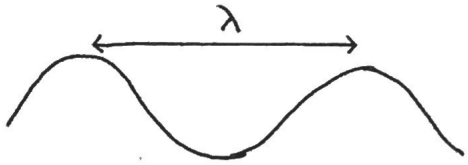
LIGHT

- Light is an electromagnetic wave.

- Two types of waves
  a) transverse waves - vibrations perpendicular to the direction in which the wave is travelling.
  b) longitudinal waves - vibrations parallel to the direction in which the wave is travelling.

- Light propagates as transverse waves.
  Sound propagates as longitudinal waves.



- A wave is characterized by its wavelength λ (lambda) and frequency f

  wavelength x frequency = velocity

  $\lambda \times f = c$

- For visible light l is measured in Angstroms (Å) $\quad 1 \text{ Å} = 10^{-8} \text{ cm}$
  Frequency is measured in Hertz (Hz) : 1 Hz = 1 cycle / sec
  c = speed of light = 3×10^{10}cm/sec = 3×10^{8} m/sec = 3×10^{5} km/s

- Visible spectrum : 4000 Å to 7000 Å

4000Å	Violet	5500Å	Yellow
4500Å	Blue	6000Å	Orange
5000Å	Green	6500Å	Red

- Visible light part of the electromagnetic spectrum

Gamma Rays	X-rays	Ultra Violet	Visible	Infra Red	Micro wave	Radio

$\lambda \longrightarrow$

$\longleftarrow f$

Properties of Light

i) Reflection :

angle of incidence = angle of reflection [i = r]

ii) Refraction

sin i / sin r = n [refractive index]

iii) Diffraction : The ability of light to bend around corners

- Dual nature of light
  - wave
  - particle

- Photon : A packet of light energy 

- Energy of photon : E α f

  E = h x f h = Planck's constant

- Types of Spectrum [Kirchhoff's Laws]

I. A hot dense gas or solid produces a continuous spectrum.

II. A hot rarefied gas produces emission spectrum.

III. A relatively cool gas in front of a hot, continuous source produces an absorption spectrum. [Fraunhoffer Lines]