Volume Holographic Optical Data Storage

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Status

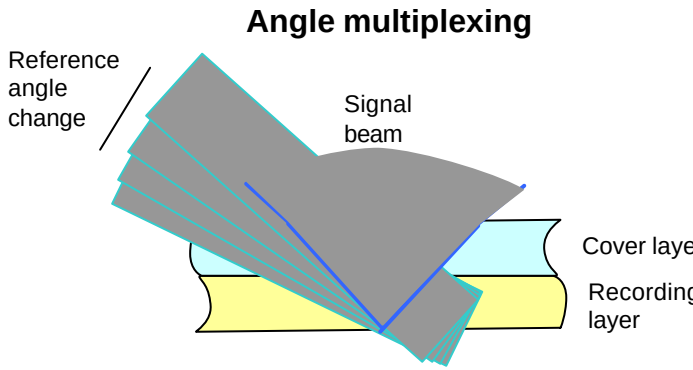
“The 3rd holographic wave has come.”

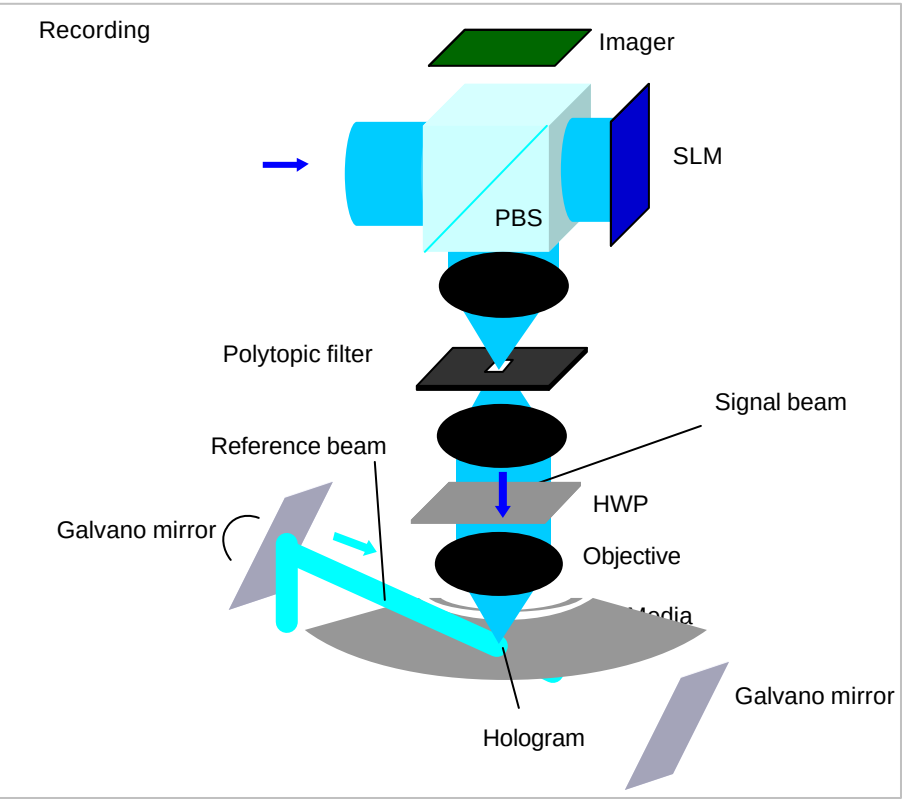
- **Photopolymer is most promising material for Write-once media.**
- **Over 500Gbit/in^2 density recording was demonstrated.**
- **200 Mbps data transfer rate was also demonstrated.**
- **The number of contributed papers for the optical storage conference is rapidly increased.**
- **”Polytopic” and ”Coaxial”methods lead this development.**

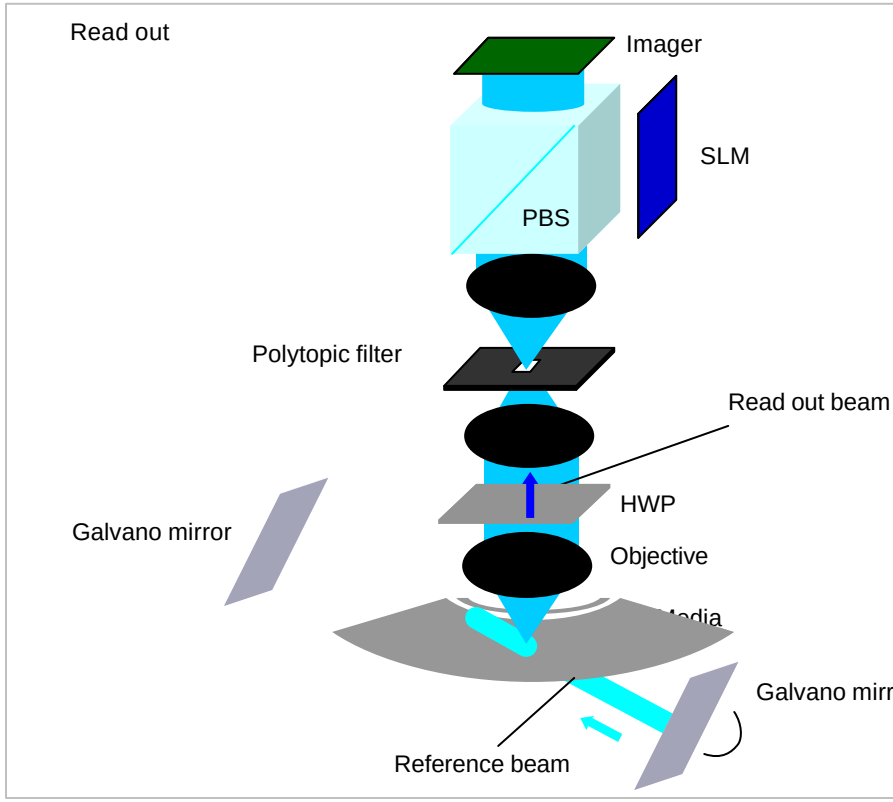
Polytopic method

Based on well-known angle multiplexing

- Simple recording and readout mechanism
- Easy to implement phase conjugate readout
- Wider tolerance compared to other methods



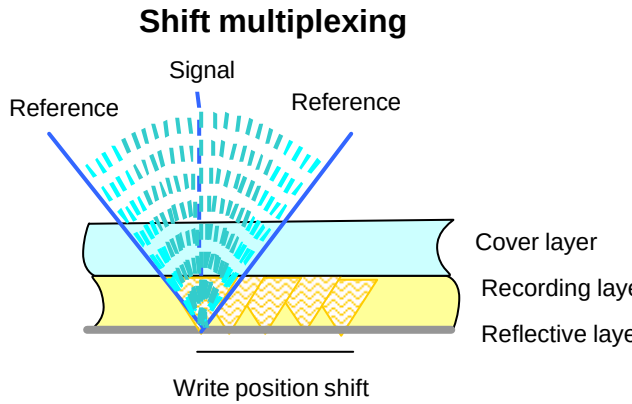




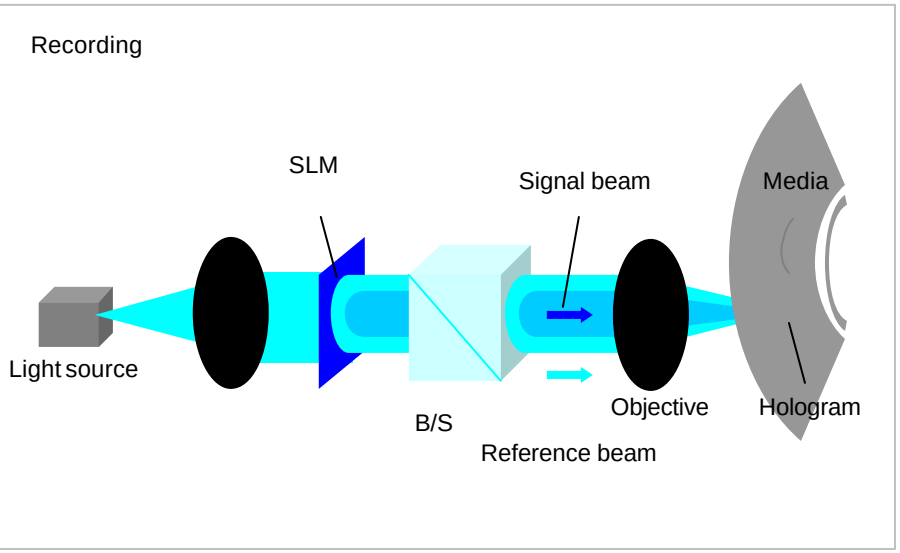
Coaxial method

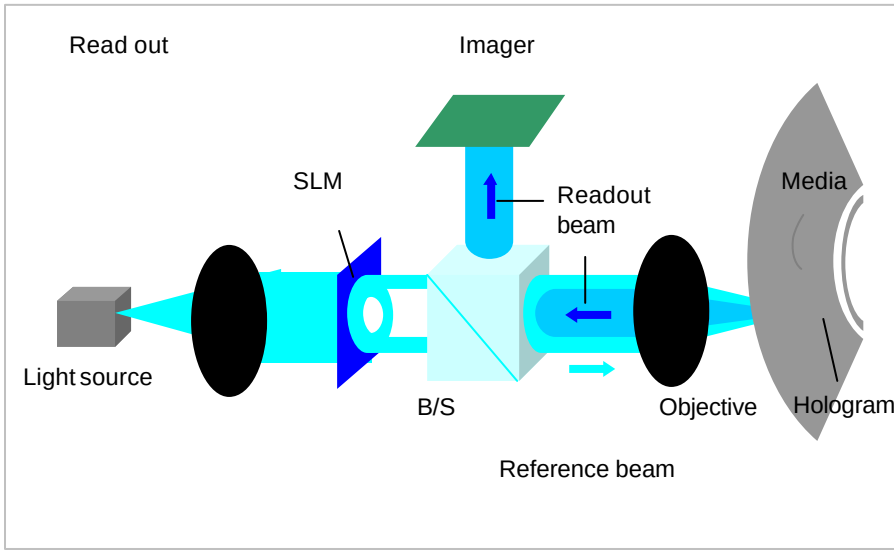
Many similarities with optical disk system

- Simple Optics
- Reflection system
- Servo control mechanism



Turn our previous experience to advantage future mass-production





Critical issues for 1TB and 1Gbps

Limitation factors

- **Recording density**

  Polytopic method: M/# and Scattering noise

  Coaxial method: M/# and Inter-page crosstalk

- **Data transfer rate**

  Polytopic method: Media sensitivity and Rapid mechanism

  Coaxial method: Media sensitivity and SLM/CMOS frame rate

→ **Further improvement of mainly media characteristics is required.**

Prospects

Holographic data recording is much sensitive for various disturbances compared to conventional optical disk recording.

The innovation such as servo mechanism and compensation technique is essential for constructing the robust system.

To make the most of high potential of holographic recording in future products is our great challenge.

Thank you!