

22-11-23

Atomic Physics

Day 50

* Photons & light

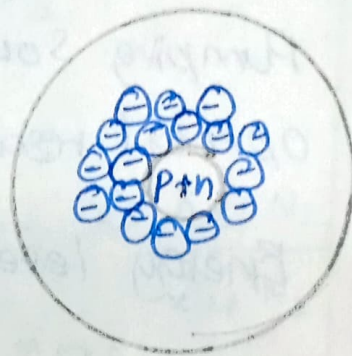
⇒ Rutherford Model

⇒ Meris Bohr Model (orbit)

(K, L, M, N) shells

⇒ Pauli exclusion principle
($2n^2$)

⇒ Landfield atom field - Model



#1 Photon

⇒ Bundles, packets, wave frequency

E.g: Sun

$$E_n = nh\nu$$

⇒ Newton ⇒ James Clark Maxwell ⇒
Einstein's Quantum Theory.

⇒ Rest - particle
motion - wave

- Photon is a energy. which is considered as a particle like electrons. They have certain frequency.

$$E \propto \nu$$

$$\nu \propto 1/\lambda$$

Properties:

- Not a charged particle unlike electron.
- Similar to electrons.
- Neutral charge.

- They don't ionise gas molecules.
- Momentum $p = mv$

#2 Matter + waves = matterwaves
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 Particle Energy

- Properties (De-Broglie)

$$\lambda = \frac{h}{mv} = \frac{h}{p}$$

$$\lambda \propto \frac{1}{p}$$

$$v \propto \frac{1}{\lambda}$$

$$E \propto v$$

$$\frac{h\nu}{\lambda} = h/mv \rightarrow (1)$$

$$E_m = \frac{1}{2} mv^2 \rightarrow (2)$$

$$m^2 v^2 = 2mE \rightarrow (3)$$

$$mv = \sqrt{2mE} \Rightarrow \lambda = h / \sqrt{2mE} \rightarrow (4)$$

$$E = eV$$

$$\text{Temperature} \Rightarrow E = \frac{3}{2} kT$$