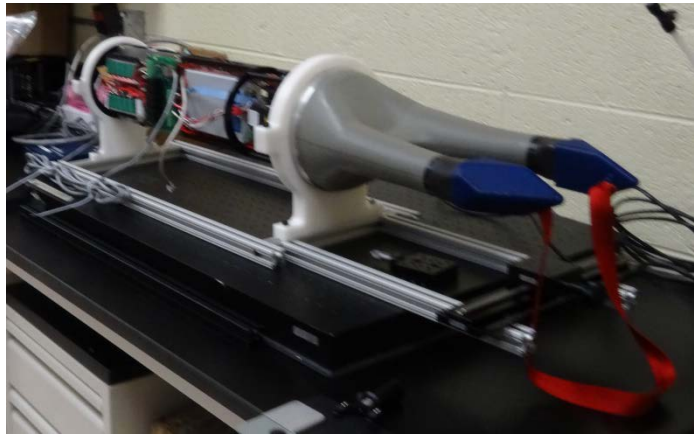
HOLODEC

-

Holographic Detector for Clouds

Susanne Glienke



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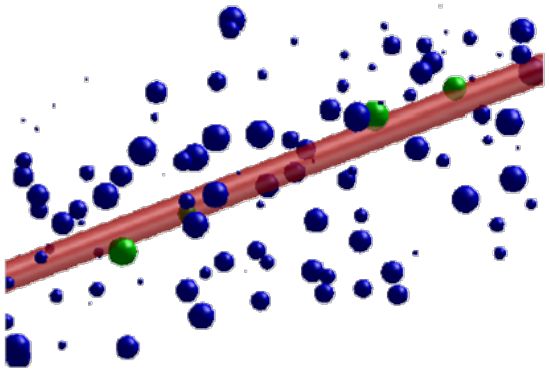
What‘s special about HOLODEC?

Others…

…average over large distance to get size distributions

…sometimes measure only single droplets

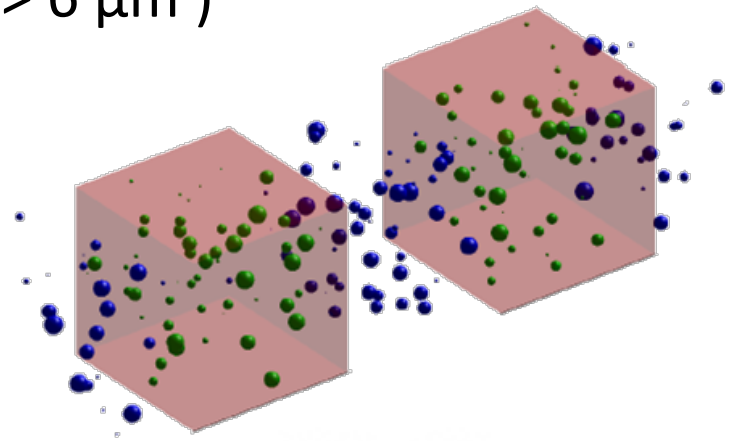


HOLODEC…

…gets size distributions from a single hologram

…can measure inter-particle distances

… measures small droplets (> 6 µm)



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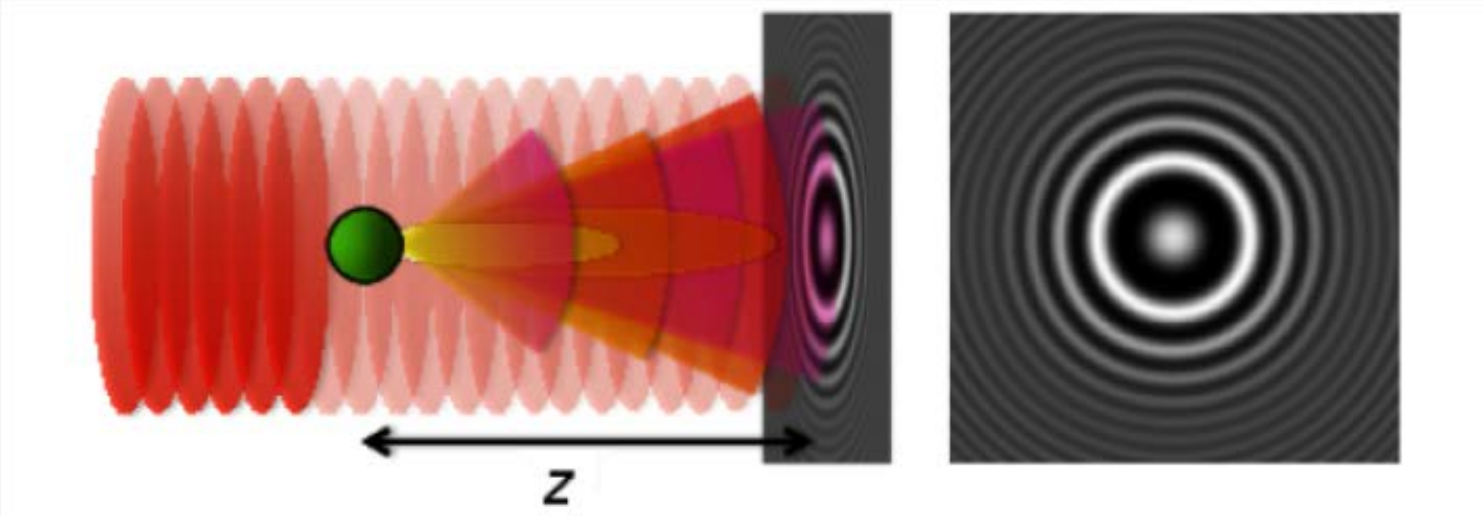
How does it work?

- Digital in-line holography
- One laser pulse per hologram



- Recording with camera
- Reconstruction

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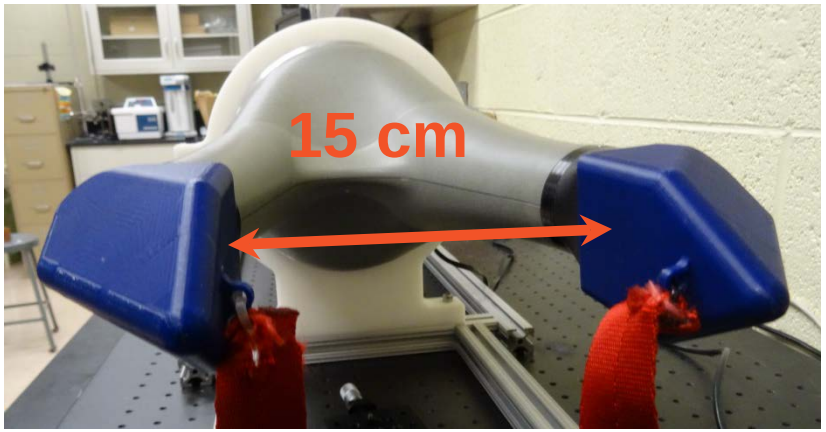
Figure adapted from Grier lab; physics.nyu.edu/grierlab

How does it work? - HOLODEC

- Sample volume from each hologram: ca. 15 cm^3
- Data amount – 1 hologram ca. 15 MB => ca. 200 GB/h or more (depending on content)
- Data storage: 2 drives in Holodecs computer

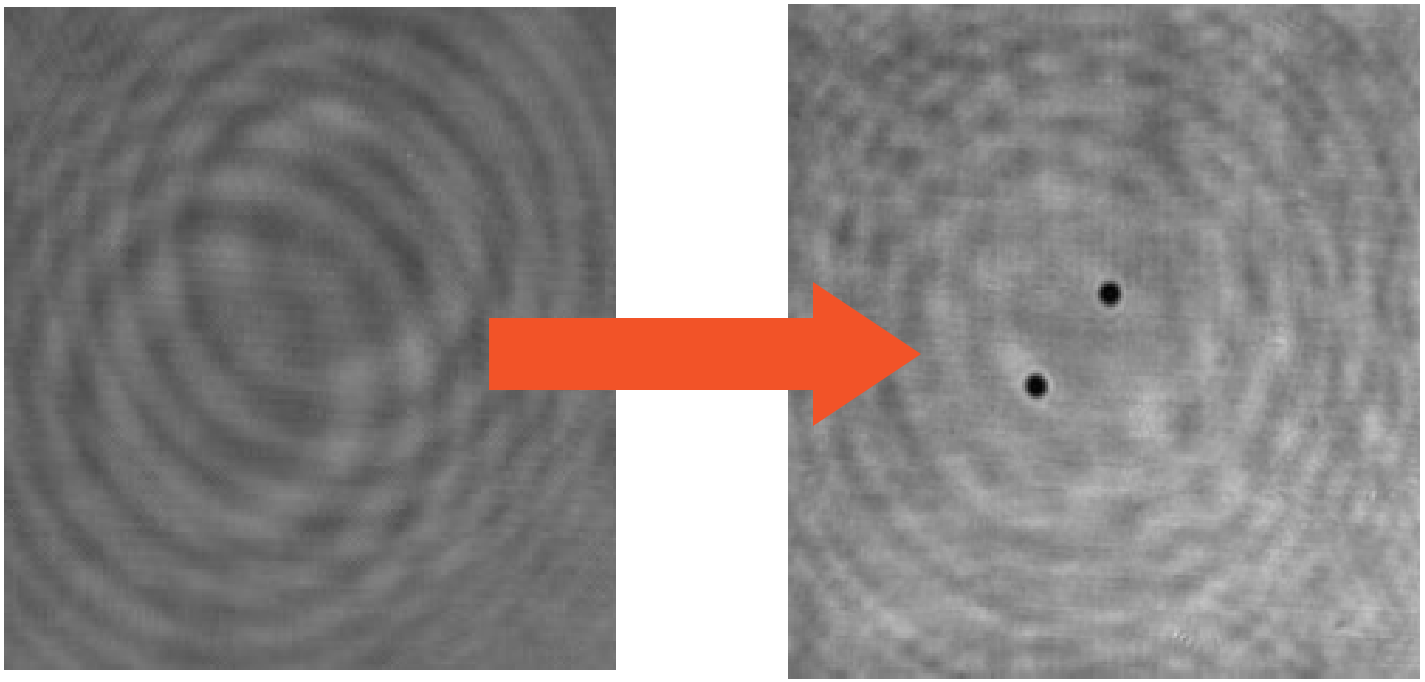


~1 cm^2

What do the results look like?

Original hologram

Reconstruction to particle plane

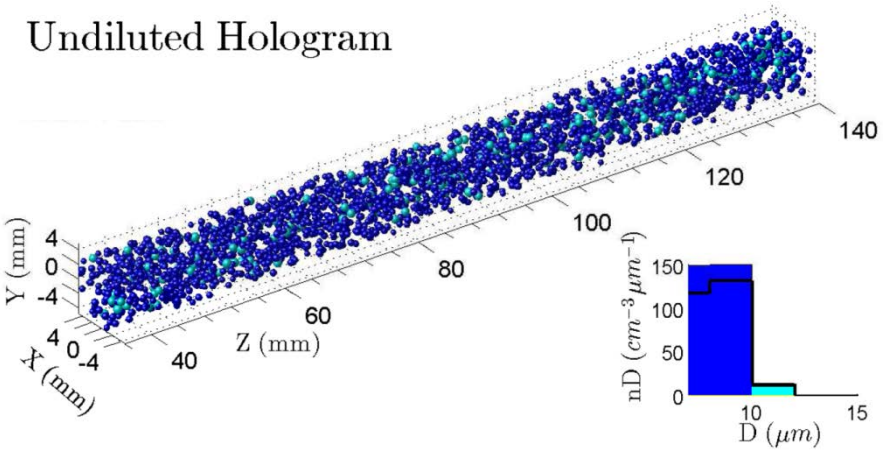


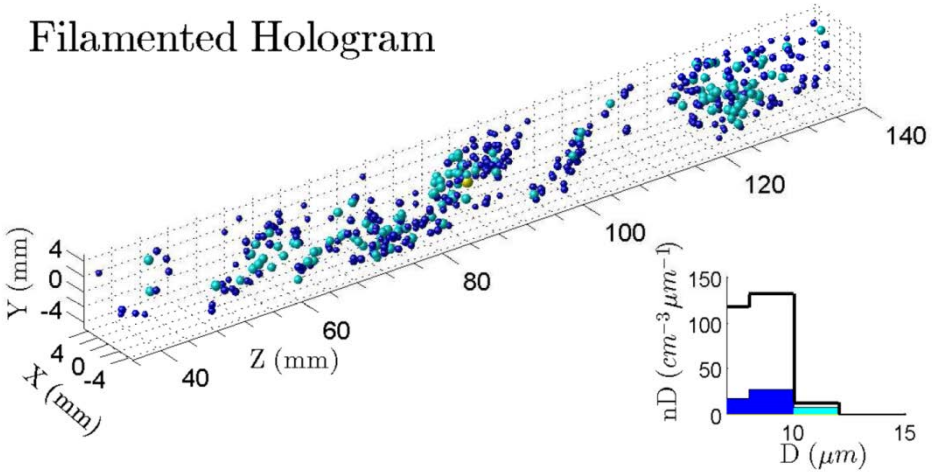
What can it measure?

- Droplets > 6 µm
- Resolution constraint due to camera pixel size
- Distances between droplets
- Many droplets on one hologram
- Holograms every 1/3 s => spatial resolution at flight speed of 100 m/s is a hologram each 30 m

What are we interested in measuring?

- Mixing at cloud edge
- homogeneous vs. inhomogeneous mixing
- Turbulence
- Effects of that on cloud





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Status

- Sent to NCAR
- Laser
  - Both actual laser and spare are sent to repair
  - Time: few weeks
  - New optics needed for new laser
- Cable for communication partly fixed
- Optics will be cleaned (planned)

HOLODEC Team

- Susanne Glienke (Michigan Tech)
- Raymond Shaw (Michigan Tech)
- Jacob Fugal (Universität Mainz)
- NCAR – several people