

ISOM 2000

**INTERNATIONAL
SYMPOSIUM ON
OPTICAL
MEMORY 2000**

SEPTEMBER 5-8, 2000

AUDITORIUM

**CHITOSE INSTITUTE OF
SCIENCE AND TECHNOLOGY
CHITOSE, HOKKAIDO, JAPAN**

**TECHNICAL
DIGEST**

TECHNICAL PROGRAM

September 6, 2000 (Wednesday)

Opening and Keynote Session (8:40-9:55)

Presider : T. Ohta (Matsushita, Japan)

M. Takeda (Sony, Japan)

F. Yokogawa (Pioneer, Japan)

Program Committee, Vice-Chairperson

We-A-01 (8:40)

Welcome and Opening Remarks

Y. Okino (Kansai Univ., Japan)

Steering Committee, Chairperson

We-A-02 (8:50)

ISOM 10th Anniversary

Y.Mitsuhashi (JST, Japan)

Organizing Committee, Chairperson

We-A-03 (Keynote)

(9:10) Extending the Capabilities of Storage System

T. Maruyama (Fujitsu, Japan) 2

We-A-04 (Invited)

(9:40) Introduction of CIST

N. Ogata (CIST, Japan)

Coffee Break (9:55-10:10)

High NA (10:10-12:00)

Presiders : H. Sueda (Hitachi, Japan)

I. Ichimura (Sony, Japan)

We-B-01 (Invited)

(10:10) Phase Change Media for High NA and Blue Wavelength Recording

H.J. Borg, M.van Schijndel, M.H.R. Lankhorst, G.F.Zhou, B.A.J. Jacobs,

M.J. Dekker (Philips, Netherlands) 6

We-B-02 (Invited)

(10:40) Multi-Level Tracking for High Density Optical Recording

D.-R. Huang, Z. W. Chao, G. Z. Wu (ITRI, R.O.C.) 8

We-B-03 (Invited)

(11:10) Hybrid Recording with a Sub-Micron Sized Laser Spot

H. Saga, H. Nemoto, Y. Itou*, C. Haginoya, H. Sukeda
(Hitachi, Japan, *Hitachi Metals, Japan) 10

We-B-04

(11:40) An Integrated Magneto-Optical Sliding Head for First Surface

LP-MFM MO-Recording

F.C. Penning, H.W. v. Kesteren, M.A.H. van der Aa, Yu. V. Martynov,
R. J. M. Vullers (Philips, Netherlands) 12

Lunch (12:00-13:20)

High Density Media(13:20-15:20)

Presiders : T. Ohta (Matsushita, Japan)

M. Takeda (Sony, Japan)

We-C-01

(13:20) Rewritable Dual-Layer Phase-Change Optical Disk utilizing Blue-Violet Laser

T. Akiyama, M. Uno, H. Kitaura, K. Narumi, K. Nishiuchi,
N. Yamada (Matsushita, Japan) 16

We-C-02

(13:40) High Density Recording using an Electron Beam Recorder

M. Katsumura, H. Kitahara, M. Ogasawara, Y. Kojima, Y. Wada,
T. Iida, F. Yokogawa (Pioneer, Japan) 18

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(14:00) 25Gbyte ROM Disk by Injection Molding

T. Imai, N. Shida, K. Suga, T. Higuchi, T. Iida, F. Yokogawa
(Pioneer, Japan) 20

We-C-04

(14:20) Photoaddressable Polymers for Rewritable Optical Disc Systems

Y. Sabi, M. Yamamoto, H. Watanabe, T. Bieringer*, D. Haarer*,
R. Hagen*, S.G. Kostromine*, H. Berneth*
(Sony, Japan, *Bayer AG, Germany) 22

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(14:40) High-Density Rewritable Optical Disk using a Groove Recording

K. Iwata, E. Nakano, A. Hosoda, K. Oishi, K. Ohshima, F. Ito, T. Kondo,
T. Ohgo, E. Nakagawa, A. Hayami, M. Itonaga
(Victor Company of Japan, Japan) 24

We-C-06

**(15:00) Acceleration of Crystallization Speed by Sn Addition into Ge-Sb-Te
Phase-Change Recording Material**

R. Kojima, N. Yamada (Matsushita, Japan) 26

Coffee Break (15:20-15:35)

Basic Theory(15:35-17:35)

**Presiders : J. Tominaga (NAIR, Japan)
T.C. Chong (DSI, Singapore)**

We-D-01 (Invited)

(15:35) Near-Field Optical Simulation of Super-RENS Disks

T. Nakano, Y. Yamakawa*, J. Tominaga, and N. Atoda
(NAIR, Japan, *Pioneer, Japan) 30

We-D-02(Invited)

**(16:05) The Mechanism of Near-Field Readout and the Role of Surface Plasmon
in Super-RENS**

D.P. Tsai, S.Y. Lin, S.C. Yang, H.L. Huang, C.R. Chang, W.C. Lin*, F.H. Ho*,
H.J. Huang*, W.Y. Lin*, W.-C. Liu**, T.F. Tseng***, C.H. Li***
(National Taiwan University, R.O.C., *National Chung Cheng University,
**National Taiwan Normal University, R.O.C.,
***Ritek Corporation, R.O.C.) 32

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(16:35) Fly Height Margin of Hybrid MO and Near Field Recording

J. Liu, H. Song, B.V.K. V. Kumar, H.-P.D. Shieh* (Carnegie Mellon University,
U.S.A., *National Chiao Tung University, R.O.C.) 34

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(16:55) Phase Change Mark Simulator for Ag-InSbTe Recording Material

Y. Nishi, J. Ushiyama, H. Kando, M. Terao (Hitachi, Japan) 36

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**(17:15) Signal Simulation of 25GB Read Only Optical Disc System
using a High-NA Objective Lens**

T. Yanagisawa, T. Nomoto, S. Ohsawa (Pioneer, Japan) 38

Basic Experiment(17:35-18:15)

Presiders : J. Tominaga (NAIR, Japan)

T.C. Chong (DSI, Singapore)

We-X-01

(17:35) Thermal Cross-Erase in High Data-Density Phase Change Disks

E.R. Meinders, H.J. Borg, M.J. Dekker (Philips, Netherlands) 42

We-X-02

(17:55) An Implementation of Limited Multi-Level(LML) Optical Recording

G.R. Langereis, W.M.J. Coene, A.M.J. Spruijt (Philips, Netherlands) 44

Banquet (19:00-21:00)

September 7, 2000 (Thursday)

Recording and Drive Technology (8:30-10:40)

Presiders : F. Yokogawa (Pioneer, Japan)

S. Kobayashi (Sony, Japan)

Th-E-01 (Invited)

(8:30) Multi-Level Recording in Erasable Phase-Change Media

by Light Intensity Modulation

H.-P.D. Shieh, Y.-L. Chen (National Chiao Tung University, R.O.C.) 48

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(9:00) A Feasibility Study of Writing Compensation for Tangential Tilt

K.-G. Lee, S.-S. Joo, T. Otsuka, Y.-G. Kim, I.-S. Park, D.-H. Shin

(Samsung, Korea) 50

Th-E-03

(9:20) Single-Stage Track Following using Disturbance Learning

I. Watanabe, T. Kawabe, J. Ichihara (Fujitsu Laboratories, Japan) 52

Th-E-04

(9:40) Radial Tilt Detection using One Beam and Its Compensation

in a High-Density ROM

T.-Y. Doh, B.I.Ma, B.H. Choi, I.S. Park, C.S. Chung, Y.-H. Lee,

S.J. Kim, D.H. Shin (Samsung, Korea) 54

Th-E-05

(10:00) New Calibration Method of Adaptive Writing Pulse

for DVD-RAM 4.7GB Drive

S. Furumiya, T. Fukushima, Y. Yamazaki (Matsushita, Japan) 56

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(10:20) A Groove Baseband Recording (GBR) and a Polarization

Readout Method for Optical ROM Discs

S. Kobayashi, H. Yamatsu, Y. Takemoto (Sony, Japan) 58

Coffee Break (10:40-10:55)

Components I (10:55-11:55)

Presiders : Y. Honguh (Toshiba, Japan)

T.D. Milster (University of Arizona, U.S.A.)

Th-F-01 (Invited)

(10:55) LADIC: A Flexible, Programmable, High-Speed Laser Driver IC.

A.H.J. Immink, J.A.T.M. van den Homberg, J. McCormack,

A.G.J. Slenter, J. Noot, M. Tryzna, H. Verhoeven (Philips, Netherlands) 62

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**(11:15) Near-Field Recording Array Heads of GaP Aperture Probes
for the Terabyte Optical Data Storage**

K. Kurihara, S. Oikawa, Y. Mukakoshi, Y.-J. Kim, K. Goto

(Tokai University, Japan) 64

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**(11:35) New Ridge-Type Waveguide QPM-SHG Device Fabricated
by Ultraprecision Machining**

T. Kawaguchi, K. Mizuuchi*, T. Yoshino, J. Kondo, A. Kondo,

M. Imaeda, K. Yamamoto* (NGK, Japan, *Matsushita, Japan) 66

Lunch (11:55-13:00)

Technical Tour (13:00-14:00)

(Lab. Tour in CIST)

New MO Disk(14:00-15:15)

Presiders : A. Takahashi (Sharp, Japan)

K. Yamada (Mitsubishi Electric, Japan)

Th-G-01(Invited)

**(14:00) 3.5in. MO as a Technology of Choice for 21st Century,
from Text-Document to Digital motion picture**

K. Ogawa, S. Moroto, K. Itoh*, K. Shono*, S. Ogawa*

(Fujitsu, Japan, *Fujitsu Labs, Japan) 70

Th-G-02 (Invited)

(14:25) MD DATA2, High Density MD Disk with a Capacity of 650 Mbytes

M. Kanno (Sony, Japan) 72

Th-G-03(Invited)	
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Components II (15:30-18:00)

Presiders : Y. Yamanaka (NEC, Japan)
O. Koyama (Canon, Japan)

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(15:30) DVD Optical Pickup Employing Two Wavelength Integrated Laser Diode(TWIN-LD)	
M. Uchiyama, T. Ebihara, K. Omi, H. Kitano, I. Hoshino, K. Mori (Toshiba, Japan)	78

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Presiders : K. Tanaka (Teikyo-Heisei Univ, Japan)	
H.-P.D. Shieh (NCTU, R.O.C.)	
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T. Fujiwara (Fujiwara-Rothchild, Japan)	94
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M. Kato (Pioneer, Japan)	98
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P.G.P. Weijenbergh (Philips, Netherlands)	100
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September 8, 2000 (Friday)

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Presiders: K. Fujita (kyoto Univ, Japan)

K. Ito (Ricoh, Japan)

M. Moribe (Fujitsu, Japan)

S. Sumi (Sanyo, Japan)

H. Watanabe (Maxell, Japan)

Fr-J-01

**Numerical Simulation on Read-out Characteristics of Planar
Aperture-Mounted Head with a Small Scatterer**

K. Tanaka, T. Ohkubo, M.Oumi*, Y. Mitsuoka*, K. Nakajima*, H. Hosaka,
K. Itao (Univ. of Tokyo, Japan, *Seiko Instruments, Japan) 108

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(LG Electronics, Korea, *Ajou Univ.,Korea) 116

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	D. Kwak, J. Lee*, H. Jung	
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	(Carnegie Mellon Univ.,USA, *Nat'l Chiao Tung Univ., R.O.C.)	164
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	(Univ. of the Philippines, Philippines, *Osaka Univ., Japan)	166
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	I.Aoki (Samsung Yokohama Research Inst., Japan)	168
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	Y.Suzuki, H.Fuji*, T.Nakano**, J.Tominaga**, N.Atoda**	
	(Olympus, Japan, *Sharp, Japan, **NAIR, Japan)	170
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	L. Men, J. Tominaga, H. Fuji*, N. Atoda (NAIR, Japan, *Sharp, Japan)	172
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	H. Fuji, J. Tominaga*, H. Katayama, N. Atoda*	
	(Sharp, Japan, *NAIR, Japan)	174
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	H.Yoshikawa, C.Baubet, Y.Andoh, A.Furuya, T.Tanabe, M.Yamamoto	
	(NTT, Japan)	176

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**Near-Field Optical Measurements of the Light-Scattering Mode
Super-Resolution Near-Field Structure**

W. C. Lin, D. P. Tsai, T. F. Tseng*, C. H. Lee*

(Nat'l Taiwan Univ., R.O.C., *Ritek, R.O.C.) 178

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**Properties and Reactive Sputtering Parameters of GeN Film
for DVD-RAM Disk**

X.S. Miao, T.C. Chong, L.P. Shi, P.K. Tan and F. Li

(D.S.I., Singapore) 180

Coffee Break

Near-Field Recording (10:00-11:40)

Presider : D.-H. Shin (Samsung, Korea)

Y. Kawata (Osaka Univ., Japan)

Fr-K-01 (Invited)

(10:00) Pseudo-Near Field Recording by Catadioptric System

C. W. Lee (Samsung, Korea) 184

Fr-K-02 (Invited)

**(10:30) Superresolution by Combination of Solid Immersion Lens
and an Aperture**

T. D. Milster, Y. Zhang, K. Erwin (Univ. of Arizona, USA) 186

Fr-K-03

(11:00) Small-Sized Near-Field Optical Head Structure with High Throughput

K. Kato, S. Ichihara, N. Kasama, M. Oumi, T. Niwa, Y. Mitsuoka,

K. Nakajima (Seiko Instruments, Japan) 188

Fr-K-04

**(11:20) Semiconductor Quantum-Well Media for Ultrahigh-Density Optical Storage
by using Probe-Collection Tunneling-Electron Luminescence**

T. Murashita, H. Kohda, K. Watanabe, H. Yokoyama, Takayoshi Meno

(NTT, Japan) 190

Lunch (11:40-13:00)

Holographic Memories and Super-RENS (13:00-15:30)

Presider : S. Yagi (NTT, Japan)

T. Nakano (NAIR, Japan)

Fr-L-01 (Invited)

**(13:00) High Density, High Performance Optical Data Storage via
Volume Holography**

W. L. Wilson, K.Curtis, M.Tackitt, A.Hill, T.Richardson, L.Dhar,
A.Harris (Lucent Tech., USA) 194

Fr-L-02 (Invited)

(13:30) Progress in Multi-Color Digital Holographic Memory

H. Hatano, T. Yamaji, S. Tanaka, H. Matsushita, Y. Itoh M. Lee*,
S. Takekawa*, Y. Furukawa*, K. Kitamura*
(Pioneer, Japan, *Nat'l Inst. for Research in Inorganic Materials, Japan) 196

Fr-L-03 (Invited)

(14:00) Advancement of Super-RENS and the Surface Plasmon Enhancement

J. Tominaga, H. Fuji*, D. Buchel, L. Men, J. H. Kim, T. Nakano,
T. Fukaya, N. Atoda (NAIR, Japan, *Sharp, Japan) 198

Fr-L-04

**(14:30) High Density ROM Disc with Super Resolution Reflective Layer
(Super-ROM)**

T. Kikukawa, T.Kato, H.Shingai, H. Utsunomiya (TDK, Japan) 200

Fr-L-05

(14:50) Near-Field Signal Enhancement by Twin Laser Pickups

J. Tominaga, H. Fuji*, T. Kikukawa**, A. Sato***, A. Tachibana****,
M. Kumagai*****, T. Nakano, T. Fukaya, N. Atoda
(NAIR, Japan, *Sharp, Japan, **TDK, Japan, ***Minolta, Japan,
****Pioneer, Japan, ***** Pulstec, Japan) 202

Fr-L-06

(15:10) Magneto-Optical Characteristics Enhanced by Non-Magnetic Mask Layer

J. H. Kim, Y. Yamakawa*, H. Fuji**, T. Nakano, D. Buechel,
J. Tominaga, N. Atoda (NAIR, Japan, Pioneer, Japan, Sharp, Japan) 204

Coffee is served (from 15:30)

Blue LD Recording (15:30-16:40)

Presider : J. Saito (Nikon, Japan)

H. van Houten (Philips, Netherlands)

Fr-M-01 (Invited)

**(15:30) Near-Field Phase-Change Recording of 1.5 Numerical Aperture
in the Blue-Violet**

I. Ichimura, K. Kishima, K. Osato, K. Yamamoto, Y. Kuroda, A. Iida,
K. Saito, S. Masuhara (Sony, Japan) 208

Fr-M-02

(16:00) Format Description and Evaluation of the 22.5 GB DVR Disc

K. Schep, B. Stek, R. van Woudenberg, M. Blüm, S. Kobayashi*, T. Narahara*,
T. Yamagami*, H. Ogawa* (Philips, Netherlands, *Sony, Japan) 210

Fr-M-03

(16:20) 25GB Read-Only Disk System using the Two-Dimensional Equalizer

H.Nishiwaki, S.Miyanabe, H.Kuribayashi, Y.Tomita, K.Yamamoto,
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