

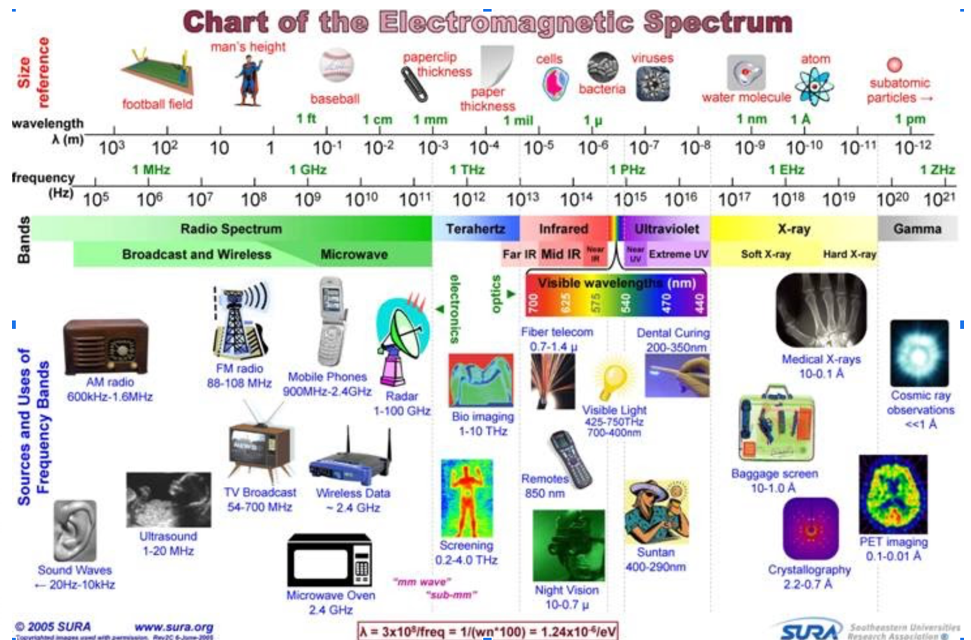
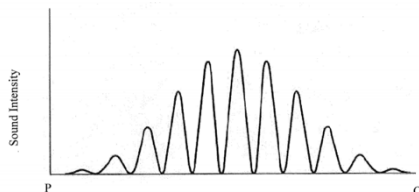
Interference pattern: $\Delta x = \frac{L\lambda}{d}$

Path Difference Path diff point P
on nodal line (destructive int):

$$PS_1 - PS_2 = \frac{1}{2}\lambda, 1\frac{1}{2}\lambda, 2\frac{1}{2}\lambda \text{ etc}$$

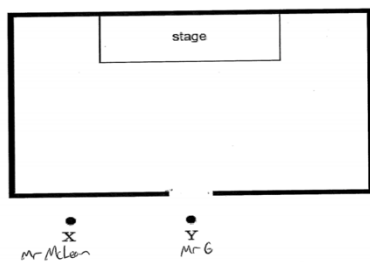
Path diff point P on maxima
(constructive int):

$$PS_1 - PS_2 = 0\lambda, 1\lambda, 2\lambda, 3\lambda \text{ etc}$$



Explain the graph:

- Superposition of coherent waves form an interference pattern
- Where the P.D is a whole number of wavelengths, waves arrive in phase and constructively interfere to give high intensity.
- Where P.D = $(n-1/2) \times \text{wavelength}$, waves arrive out of phase and destructively interfere giving minimum intensity.
- The peaks drop off from the centre as they are further away from the speakers.



- diffraction depends on the wavelength/w ratio, if this increases, then the extent of diffraction generally increases.
- High Frequency means low wavelength...therefore diffracts less
- Low frequency means high wavelength...therefore diffracts more
- Mr Mclean hears higher intensity for lower frequency compared to higher since lower frequency diffracts towards point X.
- Mr G hears higher frequency more than lower as less has diffracted away from his position.

Explain how a standing wave forms:

- Waves, travelling in opposite directions are reflected at the ends.
- The waves overlap (superposition) to produce an interference pattern.
- Forming nodes at points of destructive interference
- Antinodes at points of constructive interference.

Explain how Young's experiment supports waves:

- As observed in the experiment, an interference pattern is formed when light from each slit interferes with each other.
- Producing bright bands where the two waves are in phase, hence constructively interfering with each other.
- Also producing dark bands where the two waves are out of phase, hence destructively interfering with each other.
- It doesn't support the particle nature of light because only two Bands would have been observed if this was the case.