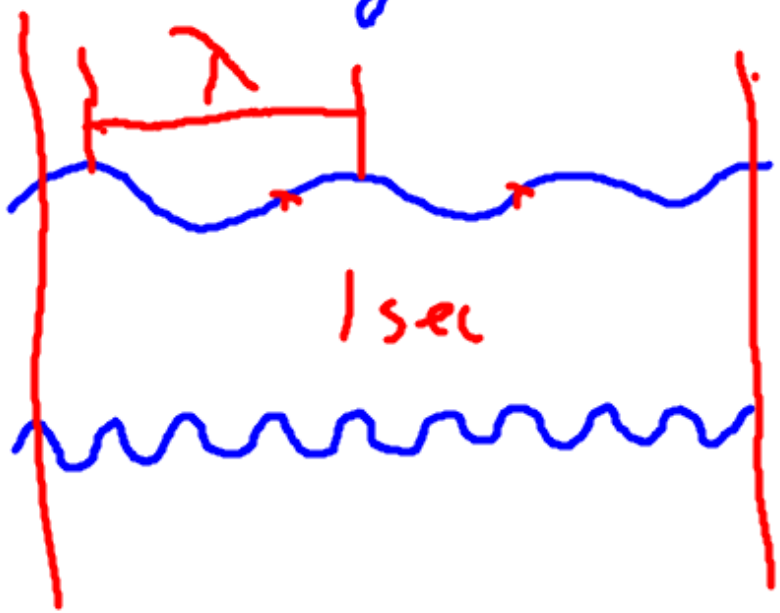
Electromagnetic Radiation

97.7 MHz



3 cycles 3 Hz or $\frac{3}{sec}$

9 cycles 9 Hz

λ and ν related (Inversely) $\frac{\lambda}{1} \propto \lambda \cdot \nu$

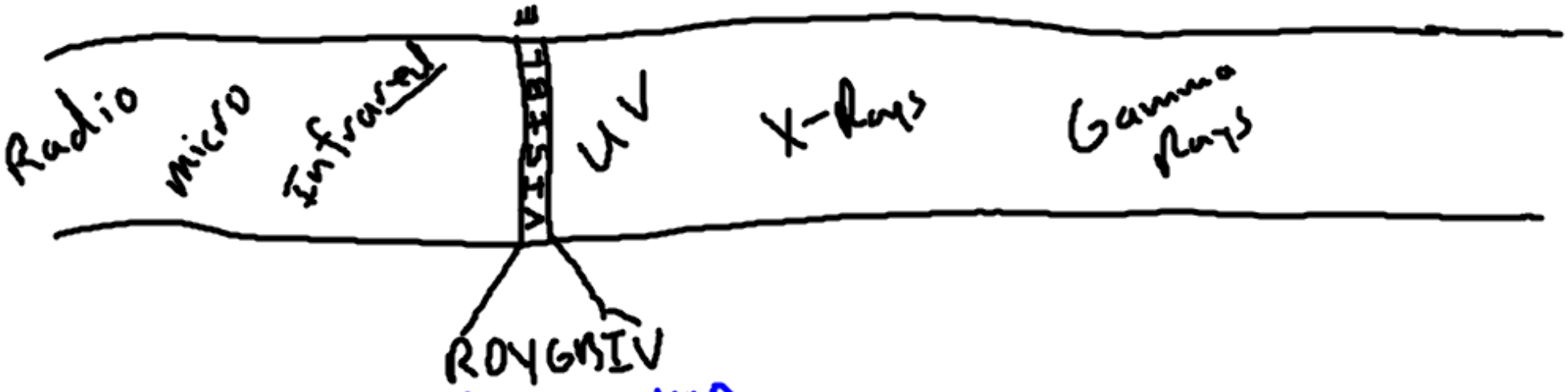
move at speed of light

$c = \lambda \cdot \nu$

$3.00 \times 10^8 \, m/s$

$\frac{m}{s} = (m)\left(\frac{1}{s}\right)$

Electromagnetic Spectrum



λ 600 m

98,000,000

700 nm 450 4.5×10^{-7} m

10^{-12} m

$c = \lambda \cdot \nu$

$\nu = \frac{c}{\lambda} = \frac{3 \times 10^{8}}{1 \times 10^{-12}}$ $\frac{3 \times 10^{20}}{s}$

Planck's constant $= 6.626 \times 10^{-34}$ J·s

$\Delta E = nh\nu$ $\quad (J \cdot s)\left(\frac{1}{s}\right)$

n ↓ integer

$c = \lambda\nu$

quantized – E only is specific levels

$2 \rightarrow 6$

$\nu = \frac{c}{\lambda}$

packets of energy = photon

$E_{photon} = h\nu = \left(\frac{hc}{\lambda}\right)$ → $E = mc^2$ massless E

$m = \frac{E}{c^2} = \frac{\left(\frac{hc}{\lambda}\right)}{(c^2)} = \frac{h}{\lambda c}$

Dual nature of light

100 m = 12.15 s

= $\frac{m}{s}$

travels in waves

but acts like a particle

$\frac{229 \text{ lbs}}{2.2} = 1 \text{ kg}$

0 0 0 0 0 0 0 0

Gm this λ

$m = \frac{h}{\lambda c}$ = $m = \frac{h}{\lambda v}$

7.96... E-37 velocity

7.96×10^{-37} m

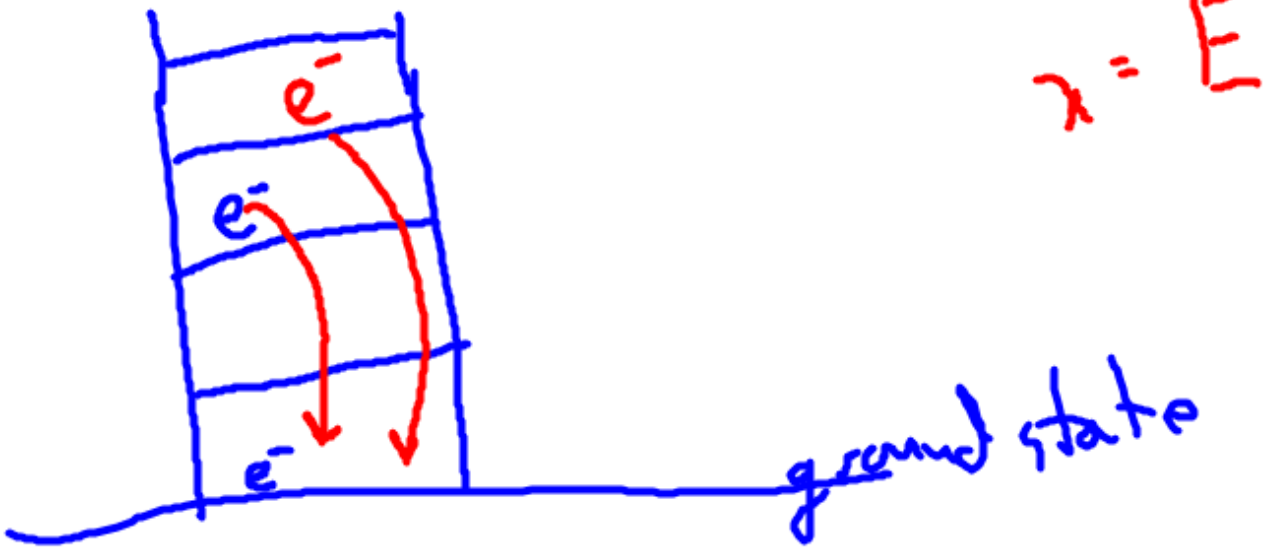
$\lambda = \frac{h}{mv} = \frac{6.626 \times 10^{-34} \left(\frac{kg \cdot m^2}{s^2}\right) s}{(104 \text{ kg})\left(8 \frac{m}{s}\right)}$

Atomic Spectrum of Hydrogen

excite it add E

$\lambda = E$

$\lambda = E$



Bohr Model - quantum model

$$E = -2.178 \times 10^{-18}\ J \left(\frac{Z^2}{n^2}\right)$$

Z: nuclear charge

n: integer