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
- thrusday 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 decontrustive and construvely 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 evenely spaced on the other side.
- single slit: double width in center, single width on the sides
- diffraction grading: 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.

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

$$d = \left(\frac{(7.7)(4.9 \times 10^{-7})}{32.9 \times 10^{-2}}\right) \tag{2}$$

$$\therefore\ d \approx 1.14 \times 10^{-9} \tag{3}$$