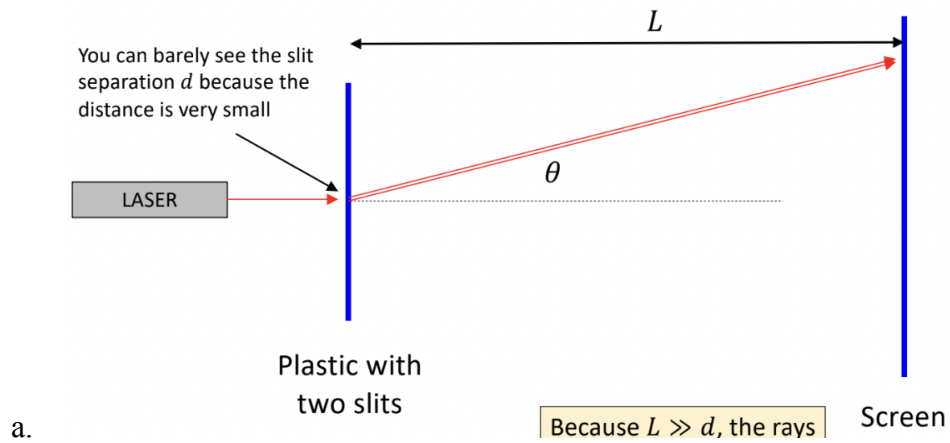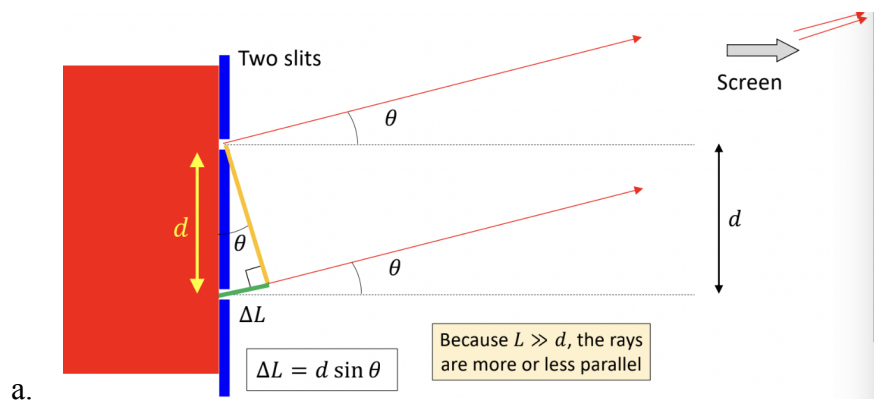CAS PY 106

Lecture Note 32

1. Double slit interference (zooming out)



   a.

   b. Distance between the two slits is d

   c. Because L is greater than d, the rays are more or less parallel

2. Double slit interference (extra zoomed in)


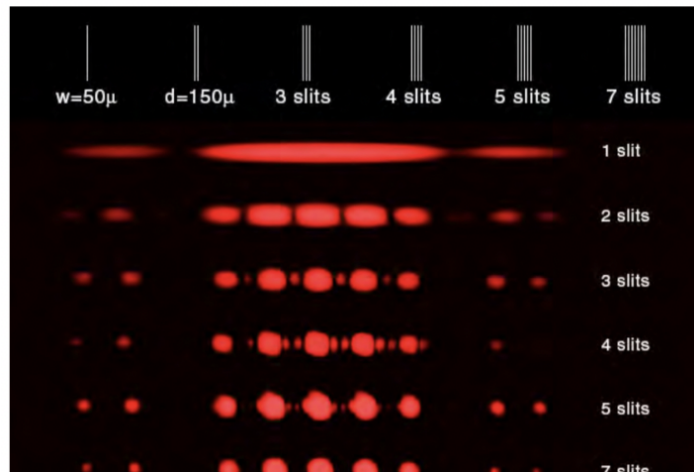
   a.

3. What happens when we add more slits?

   a. Constructive interference still happens at the same spot

   b. Multiple places will see destructive interference

   c. Sharp maxima (bright fringes):

d * sin(theta) = m * lambda

## Interference from a red laser



d.

4. What happens when we add more slits?

   a. Taking this adding slits business to an extreme, a diffraction grating consists of a large number of long slits on a glass or plastic slide

   b. 1000 slits per mm = 10^-3 mm between each slit or 1 um between each slit

   c. Diffraction gratings are commonly used in spectroscopy to separate light into its various colors, often to determine the chemical composition of the source of the light
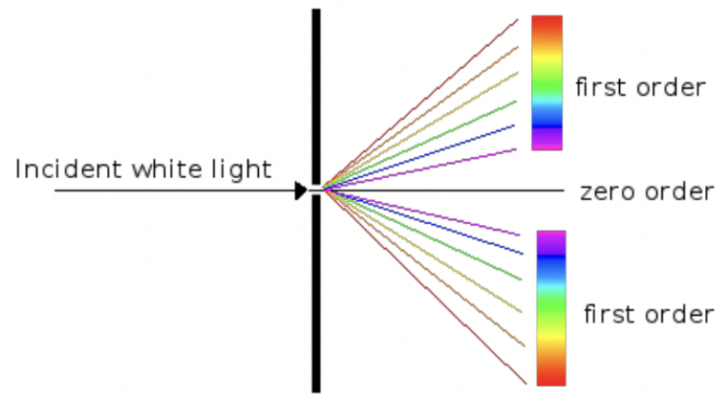


   d.

5. Diffraction Grating

   a. We have constructive interference when: $d * \sin(\theta) = m * \text{lambda} = 1 *$ lambda = lambda



   b.

   c. For the first order (m = 1)

      $d * \sin(\theta) = \text{lambda}$

      Light having larger lambda (red) will appear at larger angles from the center than light having smaller lambda (violet)