks on a Co/Pd multilayer patterned medium, and magnetizations of the single dots with a diameter of 20-25 nm were selectively reversed.

Coffee Break (10:00-10:30)

We-H-05

(10:30) An Integrated Recording Head for Heat Assisted Magnetic Recording

E. C. Gage, W. A. Challener, N. J. Gokemeijer,
G. P. Ju, B. Lu, K. Pelhos, C. B. Peng, R. E. Rottmayer,
X. M. Yang, H. Zhou, T. Rausch, M. A. Seigler
(Seagate Technology, USA)

Heat Assisted Magnetic Recording offers a new degree of freedom, write temperature that holds the promise of extending the areal density of magnetic data storage. An exemplary complete HAMR data storage system will be discussed

We-H-06

(10:50) Fabrication of Planar Type Probe Array for Near-field Optical Memory by Using the New Interferometric Exposure Technique

H. Fukuda, T. Yamaguchi, J. Takahashi, K. Yokomori
(Ricoh, Japan)

We proposed the new probe fabrication technique to form a planar type near-field optical probe array by using an exposure method that is named “Interferometric exposure method”.

We-H-07

(11:10) Improvement of Electron Beam Recorder for Mastering of Future Storage Media

Y. Wada, H. Tanaka, H. Kitahara, Y. Ozawa*,
M. Hokari*, S. Sugiura (Pioneer, Japan, *Fujitsu, Japan)

Near-field hybrid recording on patterned media is a promising approach to 1Tbit/in² density. We present an improved electron beam recorder that enables to fabricate data and servo areas of such future storage media.

Lunch (11:30-13:00)

Poster Session I (13:00-14:45)

Presiders : K. Nishikawa (Canon, Japan)

Y. Kawata (Shizuoka Univ., Japan)

T. Iida (Pioneer, Japan)

We-I-01

Numerical Simulations and Experiments about Contamination Mechanism of SIL System Concerning Hole Geometries of Lens Holder

M. H. Choi, T. M. Yang, Y. C. Rhim, J. K. Seo*,
I. H. Choi*, B. H. Min* (Yonsei Univ., Korea, *LG Electronics, Korea)

The SIL system is simulated numerically and confirmed with experiments using micro-PIV system. It was found that the back-flow from the downstream of the SIL is a major candidate for the contamination of the SIL-aperture.

We-I-02

Analysis of Diffraction Characteristics of Photopolymers by Using the FDTD Method

S. Yoshida, M. Yamamoto (Tokyo Univ. of Sci., Japan)

In this paper, we analyzed characteristics of photopolymers based on a diffusion model and clarified the diffraction characteristics by using the finite-difference time-domain (FDTD) method.

We-I-03

Numerical Simulations of a Flexible Disk Rotating Close to a Rigid Rotating Wall

A. M. M. Gad, Y. C. Rhim (Yonsei Univ., Korea)

This is numerical simulations about a flexible disk rotating close to a rigid rotating wall. New types of flat-stabilizers, co-rotating and counter-rotating flat-stabilizer, are introduced. The results showed improved stability when using counter rotating stabilizer.

We-I-04

Hundred GB Capacity Recording from Far Field

H. F. Wang, L. P. Shi, G. Q. Yuan, W. L. Tan,
T. C. Chong (DSI, Singapore)

We propose to achieve 100GB disk capacity from far field using apodization technique and the new encoding technique. A pickup with numerical aperture of 0.95 is made to have effective numerical aperture of 1.17.

We-I-05

Crystallization and Melting Kinetics of Se-doped

Fast-Growth $\text{Sb}_{70}\text{Te}_{30}$ Phase-Change Recording Films

Y. -S. Hsu, Y. -D. Liu, Y. -C. Her, S. -T. Cheng*,
S. -Y. Tsai* (Nat'l Chung Hsing Univ., R. O. C., *ITRI,
R. O. C.)

Adding Se into $\text{Sb}_{70}\text{Te}_{30}$ can improve archival stability and recording sensitivity; however, initialization sensitivity may be sacrificed. The concentration of Se should not be higher than 2.1 at.% for smooth switch between amorphous and/or crystalline marks.

We-I-06

Influence of the Crystalline Microstructure of the InSb Active Layer in a Super-Resolution ROM Disk

B. Hyot, X. Biquard*, F. Laulagnet (CEA Léti, MINATEC, France, *CEA/DSM/DRFMC, France)

We report the strong influence of the crystalline microstructure (grains size) of the InSb active layer in the efficiency of the super-resolution process in ROM disks.

We-I-07

Super-resolution Readout of 50-nm ROM Pits Using HD DVD-based Optics

T. Shima, T. Nakano, K. Kurihara, J. H. Kim*,
J. Tominaga (AIST, Japan, *Samsung Electronics, Korea)

We demonstrate that signals from 50-nm pits formed on ROM substrate can be retrieved by super-RENS using HD DVD-based optics. It is expected to increase 2-4 times the capacity of the disc per recording layer.

We-I-08

Cu Alloy Translucent Reflective Layer and Oxide Film for DVD+RW Dual Layer Disc

M. Shinotsuka, H. Sekiguchi, M. Shinkai (Ricoh, Japan)

We use Cu-alloy for DVD+RW DL disc with high reliability instead of Al or Ag alloy. That disc has high transmittance and balanced reflection of L0-layer and L1-layer.

We-I-09

Spin Coatable Inorganic Resist for High Density Disk Mastering Process Application

C. -T. Yang, M. -F. Hsu, S. -L. Chang, J. -P. Chen,
T. -R. Jeng, K. -C. Chiu (ITRI, R. O. C.)

High resolution patterns (< 100nm) formation by LBR using the inorganic spin-coatable photoresist and without developing process after a laser beam direct

write were demonstrated. The recording size can be reduced effectively by using this photoresist.

We-I-10

Topographic Imaging of Data Marks on Phase-change Optical Disks Following Coating with Ag

R. F. Cork, A. L. Greer (Univ. of Cambridge, UK)

Topographic AFM imaging of data marks on rewritable optical disks is achieved following deposition of a thin Ag layer, which diffuses into the chalcogenide active layer giving a height difference between marks and background.

We-I-11

Improved Superresolution Readout by Nitrogen Addition in Ge-doped SbTe

T. S. Lee, H. S. Lee, J. H. Choi, S. Y. Lee,

W. M. Kim, J. H. Kim*, B. -K. Cheong

(KIST, Korea, *Samsung Electronics, Korea)

In order to improve the capability of the superresolution (SR) readout by reduced thermal conductivity, it was demonstrated that nitrogen addition in Ge-doped SbTe could improve SR readout in terms of readout power and CNR.

We-I-12

Characterization of Superresolution Effects of Te-based Chalcogenide Thin Films at Blue Light Regime

H. S. Lee***, T. S. Lee*, S. Y. Lee*, W. M. Kim*,

D. H. Kim**, B. -K. Cheong* (*KIST, Korea, **Korea Univ., Korea)

We report on the superresolution effects of the two different Te-based chalcogenide materials, namely, PbTe and $\text{Ge}_2\text{Sb}_2\text{Te}_5$, as examined via static and dynamic tests using blue lasers and samples made of simple three layer stacks.

We-I-13

One-color Nonvolatile Holographic Recording in Ce:Tb:LiNbO₃

X. N. Liang*, X. W. Xu*, S. Solanki*, M. H. Li*,

T. -C. Chong*** (*DSI, A*STAR, Singapore, **Nat'l Univ. of Singapore, Singapore)

High sensitivity (0.21 cm/J), high diffraction efficiency (50%), long lifetime (11 years at room temperature) and nonvolatile readout was achieved by one-color recording scheme in Ce:Tb:LiNbO₃ crystal.

We-I-14

Recording Marks Formation with Optimized Write Strategy

B. J. Wu, C. H. Chu, I. C. Lin, T. S. Kao, A. Hsu*,
D. P. Tsai (Nat'l Taiwan Univ., *Lite-on it, R. O. C.)

In this study, we choose the ROS type to record DVD-RW. The terminal resistance was tuned to get the better jitter, and the shapes of recording mark were observed by conductive-AFM (C-AFM).

We-I-15

Read Signal on the Thermally Active Aperture in Super-ROM Disk

J. S. Kim, K. C. Kwak*, C. -Y. You (Inha Univ., Korea,
*LG Electronics, Korea)

We calculate the signal modulations of super-ROM multi-layer systems by employing finite difference time domain method.

We-I-16

Fluorinated Materials for Nanoimprint Process

Y. Kawaguchi, K. Tsunozaki, T. Yoneda
(Asahi Glass, Japan)

The master mold for the nano fabrication is very expensive. Therefore, a daughter mold is needed when mass-producing. We introduce fluorinated materials for daughter molds which has good mold-releasing.

We-I-17

Microstructure and Recording Characteristics of GeSbSnFe Film for High Speed Blu-ray Rewritable Medium

S. -H. Ma, P. -C. Liu, H. -F. Chang, D. Y. Chiang,
W. -T. Tang, S. -L. Ou*, P. -C. Kuo* (CMC Magnetics,
R. O. C., *Nat'l Taiwan Univ., R. O. C.)

A rewritable recording medium using a GeSbSnFe film was proposed for Blu-ray disc format. The effect of Fe doping on microstructure of GeSbSn film and recording characteristic was investigated.

We-I-18

Inorganic Resist Material for Phase-transition Mastering

J. -P. Chen, M. -F. Hsu, S. -C. Tseng, C. -T. Cheng,
C. -T. Yang, S. -L. Chang, B. -C. Yao, K. -C. Chiu
(ITRI, R. O. C.)

Oxide of phase-change material was proposed as a resist material for inorganic mastering. Pits or grooves

structures with different oxygen and argon gas flow ratio and laser irradiation power were investigated.

We-I-19

Blu-ray Type Super-Resolution Near-Field Phase Change Disk with In-doped GST Mask Layer

M. L. Lee, X. S. Miao, L. P. Shi (DSI, Singapore)

A new mask layer of $\text{In}_2\text{Ge}_8\text{Sb}_{85}\text{Te}_5$ was used on Super-resolution near-field phase change disks. The thermal and optical properties of the mask layer were investigated. The recording performance of the new structure is discussed.

We-I-20

HD-DVD Write-Once Recording Medium with Inorganic Si/Ta Bilayer Films

C. -P. Hsu, Y. -F. Wu, J. -C. Chen, S. -H. Chang, C. -M. Hsu, Y. Wu, D. -Y. Chiang, W. -T. Tang (CMC Magnetics, R. O. C.)

A new write-once recording medium with Si/Ta bilayer films is proposed. The Dynamic test shows that more than 35 PRSNR can be achieved at 1X recording speed and over 37 at 2X recording speed.

We-I-21

Si/Mo Bilayer Thin Film for Optical Write-once Media

S. -L. Ou, P. -C. Kuo, C. -H. Hsiao, D. -Y. Chiang*, W. -T. Tang*, S. -H. Ma*, T. -H. Wu (Nat'l Taiwan Univ., R. O. C., *CMC Magnetics, R. O. C.)

Si/Mo bilayer thin films are prepared by sputtering. The optimum jitter value of 1X and 4X recording speed for BD-R are 6.4 % and 6.8 %, which occurs at 7.4 mW and 10.6 mW, respectively.

We-I-22

UV Sensitization Characteristics of Cu- and Cu:Ce-doped LiNbO_3 for Nonvolatile Holographic Recording

X. W. Xu, X. A. Liang, M. H. Li, S. Solanki, T. C. Chong (DSI, Singapore)

Unique UV sensitization characteristics in the LiNbO_3 crystals doped with Cu, and co-doped with Cu and Ce were reported. Nonvolatile holographic recording was achieved in the UV pre-sensitized crystals with one-color recording scheme.

We-I-23

Recording Characteristics of Nano-composite Layers

Prepared by Sputtering Process Utilizing AIST-SiO₂ Composite Target

H. -C. Mai, T. -E. Hsieh, S. Huang
(Nat'l Chiao Tung Univ., R. O. C.)

AgInSbTe-SiO₂ nano-composite layers were prepared by sputtering utilizing composite target. Phase transition at about 200 C was identified. The write-once HD-DVD disk containing nano-composite layer exhibited modulation > 0.8 when 11T signals were written in

We-I-24

Quasi-synchronous Sampling and Adaptive PRML Read Channel System

A. Yamamoto, Y. Shirakawa, H. Mouri, K. Okamoto,
K. Nagano, H. Nakahira, T. Yamamoto (Matsushita, Japan)

We propose a read channel system with quasi-synchronous sampling and adaptive PRML to achieve accurate timing recovery and correct data extraction under high density recording and high transfer rate.

We-I-25

New Writing Power Balance Control Method Modified for Optical Disk Systems

Y. Ito, T. Ashitani, T. Mihara (Toshiba, Japan)

We propose a new adjustment method of the writing pulse for HD DVD. This method controls writing power balance. Use of this method makes it possible to adjust the writing pulse optimally.

We-I-26

New Adaptive PRML Detection for High-density Optical Recording

H. Sugaya, S. Ohkubo, Y. Yamanaka (NEC, Japan)

We confirmed that the new adaptive PRML developed for highly-nonlinear channel can halve bit-error-rate compared with the previous adaptive PRML under significantly high recording conditions of 40% bit-density increase from the commercial products.

We-I-27

Read Channel for Multilevel Read-only Optical Disc System

H. B. Yuan, H. Z. Xu, H. Hu, L. F. Pan
(Tsinghua Univ., P. R. China)

A read channel system for multilevel RLL read-only DVD is proposed. It employs an interpolating timing recovery module and an adaptive PRML detector.

Using primary write strategy, we can achieve practical SER below 1×10^{-4} .

We-I-28

Write Power Optimization Process for HD DVD-RW

T. Mihara, Y. Ito, T. Ashitani (Toshiba, Japan)

We have proposed a write power optimization process (OWPC: overwrite power control) suited for HD DVD-RW. This process makes high quality and stable direct overwrite (DOW) a possibility.

We-I-29

Readout Method for Multi-level Run Length Limited Read-only Disk

M. M. Yan, J. Pei, H. Z. Xu, L. F. Pan
(Tsinghua Univ., P. R. China)

This paper proposes the implementation of readout system for 15 GB multi-level run length limited (ML-RLL) read-only disk and discusses the compatibility of ML-RLL read-only disk and DVD-ROM on readout method.

We-I-30

New Rate 6/9 RLL (2, 11) Code with SPL Constraint for Four-level Read-only Optical Disc

H. Hu, H. B. Yuan, Y. Tang, L. F. Pan
(Tsinghua Univ., P. R. China)

New efficient 4-level SPL-RLL (2,11) code with rate of 6/9 is designed for multi-level read-only optical disc. Compared with the former code with the same rate, It has smaller decoding window and parameter k.

We-I-31

Investigation of Near-field Optical Sensor for Nano-Position

C. -S. Chang, K. J. Lee, L. M. Yang, M. T. Peng,
K. C. Chiu, J. J. Ju (ITRI, R. O. C.)

This study investigates near-field optical sensor, which can detect nanoscale motion for nano-position. The simple and low cost nano-positioning devices combine the sensor with a nanoscale motion actuator, which is used by an elasticity-ratio transducer.

We-I-32

A Low-complexity Turbo Equalizer Based on Iterated Lin-Kernighan Algorithm

Z. L. Qin, K. Cai, X. S. Miao, L. P. Shi (DSI, Singapore)

In this paper, we propose a low-complexity turbo equalizer over high-rate low-density parity-check (LDPC) coded

partial-response channels based on the iterated Lin-Kernighan (ILK) algorithm, which was previously used to solve the traveling salesperson problem.

We-I-33

Jet-head and Optical Head for DNA Detection in Optical Disk

T. Matsui (Funai, Japan)

For the complementary DNA(cDNA) detection, spiral scanning is required for faster and more accurate by using fluorescent optical head and jet head technologies.

We-I-34

The Metallic Slab Superlens for the Application of Near-field Optical Data Storage

L. -M. Yang, J. -P. Chen, M. -T. Peng (ITRI, R. O. C.)

The FDTD method is employed to study the superlensing effect of a gold slab for focusing Gaussian beam. We found the incident angle of the beam has to be greater than critical angle of TIR.

We-I-35

Design and Analysis of Replicated Solid Immersion Lens for Large Thickness Tolerance in Near-field Recording

Y. -J. Yoon, W. -C. Kim, H. Choi, N. -C. Park, S. Kang, Y. -P. Park (Yonsei Univ., Korea)

To increase a SIL thickness tolerance, a novel SIL optical head design with a replicated lens is proposed. The replicated SIL optical head has not only a high NA but a large SIL thickness tolerance.

We-I-36

Multi-Dimensional Multi-level Optical Pickup Head

W. L. Tan, G. Q. Yuan, L. T. Ng, H. F. Wang, C. W. Chuah, C. Y. Chong, K. G. Lim, Y. L. Chong, Y. B. Lim, K. D. Ye, L. P. Shi, T. C. Chong (DSI, Singapore)

An optical pickup head for providing multi-dimensional multi-level (MDML) optical recording is proposed. The head is able to provide multi-level modulations of at least two physical properties of light to achieve the MDML recording.

We-I-37

High Sensitivity Actuator with New Magnetic Circuit for Optical Pickup

B. Q. Zhang, J. S. Ma, L. F. Pan, X. M. Cheng, Y. Tang (Tsinghua Univ., P. R. China)

A novel magnetic circuit consisted of six thicker permanent magnets with regulated placement, two thinner permanent magnets and base/upper yokes is proposed to increase the sensitivity of the actuator further.

We-I-38

Novel Surface Plasmon Antenna Nano-source

H. F. Wang, B. X. Xu, H. X. Yuan, T. C. Chong
(DSI, Singapore)

We propose a novel surface plasmon antenna nano-source, which utilizes the surface plasmon resonance between the boundaries of a rectangular shape metal film with a rectangular aperture in it.

We-I-39

Simple Estimating Method for Life Expectancy Using Re-sampling Statistical Analysis

M. Irie, T. Yamasaki, Y. Okino*, T. Kubo** (Osaka Sangyo Univ., Japan, *Kansai Univ., Japan, **T. Kubo Eng. Sci. Office, Japan)

This paper presents discussion of a simple estimating method for the life expectancy of optical disks using re-sampling statistical analysis and the Eyring acceleration test model with four stress conditions.

Coffee Break (14:45-15:45)

Poster Session II (15:45-17:30)

Presiders : T. Okumura (Sharp, Japan)
Y. Tomita (Pioneer, Japan)
H. Tokumaru (NHK, Japan)

We-J-01

Improvement of Holographic Recording Configuration for Data Page Rewriting

M. Bunsen, H. Furuta, K. Aragane, A. Okamoto*
(Fukuoka Univ., Japan, *Hokkaido Univ., Japan)

We investigate the selective erasure of multiplexed holograms in the photorefractive crystal, and proposed a method to improve the erasure property using the diffuser for the object beam and the phase conjugate readout.

We-J-02

Bit Likelihood Mapping Method in LDPC Decoding with a Modulation Code for Holographic Data Storage System

B. W. Chung, P. L. Yoon, H. S. Kim, J. B. Moon,

J. Y. Park (Daewoo Electronics, Korea)

The bit likelihood mapping method for HDDS has been developed and evaluated. The error performance of LDPC decoding using LLR calculator from 6:8 modulation code has been improved as reflecting various condition.

We-J-03

New Mastering Method for Existing and Emerging Optical Disc Formats

F. Pirot, V. Alaiwan, A. Renard
(Kochka Technology, France)

We propose a new mastering process based on direct stamper writing for all existing formats, from BD to legacy CD format. The proposed process requires low investment, with wide process window.

We-J-04

Error Correction Code Failure Rate Analysis for Parity-Check-Coded Optical Recording Systems

K. Cai, K. A. S. Immink*, Z. L. Qin, X. S. Miao,
L. P. Shi, T. C. Chong (DSI, Singapore, *Turing
Machines, Netherlands)

A generalized block multinomial method is proposed for estimating the error correction code failure rate (EFR). The EFR analysis shows that a gain of 0.6 dB is obtained for a parity-check-coded optical recording system.

We-J-05

A Security Key for Wearing to Record Hologram with Random-reference Multiplexing Scheme

Y. Ishii, Y. Takayama*, A. Inoue, K. Kodate
(Japan Women's Univ., Japan, *NICT, Japan)

We propose a simple, compact and high-security holographic memory system using the fieldstone for an accessory. We estimate the allowable range of the fieldstone's position and angle errors for proper readout of stored images.

We-J-06

A "TRUSTED" Computing Secure Optical Storage Solution

R. C. Hines, D. L. Blankenbeckler, D. H. Davies,
L. W. Lee*, M. J. Gurkowski* (DPHI Inc / DataPlay,
USA, *InterActive Electronics LLC, USA)

The Trusted Computing Group is defining a complete "Chain of Trust" protocol set to ensure rigorous computer data integrity. We present a hardware based

practical implementation of these concepts for DVD & other optical formats.

We-J-07

Self-cleaning of SIL and Media Using Photo-catalyst TiO₂ Film for the Near-field Recording

H. -G. Hong, Y. -J. Kim (Yonsei Univ., Korea)

The feasibility test of self-cleaning mechanism with TiO₂ photo-catalyst coating was conducted with half ball lens and glass substrate. This proposed mechanism is effective to solve the contamination problems in the SIL based NFR system.

We-J-08

SNR Improvement Using Phase Compensation in Shift- and Angle-multiplexed Holographic Data Storage

N. Ishii, N. Kinoshita, T. Muroi, N. Shimidzu, K. Kamijo (NHK, Japan)

The phase compensation method was applied to shift- and angle-multiplexing using a speckled reference beam in a digital holographic storage system. Phase information could be measured and the signal to noise ratio was improved.

We-J-09

Measurement of the Reflected Light Intensity from a Ge-Sb-Te Alloy During Melting and Solidification

M. Kuwahara, T. Fukaya, T. Shima, Y. Iwanabe, P. Fons, J. Tominaga, R. Endo*, M. Susa* (AIST, Japan, *Tokyo Inst. of Tech., Japan)

This work is to measure the change in the reflected light of bulk Ge-Sb-Te alloy associated with melting and solidification in a measurement that includes continuous heating and cooling cycles using a special sample preparation.

We-J-10

Dynamic Layer-detection of Rotating Multilayered Optical Memory

M. Miyamoto, Y. Kawata, M. Nakabayashi* (Shizuoka Univ., Japan, *Lintec, Japan)

We fabricated disc type multilayered media for dynamic layer-detection of multilayered media. We could observe the reflected signals from each layer of rotating multilayered discs clearly.

We-J-11

Removal of Cross-talk Noise Using Uniform-based

Hologram Recording for the Polytopic Multiplexing System

Y. Y. Kwon, K. Y. Kim, J. Y. Park, J. Y. Park*

(Daewoo Electronics, Korea, *Hanyang Univ., Korea)

For the polytopic multiplexing, we present the method which is to overlap the reference beams considering the same exposure energy. We could obtain the result not having cross-talk noise due to the non uniform-base.

We-J-12

Two-dimensional Modulation for Holographic Data Storage Systems

O. Malki, F. Przygodda, J. Knittel, W. Hossfeld,

H. Trautner, H. Richter (Deutsche Thomson OHG, Germany)

A new method for modulating data in a holographic data storage system is presented. The main idea is to adapt the general concept of 2D-RLL modulation to a numerical efficient implementation.

We-J-13

The Thermal Effect at the Interface Between Disc and Solid Immersion LENS in Near Field Recording

J. M. Park, H. C. Ryu, D. H. Son, M. H. Jeong,

J. K. Seo, S. H. Yoo, I. H. Choi, B. H. Min

(LG Electronics, Korea)

The thermal effect at the interface between disc and SIL in NFR was studied with experiments and simulation. The maximum temperature on SIL top, and heat loss during probe scanning in AFM were discussed.

We-J-14

Channel Model for Super-resolution Signal

A. Fargeix, O. Lemonnier, B. Hyot

(CEA Léti, MINATEC, France)

A ten tap digital filter which emulates the Super-Resolution channel model for PRML decoding. The PR(1,1,2,3,4, 4,3,2,1,1) coefficients rely on dual Gaussian spot model of the optical pickup with the small spot linked to super-resolution

We-J-15

Improved Gap Control System Using Disturbance Observer for Near-field Recording

J. -G. Kim, M. -S. Kang, W. -C. Lim, Y. -J. Yoon,

J. Jeong*, N. -C. Park, H. -S. Yang, Y. -P. Park (Yonsei Univ., Korea, *Dongyang Technical College, Korea)

This paper describes gap controller for near field recording system using disturbance observer. Gap control system is susceptible to disturbances due to small air gap. Therefore, air gap controller should have excellent disturbance rejection performance.

We-J-16

Simulation and Experimental Analysis of Bit Error Characteristics for Two-dimensional Modulation Codes in Holographic Memory

T. Sano, Y. Kajiwara, M. Yamamoto
(Tokyo Univ. of Sci., Japan)

This paper, by studying the bit error characteristics for various two-dimensional modulation codes, shows that the lost bit occurs by the decrease of dynamic range of the medium in the low spatial frequency region.

We-J-17

Holographic Data Storage Disc Manufactured by DVDR Bonding Process

M. C. Li, A. Li, C. -M. Lin, W. -K. Shau*,
C. -L. Huang, T. -R. Jeng

(ITRI, R. O. C., *Nat'l Chung Cheng Univ., R. O. C.)

In this study, we adopt the DVDR bonding process to manufacture the holographic data storage disc. The cycle-time of producing one disc can be completed within 5 seconds.

We-J-18

Decay Reduction of Multiplexed Holograms on Selective Erasure by Amplified Phase Conjugate Beams

T. Sano, A. Okamoto, K. Sato*

(Hokkaido Univ., Japan, *Hokkai-Gakuen Univ., Japan)

We analytically show that the selective erasure using phase conjugator reduce the decay of multiplexed holograms by amplifying phase conjugate beams. This leads to the increase of the number of rewriting times of holographic memory.

We-J-19

Thermal and Optical Properties of Nb₂O₅-AlN Dielectric Layers in 1-4x Dual-layer BD-R Discs

H. -C. Chen, J. -K. Chen*, C. -W. Chang, Y. -T. Chen,
D. -Y. Chiang (CMC Magnetics, R. O. C., *Nat'l Taipei Univ. of Tech., R. O. C.)

We have developed a BD-R DL with ameliorative structure of L1. With the optimum arrangement of film

stacks, we are able to perform BD-R DL recording at 1-4x speeds with bottom jitter below the specification.

We-J-20

Terabyte Optical Recording Technology by Making Use of Different Parameters of the Light

L. P. Shi, T. C. Chong, X. S. Miao, H. F. Wang,
G. Q. Yuan, J. M. Li, E. K. Chua, J. Y. Sze,
W. L. Tan, L. T. Ng (DSI, Singapore)

Ultra-high density read only optical storage technology is proposed by making use of different parameters of light to achieve multi-dimensional multi-level recording. It is possible to achieve TB/disc when this is combined with near-field technology.

We-J-21

Security Improvement by Multiplexing Dummy Data for Optical Random Phase Encryption

M. Kitano, A. Okamoto, T. Sano (Hokkaido Univ., Japan)
Optical random phase encryption has a vulnerability to a narrow correct decryption. By multiplexing dummy data, security against the illegal decryption is much improved. We analyze the dependence of security improvement on the multiplicity.

We-J-22

Nano Recording Marks Formation on As-deposited Phase-change Material $\text{Ge}_2\text{Sb}_2\text{Te}_5$ with the Existence of Zinc Oxide (ZnOx) Nano Thin Film

T. S. Kao*, Y. X. Yan*, J. C. Wei*, Y. H. Fu*,
K. P. Chiu*, S. C. Yen*, D. P. Tsai*** (*Nat'l Taiwan Univ., R. O. C., **Academia Sinica, R. O. C.)

For investigating the optical properties of ZnOx nano thin film and its broad applications, we use an optical pump-probe system to observe the optical response of as-deposited phase-change material $\text{Ge}_2\text{Sb}_2\text{Te}_5$ with ZnOx nano thin film.

We-J-23

Super-Resolution Near-Field Blue Laser Type Optical Disk with Modified Coumarin Dye Recording Layer and PMMA Contrast Enhanced Layer

T. -T. Hung, Y. -J. Lu (I-Shou Univ., R. O. C.)

We have studied the characteristics of super-RENS disk with modified coumarin recording layer and contrast enhanced layer. It was possible to readout 100 nm mark with CNR of 33dB and exhibit good readout durability.

We-J-24

A Simplified Model of Replication Process for Multi-level Read-only Optical Disc

Y. Tang, J. Song, L. G. Pan, B. Q. Zhang, H. Hu
(Tsinghua Univ., P. R. China)

A simplified model of replication process for multi-level read-only optical discs is introduced. Experiments show that decreased recording power results in high pit depth-to-width ratio and V-shape pit transect, and then decreased depth replication ratio.

We-J-25

Study of Nano Recording Mark Trains on As-deposited Phase-change Recording Layer

H. W. Chang*, T. S. Kao*, I. C. Lin*, H. K. Chen*,
Y. H. Fu*, K. P. Chiu*, D. P. Tsai**** (*Nat'l Taiwan Univ., R. O. C., **Academia Sinica, R. O. C.)

For the further study of ultra-high density recording, we investigate the nano recording mark trains on as-deposited phase-change recording layer ($\text{Ge}_2\text{Sb}_2\text{Te}_5$) and its performance of ultra-high density recording.

We-J-26

Study on Focusing Mechanism of Radial Polarization in Immersion Lens

T. -H. Lan, C. -H. Tien
(Nat'l Chiao Tung Univ., R. O. C.)

We study the focusing behavior of radially and linearly polarized beams with immersion lens. According to the results, reflective index and marginal angles play a critical and distinct role on focusing different illumination beams.

We-J-27

Data Page Counter Method of Holographic Data Storage System

J. H. Kim, S. -H. Kim, Y. H. Lee, H. S. Yang,
J. B. Park, Y. -P. Park (Yonsei Univ., Korea)

In this paper, we suggest data page counter method. It is one of the data format methods. When write and retrieve data page, the holographic data storage system recognize each data page.

Night Safari Tour (18:00-)

October 25, 2007 (Thursday)

High Density Recording -III (8:30-11:45)

Presiders : I. H. Choi (LG, Korea)

S. Tanaka (Pioneer, Japan)

Th-K-01 (Invited)

(8:30) Compact Holographic Data Storage Technology

I. -S. Song, S. -W. Ha, B. -S. Kwak, S. -H. Lee,
K. T. Lee, Y. -S. Jang, I. H. Choi, H. M. Byung
(LG Electronics, Korea)

In general, Holographic Data Storage is relatively bigger than the other type of digital storages. We propose compact size HDS technology based on the optimized layout and new 2-axis actuator for reference beam angle control.

Th-K-02

(8:55) Improved Intensity and Distribution in Reconstructed Beam Using Adaptive Optics in Holographic Data Storage

T. Muroi, S. Sekiguchi*, N. Kinoshita, N. Ishii,
N. Shimidzu, K. Kamijo, M. Booth**, R. Juskaitis**,
T. Wilson** (NHK, Japan, *Tokyo Denki Univ., Japan,
**Univ. of Oxford, UK)

In holographic data storage, photopolymer media shrink, which degrades a reconstructed image. We proposed a method to compensate for distortion and improved intensity and distribution in the reconstructed images by adaptive optics with genetic algorithm.

Th-K-03

(9:15) Multiplexing Characteristics of Holographic Recording Media Employing Phase-Change Reflector

T. Ando, K. Oishi (Victor, Japan)

Multiplex recording characteristics up to a multiplexing number (M) of 1044 are investigated for holographic recording media employing phase-change reflector (HPCR). Significant advantages in SNR are confirmed in HPCR at a large M.

Th-K-04

(9:35) A New Block Modulation Code for Holographic Data Storage Systems

N. Y. Kim, J. -S. Lee, Y. G. Jung, J. Lee, Y. -S. Jang,
I. H. Choi, B. H. Min (LG Electronics, Korea)

We have presented the block code to diminish the IPI and 2D ISI. Also, the proposed code's BER performance is superior to that of the conventional code in spite of the higher code rate.

Th-K-05

(9:55) Numerical Model Calculation of Intrinsic Noises in Common Aperture Coaxial Shift Multiplexed Holographic Memories

Z. Karpat, G. Szarvas, K. Banko, Sz. Kautny,
L. Domjan (Optimal Optik, Hungary)

We investigated the intrinsic noises of the common aperture holographic system. We have shown, that with the optimal arrangement of the holograms one can greatly reduce the intrinsic noise of the common aperture holographic system.

Coffee Break (10:15-10:45)

Th-K-06

(10:45) Evaluation of the Inter-page Cross-talk in Collinear Holographic Memory by Monte-Carlo Simulation

T. Shimura, M. Terada, Y. Ashizuka, R. Fujimura,
K. Kuroda, *H. Horimai

(The Univ. of Tokyo, Japan,* Optware, Japan)

By summing up the residual diffracted waves from multiplexed holograms, SNR is calculated as a function of shift pitch of the holograms. SNR is inversely proportional to the degree of multiplexing.

Th-K-07

(11:05) Focus-shift and Angle Combined Multiplexing Method for Holographic Data Storage

Y. Nagasaka, K. Okada, A. Nakamura, M. Tanaka,
A. Kuwahara, T. Ueyama, S. Yoshida, Y. Kurata
(Sharp, Japan)

We proposed focus-shift and angle combined multiplexing as a solution to increase recording capacity of the system. This method can record angle multiplexed holograms along the thickness direction of a recording medium.

Th-K-08

(11:25) Improvement in Copying Speed and Diffraction Efficiency of Holographic ROMs by Photorefractive Amplification and Coherent Parallel Copying

T. Ito, A. Okamoto, N. Takahashi (Hokkaido Univ.)

New approaches to high-performance holographic ROM replication for collinear systems are presented. Amplification of weak signals by photorefractive wave-mixing significantly speeds up replication, and coherent copying of spatially multiplexed holograms effectively enhances diffraction efficiency.

Lunch (11:45-13:15)

Post-deadline Papers (13:15-14:15)

Presiders :J. Tominaga (AIST, Japan)

M. Irie (Osaka Sangyo Univ., Japan)

The best 4 post-deadline papers are orally presented.

**Awards, Announcement of ISOM/ODS'08
and Closing Remarks (14:15-14:35)**

H. Tokumaru (NHK, Japan)

Program Committee, Chair

S. Higashino (Sony, Japan)

T. Iida (Pioneer, Japan)

Y. Kawata (Shizuoka Univ., Japan)

Program Committee, Vice-Co-Chairs

Technical Tour (15:00-)

	We-I-04		
	We-I-13		
	We-I-22		
	We-I-36		
	We-I-38		
	We-J-04		
	We-J-20		
Chong, Y. L.	We-I-36		
Chu, C. H.	We-I-14		
Chu, T. C.	Mo-C-03		
Chua, E. K.	We-J-20		
Chuah, C. W.	We-I-36		
Chung, B. W.	We-J-02		
Cork, R. F.	We-I-10		
		D	
Davies, D. H.	We-J-06		
Domjan, L.	Th-K-05		
		E	
Eguchi, H.	Tu-E-04		
Endo, N.	Tu-G-02		
Endo, R.	We-J-09		
Eto, S.	Tu-G-03		
Eytan, O.	Tu-G-04		
		F	
Fargeix, A.	Mo-B-04		
	We-J-14		
Fons, P.	Mo-C-02		
	We-J-09		
Fu, Y. H.	We-J-22		
	We-J-25		
Fujimura, R.	Th-K-06		
Fujita, G.	Mo-D-01		
Fukaya, T.	We-J-09		
Fukuda, H.	We-H-06		
Fukumoto, A.	Mo-D-02		
	Mo-D-03		
	Mo-D-04		
	Mo-D-05		
Furuta, H.	We-J-01		
		G	
		Gad, A. M. M.	We-I-03
		Gage, E. C.	We-H-05
		Gokemeijer, N. J.	We-H-05
		Gopinath, S. C. B.	Mo-C-06
		Greer, A. L.	We-I-10
		Gurkowski, M. J.	We-J-06
		H	
		Ha, S. -W.	Th-K-01
		Han, I. G.	Tu-G-06
		Hara, M.	Mo-D-02
			Mo-D-03
			Mo-D-04
		Harada, Y.	Mo-B-03
		Hatano, H.	We-H-02
		Hayashi, K.	Mo-D-01
		Hayashi, T.	Mo-B-03
		Hayashida, N.	Mo-D-06
		Her, Y. -C.	We-I-05
		Hieda, H.	We-H-02
			We-H-04
		Hines, R. C.	We-J-06
		Hirata, M.	We-H-02
		Hirooka, K.	Mo-D-02
			Mo-D-03
			Mo-D-04
		Hirotsune, A.	Tu-G-02
		Hokari, M.	We-H-07
		Hong, H. -G.	We-J-07
		Hong, S. N.	Tu-F-03
		Hongo, K.	We-H-03
		Horigome, T.	Mo-D-01
		Horimai, H.	Th-K-06
		Hossfeld, W.	We-J-12
		Hsiao, C. -H.	We-I-21
		Hsieh, T. -E.	We-I-23
		Hsu, A.	We-I-14
		Hsu, C. -M.	We-I-20
		Hsu, C. -P.	We-I-20
		Hsu, M. -F.	We-I-09
			We-I-18
		Hsu, Y. -S.	We-I-05

Kitano, M.	We-J-21	Lee, K. T.	Tu-F-03
Knittel, J.	We-J-12		Th-K-01
Ko, E. S.	Tu-F-03	Lee, L. W.	We-J-06
Kobayashi, S.	Mo-D-01	Lee, M. L.	We-I-19
Koda, T.	We-H-02	Lee, S. -H.	Th-K-01
	We-H-04	Lee, S. Y.	We-I-11
Kodate, K.	We-J-05		We-I-12
Koide, D.	Tu-E-03	Lee, T. S.	We-I-11
Kolobov, A.	Mo-C-02		We-I-12
Komatsu, Y.	Tu-F-02	Lee, Y. H.	We-J-27
Kondo, T.	Tu-E-02	Leigh, D.	Tu-G-04
Kosuda, A.	Mo-D-06	Lemonnier, O.	Mo-B-04
Kryder, M. H.	We-H-01		We-J-14
Kumar, P. K. R.	Mo-C-06	Li, A.	We-J-17
Kubo, T.	We-I-39	Li, J. M.	Mo-B-05
Kudo, T.	Mo-D-01		We-J-20
Kuo, P. -C.	We-I-17	Li, M. C.	We-J-17
	We-I-21	Li, M. H.	We-I-13
Kurata, Y.	Th-K-07		We-I-22
Kurihara, K.	We-I-07	Liang, X. A.	We-I-22
Kuroda, K.	Th-K-06	Liang, X. N.	We-I-13
Kurokawa, T.	Tu-G-02	Lim, K. G.	Mo-B-05
Kuwahara, A.	Th-K-07		We-I-36
Kuwahara, M.	We-J-09	Lim, W. -C.	We-J-15
Kwak, B. -S.	Th-K-01	Lim, Y. B.	We-I-36
Kwak, K. C.	We-I-15	Lin, C. -M.	Tu-F-04
Kwon, Y. Y.	We-J-11		We-J-17
		Lin, I. C.	We-I-14
			We-I-25
	L		We-J-25
Lan, T. -H.	We-J-26	Liu, P. -C.	We-I-17
Lan, Y. S.	Tu-F-04	Liu, W. -C.	Mo-C-03
Laulagnet, F.	Mo-B-04	Liu, Y. -D.	We-I-05
	Mo-B-06	Lu, B.	We-H-05
	We-I-06	Lu, Y. -J.	We-J-23
Lee, H. S.	We-I-11		
	We-I-12		
Lee, J.	Th-K-04	Ma, J. S.	We-I-37
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Lee, J. -S.	Th-K-04		We-I-21
Lee, J. U.	Tu-G-06	Maeda, S.	Mo-B-03
Lee, J. Y.	Tu-F-03	Mai, H. -C.	We-I-23
Lee, K. G.	Tu-G-05	Malki, O.	We-J-12
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Peng, M. T.	We-I-31		We-I-32
	We-I-34		We-I-36
Pichon, J.	Mo-B-06		We-J-04
Pirot, F.	We-J-03		We-J-20
Przygodda, F.	We-J-12	Shima, T.	Mo-C-02
			We-I-07
			We-J-09
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Qin, Z. L.	We-I-32	Shimidzu, N.	We-J-08
	We-J-04		Th-K-02
		Shimura, T.	Th-K-06
	R	Shin, J. H.	Tu-G-05
Rausch, T.	We-H-05	Shin, Y. S.	Tu-F-03
Renard, A.	We-J-03		Tu-G-06
Rhim, Y. C.	We-I-01	Shinkai, M.	We-I-08
	We-I-03	Shinotsuka, M.	We-I-08
Richter, H.	We-J-12	Shintani, T.	Tu-G-02
Ro, M. D.	Tu-G-05		Tu-G-03
Rottmayer, R. E.	We-H-05	Shipway, A. N.	Tu-G-04
Ryu, H. C.	We-J-13	Shirakawa, Y.	We-I-24
		Solanki, S.	We-I-13
			We-I-22
	S		
Saito, K.	Mo-D-01	Son, D. H.	We-J-13
	Tu-E-02	Song, I. -S.	Th-K-01
Saito, T.	Tu-E-04	Song, J.	We-J-24
Sakurauchi, K.	Tu-E-04	Song, W. D.	Mo-B-05
Sano, T.	We-J-16	Sugaya, H.	We-I-26
Sano, T.	We-J-18	Sugimoto, Y.	Tu-E-03
	We-J-21	Sugiura, S.	We-H-07
Sato, K.	We-J-18	Sugiyama, T.	Tu-G-02
Satoh, Y.	Mo-C-04	Susa, M.	We-J-09
Seigler, M. A.	We-H-05	Szarvas, G. dr.	Th-K-05
Sekiguchi, H.	We-I-08	Sze, J. Y.	Mo-B-05
Sekiguchi, S.	Th-K-02		We-J-20
Seko, S.	Mo-D-04		
Seo, J. K.	Tu-F-03		
	Tu-G-06	T	
	We-I-01	Tajima, H.	Mo-B-03
	We-J-13	Takahashi, A.	Mo-B-03
Shau, W. -K.	We-J-17	Takahashi, J.	We-H-06
Shi, L. P.	Mo-B-05	Takahashi, N.	Th-K-08
	Mo-C-02	Takano, Y.	Tu-E-03
	We-I-04	Takatani, Y.	Tu-G-04
		Takayama, Y.	We-J-05

Takeda, T.	Mo-D-05		U
Takizawa, H.	Mo-B-01	Uchida, T.	Tu-E-01
Tan, W. L.	We-I-04	Uchiyama, H.	Mo-D-01
	We-I-36	Ueyama, T.	Th-K-07
	We-J-20	Ushiyama, J.	Tu-G-02
Tanabe, N.	Mo-D-01		
Tanaka, H.	We-H-07		W
Tanaka, K.	Mo-C-05	Wada, Y.	We-H-07
Tanaka, K.	Mo-D-02	Wang, H. F.	We-I-04
	Mo-D-03		We-I-36
	Mo-D-04		We-I-38
	Mo-D-05		We-J-20
Tanaka, M.	Th-K-07	Watanabe, K.	Mo-D-02
Tanaka, T.	Mo-D-05		
Tanaka, T.	Tu-G-01		Mo-D-03
Tang, W. -T.	We-I-17		Mo-D-04
	We-I-20		Mo-D-05
	We-I-21	Watanabe, T.	We-H-03
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	We-I-37	Wei, J. C.	We-J-22
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Tokumaru, H.	Tu-E-03	Wuttig, M.	Mo-C-01
Tokuyama, K.	Mo-D-02		
Tominaga, J.	Mo-C-02		X
	Mo-C-06	Xu, B. X.	We-I-38
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Tsai, D. P.	Mo-C-03		We-I-22
	We-I-14		
	We-J-22		Y
	We-J-25	Yamada, H.	Mo-B-03
Tsai, S. -Y.	We-I-05	Yamaguchi, T.	We-H-06
Tseng, S. -C.	We-I-18	Yamamoto, A.	We-I-24
Tsuji, M.	Tu-F-05	Yamamoto, M.	Mo-B-03
Tsunozaki, K.	We-I-16	Yamamoto, M.	We-I-02
			We-J-16
		Yamamoto, T.	We-I-24

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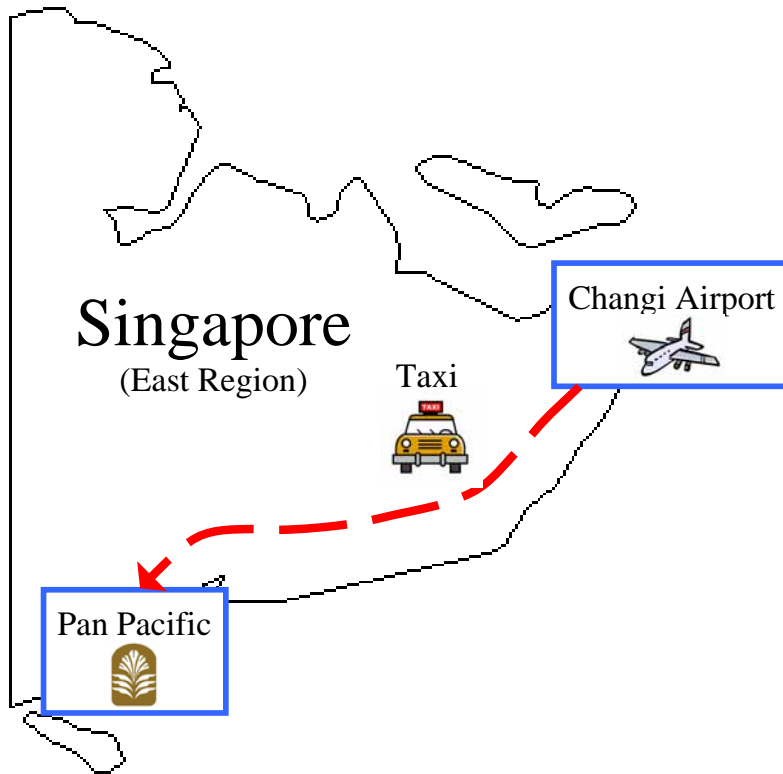
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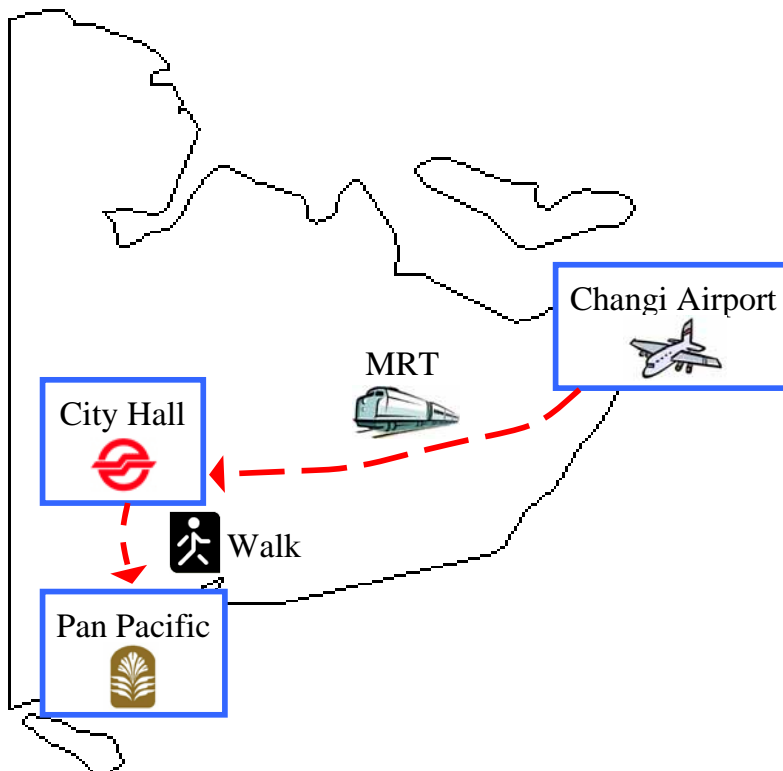
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Route1 (Recommended) --- Taxi 30 min
Board at Taxi Stand



Route2 --- Train 40 min, Walking 15 min
Board at Changi MRT station → Tanah Merah → City Hall
Walk from City Hall → Suntec City → Pan Pacific Hotel



City Map



Legends:



Pan Pacific Hotel



Marina Mandarin Hotel

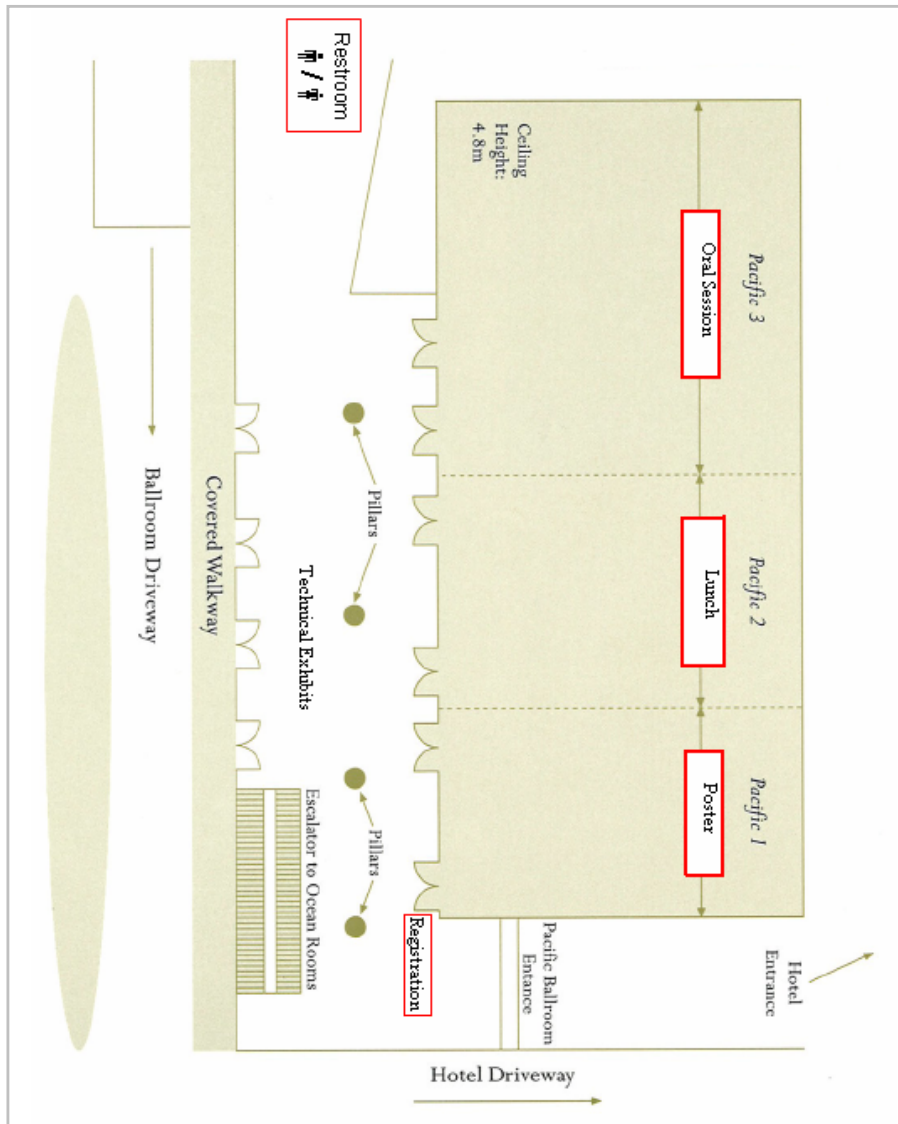


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INTERNATIONAL SYMPOSIUM ON OPTICAL MEMORY 2007

ISOM Secretariat

c/o Adthree Publishing Co., Ltd.
27-37, Higashinakano 4-chome, Nakano-ku,
Tokyo 164-0003, Japan
Phone: +81-3-5925-2840 Fax: +81-3-5925-2913
E-Mail : *secretary@isom.jp*

Local Organizing Committee Office (ISOM'07 Desk)

c/o Data Storage Institute,
DSI Building, 5 Engineering Drive 1,
Singapore 117608
Phone : +65-6874-5091 Fax : +65-6777-8517
E-Mail : *ISOM07@dsi.a-star.edu.sg*

During the Symposium (Oct.21 - Oct.25, 2007) Symposium Office

Please contact the local organizing committee office.
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Publication of ISOM optical memory roadmap



Regular price:
50,000 yen
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We have published the ISOM optical memory roadmap. The contents are now available as posters at the ISOM website. If you would like to obtain a copy, please contact our website (<http://www.isom.jp/>) or our office by e-mail (*isom_rm@isom.jp*). The booklet will include all the contents that were presented at ISOM'06 and will be about 100 pages long.