

Corrected Bohr Radius

António Saraiva – 2008-08-09

ajps2@hotmail.com

$$137.036x_e = 2\pi R_B$$

Bohr's radius -- $R_B = 5.2917721 \times 10^{-11} m$

Electron wavelength -- $x_e = 2.4263102 \times 10^{-12} m$

$137.036 =$ inverse alfa constant

The number 137 is the number of the electron wavelengths that make an orbit. This number must be an integer or the electron falls to the nucleus, so:

$$137x_e = 2\pi R_E$$

$R_E = 5.29038189 \times 10^{-11} m$ -- true Bohr's radius

$$\frac{R_B}{R_E} = 1.00026278$$

$$R_B = \frac{\epsilon_0 h_0^2}{\pi m_{e0} q_{e0}^2} ; \quad R_E = \frac{\epsilon h^2}{\pi m_e q_e^2}$$

We must correct the mass and the charge for speed. The orbital speed is $\frac{c}{137}$:

$$\frac{m_e}{m_{e0}} = \frac{1}{\left(1 - \frac{1}{137^2}\right)^{3/2}} = 1.00008$$

$$\frac{q_e^2}{q_{e0}^2} = \frac{1}{\left(1 - \frac{1}{137^2}\right)^2} = 1.00010657$$

$$\frac{\epsilon}{\epsilon_0} = \sqrt{1 - \frac{1}{137^2}} = \frac{1}{1.00002664}$$

$$\frac{h^2}{h_0^2} = \left(1 - \frac{1}{137^2}\right) = \frac{1}{1.00005}$$

Total correction:

$$\frac{1}{\left(1 - \frac{1}{137^2}\right)^5} = 1.00026644$$

We found the correct value and prove the formulas of mass, charge, permittivity and angular momentum variation with speed.