

# Testing of key elements for common path holography

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# Content

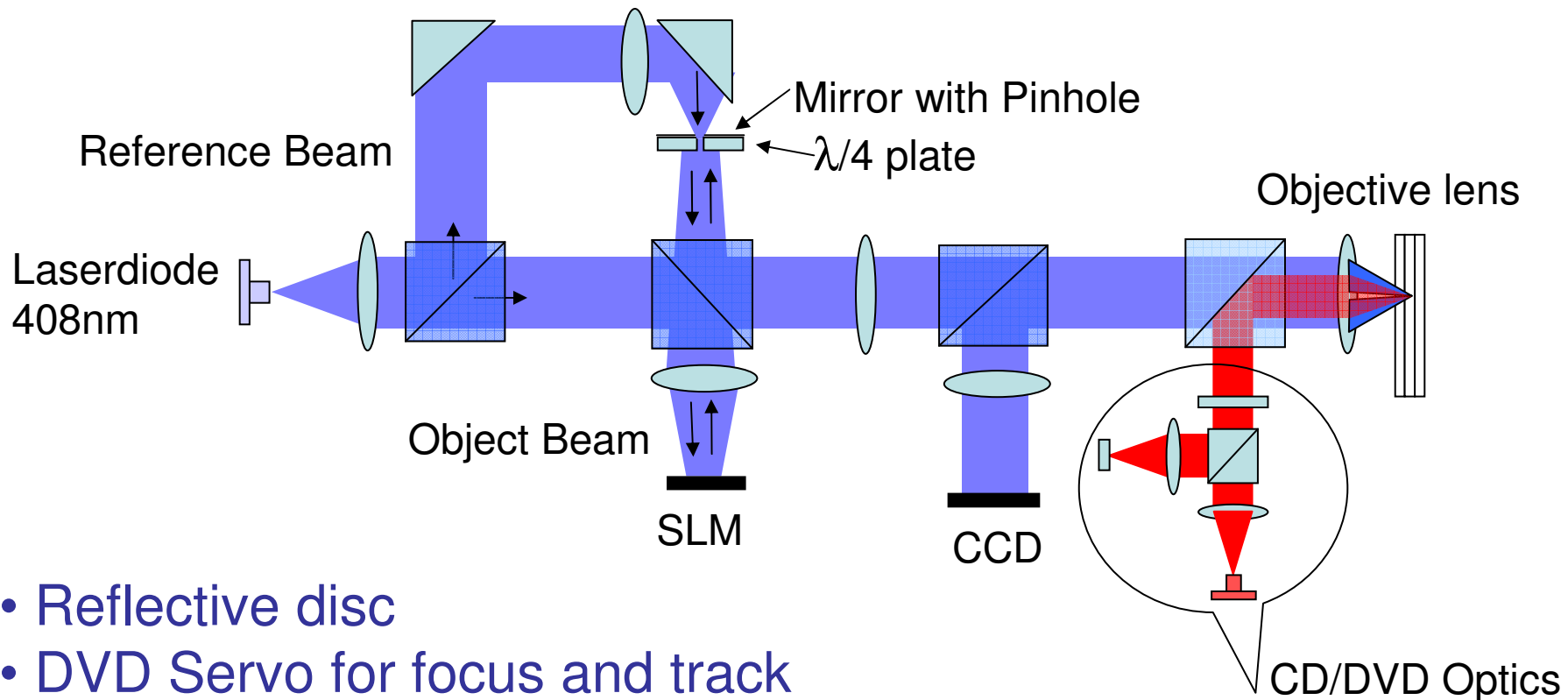
- Concept of a holographic drive with co-propagating beams
- Multiplexing Tester Setup
- Results from the Plane Wave Media Tester
- Conclusion and Outlook

# Short comparison of techniques

- Angle multiplexed setup:
  - Many moving elements
  - More sensitive to vibration
  - + Large datapages possible
- Co-propagating beams
  - + Common path through many optical elements
  - + Less sensitive to vibration
  - + Compact Drive seems to be feasible
  - Large datapages (>500 kPixel) are very difficult

# Drive Concept

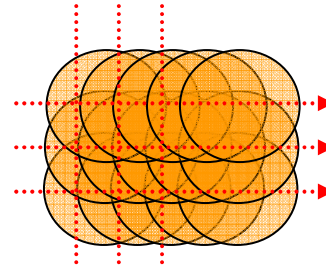
- Reference and object beam share the same objective lens
- Reference and object beam rejoin at a Fourier plane



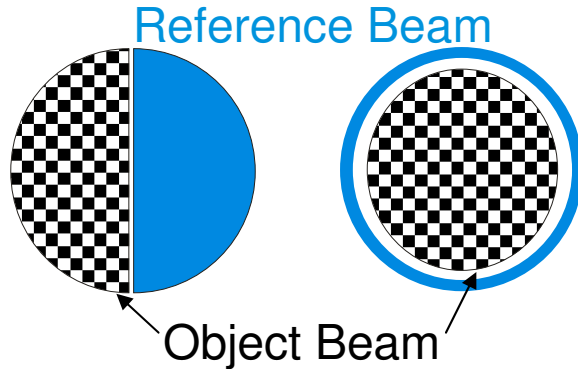
- Reflective disc
- DVD Servo for focus and track
- Shift multiplexing

# Shift Multiplexing

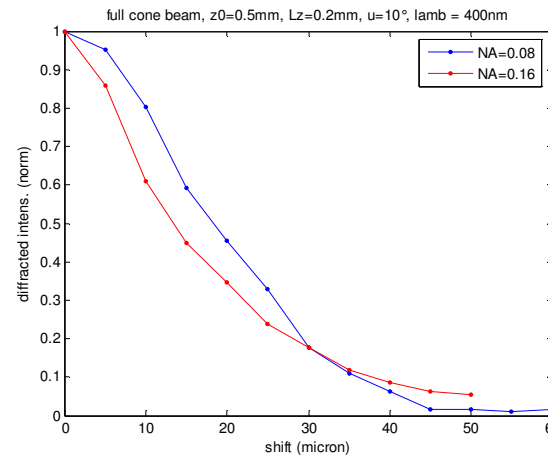
- Shift multiplexing: Holograms are written overlapped to increase storage capacity.



- Selectivity depends on
  - beam configuration

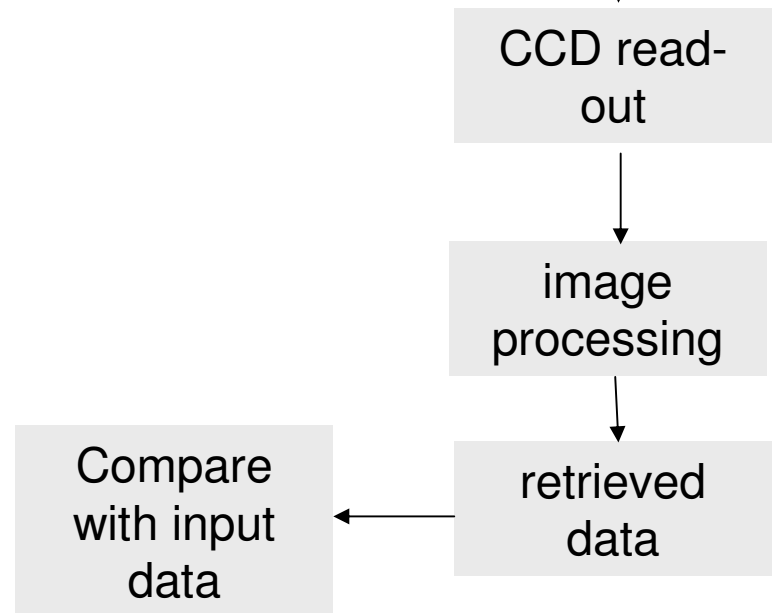
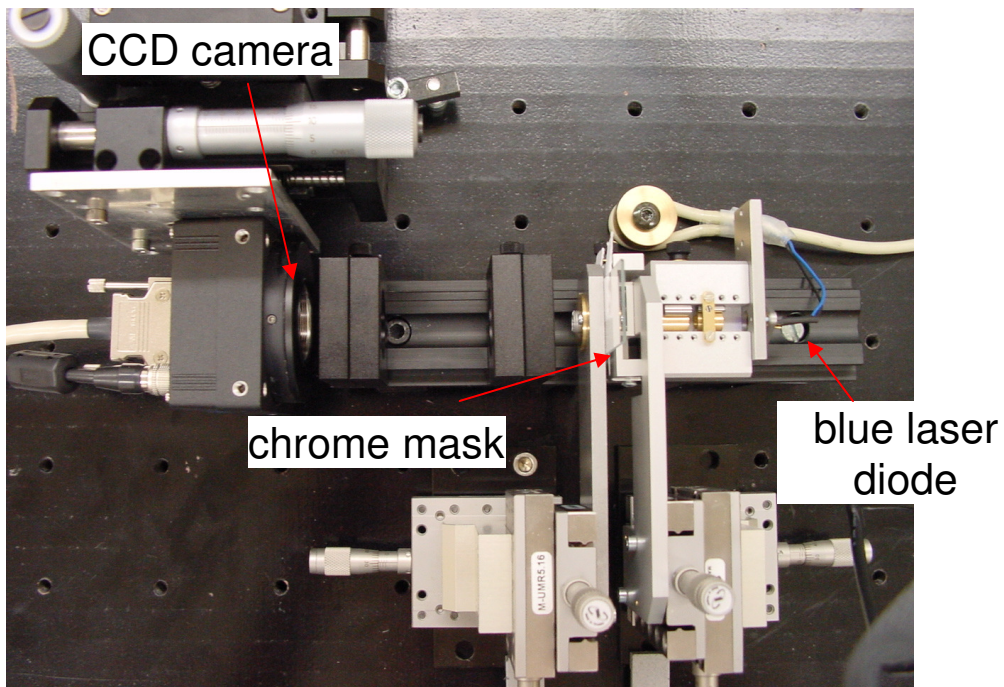
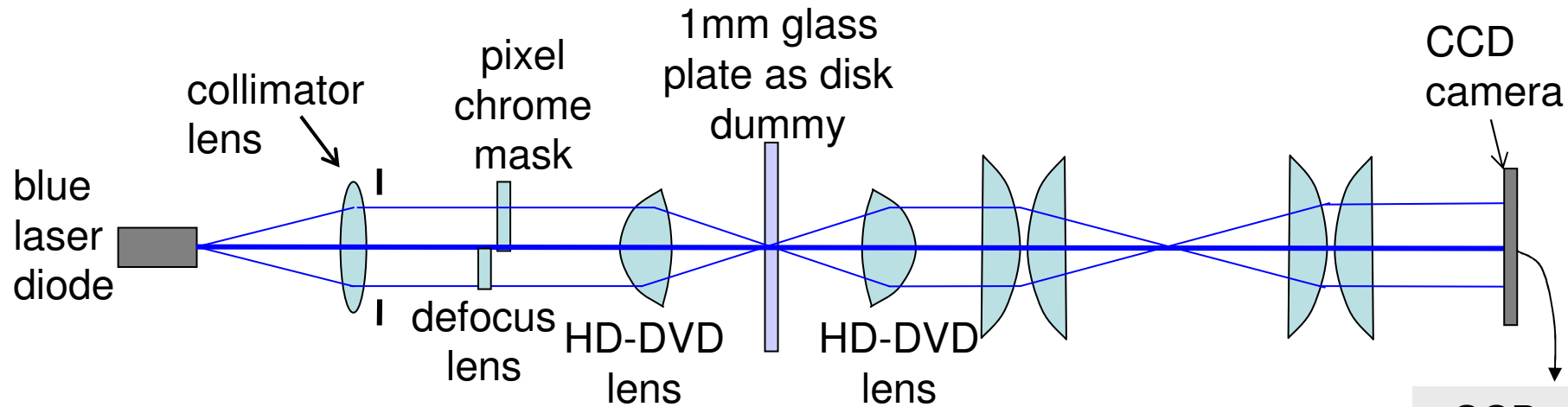


- numerical aperture of objective lens



- Final goal: Optimize shift multiplexing to maximize the storage capacity.

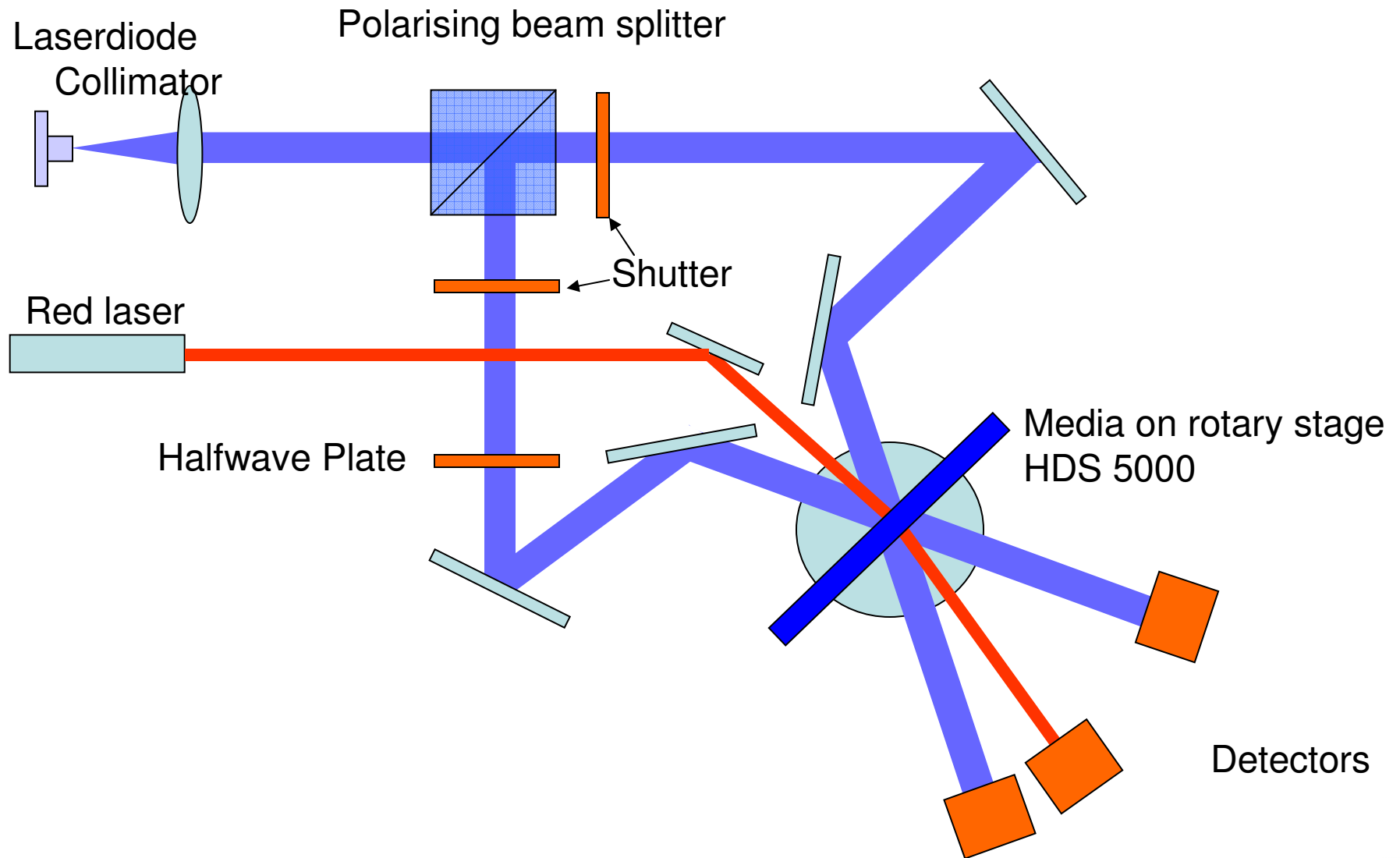
# MUX tester



# Planned experiments with MUX tester

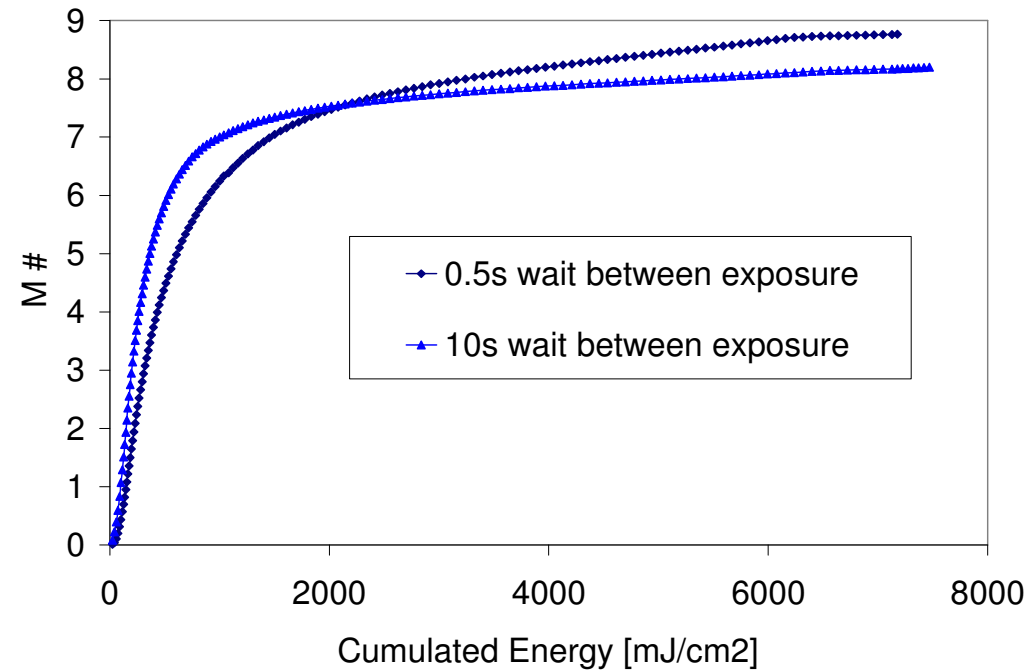
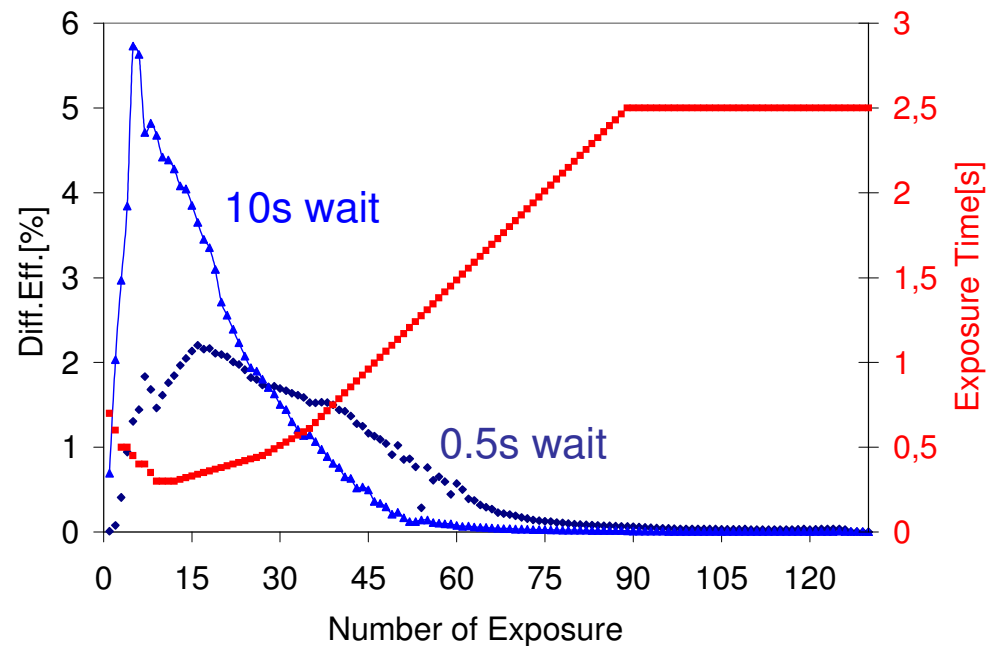
- Demonstration of writing and reading of shift-multiplexed holograms.
- Measure shift and tilt sensitivity of read out holograms and compare with theory.
- Test first coding and image processing/decoding solutions with real holograms images.

# Blue media tester Setup



# Media tester: Scheduling

- Exposure of the material has to be varied with time (= Scheduling)
- Each exposure leaves less monomers available
- Scheduling depends on history, e.g. on the time between the past exposures



M# = 8,7

# Summary and Outlook

- A tester setup with off-the-shelf components was realized, which will enable us to evaluate the correctness of different simulations.
- This tester will allow to measure important parameters like hologram crosstalk, BER and others.
- Image processing algorithms will be developed to achieve high fidelity data retrieval.
- Results of measurements with a material tester were shown.
- Multiplexed gratings with equal diffraction efficiencies will be written soon.

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