International Journal of Advanced Research in Physical Science (IJARPS)
Volume 6, Issue 4, 2019, PP 17-19
ISSN No. (Online) 2349-7882
www.arcjournals.org

Neutrino Relativistic Energy in Heracletean World

Janez Špringer

Cankarjeva cesta 2, 9250 Gornja Radgona, Slovenia, EU

Corresponding Author:** ***Janez Špringer, *Cankarjeva cesta 2, 9250 Gornja Radgona, Slovenia, EU*

Abstract: *The relativistic energy being in inverse proportion to speed can justify a great energy of neutrinos obeying Heracletean dynamics.*

Keywords: *Heracletean dynamics, neutrino ground and relativistic mass, neutrino slowdown energy and speed, neutrino observable paired and unobservable unpaired speed*

1. Introduction

In Heracletean dynamics[1], [2] expressed as F = dp/dt + d(k/p)/dt the relativistic energy of a mass body is proportional to the speed higher than the ground speed and contrary the relativistic energy is in inverse proportion to the speed lower than the ground speed. Further, the relativistic energy is zero at the non-zero speed and consequently it is infinite at rest. The relativistic energy is infinite at the luminal speed c but unfortunately that speed being higher than the ground speed is reserved only for the infinite ground mass. So the relativistic energy at the speed higher than the ground speed is for any finite mass upside limited. Consequently, to any speed higher than the ground speed belongs energetically equal state of lower speed than the ground speed. But vice versa, it is not always true. Some enough low speeds stay alone without any energetically equal state of higher speed. That part of Heracletean world - where the duality of speeds is broken and the relativistic energy is manifested as – let us say – slowdown energy – is the subject of interest in the present article with the aim to explain high relativistic energy of the light neutrinos obeying Heracletean dynamics.

2. The Maximal Kinetic Energy

The maximal kinetic energy allows a physical body in Heracletean world to manifest motion at the pair of extreme speeds: the minimal speed $v_{minimal}$ and the maximal speed $v_{maximal}$ both being related by the maximal relativistic mass $m_{maximal}$[1]

$$v_{minimal}\, x\, v_{maximal} = \frac{k}{m^2_{maximal}}. \tag{1}$$

Where k represents the dynamics constant, and the maximal relativistic mass $m_{maximal}$ is related to the ground mass m_{ground} [2]:

$$m_{maximal} = \frac{1}{c}\sqrt{e^{\frac{m^2_{ground}c^2}{k}+lnk} - k}. \tag{2}$$

Then the maximal kinetic energy $W_k^{maximal}$ is related to the ground mass m_{ground} [3]:

$$W_k^{maximal} = m_{maximal}c^2 - m_{ground}c^2 = c\sqrt{e^{\frac{m^2_{ground}c^2}{k}+lnk} - k} - m_{ground}c^2. \tag{3}$$

The extreme speeds $v_{minimal}$ and $v_{maximal}$ are related to the ground mass m_{ground}, too[2]:

$$v_{maximal} = c\sqrt{1 + \frac{k}{e^{\frac{m^2_{ground}c^2}{k}+lnk} - k}}. \tag{4}$$

And

$$v_{minimal} = \frac{ck}{\left(e^{\frac{m_{ground}^2 c^2}{k}+lnk} - k\right)\sqrt{1 + \frac{k}{e^{\frac{m_{ground}^2 c^2}{k}+lnk} - k}}}. \quad (5)$$

3. The Slowdown Energy

A physical body travelling with the unpaired speed $v_{unpaired}$ possess the slowdown energy instead of kinetic energy. The unpaired speed $v_{unpaired}$ is any speed lower than minimal speed $v_{minimal}$:

$$v_{unpaired} < v_{minimal}. \quad (6)$$

And the belonging slowdown energy is higher than the maximal kinetic energy of the concerned physical body:

$$W_{slowdown} > W_{kinetic}^{maximal}. \quad (7)$$

Contrary to the kinetic energy being upside limited[3], [4] the slowdown energy is limitless.

4. The Neutrino Slowdown Energy

Respecting Heracletean dynamics light neutrinos possess only very low kinetic energy[3],[4].

So their greater relativistic mass could be only of slowdown energy origin. In the case of the slowdown speed being subluminal, i.e. $v_{slowdown} < v_{minimal} = c$, the ground mass should be non-zero since it should surpass the ratio of the dynamics constant k and the speed of light c, i.e. $m_{ground} > \frac{k}{c}$. Indeed, for the minimal speed $v_{minimal} = c$ belonging to the maximal kinetic energy according to the equation (5) holds:

$$v_{minimal} = c = \frac{ck}{\left(e^{\frac{m_{ground}^2 c^2}{k}+lnk} - k\right)\sqrt{1 + \frac{k}{e^{\frac{m_{ground}^2 c^2}{k}+lnk} - k}}} \quad (8a)$$

And after rearranging

$$\left(e^{\frac{m_{ground}^2 c^2}{k}+lnk} - k\right)^2 + \left(e^{\frac{m_{ground}^2 c^2}{k}+lnk} - k\right) - k^2 = 0 \quad (8b)$$

Solving the quadratic equation

$$e^{\frac{m_{ground}^2 c^2}{k}+lnk} - k = k^2 \quad (8c)$$

And applying the logarithmic form

$$\frac{m_{ground}^2 c^2}{k} = \ln(k+1) \approx k \quad (8d)$$

The ground mass belonging to the neutrino minimal speed c is given:

$$m_{ground} \approx \frac{k}{c}. \quad (8e)$$

In the case of $c = 2.997\,924\,58\,x\,10^8 \frac{m}{s}$ and $k = 2.272\,251\,5\,kg^2 m^2 s^{-2}$ [3], [4] the neutrino ground mass surpassing the next value is calculated:

$$m_{ground} > 2.1\,x\,10^{-54} kg = 1.2\,x\,\frac{10^{-18} eV}{c^2}. \quad (9)$$

5. The Observable Subluminal and the Unobservable Superluminal Neutrino

The maximal speed $v_{maximal}$ in pair with minimal speed $v_{minimal} = c$ belonging to the ground mass $m_{ground} \approx \frac{k}{c}$ can be calculated with the help of equation (4):

$$v_{maximal} = c\sqrt{1 + \frac{k}{e^{\frac{m_{ground}^2 c^2}{k}+lnk} - k}} = c\sqrt{1 + \frac{k}{e^{k+lnk} - k}} \approx \frac{c}{\sqrt{k}} = 1.2\,x\,10^{31}\frac{m}{s}. \quad (10)$$

Neutrino with such an enormous speed would be unobservable. But with a slowdown speed being just slightly lower than luminal speed the neutrino becomes observable again due to the unpaired subluminal speed.

6. The Neutrino Relativistic Mass

The relativistic mass of neutrino can be calculated applying Panta rei equation [5]:

$$m_{relativistic}^2 c^2 a^2 = e^{\frac{m_{ground}^2 c^2 - k(1-lnk) + m_{relativistic}^2 c^2 (a^2-1)}{k}}. \tag{12}$$

At luminal speed where $a = \frac{v_{minimal}}{c} = 1$ and $m_{ground} \approx \frac{k}{c}$ (8e) the next relativistic mass is given:

$$m_{relativistic} = \frac{\sqrt{e^{k-1+lnk}}}{c}. \tag{13}$$

The relativistic mass of neutrinos travelling at the subluminal speed should surpass the above relativistic mass limit which in the case of our speculated value of dynamic constant k [3], [4] yields:

$$m_{relativistic}(k = 6.2723515\ x\ 10^{-46} kg^2 m^2 s^2) > 0.5\ x\ 10^{-31} kg = 28 \frac{keV}{c^2}. \tag{14}$$

7. Conclusion

Neutrinos obeying Heracletean dynamics should have non-zero ground mass. To be observable they should travel with the subluminal speed being in inverse proportion to the relativistic mass.

References

[1] Špringer J. Panta rei as F = dp/dt + d(k/p)/dt and Possible Geometric Consequences. International Journal of Advanced Research in Chemical Science (IJARCS), Volume 1, Issue 6, August 2014, 36-46.

[2] Špringer J. Panta rei Function and Light Diversity (Exercise at Seventy-Two Decimal Places). International Journal of Advanced Research in Chemical Science (IJARCS), Volume 2, Issue 4, April 2015, 6-12.

[3] Janez Špringer. “Neutrino Kinetic Energy in Heracletean World”, International Journal of Advanced Research in Physical Science (IJARPS), vol. 6, no.3, pp. 37-38, 2019

[4] Janez Špringer, (2019). Neutrino Kinetic Energy in Heracletean World (Second Side of Fragment). International Journal of Advanced Research in Physical Science (IJARPS) 6(4), pp.6-7, 2019.

[5] Špringer J. About Electron Position in Ground State of Hydrogen Atom (Another Variation on a Theme). International Journal of Advanced Research in Physical Science (IJARPS), Volume 3, Issue 7, July 2016, 15-17.

Citation: *Janez Špringer, (2019). Neutrino Relativistic Energy in Heracletean World. International Journal of Advanced Research in Physical Science (IJARPS) 6(4), pp 17-19, 2019.*