International Journal of Advanced Research in Physical Science (IJARPS)
Volume 6, Issue 10, 2019, PP 13-14
ISSN No. (Online) 2349-7882
www.arcjournals.org

Dynamics Constant Deduced from Relativistic Mass and Distance on Bohr Orbit (Second Side of Fragment)

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Abstract: *The relativistic mass and distance on Bohr orbit are explained with the ratio of two dynamics constants $\frac{k_m}{k_s}$ being equal the square of the ratio of the relativistic mass of the electron and Compton wavelength of the electron.*

Keywords: *Heracletean dynamics, relativistic mass and distance, Bohr orbit, mass dynamics constant, distance dynamics constant*

1. Introduction

Respecting Heracletean dynamics for mass two speeds $a_1 < a_{ground}$ and $a_2 > a_{ground}$ belong to the relativistic mass of the electron $m_{relativistic} = (1 + \frac{1}{2\alpha^{-2}})m_e$ in the ground state of Hydrogen atom [1] where α^{-2} and m_e is the square of the inverse fine structure constant and ground mass of the electron, respectively:

$$a_1 x\, a_2 = \frac{k_m}{m_{relativistic}^2 c^2}. \tag{1}$$

The above speeds are given solving the first relativistic equation[1]:

$$m_{relativistic}^2 c^2 a^2 = e^{\frac{m_{ground}^2 c^2 - k_m(1 - \ln k_m) + m_{relativistic}^2 c^2 (a^2 - 1)}{k_m}}. \tag{2}$$

By analogy [2] both speeds should belong to the ground distance $s_0 = \lambda_e$ of the electron, too, where λ_e is Compton wavelength of the electron:

$$a_1 x\, a_2 = \frac{k_s}{s_0^2 c^2}. \tag{3}$$

Two speeds a_1 and a_2 are now given solving the second relativistic equation where $s_0 = \lambda_e$[2]:

$$s_0^2 c^2 a^2 = e^{\frac{s^2 c^2 - k_s(1 - \ln k_s) + s_0^2 c^2 (a^2 - 1)}{k_s}} \tag{4}$$

It is evident from (1), (3) that the ratio of the concerned dynamics constants $\frac{k_m}{k_s}$ equals the ratio of parameters $\frac{m_{relativistic}^2}{s_0^2}$ [2] expressed in the same system of units:

$$\frac{k_m}{k_s} = \frac{m_{relativistic}^2}{s_0^2} = \left(\frac{9.109\,626\,245\,0.10^{-31}}{2.426\,310\,236\,7.10^{-12}}\right)^2 kg^2 s^2 = 1.409\,640\,8.10^{-37} kg^2 m^{-2}. \tag{5}$$

Then for the speculative value of the mass dynamics constant $k_m = 6.2723515.10^{-46}\, kg^2 m^2 s^{-2}$ [3] the next relatively much greater distance dynamics constant is given:

$$k_s = 4.449\,609\,8.10^{-9} m^4 s^{-2}. \tag{6}$$

The corresponding relativistic speeds in the ground state of Hydrogen atom are then the next [1]:

$$a_1 = 0.0865946 < a_{ground} = 0.0917077 < a_2 = 0.0969126. \tag{7}$$

With the average electron speed:

$$\overline{a} = \frac{a_{1+}a_2}{2} = 0.0917536 = 1.0005011\ a_{ground} \approx 4\pi\alpha. \quad (8)$$

2. Conclusion

The proposed average relativistic speed obeying Heracletean dynamics is about $4\pi - times$ higher than the classical electron speed on Bohr orbit where $a = \alpha$; and about $4 - times$ higher than that one estimated on the first side of the fragment. As such it does not obey Newtonian and Einsteinian dynamics nor for mass nor distance.

References

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Citation: *Janez Špringer, (2019). Dynamics Constant Deduced from Relativistic Mass and Distance on Bohr Orbit (Second Side of Fragment). International Journal of Advanced Research in Physical Science (IJARPS) 6(10), pp.13-14, 2019.*