

# ECE 299 Holography and Coherent Imaging

Lecture 14. Midterm Review

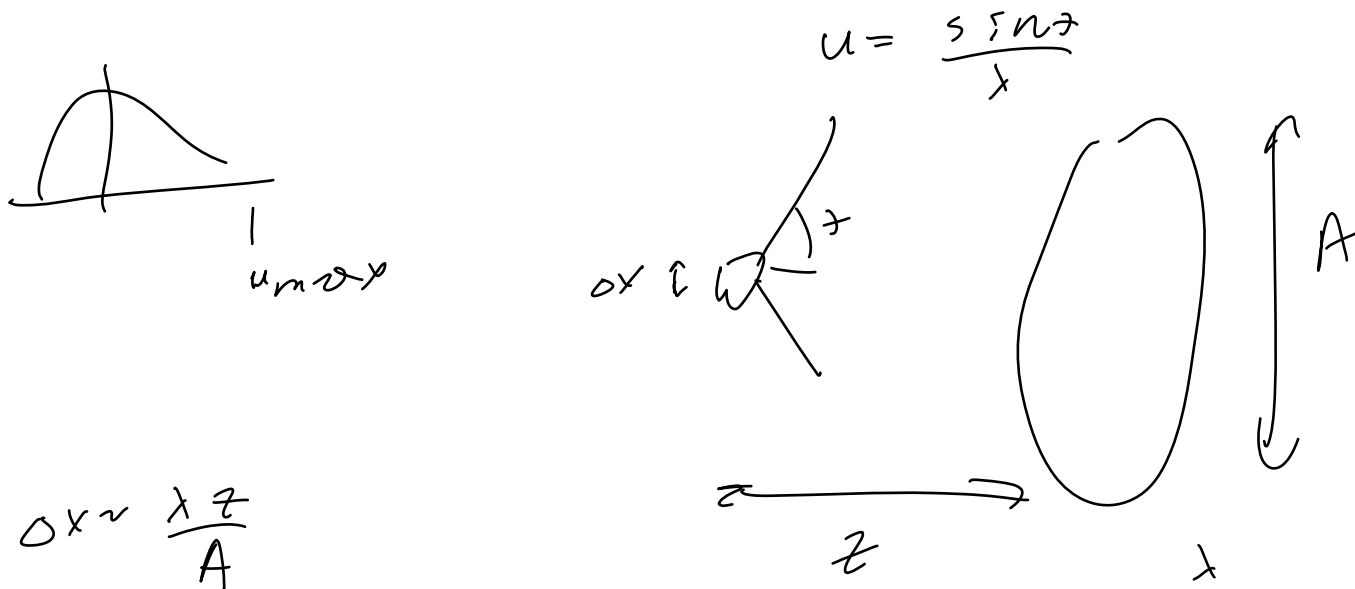
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# 6 questions

1. Spatial resolution of a holographic image
2. Recording geometry for off-axis hologram
3. Reconstruction color and resolution of a display hologram
4. Bragg matching bandwidth, volume storage
5. OCT/time of flight imaging
6. Computer generated holograms

# Question 1

- Spatial resolution of a holographic image

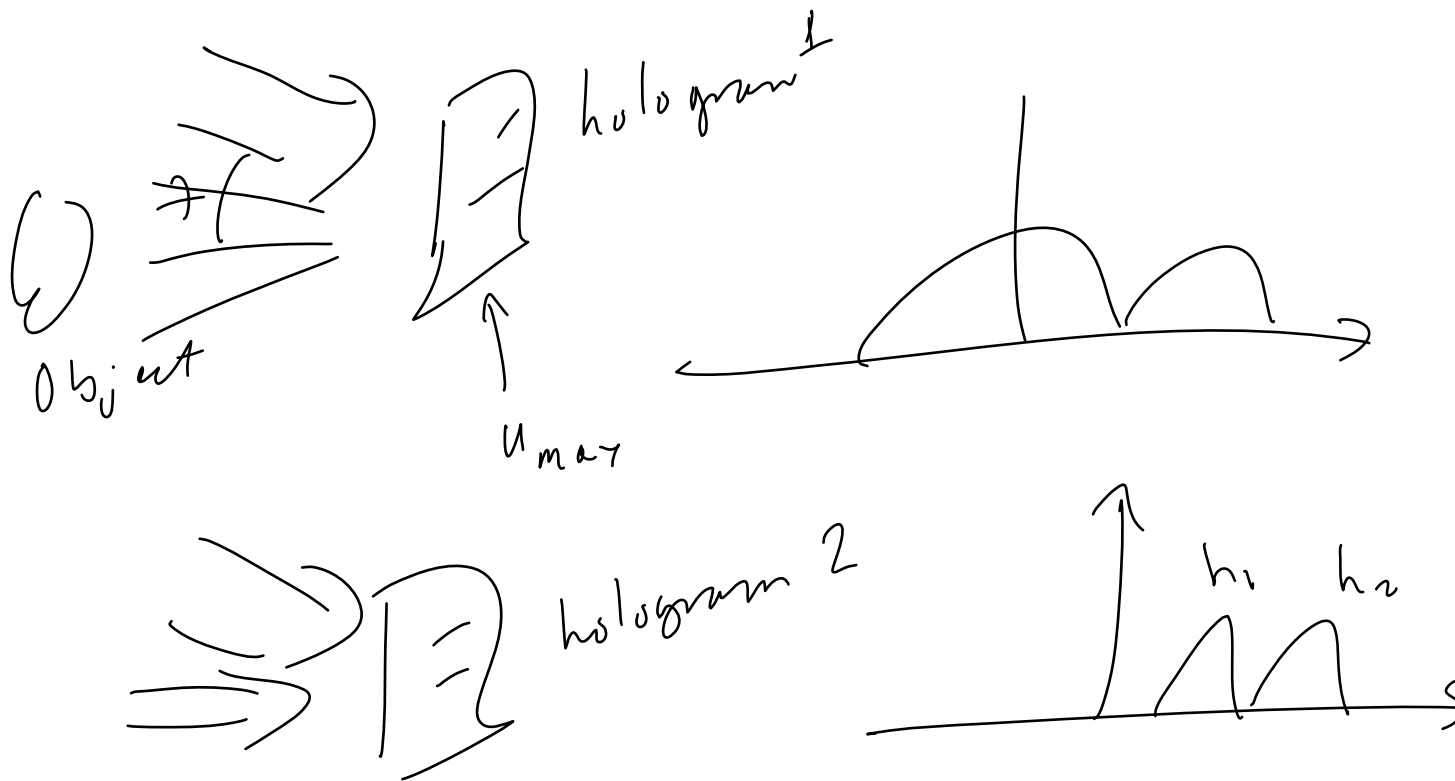


$$\Delta x \sim \frac{\lambda z}{A}$$

$$\Delta x = \max \left[ \frac{\lambda z}{A}, \frac{\lambda}{2 \sin \theta}, \frac{z}{u_{\max}} \right]$$

# Question 2

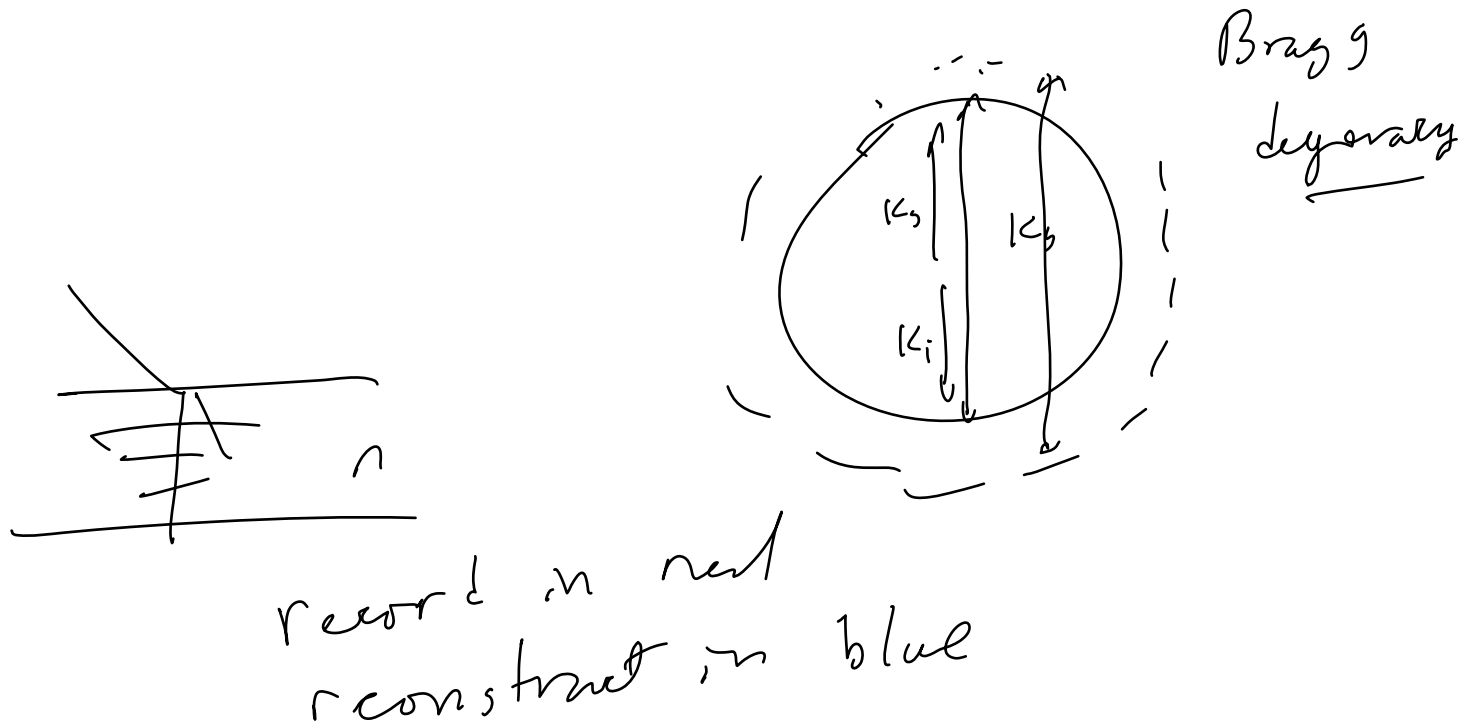
## Recording geometry for off-axis hologram





# Question 3

## Reconstruction color and resolution of a display hologram



# Question 4

## Bragg matching bandwidth, volume storage



$$\Delta U = \frac{\Delta \lambda}{\lambda^2}$$

Info for mutation capacity

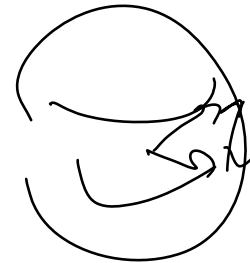
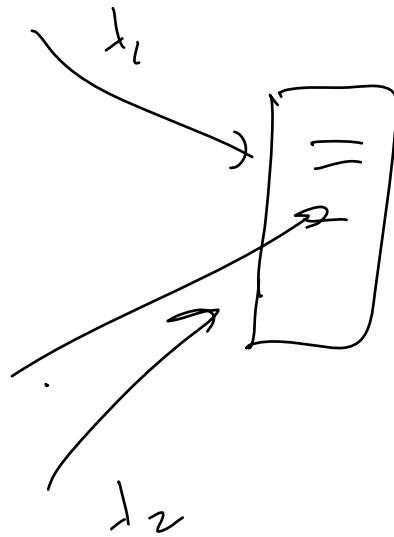
$$S = \frac{2 \Delta \lambda}{\lambda^2} L$$

related

problem

what is spectral resolution of holographic filter

# Angular Bragg's matching



draw

wave

normal



# Question 5

OCT/time of flight imaging

# Question 6

## Computer generated holograms

Given

$$E = A e^{i\phi(x)}$$

Describe method to create CGH  
including phase & amplitude  
encoding.

resolution requirements