$c = \lambda\nu$
$E = h\nu$

Bohr Model

Preface:

Spectral Tubes: Spectroscopy!

The electrons of each element were excited in a discharge tube using electricity. As the electrons relax towards the nuleus they emit photons of light. The different colors emitted can tell us some things abt the structure of its atoms.

Part 1: Bohr shows us that heavier elements have more visible lines.

Law of Concervation of Energy: "Energy can be neither created nor destroyed."

conclusion: The energy of the emitted photon ($h\nu$) must come from an energy change within the atom. ΔE_{atom}.

$$\Delta E_{atom} = E_{photon}$$

The energy from both, atom and photon are quantized.

Balmer (1885)

This equation is for the visible light spect.

$$\lambda = \frac{h\, m^2}{m^2 - n^2}$$

h: Balmers Constant

λ: Wavelenght

$n = 2$

$m = 3, 4, 5, 6 \ldots$

Rydberg (1888)

This equation is for all wavelenghts

$$\frac{1}{\lambda} = R_H \left(\frac{1}{n_{LOW}^2} - \frac{1}{n_{HIGH}^2} \right)$$

n = interger

always big#

$R_H = 1.097373 \times 10^7 \, m^{-1}$

Part 2: Bohr Model of Hydrogen

$$E_n = -\frac{z^2 h R}{n^2}$$

electron energy → E_n

nuclear charge (z) (+1 for H)

minus!

h: Plank's constant

R: ← Rydbergs Constant

n: ← natural number

$R \sim 3.290 \times 10^{-15} \, s^{-1}$

$hR \; 2.180 \times 10^{-18} \, J$