Lecture Three

Questions

This week:

Kohler

Assn 3 – Making photomicrographs
Quiz one

• Name one important pioneer of scientific photography?

• List the theories of energy travel

• List 5 light behaviors
Refractive errors

• Lead to image defects
• Low contrast
• Spherical aberration
• Low Visibility
Diffraction

- Effects resolution of image
- Change to energy when forced through a small opening
Diffraction is required optical to create optical resolution
Sample role

Sample is a diffraction gradient. It has much fine detail & hard often difficult to resolve.
Interference

- Constructive
- Destructive
Dispersion
Aberrations

Spherical
Chromatic
Astigmatism
Flatness of Field
Flatness of field
Spherical & Chromatic aberration
Diffraction
Specimen is a diffraction gradient

Frequency remains the same
Amplitude is reduced
Apertures

smaller apertures = more diffraction
Interference

• Energy can be described as coherent or incoherent which defines the PHASE of the energy’s travel.
Optical resolution

• Separation of 2 points. To occur an Objective must gather - at a minimum - 2 orders of diffracted rays to resolve structure.
Numerical Aperture - NA

- Light gathering ability of the objective
Numerical Aperture

\[ NA = n \ \text{Sine} \ \varnothing \]
Common Refractive Indexes

AIR - 1.00
Water – 1.33
Immersion oil – 1.53
Photography through the microscope

• Microphotography
• Microscopy
• Photomicroscopy
• Photomicrography