

Formulas and constants

Mass of electron $m_e = 9.1 \cdot 10^{-31}$ kg

Charge on electron = $1.6 \cdot 10^{-19}$ C

Planck's Constant $h = 6.626 \cdot 10^{-34}$ J.s = $4.136 \cdot 10^{-15}$ eV.s

$\hbar = h / 2\pi = 1.055 \cdot 10^{-34}$ J.s = $6.582 \cdot 10^{-16}$ eV.s

1 eV = $1.6 \cdot 10^{-19}$ J

Coulomb's constant $k = 1 / (4\pi\epsilon_0) = 8.99 \cdot 10^9$ N.m² / kg²

Velocity of light $c = 3 \cdot 10^8$ m/s

Energy of photon $E = hf$

For photon $\lambda f = c$

Compton formula $\lambda' - \lambda = (h/m_e c)(1 - \cos \varphi)$

Bragg's Law $n\lambda = 2d \sin \theta$ (n=1,2,.....)

Bohr's quantization for Angular momentum $mvr = n\hbar$

Bohr radius $a_0 = 0.529 \cdot 10^{-10}$ m

1 Rydberg (Energy required to ionize hydrogen atom) = 13.6 eV

Rydberg Constant $R = 1.097 \cdot 10^7$ m⁻¹

Force due to Electric field : $\mathbf{F} = q\mathbf{E}$

Force due to Magnetic Field: $\mathbf{F} = q\mathbf{v} \times \mathbf{B}$