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 \(k_m/k_s\) 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 \(a_1 < a_{\text{ground}}\) and \(a_2 > a_{\text{ground}}\) belong to the relativistic mass of the electron \(m_{\text{relativistic}} = (1 + \frac{1}{2\alpha^2})m_e\) in the ground state of Hydrogen atom [1] where \(\alpha^2\) and \(m_e\) is the square of the inverse fine structure constant and ground mass of the electron, respectively:

\[
a_1 x a_2 = \frac{k_m}{m_{\text{relativistic}} c^2}.
\]  

(1)

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

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

(2)

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

\[
a_1 x a_2 = \frac{k_s}{s_0 c^2}.
\]  

(3)

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

\[
s_0^2 c^2 a^2 = e^\frac{s^2 c^2 - k_s (1 - \ln k_s) + s_0^2 c^2 (a^2 - 1)}{k_s}.
\]  

(4)

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

\[
k_m/k_s = m_{\text{relativistic}}^2/s_0^2 = \left(\frac{9.109 \times 10^{-31} \text{kg} \cdot \text{m}^2}{2.426 \times 10^{-12} \text{erg}}\right)^2 8.10^{-37} \text{kg} \cdot \text{m}^2 \cdot \text{s}^{-2}.
\]  

(5)

Then for the speculative value of the mass dynamics constant \(k_m = 6.272 \times 10^{-46} \text{kg} \cdot \text{m}^2 \cdot \text{s}^{-2}\) [3] the next relatively much greater distance dynamics constant is given:

\[
k_s = 4.449 \times 10^{-9} \text{m} \cdot \text{s}^{-2}.
\]  

(6)

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

\[
a_1 = 0.0865946 < a_{\text{ground}} = 0.0917077 < a_2 = 0.0969126.
\]  

(7)

With the average electron speed:
\[ \bar{a} = \frac{a_1 + a_2}{2} = 0.0917536 = 1.005011 \text{ } a_{\text{ground}} \approx 4\pi a. \]  

(8)

2. CONCLUSION

The proposed average relativistic speed obeying Heraclean dynamics is about \(4\pi \) times higher than the classical electron speed on Bohr orbit where \( a = a \); 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

