

The Electron's Momentum Formula

António Saraiva – 2008-10-13

ajps2@hotmail.com

The electron magnetic moment is not a magnetic moment but only a momentum. The true magnetic moment is the magnetic charge times the wavelength of the electron as the electric dipole moment (the electric dipole moment is a mass).

$$MM = q_m x_e = \frac{h}{2q_e} x_e = 5.0165 \times 10^{-27} m^4 s^{-1}$$

We don't know why but the electron momentum in hydrogen atom has four components related with a particle with the energy:

$$E = \frac{\epsilon_0^2}{\mu_0^2} = 310 MeV$$

Momentum formula:

$$\mu_e = \frac{m_e c}{137} \left(1 + \frac{\epsilon_0}{x_e} \right) \left(1 + \frac{m_e c^2 \mu_0^2}{\epsilon_0^2} \right) = 9.2848 \times 10^{-24} m^7 s^{-3}$$

q_m = Unitary magnetic charge

x_e = Electron's wavelength

h = Planck's constant

q_e = Unitary electric charge

ϵ_0 = Vacuum permittivity

μ_0 = Vacuum permeability

m_e = Electron's mass

c = Light speed

$\frac{c}{137}$ = Electron's orbital speed