ADVANCE PROGRAM

ISOM'10

International Symposium on Optical Memory 2010

Parkview Hotel
Hualien, Taiwan
October 24-28, 2010

IN COOPERATION WITH

The Institute of Electrical and Electronics Engineers, Photonics Society (IEEE, PS)

Optical Society of America (OSA)

SPIE

The Institute of Electronics, Information and Communication Engineers (IEICE)

The Chemical Society of Japan

Information Processing Society of Japan

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

SPONSORED BY

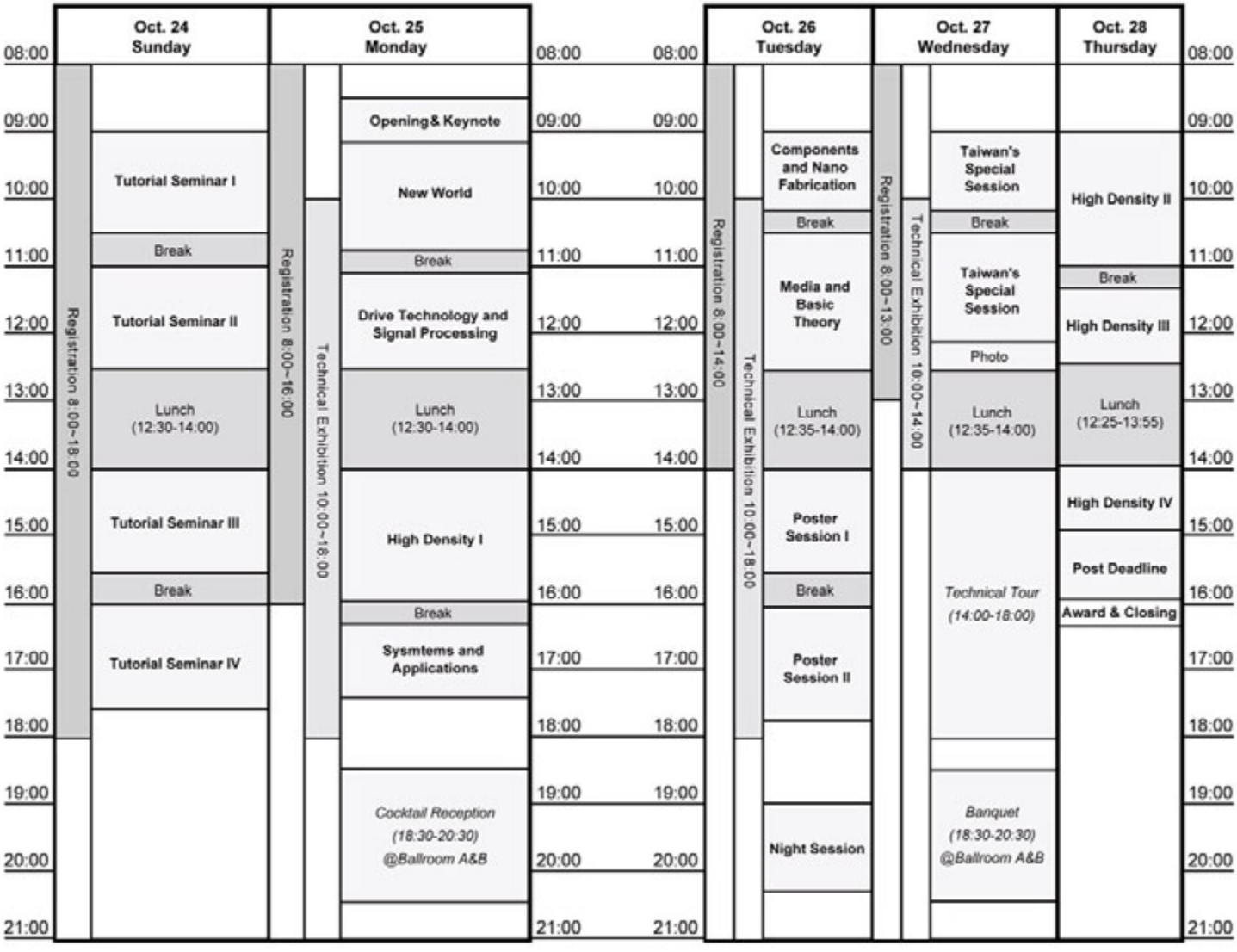
- The Japan Society of Applied Physics (JSAP)
- The Magnetics Society of Japan (MSJ)
- Optoelectronic Industry and Technology Development Association (OITDA)
- Taiwan Information Storage Association (TISA)
- Industrial Technology Research Institute (ITRI)
- National Dong Hwa University (NDHU)
- IEEE Taipei Section Instrumentation & Measurement Society
- Taiwan Photonics Society

DEADLINES :

Post Deadline Paper : August 18, 2010
Early Registration : September 24, 2010

http://www.isom.jp/

Symposium Schedule



WELCOME TO ISOM'10

WELCOME STATEMENT FROM THE ORGANIZING COMMITTEE CO-CHAIRPERSON

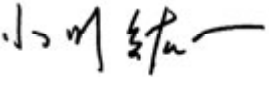
The 20th International Symposium on Optical Memory (ISOM'10) will be held in Hualien, Taiwan
October 24-28, 2010

On behalf of the International Symposium on Optical Memory (ISOM) organizing committee, I am delighted to welcome all of you to the ISOM'10 in Hualien, Taiwan.

Since the first ISOM meeting in 1987, ISOM has shown remarkable capability for technological and social innovation chain in open global industry. The CD-ROM/CD-R and the DVD for example, have greatly contributed not only to the global PC, Game and the A/V software industry, but also to the local economic growth in Korea, Singapore, Taiwan/China and Japan. The third generation optical memory called Blu-ray Disc has already got on track of high volume market, overcoming the economic recession in last year. We are very proud of the ISOM activities as major technologies supporting the drive and media development have been presented in the past ISOM meetings.

Past 30 years, optical memory technology has been developed mostly focusing on high density and this year is the starting year of the fourth generation technology. But I would like to ask all of ISOM'10 participants to pay attention to that Taiwan local committee has planned special session for expanding scope of ISOM, including the SSD, the cloud network system as well new application development in the green market. We would like to share the vision that technologies of the optical memory have high potential even in the expanded scope.

All of us remember that the ISOM'01 in Taiwan was very successful. The ISOM Committee sincerely hopes participants to enjoy the meeting and to contribute again to great success of ISOM'10 in Taiwan.



Koichi Ogawa
ISOM'10 Organizing Committee, Co-Chairperson

WELCOME TO ISOM'10, HUALIEN, TAIWAN

WELCOME STATEMENT FROM THE ORGANIZING COMMITTEE CO-CHAIRPERSON

On behalf of the Conference organizing committee, I would like to welcome you to the International Symposium on Optical Memory 2010 (ISOM'10).

Taiwan is very much honored to be the first host outside Japan on year 2001, when the conference ended successful and memorable. This year, at the end of the first decade of the 21st century, Taiwan respectfully hosts ISOM again. We believe it will mark an exciting and fruitful event of ISOM'10 this year.

Although Blu-ray Disc has launched into market for several years, optical data storage still faces the commercial competition. Large data storage is requested for clouding computing, multi-media and 3D image recently. The next generation of optical data storage definitively needs to be developed or proposed. Multi-layered optical disc seems to be the straightest way. As for holographic recording or near field recording, their commercialization seems face the bottleneck. We expect the valued experiences in this ISOM will be delivered to improve the current technologies.

ISOM'10 will be held at the Parkview Hotel in Hualien, Taiwan from October 24 to 28, 2010. Hualien possesses majestic and unpolluted natural sceneries, mountains, white water rapids, cliffs, waterfalls, and precipices make it the most beautiful and multi-cultural county in Taiwan. We believe that all of you will enjoy the great events of ISOM'10 and fascinated scenery of Hualien. I look forward to seeing you and exchanging valuable ideas on optical memories at ISOM'10.

黃得瑞

Der-Ray Huang
ISOM'10 Organizing Committee, Co-Chairperson

INTRODUCTION

The 20th International Symposium on Optical Memory (ISOM) will be held from Oct. 24th to 28th 2010 at Parkview Hotel in Hualien, Taiwan. 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. In 2009, the second version of ISOM Optical Memory Roadmap focusing on applications, such as archival systems, audio-video systems, inter-cross business market was disclosed. In 2010, it will be very expected to discuss new optical data systems and application systems as well as high density technologies or future technologies. In addition, two special sessions featuring Taiwan's advanced technologies and the new scope of ISOM will be presented.

The Symposium site, Parkview Hotel is located in Hualien, the most beautiful county in Taiwan. Hualien County is approximately 4,628 sq. km and has a population of about 350,000. Four hundred years ago, the Portuguese sailors went past the East Coast of Taiwan, fascinated by its beauty, and called it "FORMOSA." It was called "chi-lai" in the ancient period. Owing to the fact that Hualien River empties into the Pacific Ocean on the East Coast, where the surge and wave is turbulent, it is also called "huei-lan," similar sound with Hualien.

Hualien County, facing the immense Pacific Ocean in the east and leaning against the grand Central Mountain Range in the west, is famous for its beautiful scenery: the natural resources in Taroko National Park, East Coast National Scenic Area, East Rift Valley Scenic Area and Yushan National Park.

SCOPE OF THE SYMPOSIUM

ISOM'10 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. From ISOM'09, the scope of the symposium was extended to accept a wide range of researches and technologies.

In addition to ordinary contributed papers, a number of invited papers in cutting edge will be presented. Topics to be covered in this symposium include, but are not restricted to:

1. Basic Theory and Physical Optics

- Structure Analysis
- Photochemical Reaction
- Multi-Photon Process
- Electromagnetic Optics
- Nonlinear Optics
- Near-Field Optics
- Quantum Optics
- Spectroscopy
- Simulation

2. Media and Material Science

- Rewritable, Write-Once, Read-Only Media
- Characterization, Recording and Readout Mechanisms
- Manufacturing Technology
- Substrates, Mastering
- Super Resolution Media
- Photochromic and Photorefractive Materials, Other Materials
- Photonic Crystals
- Plasmonics, Metamaterials, Nanomaterials

3. Drive Technologies and Signal Processing

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

4. Components and Nano Fabrication

- Optical Heads, Actuators
- Lenses, Diffractive Optics
- Active or Adaptive Optics
- Light Sources, Detectors
- Integrated Optical Heads and Components
- Modulators, Image Sensors
- MEMS/NEMS Fabrication and Devices
- Nano Imprint

5. Testing Methods and Devices

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

6. Systems and Applications

- Optical Storage Systems
- Archival Applications
- Security Applications
- Mobile Applications
- Medical and Bio Applications
- New 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

All participants (including speakers) are requested to register, and are encouraged to register in advance (by **September 24, 2010**) in order to receive the early registration discount.

I. Registration Fees

Registration Categories	Before / On September 24, 2010	After September 24, 2010
Regular	NTD 17,000	NTD 20,000
Student/ Retiree	NTD 6,000	NTD 8,000
Tutorial Seminar	NTD 3,000 One seminar NTD 5,000 Two seminars NTD 6,500 Three seminars NTD 7,500 Four seminars	NTD 3,000 One seminar NTD 5,000 Two seminars NTD 6,500 Three seminars NTD 7,500 Four seminars
Additional Options:		
Additional Technical Digest	NTD 1,000 per copy	
Tutorial Seminar Note	NTD 1,000 per copy	

* The currency is New Taiwan Dollar (NTD).
* Students are asked for showing their ID cards.

Payment of the Symposium registration fee entitles one print and one CD version of the Technical Digest, tickets for the Cocktail Reception and Banquet, Free lunch during the symposium and entrance to all technical sessions.

Payment of the Tutorial Seminar registration fee entitles single registrant to Tutorial Seminar and one print copy of the Tutorial Seminar handout.

II. Method of Registration

On-line registration for ISOM'10 will be opened on August 10, 2010. Those who wish to attend ISOM'10 should access the ISOM website (http://www.isom.jp/). On-line registration is highly recommended. In case where on-line registration is not convenient, you can register by submitting the Registration Form via facsimile, e-mail or postal mail to ISOM'10 Local Secretariat along with your proof of payment. Registration before or on September 24 will enjoy a lower registration fee and the registration website will be opened until October 15. After October 15, registration has to be done on-site during the conference.

III. On-Site Registration

The Registration Desk will be located in front of the Ballroom on the 2nd floor of Parkview Hotel from Sunday through Wednesday during the following hours.

Sunday, Oct. 24	8:00-18:00
Monday, Oct. 25	8:00-16:00
Tuesday, Oct. 26	8:00-14:00
Wednesday, Oct. 27	8:00-13:00

Because the Registration Desk in the morning on October 25 is supposed to be so crowded, it is recommended to finish your registration within October 24.

IV. Registration and Payment

Payment should be made in New Taiwan Dollar by cash or credit cards (JCB, VISA and Master Card), payable to ISOM'10. No personal checks will be accepted. On-site payment should be made in New Taiwan Dollars by credit cards or cash.

V. Cancellation Policy

You are encouraged to register in advance for your own convenience. Due to materials printing commitments, refunds

requested after October 8, 2010 cannot be guaranteed.

If written notice of cancellation reaches the ISOM'10 Secretariat:

- Before 23:59 GMT+0800, October 8, 2010: A NTD 1,500 processing fee will be withheld from all refunds.
- After 23:59 GMT+0800, October 8, 2010: no refund will be given. A copy of the conference proceedings will be sent after the Symposium.

INSTRUCTION FOR SPEAKERS

I. Speaker and Presider Check-In

All speakers and presiders are requested to check in at the VIP Registration Desk that will be located in front of the Ballroom on the 2nd floor of Parkview Hotel.

II. Oral Presentation

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.

All speakers are requested to get in touch with their presiders 15 minutes before their sessions start.

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 Ballroom 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 Ballroom 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.

III. Poster Presentation

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

the board.

The papers are divided into two sessions: Poster Session I (14:00-15:30) and Poster Session II (16:00-17:30), both on October 26.

Each author is provided with a 200 cm high x 150 cm wide poster space on which a summary of the poster paper is to be displayed on the board.

All authors are requested to affix their posters on the day of the poster session. 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 30 min. The absence of authors during the assigned session is treated as "CANCELLED". 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 July 31 to August 18, 2010.

Authors will be notified about the beginning of September, 2010 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.

Type	Total	Presentation	Discussion
Post Deadline	15 min.	12 min.	3 min.

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 September, 2011. The authors who will have, by themselves, presented papers at ISOM'10 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/). The deadline for submission of manuscripts is January 30, 2011. 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

I. Tutorial Seminars

The Tutorial Seminars (T-1, 2, 3, 4) are offered on the first day of the conference and are targeted to expand your knowledge with technical information on the current state of research and developments in optical memories.

Pre-registration using the on-line 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: October 24, 9:00-17:30
- Place: Parkview Hotel, Ballroom A & B
- Fee: NTD 3,000 One seminar
  NTD 5,000 Two seminars
  NTD 6,500 Three seminars
  NTD 7,500 Four seminars
- Language: English

Program:

T-1 9:00-10:30

Plasmonics and Its Applications to Optical Data Storage
Prof. Din Ping Tsai (Nat'l Taiwan Univ., Taiwan)

Abstract: Tutorial of basic properties of plasmons, and its applications to optical data storage. Principle of plasmons and localized plasmons will be addressed. Advanced applications of plasmonics on the optical data storage will be reviewed.

Instructor Biography: Din Ping Tsai is a professor of National Taiwan University and Director General of the National Instrument Technology Research Center in Taiwan. He is a Fellow of SPIE, OSA, APS, EMA and the Physical Society of ROC. He is author and coauthor of 140 SCI journal papers and 16 patents.

10:30-11:00 Break

T-2 11:00-12:30

Tutorial Overview of Probe-based Memories

Dr. Mustafa M. Aziz (Univ. of Exeter, UK)

Abstract: An overview of the operating principles of various probe-based memories will be given, along with an in-depth case study of the design of Terabit/in^2 phase-change electrical probe memories carried out as part of the EU-FP6 ProTeM project (www.protem-fp6.org).

Instructor Biography: Dr. Mustafa M. Aziz is a senior lecturer in Electronics at the University of Exeter. His research focuses on the theoretical modeling and experimental measurements of the write, read, and noise processes in storage technologies involving magnetic and phase-change media.

12:30-14:00 Lunch

T-3 14:00-15:30

Phase Change Memory Technologies (Optical Disc to New Applications)

Dr. Takeo Ohta (Ovonic Phase Change Institute, Japan)

Abstract: What is Phase Change Memory and the break through technologies for rewritable optical disc as DVD-RAM and BD. And the next stage, Phase Change has the functions of NVM and the future applications.

Instructor Biography: Dr. Takeo Ohta received a BSc and MS degree in Physics from Faculty of Science of Kyoto University. He awarded the 1st Matsushita Science Prize in 2001. He moved to Energy Conversion Devices Inc. (Michigan, USA), vice president, Optical and Electronic Memory in 2002. And he started “Ovonic Phase Change Institute”, Japan in 2004.

15:30-16:00 Break

T-4 16:00-17:30

Digital Archive using Optical Disks

Prof. Kunimaro Tanaka (Teikyo-Heisei Univ., Japan)

Abstract: Digital archive is recent method to preserve existing various information to the future. Optical disk will play important role because of its longevity. This paper explains standardization activity of the optical disk for archive.

Instructor Biography: Graduated from Chiba University in 1962 and joined Mitsubishi Electric Corp. He had worked on development of consumer use video recorder, professional digital tape recorder, and optical disk drive. He moved to Teikyo Heisei University in 1991. Prof. Dr. Tanaka is fellow member of AES, IEEE, IEICE, ITE, JFES.

II. Social Program

Cocktail Reception

All regular and student attendees are invited to the Cocktail Reception.

- Date & Time: Monday, October 25 18:30-
- Place: Parkview Hotel, Ballroom A & B
- Fee: Free for all of registered regular and students.
  Accompanying person will have to pay NTD 1,000.

Banquet

All regular and student attendees are invited to the Banquet.

- Date & Time: Wednesday, October 27 18:30-
- Place: Parkview Hotel, Ballroom A & B
- Fee: Free for all of registered regular and students.
  Accompanying person will have to pay NTD 1,000.

III. Technical Exhibition

Technical Exhibition is organized. The optical storage and related products, equipment, etc. from the leading companies and laboratories will be presented.

- Date & Time: Monday, Oct. 25 10:00-18:00
  Tuesday, Oct. 26 10:00-18:00
  Wednesday, Oct.27 10:00-14:00
- Place: Parkview Hotel, 2F Lobby

IV. Technical Tour

- Date & Time: Wednesday, October 27, 14:00-18:00
- Place: Taiwan Yes Deep Ocean Water Co., Ltd.
  National Dong Hwa Univ.
- Fee: Free
- Schedule:

【Group A】Parkview Hotel → Taiwan Yes Deep Ocean Water Co., Ltd. → National Dong Hwa Univ. → Parkview Hotel

【Group B】Parkview Hotel → National Dong Hwa Univ. → Taiwan Yes Deep Ocean Water Co., Ltd. → Parkview Hotel

There is no limitation of participant; however, advance registration is required.

V. Excursion

Optional tours are offered during the ISOM'10 for you to enjoy the visit to Taiwan. If you need assistance with any of your travel plans, please contact:

The Parkview Hotel Concierge Center
Tel: +886-3-822-2111 / Fax: +886-3-822-6999

Half-Day Tour

- Taroko Gorge Tour
  - Duration: 4 hrs
  - Tour Fare: NTD 700 per adult
  - Tour Spotlight: Gorge Gateway, Swallow Grotto Trail, Tunnel of Nine TurnsTrail, Eternal-Spring Shrine, etc.
- City Culture Tour
  - Duration: 4 hrs
  - Tour Fare: NTD 700 per adult
  - Tour Spotlight: Pine Garden, Cisingtan Scenic Area, Liyutan, etc.

Full-Day Tour

- East Rift Valley Leisure Tour
  - Duration: 7 hrs
  - Tour Fare: NTD 2,500 per adult
  - Tour Spotlight: Wetland Ecology of Mataian Tribe, Caves of the Eight Immortals, Long Rainbow Bridge, Shihtiping Fishing Port, etc.

Other touring program will be available at the Registration and Information desk.

HOTEL ACCOMMODATIONS

A block of rooms has been reserved for the convenience of the ISOM'10 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. Please complete the reservation form and return it to the following hotels before September 10, 2010. It is recommended for you to reserve the room as soon as possible.

Early reservation is highly recommended because of the high occupancy rate during the Symposium period. The hotels' reservation deadline is on October 1, 2010.

Hotel Name	Type	Room Rate	Internet Facilities	Characteristic
Parkview Hotel	Single	weekday NT$ 3,000 holiday NT$ 4,500	Available	Conference Hotel
	Twin	weekday NT$ 3,300 holiday NT$ 4,500		
KKS Hotel	Single	weekday NT$ 1,400 holiday NT$ 2,240	Available	only 300m apart from Hualien Rail Station
	Twin	weekday NT$ 1,800 holiday NT$ 2,600		
Astar Hotel	Single / Twin	weekday NT$ 2,000 holiday NT$ 2,600	(Lobby)	located by the seashore
Marshal Hotel	Single	weekday NT$ 1,800 holiday NT$ 2,800	Available	located by the shopping street
	Twin	weekday NT$ 2,000 holiday NT$ 2,920		

- Reservation of hotel room must be made directly with the hotel by e-mail or facsimile.
- All room rates are per night including one breakfast.
- Free Shuttle service to/from the Parkview Hotel is available, advanced registration is required.
- It takes about 10 minutes to the conference site by shuttle bus from all the sub-hotels.

Payment

Payment must be completed in New Taiwan Dollars (NTD) when you make reservations by credit card.

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.

Official Hotels Information

Parkview Hotel (Conference hotel)
No.1-1, Linyuan, Hualien City, Hualien County 970, Taiwan
Tel: +886-3-822-2111 Fax: +886-3-822-6999
Website: http://www.parkview-hotel.com/english/map.htm

KKS Hotel
No.223, Guolian 5th Rd., Hualien City, Hualien County 970, Taiwan
Tel: +886-3-832-5222 Fax: +886-3-833-5810
Website: http://www.kkshotel-mwm.com/

Astar Hotel
No.6-1, Minquan Rd., Hualien City, Hualien County 970, Taiwan
Tel: +886-3-832-6111 Fax: +886-3-832-4604
Website: http://www.astar-hotel.com.tw/

Marshal Hotel
No.36, Gongyuan Rd., Hualien City, Hualien County 970, Taiwan
Tel: +886-3-832-6123 Fax: +886-3-832-6140
Website: http://www.marshal-hotel.com.tw/

GENERAL INFORMATION & ATTENTION

I. Official Language

The official language of ISOM'10 is English.

II. 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'10 Symposium Registration Desk.

III. Visa Requirement

30-days visa-free privileges are afforded to citizens of the Australia, Austria, Belgium, Canada, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Republic of Korea, Latvia, Liechtenstein, Lithuania, Luxembourg,

Malaysia, Malta, Monaco, the Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, U.K., U.S.A and Vatican City State.

For other countries, visas are required to enter Taiwan and can be obtained from R.O.C. embassies, consulates or designated representative offices in visitors' native countries. Tourist visas are recommended. Foreign nationals may obtain a tourist visa to visit the Republic of China for purposes of sightseeing, business, family visits, study or training, medical treatment, or other legitimate activities. Tourist visas may be single- or multiple-entry. Meanwhile, passports valid for at least 6 months are required for anyone who plans to visit Taiwan.

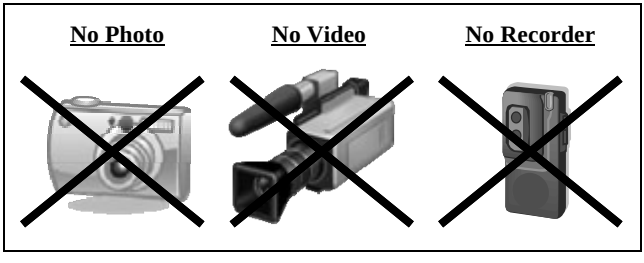
IV. Lunches

Lunches will be served by the ISOM'10 at Parkview Hotel 1F Garden Court.

V. Others

To receive further ISOM'10 announcement, please visit ISOM website (http://www.isom.jp/).

ATTENTION



TECHNICAL PROGRAM

October 25, 2010 (Monday)

A: Opening and Keynote

Presiders: Y. Kawata (Shizuoka Univ., Japan)
D.P. Tsai (Nat'l Taiwan Univ., Taiwan)
Program Committee Co-chairpersons

Mo-A-01
(8:30) Opening Remarks

K. Ogawa (Univ. of Tokyo, Japan)
Organizing Committee Co-chairperson
M.-K. Wu (Academia Sinica, Taiwan)

Mo-A-02 (Keynote Speech)
(8:40) The Developement Strategy of Taiwan Optical Electrics Industry

C.-K. Lee[1,2] ([1]ITRI, [2]TISA, Taiwan)

B: New World

Presiders: N. C. Park (Yonsei Univ., Korea)
T. Tanaka (RIKEN, Japan)

Mo-B-01 (Invited)
(9:10) Optical Disk for Photocatalytic Process of Environmental Applications

D. P. Tsai[1,2,3], H. J. Huang[1], N.-L. Wu[2], C.-S. J. Wu[2] ([1]Nati'l Applied Research Laboratories, [2]Nati'l Taiwan Univ., [3]Academia Sinica, Taiwan)

A new application of optical disk is introduced. We demonstrated a novel technology of using optical disk in photocatalytic chemical process to decompose the environmental waste such as Methyl Orange to carbon dioxide and water.

Mo-B-02 (Invited)
(9:35) Application of Optical Pick-up Head System for Bio-Sensing with New Circular Substrate Format

D.-R. Huang[1], J.-J. Ju[2], Y.-C. Lee[2], J.-S. Chen[2], F.-H. Lo[2], Y.-C. Weng[1] ([1]National Dong Hwa Univ., [2]Industrial Tech. Research Institute, Taiwan)

A new method to detect the bio-image of DNA samples on circular substrate format by using the optical pick-up head system with triple wavelength and three axis acuactor that can detect the florencent signal effectively.

Mo-B-03 (Invited)

(10:00) Magneto-Optics in Medicine a New Rapid Volumetric Diagnostic Assay for Malaria

D. M. Newman, R.J. Matelon, L. Savage, M.L. Wears (Univ. of Exeter, UK)

A novel hand held instrument has been developed that rapidly and sensitively diagnoses malaria by using the Cotton-Mouton effect to perform a volumetric assay for haemozoin, the parasites metabolic end product, in fingerprick blood samples.

Mo-B-04

(10:25) Low-loss Coherent Control of Light Confined Near a Defect in Photonic Crystal

H. Nihei[1], A. Okamoto[2] ([1]Health Sciences Univ. of Hokkaido, [2]Hokkaido Univ., Japan)

The energy loss of confined light near a defect in photonic crystals during the coherent control is strongly suppressed by tuning the confined light mode to a dark line, leading to the low-loss optical control.

Break (10:45-11:05)

C: Drive Technology and Signal Processing

Presiders: S. Higashino (Sony, Japan)
M. Aziz (Univ. of Exeter, UK)

Mo-C-01 (Invited)

(11:05) Advancement of the Neural Network based Hybrid Equalizer

M. Itonaga, K. Matsuzaki, A. Saito, A. Hayami (JVC Kenwood, Japan)

Characteristics of the adaptive neural network hybrid equalizer are analyzed by using an engineering model of cerebellum learning process of brain. The results about downsizing of the circuit are also demonstrated.

Mo-C-02

(11:30) New Edge-Shift Detection Method for Write Strategy Optimization in High-Density Optical Disc Recording

T. Kurokawa, H. Minemura, A. Kikukawa, K. Watanabe (Hitachi, Japan)

We propose a sophisticated edge-shift detection method based on the PRML theory. It is capable of detecting the edge-shifts corresponding to the write-strategy table. Also, its results do not vary with SNR variation among drives.

Mo-C-03

(11:50) Perfect Tracking Control System with Prediction State Observer for Next Generation Optical Disk

T. Ogata[1], Y. Nabata[1], K. Ohishi[1], T. Miyazaki[1], M. Sazawa[1], D. Koide[2], Y. Takano[2], H. Tokumaru[2] ([1]Nagaoka Univ. of Tech., [2]NHK, Japan)

The tracking control of optical disk system is required high precision and robustness in more high rotation speed. This paper propose the new Perfect Tracking Control (PTC) system with Prediction State Observer.

Mo-C-04

(12:10) Experimental Analysis of Axial Run-out in Flexible Optical Disks

T. Kajiyama[1], D. Koide[1], H. Tokumaru[1], Y. Takano[2], N. Onagi[3], Y. Aman[3] ([1]NHK, [2]NHK Engineering Service, [3]Ricoh, Japan)

We investigated the axial run-out in flexible optical disks. Axial run-out have the three states. These states change conditions vary with the disk thickness. 0.2-mm-thick disks are suitable for high-speed rotation than 0.1-mm-thick disks.

Lunch (12:30-14:00)

D: High Density I "Plasmonics and Near-field"

Presiders: J. Kawamata (Yamaguchi Univ., Japan)
H. Miyamoto (Hitachi, Japan)

Mo-D-01 (Invited)

(14:00) Advances in Multi-Dimensional Optical Data Storage

M. Gu (Swinburne Univ. of Tech., Australia)

We present the recent progress on multi-dimensional optical data storage in nanoparticle-dispersed materials. It provides a new horizon of the high capacity data storage when super-resolution optical systems are combined.

Mo-D-02 (Invited)

(14:25) Plasmon Enhanced Three-Dimensional Multi-Layer Optical Disk

T. Tanaka[1,2] ([1]Riken Metamaterials Lab., [2]Hokkaido Univ., Japan)

Surface plasmon enhanced 3D multi-layered optical disk has developed. Digital data are recorded as a fluorescent pattern of Rhodamine-B and are retrieved by a confocal fluorescent pick-up without any significant crosstalk from the adjacent layers.

Mo-D-03

(14:50) One Head Writing/Erasing on a Rewritable Dual-Layer NFR Optical Disk Having High-index Cover and Separation Layers

K. Narumi, K. Hisada, T. Mihara, T. Shiono, R. Kojima, H. Tomita, M. Birukawa, N. Yamada (Panasonic, Japan)

Recording/reading characteristics of a rewritable dual-layer NFR optical disk with high-index (n=1.8) thin cover and separation layers are presented. A new optical head system enabling to access the both layers with single SIL was used.

Mo-D-04

(15:10) Thermal Analysis of HAMR Head with LD on Slider

B. Xu, Q. Zhang, C. An, G. Vienne, Y. T. Toh, C. W. Chia, T. C. Chong (Data Storage Institute, Singapore)

The temperature changes of HAMR head with LD on slider are studied at different boundary thermal resistance, heat power, slider fly height and fly speed. The effects of it on head performances are discussed.

Mo-D-05 (Invited)

(15:30) TBD

P. Török (Imperial College, UK)

Break (15:55-16:15)

E: Systems and Applications

Presiders: K. Tanaka (Teikyo Heisei Univ., Japan)
Y. Chiu (Nat'l Chiao Tung Univ., Taiwan)

Mo-E-01 (Invited)

(16:15) State-of-the-art of 3D Standardization

T. Koike (Hitachi, Japan)

3D technology covers a wide range of technologies. Thus, much 3D standardization has ongoing discussions. We present current statuses and futures of various 3D standardizations with indicating their scopes.

Mo-E-02

(16:40) SIL based Near Field Recording System with Flexible Optical Disk

H. Hwang, J.-G. Kim, K. W. Song, K.-S. Park, N.-C. Park, H. Yang, Y.-C. Rhim, Y.-P. Park (Yonsei Univ., Korea)

In this paper, in order to realize high data storage capacity and high data transfer rate together, SIL-based NFR system with flexible optical disk is proposed.

Mo-E-03

(17:00) Demonstration of Optical Threshold Secret Sharing Scheme with Secure Holographic Memory and Mutually Pumped Phase Conjugator

Y. Okada[1], A. Okamoto[1], A. Tomita[1], M. Takabayashi[1], S. Honma[2] ([1]Hokkaido Univ., [2]Univ. of Yamanashi, Japan)

We demonstrate a threshold secret sharing scheme all-optically first by combing authentication mechanism based on two-wave encryption method which is one of secure holographic memories and a threshold processing device by mutually pumped phase conjugator.

October 26, 2010 (Tuesday)

F: Components and Nano Fabrication

Presiders: M. Itonaga (JVC Kenwood, Japan)
Y.-J. Kim (Yonsei Univ., Korea)

Tu-F-01

(8:30) Design, Fabrication and Testing of Compact Light Path for Heat Assisted Magnetic Recording

E. J. Black, Y. Kong, Y. Luo, J. A. Bain,
T. E. Schlesinger (Carnegie Mellon Univ., USA)

We present a compact light path for integration with HAMR heads in magnetic disk drives consisting of a curved grating input coupler and symmetric slab dielectric waveguide tapered to a single mode rectangular waveguide.

Tu-F-02

(8:50) Non-Contact Deformable Mirror Actuator for Spherical Aberration Compensation

J. Hashizume, T. Ide, M. Kanamaru, M. Mukoh,
K. Watanabe, Y. Yamauchi (Hitachi, Japan)

We proposed and demonstrated a novel non-contact deformable mirror actuator for spherical aberration. The continuous change of defocus aberration proportional to the deformation of mirror was achieved in a normal incidence.

Tu-F-03

(9:10) One-Beam Push-Pull Method for Multilayer Blu-ray Discs

H. Nakahara, M. Ohmaki, M. Shinoda, T. Matozaki,
N. Takeshita (Mitsubishi Electric, Japan)

We propose a newly developed one-beam push-pull method for multilayer Blu-ray Discs. It can effectively suppress the influence of stray lights from other layers which disturbs tracking error signal.

Tu-F-04

(9:30) Novel Three-Beam Tracking Method using Slit-Integrated-PDIC for Multi-Layer Blu-ray Disc Recording

N. Kawano, T. Nishiyama, Y. Sato, K. Mishima, H. Utsunomiya, H. Nishimura, T. Ishida (TDK, Japan)

In this paper, we propose a slit method using slit-integrated-PDIC that solves issues concerning the stray lights of multi-layer disc in three-beam tracking detection method.

Tu-F-05

(9:50) A MEMS Optical Pickup Unit Fabricated and Assembled on SOI Wafers

Y. Chiu[1], C.-A. Lin[1], J.-C. Chiou[1], H.-F. Shih[2] ([1]Nat'l Chiao Tung Univ., [2]Nat'l Chung Hsing Univ., Taiwan)

The assembly technology for 3-D microstructures is applied to a MEMS-based optical pickup. The design and fabrication of the optical pickup components is presented.

Break (10:10-10:30)

G: Media and Basic Theory

Presiders: T. Shintani (AIST, Japan)
P. Török (Imperial College, UK)

Tu-G-01 (Invited)

(10:30) Progress of Thermal Recording for High Density Disc Mastering

S. Murakami, N. Yamaoka, Y. Sugawara, S. Jinno, T. Takishita, F. Yokogawa (Pioneer, Japan)

We confirmed that the optimization of silicon master structure could make the pit shape clearly defined. We have chosen a dielectric as the recording material of the thermal recording.

Tu-G-02

(10:55) Effect of Input Beam Polarization on Induced Magnetic Field in All-Optical Magnetic Recording

G. Vienne, K. Eason, J. M. Li (Data Storage Institute, Singapore)

We consider three polarization states (radial, azimuthal, and circular) and calculate the contributions of both the inverse Faraday effect and the optically induced spin-orbit coupling to the laser-induced magnetic field in GdFeCo.

Tu-G-03

(11:15) Temperature Controlled Extraordinary Transmission of Freestanding Superconductor Photonic Crystal Slabs

H.-M. Lee, J.-H. Shyu, L. Horng, J.-C. Wu (Nat'l Changhua Univ. of Education, Taiwan)

We have first provided a 3-D model and demonstrated the temperature controlled extraordinary transmission of freestanding superconductor slab numerically. Our simulation results clearly show that the unusual transmission spectra are observed for perforated superconductor slab.

Tu-G-04

(11:35) Influence of Thermal Expansion for Reflection Volume Hologram Stored in $LiNbO_3$ Crystal

C. S. Wu[1], C. M. Shih[2], H. M. Chu[2], T. Y. Chung[1], Y. W. Yu[1], C. C. Sun[1] ([1]Nat'l Central Univ., [2]Chung Yuan Christian Univ., Taiwan)

Through the consistent results of the experiment and simulation, we can analyze the effect of diffracted field for arbitrary thermal expansions by the model of VOHIL[6].

Tu-G-05

(11:55) Chemical Analysis of the Dyes in Today's Archival- and Standard-Grade DVDs

G. Jiang[1], D. S. Jensen[1], M. C. Asplund[1], D. P. Hansen[2], R. C. Davis[1], B. M. Lunt[1], M. R. Linford[1] ([1]Brigham Young Univ., [2]Millenniata, USA)

Chemical analysis shows significant similarities of the dyes from archival- and standard-grade recordable DVDs. Also, a new compound was found in the dye of one archival-grade DVD after writing and then exposure to extreme conditions.

Tu-G-06

(12:15) Effects of Elevated Temperature, Humidity and Light on DVDs

Bradley M. Lunt, Barry M. Lunt (Brigham Young Univ., USA)

The data on DVDs degrades much more quickly when subjected to accelerated testing combined conditions of

elevated temperature, humidity, and full-spectrum light, than when these test conditions are applied separately.

Lunch (12:35-14:00)

H: Poster Session I (14:00-15:30)

Presiders: Y. Kawata (Shizuoka Univ., Japan)
T. Kikukawa (TDK, Japan)

Tu-H-01

Origin of Second-Order Nonlinear Optical Effects of Nonpoled Donor-Acceptor Chromophores on Surface

T. Michinobu, Y. Li, Y. Washino, K. Murata, K. Tsuboi (Tokyo Institute of Tech., Japan)

Donor-acceptor molecules, prepared by high-yielding and atom-economic addition reaction between electron-rich alkynes and strong acceptor molecules, were spin-coated on a quartz plate and their second-order nonlinear optical effects were investigated.

Tu-H-02

Optimization of Angle-Multiplexing Holographic Data Storage in the Transmission Geometry

J.-P. Liu (Feng Chia Univ., Taiwan)

We proposed an algorithm to find an optimized set of the angular separations for a holographic angle -multiplexing storage system in the transmission geometry. The effect of the refractive index of the hologram is also discussed.

Tu-H-03

Phase-Change Fabrication for Opto-Thermal Nanolithography

Z. H. Lu, F. H. Chen, B. H. Chen, C. H. Chu, L. H. Huang, H. W. Chen, Y. H. Fu, D. P. Tsai (Nat'l Taiwan Univ., Taiwan)

The ultra high density optical data storage technology shows the capability of fabrication for less than 100 nm dimension recording marks, far beyond the diffraction limit. The novel nanolithography to fabricate on $Ge_2Sb_2Te_5$.

Tu-H-04

Study Inorganic Resist as a Mask Layer for Dry Etching Process

J.-P. Chen[1], C.-C. Chang[2], H.-H. Chen[1], M.-F. Hsu[1], C.-T. Cheng[1], C.-W. Chen[2], W.-C. Wang[2] ([1]Industrial Tech. Research Institute, [2]Ritek, Taiwan)

In this paper, we introduce a positive-type inorganic resist as a mask and use the Reactive Ion Etching (RIE) process to transfer the pattern into a pre-deposited silicon thin film on the substrate.

Tu-H-05

High Resolution Image Restoration Method for Page based Holographic Data Storage System

N. Kim[1], P. Yoon[2], S. Lim[1], J. Kim[1], K.-S. Park[1], N.-C. Park[1], H. Yang[1], Y.-P. Park[1] ([1]Yonsei Univ., [2]Samsung Electronics, Korea)

Proposed method is able to generate high resolution CMOS detected data image virtually. The virtual detected data image with high resolution has a good reconstruction quality compared with the retrieved data image from HDS system.

Tu-H-06

Sensorless Permanent Magnet Synchronous Motor Speed Control with a H∞ Observer

H.-H. Chou[1], S. Cheng[2], C.-M. Ting[1] ([1]Intelligent Machinery Tech., [2]Nat'l Chiao-Tung Univ., Taiwan)

This paper derives and proves the convergence of H∞ observer to realize the sensorless PMSM speed control. The observer guarantees the gain for the worst-case estimation error is within the index range of design performance.

Tu-H-07

Evaluation of Statistical Analysis Method for Optical Disks Life Expectancy

M. Irie[1], Y. Tani[1], T. Yamazaki[1], Y. Okino[2], T. Kubo[3] ([1]Osaka Sangyo Univ., [2]Kansai Univ., [3]T. KUBO Eng. Sci. Office, Japan)

We discuss some statistical analysis method for the life expectancy of optical disks using an archival digital image in order to apply a rigorous clarification of archival grade disks.

Tu-H-08

Extending the Sensing Range of Refractive Index for Radial Polarization Enabling Wide-Field SPR Sensor

T.-H. Lan, Y.-K. Chung, C.-H. Tien (Nat'l Chiao Tung Univ., Taiwan)

We utilize sandwiched structure to extend the sensing range of a radial polarization Wide-Field SPR Sensor as well as elicits transformed SPR mode within all visible range.

Tu-H-09

Simulation Method for Measuring the Displacement and Angle with a DVD Pickup Head

W.-S. Sun, Y.-N. Lin, J.-Y. Chang (Nat'l Central Univ., Taiwan)

We develop a fiber coupled laser pickup head for measuring the tilt angle and displacement on a test plane. Two optical design software packages, Code V and LightTools, are used in this study.

Tu-H-10

Speckle-Multiplexing Technique for Holographic Memory using a Random Phase Filter and a Polymer-Dispersed Liquid Crystal Filter

W. Hu[1], T. Hasagawa[1], T. Sekiguchi[2], S. Honma[1] ([1]Univ. of Yamanashi, [2]NEC Networks & System Integration, Japan)

We propose new method to increase recording density using the combination of a PDLC filter and a random phase filter. We experimented on holographic recording and estimated the shift and the applied voltage selectivity.

Tu-H-11

Nonlinear Equalization for Super-RENS Disc using a Simplicial Canonical Piecewise-Linear Model

M. Seo, S. Jeon, S. Im (Soongsil Univ., Korea)

In this paper, we proposed a SCPWL model-based equalizer for the super-RENS read-out signal to mitigate the nonlinear ISI. The experiment results verified that the proposed scheme could efficiently improve the performance of super-RENS systems.

Tu-H-12

Axial Vibration Characteristics Considering a Moving Pick-up of a Optical Flexible Disk System

J. H. Jo, Y.C. Rhim (Yonsei Univ., Korea)

The effects of pickup window on the stability of flexible disk are investigated numerically and experimantally.

Tu-H-13

The Experimental Result of the Collinear Holographic Storage System

C.-Y. Cheng, Y.-W. Yu, C.-C. Sun (Nat'l Central Univ., Taiwan)

The holographic data storage system is one of the methods which can enhance the capacity of the storage system. In this paper, we show the experimental and simulation results of the collinear holographic storage system.

Tu-H-14

Near-Field Optical Recording with Numerical Aperture of 1.85

J.-H. Kim, S.-H. Lee, J.-S. Lee, B.-S. Kwak, J.-K. Seo, J.-J. Lee, B.-H. Min (LG Electronics, Korea)

The recording and readout characteristics of high density rewritable NFR with NA of 1.85 using advanced type SIL and high refractive index cover-layer will be discussed.

Tu-H-15

Neural Network Equalizer Matched to Recording Code in Holographic Data Storage

H. Osawa, S. Natsui, Y. Okamoto, Y. Nakamura (Ehime Univ., Japan)

A simplification method of neural network equalizer (NNE) matched to 5-9 recording code in holographic data storage is proposed. A 40 percent reductions in the number of connections of NNE is attained without performance degradation.

Tu-H-16

Air Gap Control Algorithm Technologies for High NA Near-Field Storage System using Solid Immersion Lens

J.-G. Kim, H.-W. Hwang, N.-C. Park, H. Yang, Y.-P. Park (Yonsei Univ., Korea)

This paper describes improved precision air gap control algorithm for near field storage system using an advanced control method. By applying proposed gap servo system, control performance of external disturbance rejection is in creased effectively.

Tu-H-17

New Coding Method by Multi-Resolution for High Density Recording in Holographic Data Storage

M. Shigaki, K. Nitta, O. Matoba (Kobe Univ., Japan)

We propose a new data coding method by using multi-resolution with phase modulation for holographic memory. We show that 3:9 coding with phase modulation gives the highest coding efficiency of 0.78.

Tu-H-18

Soft-Decoding Algorithm of 3/4 Tone-Controllable Code with LDPC code for Holographic Data Storage

D. Park, J. Lee (Soongsil Univ., Korea)

The input of LDPC decoder prefers the soft values of the modulation decoder rather than hard decision data. Therfore, we propose a soft-decoding algorithm for the 3/4 TC code for better decoding performance.

Tu-H-19

Simple Readout Channel Model of Super-RENS Disk System

T. Tanabe, H. Igawa, K. Suzuki, T. Ansai (Ibaraki Nat'l College of Tech., Japan)

The readout channel response of the Super-RENS disk is investigated by using pseudorandom sequence and a simple readout channel model is proposed.

Tu-H-20

An EM based Adaptive Threshold Detection Algorithm for Multi Level Holographic Data Storage

J. Kim, J. Lee, T. Park, S. Im (Soongsil Univ., Korea)

EM algorithm is applied to the estimation of multipath channel, joint symbol detection and timing offset estimation problem, and the processing of the hidden Markov models in the speech recognition.

Tu-H-21

Ge/CuSi Bilayer Thin Film for Write-Once Blue Laser Optical Recording Media

S.-L. Ou[1], P.-C. Kuo[1], D. Chiang[2], W.-T. Tang[3], H.-F. Chang[4], C.-Y. Yeh[4] ([1]Nat'l Taiwan Univ., [2]Nat'l Applied Research Laboratories, [3]Nat'l Tsing Hua Univ., [4]CMC Magnetics, Taiwan)

The microstructures and recording properties of the Ge/CuSi bilayer film had been studied. The reflectivity change occurred at 180 °C ~ 280 °C and 320 °C ~ 350 °C evaluated by the thermal analysis.

Tu-H-22

Diffraction Efficiency in One-step Reflection Disk-type Multiplex Hologram

Y.-S. Cheng, C.-H. Chen, P.-J. Chen (Nat'l Central Univ., Taiwan)

In this paper, diffraction efficiency of the multiple-exposure disk-type hologram as compared with that of the single-exposure condition is demonstrated. Through the experimental results, suitable exposure energy for disk-type multiplex hologram can be determined.

Tu-H-23

VHOE based Sub-Pixel Position Sensor

Y.-W. Yu[1], T.-C. Teng[2], C.-S. Wu[1], C.-C. Su[1] ([1]Nat'l Central Univ., [2]Nat'l Taiwan Normal Univ., Taiwan)

We proposed a volume holographic optical element (VHOE) which is one-dimensional point-to-points-array imaging. Using CCD to detect the shifting points array, sub pixel of shift resolution can be achieved.

Tu-H-24

Fabrication of Magneto-Optical Kerr Microscopy with ns-Temporal and GHz-Frequency Resolution

S.-H. Lee, J.-H. Shim, H.-G. Piao, D.-H. Kim (Chungbuk Nat'l Univ., Korea)

We report a fabrication of the magneto-optical Kerr microscopy combined with fast-gated CCD and the broadband spectrum analyzer.

Break (15:30-16:00)

I: Poster Session II (16:00-17:30)

Presiders: M. Irie (Osaka Sangyo Univ., Japan)
T. Shintani (AIST, Japan)

Tu-I-01

Talbot Patterns on Nanometer Permalloy Gratings

C.-Y. Kuo[1], H.-M. Lee[1], C.-T. Chao[1], T.-H. Wu[2], J.-C. Wu[1] ([1]Nat'l Changhua Univ. of Education, [2]Nat'l Yunlin Univ. of Science and Tech., Taiwan)

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

Tu-I-02

High Speed Dual-Layer Blu-ray Recordable Disc without Silver/Silver Alloy Semi-Reflective Layer

Y.-R. Kuo, Y.-H. Hung, C.-P. Li, Y.-K. Huang, K.-L. Li (CMC Magnetics, Taiwan)

In this paper, a design of dual-layer BD-R without metal semi-reflective layer is introduced, which achieves the desired performance and provides the possibility of simplified mass production configuration.

Tu-I-03

Investigation of Pulse Recording Characteristics in Holographic Memory

J. Nishide, A. Goto, S. Yoshida, M. Yamamoto (Tokyo Univ. of Science, Japan)

We simulated the formation of diffraction gratings by using a diffusion model and analyzed the diffraction characteristics by the beam propagation method; we also examined the characteristics of pulse recording by read/write simulation.

Tu-I-04

Effect of Light Exposure on the Characteristics of Optical Recording Media

D.-R. Huang[1], J.-X. Lin[1], J.-S. Chen[2], M.-Y. Lin[2], J. Tsai[2], H.-W. Wu[2] ([1]Nat'l Dong Hwa Univ., [2]Industrial Tech. Research Institute, Taiwan)

The characteristics of recordable discs under long time light exposure may be defected seriously. Generally, the

jitter values are increased as the light exposure time is increased, but the increased rates of jitter are different.

Tu-I-05

Application of Herringbone Groove Bearing to a Slim Type Optical Disk Drive for the Reduction of Warpage, Noise Level, and Vibration of the Rotating Disk

J. H. Seo, M. H. Choi, Y. C. Rhim (Yonsei Univ., Korea)

Herringbone grooves are applied to the top cover of the slim type ODD to reduce noise and vibration. Geometric effects of herringbone grooves are investigated numerically and experimentally.

Tu-I-06

Application of HIT Solar Cell on Photo-Detectors

C.-Y. Wei, C.-H. Lin (Nat'l Dong Hwa Univ., Taiwan)

We use the high efficiency HIT structure for applications on photo-detectors. We have investigated the relation between material thickness and responsivity. The thickness of a HIT photodetector should depend on the detection wavelength we desired.

Tu-I-07

Evaluation Method of an Influence of Wavefront Aberration on Signal Quality in Holographic Memory

A. Nakajima, K. Akieda, T. Ohori, K. Katakura, M. Yamamoto (Tokyo Univ. of Science, Japan)

One of the problems that affects the practical use of holographic memory is deterioration of reproduced images due to aberration in the optical system. The possibility of using liquid crystals for aberration control is investigated.

Tu-I-08

Magneto-Dielectric Relaxation Behavior of E7-Liquid Crystal

C.-M. Fu[1], C.-W. Tseng[2], L.-C. Huang[1], M.-F. Kuo[1], C.-W. Lee[1], C.K. Lo[2] ([1]Nat'l Taiwan Univ., [2]Nat'l Taiwan Normal Univ., Taiwan)

The magneto-dielectric relaxation behavior of E7-Liquid Crystal under external magnetic field was

studied in this work through the dynamic dielectric analysis. Further analysis implies that this result may be applicable for optoelectronic or storage devices.

Tu-I-09

Development of the Precision Long-Stroke 3-DOF Nano-Stage for the Photonic Crystal Process

W.-Y. Jywe[1], C.-T. Yang[2], J.-C. Shen[1], C.-C. Huang[2], C.-H. Wu[1], C.-Y. Chen[2] ([1]Nat'l Formosa Univ., [2]Industrial Tech. Research Institute, Taiwan)

This paper presents a precision long-stroke 3-DOF nano-stage for the nano photonic crystal process. It integrates a linear motor driven long-stroke stage, a piezoelectric driven 3-DOF nano stage, multi-DOF laser interferometer measurement system.

Tu-I-10

Design of Reference Pattern and Input Phase Mask for Coaxial Holographic Memory

Y. Saita, T. Nomura, E. Nitanai, T. Numata (Wakayama Univ., Japan)

Design methods of both a reference pattern and an input phase mask for a coaxial holographic memory are proposed. Experimental verification of them are shown to confirm the proposed method.

Tu-I-11

Development of Plane Inclination Detection for Coaxial Holography Data Recording System using Patterns Variation

S. Cheng, C.H. Lin (Nat'l Chiao-Tung Univ., Taiwan)

This paper presents a new detection method for coaxial holography data recording system which estimates the direction and the angle of the disc plane inclination by calculating the area variation of the micro patterns.

Tu-I-12

Unitary Photodetector Compatible Optical Pickup Head for Blu-ray Disc, Digital Versatile Disc, and Compact Disc Systems

W.-S. Sun, Y.-N. Lin, J.-Y. Chang (Nat'l Central Univ., Taiwan)

We present a unitary photodetector compatible optical pickup head design for Blu-ray Disc, DVD, and CD

systems. We make three laser diodes, holographic optical element and one photodetector be encapsulated within an integrated optical unit.

Tu-I-13

Parallel Signal Readout for Roll-type Optical Advanced Memory

M. Tsuji[1], T. Tsukamoto[1], W. Inami[1], Y. Kawata[1], M. Ito[2] ([1]Shizuoka Univ., [2]Lintec, Japan)

We propose a one-dimensional parallel readout for roll-type optical advanced memory. Since signals are read out in parallel, the readout system that we proposed can increase data transfer rate compared with currently available system.

Tu-I-14

Full Motion Analysis for Holographic Memory by Three-Dimensional Fast Fourier Transform Beam-Propagation Method

A. Okamoto[1], J. Tanaka[1], H. Funakoshi[2], A. Tomita[1], A. Shibukawa[1] ([1]Hokkaido Univ., [2]Gifu Univ., Japan)

In full motion analysis by FFT-BPM for the collinear holographic memory, recording of 63 two-dimensional data pages from three color JPEG images and reconstructions are simulated. The relation between multiplicity and SNR is clarified quantitatively.

Tu-I-15

Validation of Macroscopic Shrinkage Model of Photopolymer for Holographic Memory Simulator using Angular Multiplexing

M. Shigaki, K. Nitta, O. Matoba (Kobe Univ., Japan)

We show the effectiveness of the macroscopic shrinkage model of photopolymer by comparing the theoretical analysis based on wave-vector diagram for holographic memory with angular multiplexing.

Tu-I-16

Error Correcting 6/8 Modulation Code for Reducing Two-Dimensional Intersymbol Interference

K. Shin, J. Kim, J. Lee (Soongsil Univ., Korea)

We propose an error correcting 6/8 modulation code for holographic data storage.

Tu-I-17

PRML System for Two-Photon Absorption Recording

Y. Nakamura, K. Okinaka, Y. Okamoto, H. Osawa (Ehime Univ., Japan)

The performances of the PRML systems are evaluated in a two-photon absorption recording channel model. The results show that the PR (1,2,2,2,1) ML system has the better performance compared with the PR (1,2,2,1) ML system.

Tu-I-18

Design of Copying System for Reflection Disk-type Multiplex Hologram

C.-H. Chen, Y.-S. Cheng (Nat'l Central Univ., Taiwan)

Using the symmetric property of diffracted image rays generated from 360-degree viewable disk-type multiplex hologram, we propose a stable optical system for holographic copying as reflection hologram.

Tu-I-19

Phase Transition Mastering Technology for BD-Recordable Stamper

C. C. Chang[1], J. P. Chen[2], K. C. Chiu[2], C. W. Chen[1], W. H. Wang[1] ([1]Ritek, [2]Industrial Tech. Research Institute, Taiwan)

This study show that BD-R stamper with inorganic resist depth smaller than 25nm can be successful manufacture by means of a designed three layer stack.

Tu-I-20

Iterative Decoding Between 2D SOVA and Error Correcting Modulation Code on Holographic Data Storage

J. Kim, J. Lee (Soongsil Univ., Korea)

We propose an iterative decoding method between 2D soft output Viterbi algorithm (SOVA) that is channel detector and error correcting modulation code on holographic data storage.

Tu-I-21

(k, k+1) Tone-Controllable Codes for Holographic Data Storage

K. Lim, D. Park, J. Lee (Soongsil Univ., Korea)

We propose the (k, k+1) tone-controllable codes that can easily change the ratio of ON and OFF pixels in a page.

Tu-I-22

Study of Laser Forward Patterning of $Ge_2Sb_2Te_5$ Phase-Change Thin Film

M. L. Tseng[1], B. H. Chen[1], C. H. Chu[2], C. M. Chang[1], W. C. Lin[1], H.-P. Chiang[2], D. P. Tsai[1] ([1]Nat'l Taiwan Univ., [2]Nat'l Taiwan Ocean Univ., Taiwan)

We utilize femto-second laser induced forward transfer method to deposit phase-change material $Ge_2Sb_2Te_5$ pattern. The phase composition and formation of $Ge_2Sb_2Te_5$ patterns are analyzed by various incident conditions.

Tu-I-23

Thermal Lithography using GeSbSn Oxide as Photoresist material

C.-T. Yang[1], C.-T. Cheng[1], S.-W. Chen[2], D. Chiang[3] ([1]Industrial Tech. Research Institute, [2]Nat'l Synchrotron Radiation Research Center, [3]Nat'l Applied Research Laboratories, Taiwan)

We introduce a new GeSbSn oxide as photoresist material and design an experimental procedure to evaluate the potential candidate materials, which are suitable for thermal lithography applications.

Tu-I-24

A Tunable Localized Surface Plasmon Resonance based on Gold Pillar Array Containing Liquid Crystal

J.-H. Shyu, Y.-C. Lin, H.-M. Lee, C.-T. Hsieh, C.-Y. Huang, J.-C. Wu (Nat'l Changhua Univ. of Education, Taiwan)

We demonstrate a tunable localized surface plasmon resonances device based on a gold pillar array in an ITO glass cell and infiltrated with nematic liquid crystal and investigation of varying external voltage bias.

Break (17:30-19:00)

J: Night Session

Presiders: S. Tanaka (Pioneer, Japan)
K. Sano (Panasonic, Japan)

Tu-J-01
(19:00) Introduction to the New Keynote of ISOM

M. Shinoda (ISOM Steering Committee, Japan)

Tu-J-02 (Invited)
(19:10) Internet Traffic and Network Energy Bottleneck

T. Hasama, H. Ishikawa (AIST, Japan)

The continuance of the present Internet traffic growth rate would result in network equipment power consumption above the total electricity generated in Japan in 2030. We propose 'optical path network' to overcome this energy bottleneck.

Tu-J-03 (Invited)
(19:35) Development of Optically Reconfigurable Gate Arrays

M. Watanabe (Shizuoka Univ., Japan)

This paper introduces optically reconfigurable gate array (ORGA) developments which can realize nanosecond-order reconfiguration capability along with numerous reconfiguration contexts by combining a holographic memory with a programmable gate array.

Tu-J-04 (Invited)
(20:00) Detection of Structural Defects of Extremely Low Concentrations in Commercial Synthetic Silica Glass

M. Ono, T. Ogawa, A. Koike, M. Takata (Asahi Glass, Japan)

Highly-sensitive electron-spin-resonance and photoluminescence measurements revealed that the concentrations of the intrinsic structural defects in synthetic silica glass, AQ, were less than 10^{13} pcs/cm^3. Together with extreme purity, absorption coefficient at 193 nm reached to 10^{-5} cm^{-1}.

October 27, 2010 (Wednesday)

K: Taiwan's Special Session

Presiders: D.-R. Huang (Nat'l Dong Hwa Univ., Taiwan)
T.-H. Wu (Overseas Chinese Univ., Taiwan)

We-K-01 (Invited)

(8:30) Development of Blue Laser Direct Write Lithography System for Periodic Nano Patterning Applications

C.-T. Yang[1,2] ([1]EOL, [2]ITRI, Taiwan)

The aim of this study is to develop thermal mode lithography process as well as a blue laser direct write lithography system equipped with a nano-positioning XY stage for arbitrary, highly ordered nanostructured pattern fabrication applications.

We-K-02 (Invited)

(8:55) Development of the Precision Long-Stroke 3-DOF Nano-Stage for the Photonic Crystal Process

W.-Y. Jywe (Nati'l Formosa Univ., Taiwan)

A precision long-stroke three DOF nano-stage for the nano photonic crystal process is presented, which integrates a long-stroke stage, a three DOF nano stage, a multi-DOF laser interferometer measurement system. With this precision nano-stage, the laser direct writing system can improve the process speed and generate the arbitrary patterns.

We-K-03 (Invited)

(9:20) Real-Time Detection of Linear and Angular Displacement with an ADS

E.-T. Hwu[1,2] ([1]Surface and Nano Science Lab., [2]Academia Sinica, Taiwan)

We demonstrate that an astigmatic detection system (ADS), constructed with a modified digital-versatile-disk (DVD) optical head, can achieve real-time measurement of a linear displacement and two-dimensional tilt angles with high sensitivity.

We-K-04 (Invited)

(9:45) Low-Cost Design for Flash-Memory Storage Systems

J.-W. Hsieh (Nat'l Taiwan Univ. of Science and Technology, Taiwan)

This talk presents a series of low-cost designs for various flash-memory storage systems, including a configurable management scheme to balance between cost and paerformance, a set-based strategy for reclaiming downgraded chips, and an on-demand hash-based scheme for huge-capacity systems.

Break (10:10-10:30)

We-K-05 (Invited)

(10:30) Cloud Storage Architecture

T.-C. Chiueh[1,2] ([1]CCMA, [2]ITRI, Taiwan)

Cloud-scale data centers demand a scalable and highly available storage system solution that meets the persistence requirement of the applications and services running on top of them. To achieve the kind of scalability and availability as demanded by cloud data centers, cost-effective data replication and dynamic storage tiering are two key building blocks. In this talk, I will describe the integrated storage architecture used in ITRI's Cloud OS 1.0, and explain its design rationale and detailed tradeoffs.

We-K-06 (Invited)

(10:55) Virtual Network Design in Taiwan UniCloud

R.-S. Chang (Nat'l Dong Hwa Univ., Taiwan)

Many universities in Taiwan are joining forces to build a university cloud, called Taiwan UniCloud. Since the resources are dispersed remotely, a virtual network design is very important. In this talk, we introduce the design principles of virtual networks in Taiwan UniCloud.

We-K-07 (Invited)

(11:20) Cloud Computing: Quanta Perspectives

T. Chang (Quanta Computer, Taiwan)

Quanta is the world's largest ODM company with products ranging from smartphone, PND, notebook PC

to data center solutions. In 2020, Quanta set her next vision on the new 3C (Cloud Computing, Connectivity and Client Devices) area. In this talk, we shall discuss how 3C technology revolution change the digital knowledge economics.

We-K-08 (Invited)

(11:45) Instant Read after Write Technology of Solid State Drive for Cloud Data Center

G.-Z. Wu[1,2] ([1]EOL, [2]ITRI, Taiwan)

Cloud data centers provide huge data transmission service with instant data validation. New solid state drives equipped with instant read after write function was proposed to break the technology bottleneck of cloud data storage devices.

Lunch (12:35-14:00)

Technical Tour (14:00-18:00)

October 28, 2010 (Thursday)

L: High Density II "Volume Recording"

Presiders: T. Shimano (Hitachi Maxell, Japan)
M. Gu (Swinburne Univ. of Tech., Australia)

Th-L-01 (Invited)

(8:30) Visible Laser Beam Excitable Efficient Two-Photon Absorption Materials

J. Kawamata (Yamaguchi Univ., Japan)

Recent two-photon absorption (TPA) materials obtained using novel material design strategies exhibit efficient TPA even by a visible laser beam excitation. Such materials will be outlined.

Th-L-02 (Invited)

(8:55) Microholographic Recording Toward Green Storage Systems

R. Katayama (NEC Avio Infrared Tech, Japan)

Several elemental technologies for microholographic recording toward large-capacity, high-reliability, and low-power-consumption professional storage systems, including electrical beam control, in-plane error signal detection, single-sided optics, and wavelength and angle multiplexing, will be described.

Th-L-03

(9:20) Void Type Micro-Reflector Recording using an All-semiconductor picosecond Laser

H. Yamatsu[1], Y. Takemoto[1], S. Tashiro[1], G. Fujita[1], T. Miura[1], T. Iwamura[1], H. Uchiyama[1], K. S. Yun[2] ([1]Sony, [2]Sony Chemical & Information Device, Japan)

We successfully demonstrated void type Micro-reflector recording using our drive system with spherical aberration compensator, recording medium which exhibits non-linear absorption, and an all-semiconductor picosecond laser as a light source.

Th-L-04

(9:40) Analysis of Phase Multi-Level Recording in Microhologram

T. Ide, H. Mikami, K. Osawa, K. Watanabe (Hitachi,

Japan)

This paper presents results on the characterization of phase signal detected from microholograms by phase-diversity homodyne detection comparing to that of BD-ROM and shows microhologram is suitable for phase multi-level recording.

Th-L-05

(10:00) Disk Focusing Error Detection Method in Microholographic Data Storage System using Polarization Characteristics

C.-H. Im, S.-H. Lee, T. Kim, N. Kim, N.-C. Park, H. Yang, Y.-P. Park, K.-S. Park (Yonsei Univ., Korea)

Readout efficiency in microholographic data storage system is rapidly decreased as a beam is defocused from a center of microholograms. We proposed disk focusing error detection method with a single laser using polarization characteristics.

Th-L-06 (Invited)

(10:20) A Proposal of a Design Principle of Super-Multilayer Media

T. Kikukawa, M. Inoue, A. Kosuda, T. Ushida (TDK, Japan)

We propose a novel media structure with a novel optical design that has ten layers. By adopting of the novel optical design, the media structure becomes simpler, which makes the super-multilayer technology more practical.

Th-L-07

(10:45) 16 Layers Write Once Disc with a Separated Guide Layer

M. Ogasawara[1], K. Takahashi[1], M. Nakano[1], M. Inoue[2], A. Kosuda[2], T. Kikukawa[2] ([1]Pioneer, [2]TDK, Japan)

We developed the new multi-layer write-once disc which consists of the separated guide layer and 16 recording layers made of high transmittance material. Sufficient recorded signal quality was confirmed through the experiments.

Break (11:05-11:25)

M: High Density III "Hologram"

Presiders: T. Shimura (Univ. of Tokyo, Japan)
C.-C. Sun (Nat'l Central Univ., Taiwan)

Th-M-01

(11:25) Investigation and Reduction of Signal Deterioration Caused by Submicron Vibration on Holographic Data Recording

T. Usui, K. Watabe, H. Okano, A. Ogawa, Y. Ueda, S. Tatsuta, Y. Kubota (Toshiba, Japan)

We present an analytical and experimental investigation of reconstructed signal deterioration caused by vibration-induced holographic recording and the writing method to preclude vibration disturbances during the recording process using displacement-based gating exposure.

Th-M-02

(11:45) Estimation of the Signal to Noise Ratio and M/# Consumption of the Collinear Holographic Memory for High Density Recording

T. Shimura, J. Tottori, R. Fujimura, K. Kuroda (The Univ. of Tokyo, Japan)

Numerical simulations of the collinear holographic memory are carried out. SNR of 1.5 was obtained for 5 TByte/disk density and M/# consumption is strongly depends on the white rate of the SLM pixels.

Th-M-03

(12:05) Angle Scheduling for Divided Datapage Regions in Angular Multiplexing Holographic Memory

N. Kinoshita[1], T. Muroi[1], N. Ishii[1], K. Kamijo[1], N. Shimidzu[1], T. Ando[2], K. Masaki[2], T. Shimizu[2] ([1]NHK, [2]Nippon Steel Chemical, Japan)

We present a method that divides a datapage region into two and determines the angular intervals for each region. The experiment resulted in improving the number of anglular multiplexing with low bit-error rates.

Lunch (12:25-13:55)

N: High Density IV "Hologram"

Presiders: O. Matoba (Kobe Univ., Japan)
T. R. Jeng (ITRI, Taiwan)

Th-N-01

(13:55) Evaluation of Storage Capacity by Confocal Reflection-type Holographic Memory System with Speckle Shift Multiplexing

R. Hiramatsu, Y. Yonetani, K. Nitta, O. Matoba (Kobe Univ., Japan)

In this paper, we propose a method to improve the storage capacity by introducing a confocal system in the reflection-type holographic memory system. The effectiveness of the confocal system in achievable storage capacity is presented.

Th-N-02

(14:15) Symbol Error Rate Characteristics of Hybrid-Modulated Holographic Data Storage with Multi-Phase and 2/4 Intensity Modulation Code

M. Takabayashi[1], A. Okamoto[1], A. Tomita[1], M. Bunsen[2] ([1]Hokkaido Univ., [2]Fukuoka Univ., Japan)

We clarified SER characteristics of hybrid modulation with multi-phase and 2/4 intensity-only modulation. As a result, by hybrid modulation, data density per a page increase 3 times compared to only use of 2/4 intensity modulation.

Th-N-03

(14:35) Low Inter-page Crosstalk Recording by Multi-Layer Collinear Holographic Memory

A. Shibukawa[1], A. Okamoto[1], A. Tomita[1], M. Takabayashi[1], K. Sato[2] ([1]Hokkaido Univ., [2]Hokkai-Gakuen Univ., Japan)

We demonstrated that low inter-page crosstalk recording can realized by controlling the number of shift multiplexing along in-plane direction and multi-layered along optical axis direction in multilayer collinear holographic memory.

Post Deadline Papers (14:55-15:55)

Presiders: R. Katayama (NEC Avio Infrared Tech., Japan)
J. Tominaga (AIST, Japan)

The best 4 post deadline papers are orally presented.

Award & Closing (15:55-16:15)

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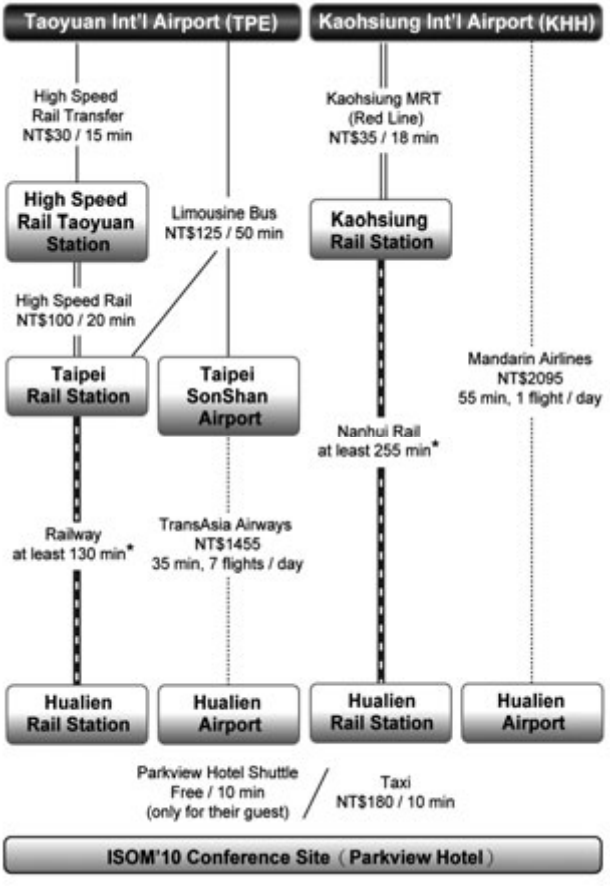

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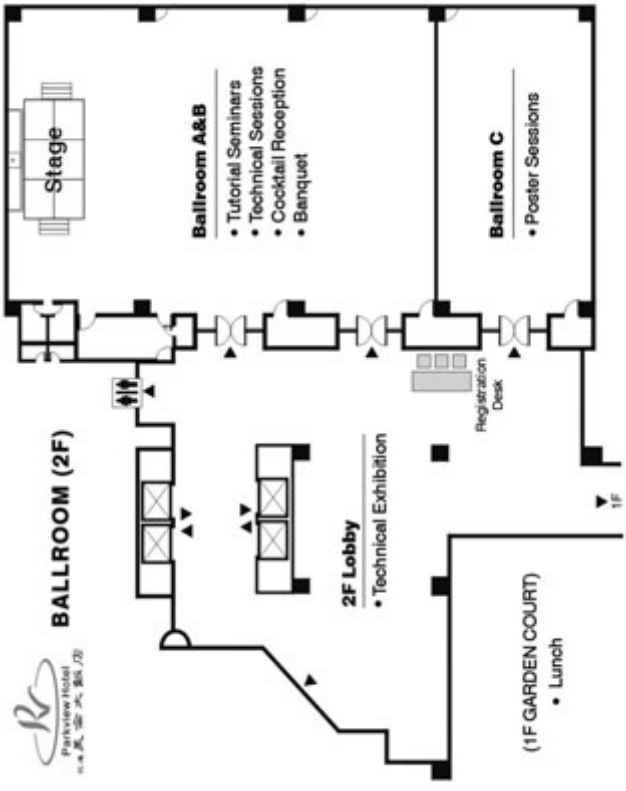

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c/o Adthree Publishing Co., Ltd.

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

c/o Taiwan Information Storage Association (TISA)

Rm. 913, Bldg.51, 195, Sec.4, Chung Hsing Rd, Chutung, Hsinchu 310, Taiwan

Phone: +886-3-591-8350 Fax: +886-3-591-7531

E-Mail: tisa@itri.org.tw

During the Symposium (Oct.24 - Oct.28, 2010)

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