

# Diffraction

may 8 2018

the bending and spreading of a wave when it passes through an opening

the amount of diffraction is dependent on the size of the gap, and wavelength of the light

- large  $\lambda \rightarrow$  more diffraction
- large Gap  $\rightarrow$  less diffraction

## Interference

Light waves can interfere like sound waves, if light waves interact so they are in phase with each other they constructively interfere, if they meet out of phase they destructively interfere

when waves from two sources producing waves of the same wavelength interact they make an interference pattern.

read 9.3/9.4

page 456 q 460 1 and 2 page 465 1 - 5

## Double Slit Experiment

Light rays are able to interfere with each other and will produce a distinct predictable pattern on a screen beyond the double slits

as rays of light come out of the double slit they travel to the viewing screen, if they reach the screen in phase, there is constructive interference, if they reach out of phase they destructively interfere.

$$d \sin \theta = m\lambda$$

the angle between the central axis and the specific minima is shown in the relationship

$$d \sin \theta = (n - \frac{1}{2})\lambda$$

the distance between a certain number of maxima can be modeled with the equation

$$x_m = \frac{mL\lambda}{d}$$

where  $x_m$  is the distance between certain numbers of maxima,  $m$  is the number of number of maxima being measured,  $L$  is the distance between the given maxima,  $\lambda$  is the wavelength of the light, and  $d$  is the distance between the slits

$$x_n = \frac{(n - \frac{1}{2})L\lambda}{d}$$

where  $x$  is the distance between certain numbered minima,  $n$  is the number of minima between the given minima,  $L$  is the distance between the given minima,  $\lambda$  is the wavelength of the light,  $d$  is the distance between the slits

page 473 1 - 8