

Young's Double Slit

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1 Notes

- the longer the wave lengths, the farther the interference pattern is.
- the shorter the wave length, the shorter the interference pattern is.
- florescant lights: put fingers close together act like a slit
- thursday is young's double slit experiment
- monochromatic light you see either light or dark
- light from sun you see white in center then colors on the side depending on how the waves deconstructive and constructively interfere
- by rotating the wave in a slit, the wave distances between the two waves (original wave and reflected wave) changes
- minima is when a crest and a trough align with eachother, cancelling eachother out
- maxima is when a crest and crest or trough and trough align with eachother
- angle from dark region formula: $\sin \theta_n = (n - \frac{1}{2}) \frac{\lambda}{d}; n = 1, 2, 3...$
- angle from bright region formula: $\sin \theta_m = \frac{m\lambda}{d}; m = 1, 2, 3...$
- distance between adjacent nodal lines: Δx as $\frac{\Delta x}{L} = \frac{\lambda}{d}$
- young's double slit you have a central maxima then all the rest are evenly spaced on the other side.
- single slit: double width in center, single width on the sides
- diffraction grating: all same intensity, small minimas and large maximas. All evenly spread out.
- Must explain why the above happens for test.

2 Homework

Two slits produce an interference pattern. The distance between the slits and the screen is 7.7m. The two third-order maxima are separated from each other by a distance of $32.9 \times 10^{-2}m$. The wavelength of the light is $4.9 \times 10^{-7}m$. Calculate the separation between the slits.

$$\Delta x = (L) \left(\frac{\lambda}{d} \right) \quad (1)$$

$$\Delta x = (32.9 \times 10^{-2}) \left(\frac{4.9 \times 10^{-7}}{7.7} \right) \quad (2)$$

$$\therefore \Delta x \approx 2.01 \times 10^{-8} \quad (3)$$

3 Images

