

ISOM'95

**INTERNATIONAL
SYMPOSIUM ON
OPTICAL
MEMORY 1995**

August 30 ~ September 1, 1995

**KANAZAWA CITY CULTURAL HALL,
KANAZAWA, ISHIKAWA, JAPAN**

**TECHNICAL
DIGEST**

TECHNICAL PROGRAM

August 30, 1995 (Wednesday)

Welcome and Opening Remarks (9:20-9:30)

R. Ito (*Univ. of Tokyo*)
Organizing Committee, Chairperson
H. Ukita (*Ritsumeikan Univ.*)
Program Committee, Chairperson

Keynote Presentation & Components (9:30-11:40)

Presider: S. Tanaka (*Matsushita Elec., Japan*)

- We-K1 (Keynote)**
(9:30) Design Considerations for MM CD
J. Heemskerk (*Philips, The Netherlands*)..... 3
- We-A1 (Invited)**
(10:10) Silicon Microstructures and Microactuators for Future Compact Disk Drives
W. Tang*, Y-C. Tai, D.K. Miu*, S. Wu and V. Temesvary* (*Caltech and *UCLA, U.S.A.*)..... 5
- We-A2 (Invited)**
(10:40) A New Application of Holographic Optical Element to an Optical Head
S. Nishino, H. Yamamoto, K. Kasazumi, H. Wada and K. Sano (*Matsushita Elec., Japan*) 7
- We-A3 (Invited)**
(11:10) Present Status of Light-Emitting Devices Based on III-V Nitride
S. Nakamura (*Nichia Chemical, Japan*) 9
- Lunch (11:40-13:10)

High Density Recording I (13:10-15:10)

Presider: M. Irie (*Kyushu Univ., Japan*)

- We-B1 (Invited)**
(13:10) Near Field Technology for Ultra High Density Storage
A. Partovi and J.H-J. Yeh (*AT&T Bell, U.S.A.*)..... 13
- We-B2 (Invited)**
(13:40) Ultra-High Density Data Storage Using Proximal Probes
H.J. Mamin, B.D. Terris and D. Rugar (*IBM, U.S.A.*) 15
- We-B3 (Invited)**
(14:10) Digital Holographic Data Storage
L. Hesselink, J.C. Heanue and M.C. Bashaw (*Stanford Univ., U.S.A.*)..... 17
- We-B4 (Invited)**
(14:40) Holographic Motion Picture by $\text{Eu}^{3+}:\text{Y}_2\text{SiO}_5$
H. Sasaki, K. Karaki and M. Mitsunaga* (*Olympus and *NTT, Japan*) 19
- Coffee Break (15:10-15:40)

High Density Recording II (15:40-17:50)

President: A. Takahashi (*Sharp, Japan*)

We-C1 (15:40)	(Invited) Super Resolution Using Variable Transmittance Detection M. Kuroda (<i>Victor, Japan</i>).....	23
We-C2 (16:10)	A New Write Compensation Pulse for High Density Recording on MSR Media M. Kanno, M. Okumura, A. Nakaoki, M. Kaneko and H. Owa (<i>Sony, Japan</i>)...	25
We-C3 (16:30)	Magneto-static Coupling MSR with In-Plane Magnetization Films N. Nishimura, T. Hiroki and T. Okada (<i>Canon, Japan</i>)	27
We-C4 (16:50)	Rear Aperture Detection on Magneto-Staticly Coupled MSR Media K. Tamanoi and K. Shono (<i>Fujitsu Labs., Japan</i>).....	29
We-C5 (17:10)	Magnetically Inducted Super Resolution Using Domain Stability J. Hirokane, A. Takahashi and S. Terashima (<i>Sharp, Japan</i>).....	31
We-C6 (17:30)	Readout Scheme by Pulsed Irradiation Center Aperture Detection on Magnetically Induced Super Resolution MO Disks B.-W. Yang, W.-K. Hwang and H.-P.D. Shieh (<i>Nat'l Chiao Tung Univ., Taiwan</i>).....	33

Reception (18:00-20:00)

August 31, 1995 (Thursday)

Applications (8:50-11:20)

President: T. Maeda (*Hitachi, Japan*)

Th-A1 (8:50)	(Invited) Development of Medical Image Filing System using Magneto-Optical Disk N. Ohyama (<i>Tokyo Inst. of Technol., Japan</i>)	37
Th-A2 (9:20)	(Invited) Development of 3.5 inch High Performance Magneto-Optical Disk Drive Using Laser Strobe Magnetic Over-riding Recording Technology T. Watanabe (<i>Sony, Japan</i>)	39
Th-A3 (9:50)	(Invited) "PD" Optical Disk System for Multimedia R. Imanaka, T. Saimi, Y. Okazaki and I. Kawamura (<i>Matsushita Elec., Japan</i>)...	41
Th-A4 (10:20)	(Invited) International Standard of 90 mm Optical Disk (Magneto-optical Media & Phase-change Media) K. Tanaka and T. Toshima* (<i>Teikyo Heisei Univ. and *NTT, Japan</i>)	43
Th-A5 (11:00)	Playback Techniques in a Video-on-Demand System Using an Optical Mass Storage System T. Mori, H. Suzuki, K. Nishimura and H. Nakano (<i>NTT, Japan</i>).....	47

Lunch (11:20-12:50)

Poster & Post-deadline Papers

Preview (12:50-15:30)

Presentation (15:30-17:30)

Component I (12:50-13:20)

Presider: H. Inada (NEC, Japan)

- P-1 Compact Magneto-Optical Head Module Integrated with Chip Elements Using Double Holograms**
R. Katayama, Y. Komatsu, T. Nagano, A. Watanabe, K. Tada, H. Hotta and Y. Ono (*NEC, Japan*) 51
- P-2 Integrated Magneto-Optical Disk Head Using Laminated Glass Plates**
S. Horinouchi, H. Yoshinaka, S. Takeuchi, K. Higo, T. Koga and F. Kobayashi (*Kyushu Matsushita Elec., Japan*) 53
- P-3 A Walk-Off Plate for Magneto-Optical Disk System**
W. Wiechmann, N. Eguchi and S. Kubota (*Sony, Japan*) 55
- P-4 Monolithic Integration of Waveguide Gratings and QW-DFB Laser for Implementation of Subminiature Disc Pickup Head**
T. Suhara, T. Taniguchi, M. Uemukai, A. Yoshimoto, H. Nishihara, T. Hirata*, S. Iio* and M. Suehiro* (*Osaka Univ. and *Yokogawa Elec., Japan*)... 57
- P-5 A Proposal of Thin Film Integrated Optical Head for Flexible Magneto-Optic Disk**
K. Goto, T. Nakamura, Y. Itoh, M. Sano, Y. Suzuki, M. Suzuki, M. Oki and T. Sato (*Tokai Univ., Japan*) 59
- P-6 Multibeam Optical System Incorporating a Microlens Array**
H. Tokumaru, K. Arai and N. Kawamura (*NHK, Japan*) 61
- P-7 Novel Position Sensitive Detector Heads for Optical Data Recording**
D. Gibson, E.W. Williams and H.S. Gamble* (*Keele Univ. and *Queen's Univ. of Belfast, U.K.*) 63
- P-8 Magneto-Optic Pick-up Head Employing Interferometer Configuration**
Z.W. Chao (*ITRI, Taiwan*) 65

Component II (13:20-13:50)

Presider: M. Emoto (Ricoh, Japan)

- P-9 Overdrivability of Red Laser Diode Pulse Power for Recording on Direct Overwrite Magneto-Optical Disk**
K. Ishii, J. Saito, Y. Yamanaka and H. Akasaka (*Nikon, Japan*) 69
- P-10 Focusing Characteristics of The Optical Head with Superresolution of a High-aspect Ratio Red Laser Diode**
M. Shinoda and K. Kime (*Mitsubishi Elec., Japan*) 71
- P-11 Diffraction of Focused Beams by a Dielectric Groove -An Efficient 2D Vector Diffraction Theory-**
Y.F. Lin and Y. Lai (*Nat'l. Chiao Tung Univ., Taiwan*) 73

P-12	Dependence of Signals from Embossed Recording Fields and Grooves on Filling of Aperture of Objective Lens H. Takeshima and H. Yoshida (<i>Mitsubishi Chemical, Japan</i>).....	75
P-13	Two-Axis Actuator for Small-Sized Optical Head M. Nagasato and I. Hoshino (<i>Toshiba, Japan</i>)	77
P-14	Design and Dynamic Analysis of a 4-wire Actuator for Digital Video CD T.K. Chang, L.H. Kuo and J.S. Tsai (<i>ITRI, Taiwan</i>).....	79
P-15	Effect of Disc Tilt on High-density Optical Pick-up with 532nm Wavelength and 0.6 Numerical Aperture P.Y. Seong, J.H. Yoo, K.H. Cho, K.H. Rim and D.H. Shin (<i>Samsung, Korea</i>)... ..	81
Drive Technology (13:50–14:20)		
President: K. Tanaka (<i>Teikyo Heisei Univ., Japan</i>)		
P-16	Three-track Readout Method Using Two Offset Beams H. Dobashi, T. Tanabe and M. Yamamoto (<i>NTT, Japan</i>).....	85
P-17	The (2,9) Modulation Code for Optical Disk Media Y.K. Won, J.W. Ko, S.H. Lee, D.H. Shin and S.T. Lee (<i>Samsung, Korea</i>)	87
P-18	A Study of the PRML Channel for Mark Edge Recording on Magneto-Optical Disks M. Taguchi, A. Itakura, Y. Fujita, H. Izumi and M. Matsuura (<i>Fujitsu Labs., Japan</i>).....	89
P-19	A Study on PRML Systems in Optical Disk M. Shiokawa, K. Kayanuma, H. Honma, S. Sugaya and T. Iwanaga (<i>NEC, Japan</i>).....	91
P-20	State-Space Intercept Method for Seek Control of Optical Disk Drives T. Semba and A.A. Fennema* (<i>IBM, Japan and *U.S.A.</i>)	93
P-21	Methods for Measuring Track Pitch Variation in Optical Discs K. Kurokawa, N. Eguchi, S. Masuhara and H. Ohki (<i>Sony, Japan</i>)	95
P-22	Exchangeability Test on $\phi 90\text{mm}/600\text{MB}$ Phase-Change (PC) Optical Disks for Common Specifications S. Yamada, T. Kubo, T. Ito and K. Yamauchi (<i>Shizuoka Univ., Japan</i>)	97
P-23	Laser Power Correlation of Optical Disk Drives S. Hara*, K. Ohishi** and T. Kubo*** (<i>*Fujita Health Univ., **Pulstec Ind. and ***Shizuoka Univ., Japan</i>).....	99
High Density Recording III (14:20–14:50)		
President: I. Morimoto (<i>Asahi Chemical, Japan</i>)		
P-24	Nanometer Sized Phase Change Recording Using a Scanning Near-field Optical Microscope with a Laser Diode S. Hosaka, T. Shintani, M. Miyamoto, A. Hirotsune, M. Terao, M. Yoshida*, K. Fujita** and S. Kammer*** (<i>Hitachi, *Hitachi Instruments Service, **Nissei Sangyo and ***TopoMetrix, Japan</i>)	103

P-25	Wavelength-Multiplexed Holographic Recording in Ce-SBN by Using Tunable LD T. Kume, K. Nonaka and M. Yamamoto (<i>NTT, Japan</i>)	105
P-26	High Performance Holographic Frequency Domain Optical Storage Y. Ruan and J.H. Zhai (<i>Huazhong Univ. of Sci. and Technol., China</i>)	107
P-27	Image Parallel Storage Technique Using Holographic Optical Disk J.H. Zhai, Y. Ruan and Z.G. Li* (<i>Huazhong Univ. of Sci. & Technol. and *Nat'l. Experiment of Laser Technol., China</i>)	109
P-28	Photo-Chemical Hole Burning and Structural Change of X-RAY Irradiated Glasses Doped with Sm²⁺ ION D.H. Cho, K. Hirao and N. Soga (<i>Kyoto Univ., Japan</i>)	111
P-29	Photon Gated Persistent Spectral Hole-Burning in Zn-Tbp-CA/PhR L. Shi and Z. Zhang (<i>Beijing Univ. Aero. Astro., China</i>)	113
P-30	Nonlinear Optical Recording A. Rong, Y.W. Lu, Z.L. Mao and K.H. Yuan (<i>Beijing Univ. Aero. Astro., China</i>)	115

P-31~ Post-deadline Papers (14:50-15:30)

Presider: Y. Honguh (*Toshiba, Japan*)

Break (17:30-18:00)

Night Session (18:00-20:30)

Theme: Multi-Media and Optical Disks

Presider: K. Goto (*Tokai Univ., Japan*)

NS-1	(Invited) (18:00) Consumer Optical Disk Products and Business Development T. Anazawa (<i>Nippon Columbia, Japan</i>)	119
NS-2	(Invited) (18:50) Current Status and Perspective of Multi-Media Service H. Fujiwara (<i>Graphics Communication Laboratories, Japan</i>)	121
NS-3	(Invited) (19:40) Future Prospects for Virtual Reality M. Ohmi (<i>Kanazawa Inst. of Technol., Japan</i>)	123

September 1, 1995 (Friday)

Media I (8:30-10:10)

Presider: T. Setsuie (*Mitsubishi Rayon, Japan*)

Fr-A1	A New Method to Measure Information Track Parameters of Optical Disk (8:30) H. Zhang, L.F. Pan and Y. Song* (<i>OMNERC and *Chinese Aerospace, China</i>) ..	127
Fr-A2	A Systematic Investigation of the Annealing Behavior of Magneto-Optical Discs (8:50) B. Friedrichs and M. Horie (<i>Mitsubishi Chemical, Japan</i>)	129

Fr-A3 (9:10)	Low-Noise Substrate for Mark-Edge MO Recording Y. Iwamura, S. Kuroda, T. Tanaka, I. Tsugawa and M. Moribe (<i>Fujitsu Labs., Japan</i>).....	131
Fr-A4 (9:30)	Effect of Underlayer Surface Roughness Upon the Magnetic Properties and Noise Characteristics of Magneto-Optical Disks J. Ushiyama, H. Awano, H. Miyamoto, K. Andoh and M. Takahashi (<i>Hitachi, Japan</i>).....	133
Fr-A5 (9:50)	Magneto-Optical Signal Calculation with Simplified Substrate Birefringence Model T. Shimano, M. Umeda and K. Kawamoto (<i>Hitachi, Japan</i>).....	135

Media II (10:10–11:40)

Prsided: J. Saito (Nikon, Japan)

Fr-B1 (10:10)	(Invited) Design of Magnetic Multi-Valued Magneto Optical Disk for High Density Storage Media K. Shimazaki, M. Yoshihiro, N. Nagai, O. Ishizaki and N. Ohta (<i>Hitachi Maxell, Japan</i>).....	139
Fr-B2 (10:40)	Improvement of Magneto-Static Coupling in Reversal Type MSR T. Kawano, H. Ito and H. Yoshida (<i>Mitsubishi Chemical, Japan</i>).....	141
Fr-B3 (11:00)	Analysis of Scattering Light from Magnetic Material with Land/Groove by Three-Dimensional Boundary Element Method M. Ogawa, M. Nakada, R. Katayama, M. Okada and M. Itoh (<i>NEC, Japan</i>)... ..	143
Fr-B4 (11:20)	High Coercivity in Co/Pt Multilayers J.H. Kim and S.C. Shin (<i>KAIST, Korea</i>)	145

Lunch (11:40–13:10)

Media III (13:10–15:00)

Prsided: S. Yagi (NTT, Japan)

Fr-C1 (13:10)	(Invited) Exploration of Novel Photochromic Memory Media for Photonmode Near Field Optical Recording M. Irie (<i>Kyushu Univ., Japan</i>).....	149
Fr-C2 (13:40)	High-Density Recording on a Phase-change Optical Disk with Suppression of Material Flow and Recording-Mark Shape-deformation A. Hirotsune, Y. Miyauchi and M. Terao (<i>Hitachi, Japan</i>).....	151
Fr-C3 (14:00)	Estimation of Incubation Time for the Erasure Process in Optical Memories S. Nagpal and P.K. Bhatnagar (<i>Univ. of Delhi South Campus, India</i>)	153
Fr-C4 (14:20)	Short Wavelength Properties of Inorganic CD-R with AgOx J. Tominaga, A. Motai, S. Haratani, T. Kato and T. Kuwahara (<i>TDK, Japan</i>)... ..	155
Fr-C5 (14:40)	Reliability of Phthalocyanine CD-R E. Takahashi, Y. Suzuki, H. Inagaki, S. Murakami, T. Sasakawa and H. Hyakutake (<i>Mitsui Toatsu Chemical, Japan</i>)	157

Coffee Break (15:00–15:20)

High Density Recording IV (15:20-17:00)

Presider: S. Kubota (Sony, Japan)

- Fr-D1** **Premastered Optical Disk by Superresolution Using Rear Aperture Detection**
(15:20) Y. Kasami, K. Yasuda, M. Ono, A. Fukumoto and M. Kaneko (*Sony, Japan*)... 161
- Fr-D2** **Interface Wall Energy in Exchange-Coupled Ferrimagnetic Double-Layered**
(15:40) **Films**
W.K. Hwang, J.R. Liu and H.-P.D. Shieh (*Nat'l Chiao Tung Univ., Taiwan*)... 163
- Fr-D3** **Sampled Servo ROM System Using SCIPER**
(16:00) J.P.de Kock, S. Kobayashi, T. Ishimoto, H. Yamatsu and H. Ooki (*Sony, Japan*)..... 165
- Fr-D4** **A New Disc Format for Land/Groove Recording on a MSR Disc**
(16:20) M. Mieda, H. Takemori, Y. Murakami, A. Takahashi and S. Terashima (*Sharp, Japan*)..... 167
- Fr-D5** **Coaxing the Maximum Performance out of an Ordinary MO Disk**
(16:40) K. Aratani, T. Narahara, A. Fukumoto, S. Masuhara N. Arakawa,
Y. Takemoto and Y. Takeshita (*Sony, Japan*) 169

Closing Remarks (17:00-17:10)

M. Ojima (Hitachi, Japan)
Steering Committee, Chairperson