

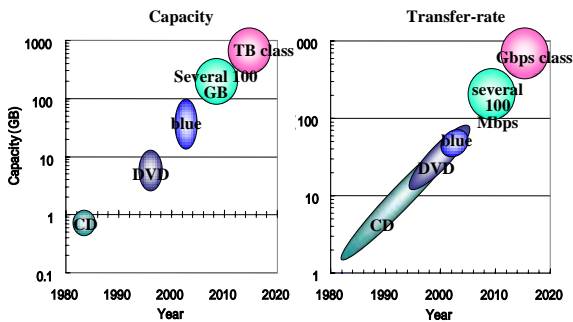
Prospect of the future technology

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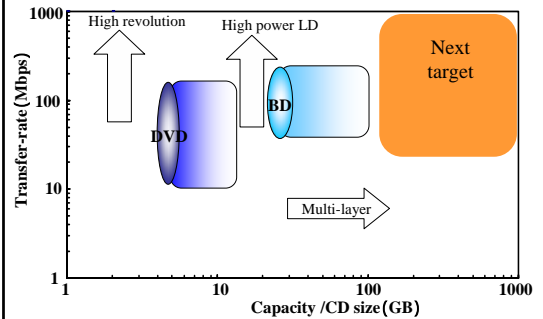
Outline

- Trend of optical storage
- Current status and next target
- Technology candidates
 - Multi-level recording, Multi-layer recording
 - Near field recording, Volumetric recording
 - Holographic recording
- Developing status of future technologies
- Making ISOM roadmap

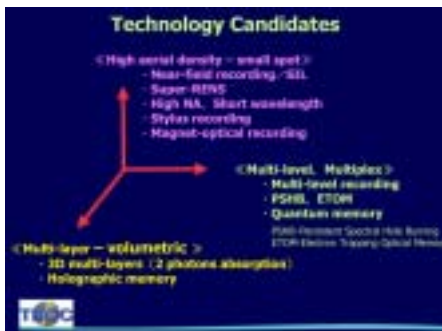
- Trend of Optical Storage -



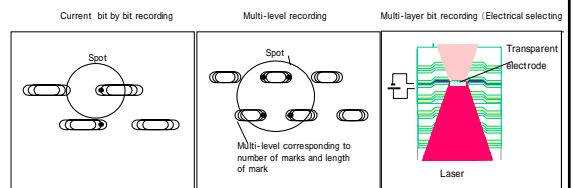
-Current status and next target-



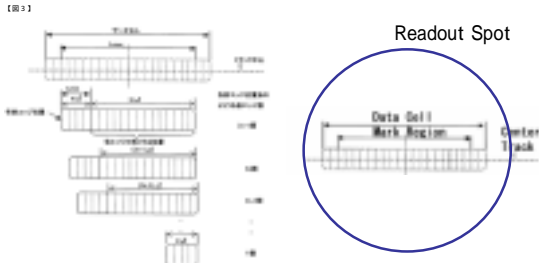
Technology candidates



Approach to large capacity (1)



Multi-level Recording



Maeda *et al.* APDSC2006

Multi-level Readout

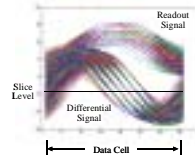


Fig. 2 Readout and differential signal

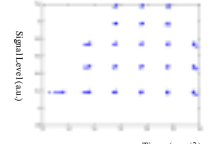


Fig. 3 (a) Eye diagram without noise signal

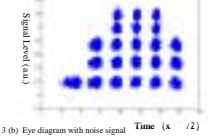
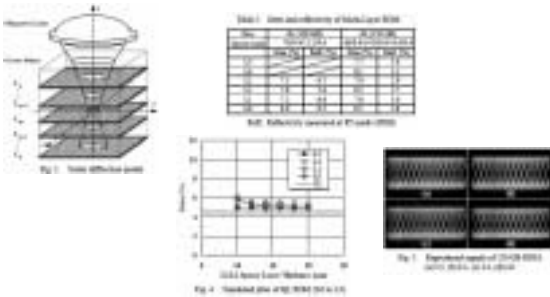


Fig. 3 (b) Eye diagram with noise signal

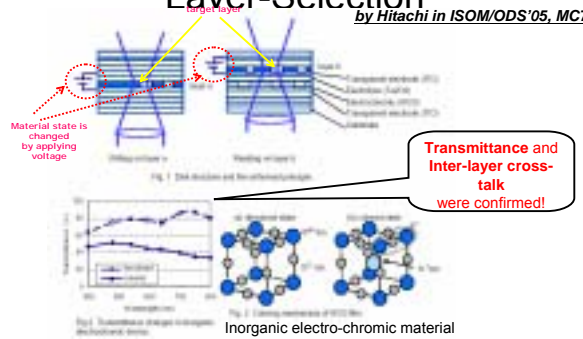
Multi-disk (Sony)



I. Ichimura *et al.* Jpn. J. Appl. Phys. Vol. 44 No. 5B

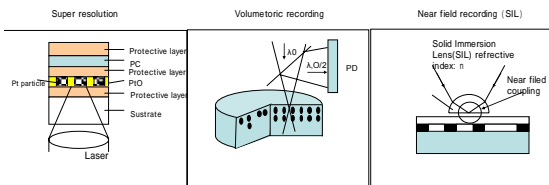
Layer-Selection

by Hitachi in ISOM/ODS'05, MC7



Inorganic electro-chromic material

Approach to large capacity (2)



Pit Selection Using Super Resolution

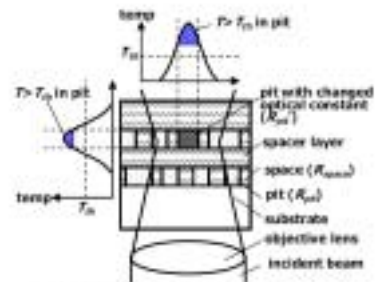


Fig. 1. Concept of Three-dimensional Pit Selection.

T. Shintani *et al.* ODS2006

Effect of Pit Selection

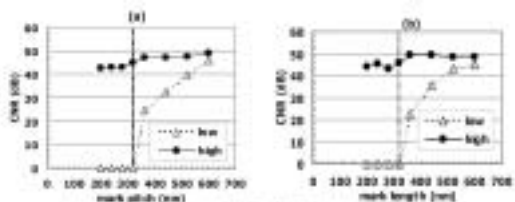


Fig. 3 Relationship between mark length and CTR measured on dual-layer discs.
 (a) L1 (Layer which is close to the laser incidence), (b) L2 (Layer which is farther from the laser incidence).
 Cases of low and high incident power are shown. Vertical broken lines show LCTR.

High NA (> 1) lens



Figure 2 (a) Schematic of the lens, (b) and (c) are photographs of the illumination of an assembled lens. (d) near field distribution for a 200 nm pitch grating with a thickness of 100 nm. (e) Photograph of the illumination of the lens.

M.Shinoda et al. ODS 2004

Near field recording set-up

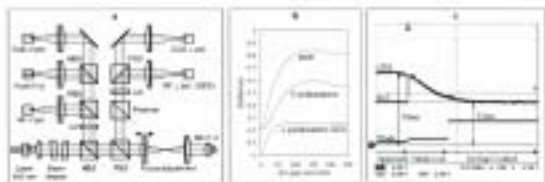
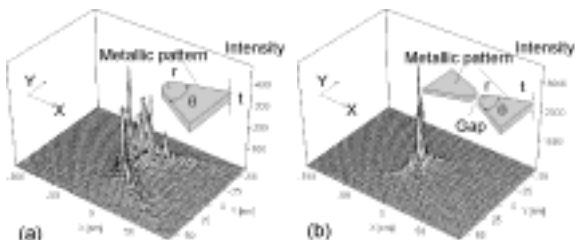


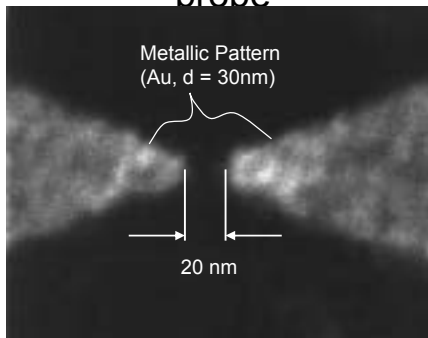
Figure 2 (a) Schematic of the near field probe set-up. (b) Calculated reflection on a flat metal for the θ polarizations and the θ polarizations from which the LCTR is derived. (c) Response along the probe diameter.

Planar Plasmon Probe

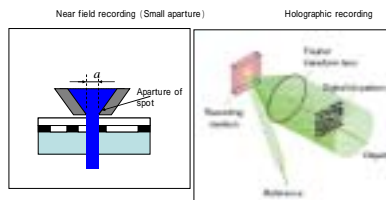


Takuya Matsumoto, Takeshi Shimano and Sumio Hosaka, *Technical Digest of 6th international conference on near field optics and related techniques, the Netherlands, Aug. 27-31, 2000, p55.*

Fabricated novel near-field probe

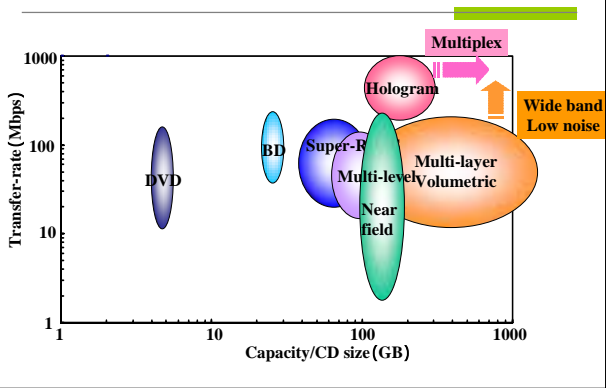


Approach to large capacity (3)

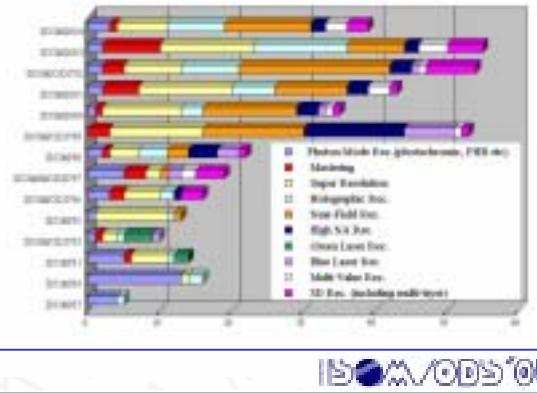


From InPhase H.P

— Status of future technologies —



High density Recording technologies appeared in ISOM



ISOM Roadmap Outline(1)

1. Don't touch the current business.
2. Target:
Capacity : 200GB to 1TB / side / CD size disc
Transfer-rate: up to 1G bps
3. Selected technologies :
2-photon,
Super-RENS,
Multi-layer,
Hologram,
Near-field



ISOM Roadmap Outline(2)

4. Make sure the problems and approaches
Mile-stone
Requirements and breakthrough technology
5. Duration: April 2005 to November 2006
Intermediate Report: ISOM/ODS2005
Final Report : to be published to Web
6. Organization :
Coordinators: Members of Steering committee
Organizers: Members of ISOM committee
Members: Researchers recommended by organizer



Thank you