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Short Research Article

FORMS of TIME: Fields and Particles

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"It startles us to find the law of gravitation taught long before Newton, and the circulation of the blood ages previous to the time of Harvey. It is as though human history ran in cycles, in which not only the general outlines of events occur, but event he specific and individual instances // Edwin Hubbel Chapin".

Abstract

We investigate the nature of time along the lines of some new Cosmological connections as well as introduce some new concepts on Tachyon and Tardyon theory.

Keywords

Time, Field Theory, Tachyon, Tardyon, Relativity, Quantum, Gravity

1. Preface

1.1 In (1) (Note 1), we equated the Bohr radial time result (eq.3) with the integral form (eq.1). In this article, we shall continue by using the Expansive field or Dark energy form (eq.2). Then, Necati Demiroglu's results in Tardyon and Tachyon theory are presented.

2. Dark Energy Field at the Electron

Recall from (1) that Fe = $\frac{2qc}{t}$, where Fe is the Force of Dark energy at the electron.

Hence we can derive the following equations:

$$\frac{2qc}{F_e} = \sqrt[2c]{e^{-k}} \rightarrow \left(\frac{2qc}{F_e}\right)^{2c} = e^{-k} \tag{2.1}$$

$$\frac{2qc}{F_e} = \frac{2a_0ce}{G_\nu q} \Rightarrow F_e = e^{-1}\frac{G_\nu}{a_0} \tag{2.2}$$

3. Schwarzchild Radius of Electron

3.1 Q notation. In this section, Q will be used for readability to denote the charge of the electron.

The Schwarzchild Radius of a body with mass m is given by the formula:

$$R = \frac{2Gm}{c^2} \tag{3.1}$$

3.2 The Schwarzchild radius of an electron has a value of about 1.3529×10^{-57} m.

$$\text{Using } G = \frac{a_0}{q}^2 \left(\frac{2Qc}{t}\right) e \text{ we get:}$$

$$R = \left(\frac{4e\frac{a_0^2}{Q}}{ct}\right)m = \left(\frac{4e\frac{a_0^2}{Q}}{c\frac{2Qc}{F_e}}\right)m = \left(\frac{2eF_e a_0^2}{c^2Q^2}\right)m.$$

So that again we see that:

$$G = F_e \frac{ea_0^2}{Q^2}. \tag{3.2}$$

This shows that the Schwarzchild radius is directly proportional to Dark Energy but inversely proportional to the square of charge.

4. Tardyon and Tachyon Theory

4.1 Introduction. Tardyons have velocity less than c and Tachyons have a ve-locity greater than c. The Real and Imaginary masses of Tardyons and Tachyons combine to form a total mass for each type of particle.

$$m_{total} = m_{real} + m_{imaginary}$$

$$Tardyons : v_1 < c \to m_{total} = \frac{m_0}{\sqrt{1-v_1^2/c^2}} + i\frac{m_0}{\sqrt{1+v_1^2/c^2}}$$

$$Tachyons : v_2 > c \to m_{total} = \frac{m_0}{\sqrt{1-c^2/v_2^2}} + i\frac{m_0}{\sqrt{1+c^2/v_2^2}}$$

Let's give some examples; with result:

$$\text{1: for } v_1 = c/2 \text{ , } m_{total} = \frac{m_0}{\sqrt{1-(c/2)^2/c^2}} + i\frac{m_0}{\sqrt{1+(c/2)^2/c^2}}$$

$$\text{with the result: } m_{total} = 2\frac{m_0}{\sqrt{3}} + 2i\frac{m_0}{\sqrt{5}}$$

$$\text{2: for } v_2 = 2c \text{ , } m_{total} = \frac{m_0}{\sqrt{1-c^2/(2c)^2}} + i\frac{m_0}{\sqrt{1+c^2/(2c)^2}}$$

It seems that, for Tardyons and Tachyons, $v_1 v_2 = c^2$.

4.2 Momentum and Energy. Continuing in this way, we can write general momentum and energy equations as follows:

$$p = m_{total} * v \text{ and } E = m_{total} * c^2$$

For the Tardyon: v1 < c and hence:

$$p = \frac{m_0}{\sqrt{1-v_1^2/c^2}}v_1 + i\frac{m_0}{\sqrt{1+v_1^2/c^2}}v_1 \text{ and } E = \frac{m_0}{\sqrt{1-v_1^2/c^2}}c^2 + i\frac{m_0}{\sqrt{1+v_1^2/c^2}}c^2$$

And for the Tachyon where v2 > c:

$$p = \frac{m_0}{\sqrt{1-c^2/v_2^2}}v_2 + i\frac{m_0}{\sqrt{1+c^2/v_2^2}}v_2 \text{ and } E = \frac{m_0}{\sqrt{1-c^2/v_2^2}}c^2 + i\frac{m_0}{\sqrt{1+c^2/v_2^2}}c^2$$

4.3 Quantum Probability State. The masses must become real in the Quantum Probability State (QPS). For this, we could multiply m_{total} by the Conjugate of m_{total}:

For example, in the case of the Tardyon we would have:

$$[\frac{m_0}{\sqrt{1-v_1^2/c^2}} + i\frac{m_0}{\sqrt{1+v_1^2/c^2}}][\frac{m_0}{\sqrt{1-v_1^2/c^2}} - i\frac{m_0}{\sqrt{1+v_1^2/c^2}}] = \frac{2m_0^2}{1-(v_1^2/c^2)^2} \rightarrow QPS$$

And, in the case of the Tachyon:

$$[\frac{m_0}{\sqrt{1-c^2/v_2^2}} + i\frac{m_0}{\sqrt{1+c^2/v_2^2}}][\frac{m_0}{\sqrt{1-c^2/v_2^2}} - i\frac{m_0}{\sqrt{1+c^2/v_2^2}}] = \frac{2m_0^2}{1-(c^2/v_2^2)^2} \rightarrow QPS$$

4.4 Total Masses and Quantum Probabilities.

Table 1. Total Masses

Tardyon Velocity:	Tachyon Velocity:	Total Mass (Tardyon):	Total Mass (Tachyon):
0	∞	$1+i$	$1+i$
$c/4$	$4c$	$\frac{1}{\sqrt{\frac{15}{16}}} + i\frac{1}{\sqrt{\frac{17}{16}}}$	$\frac{1}{\sqrt{\frac{15}{16}}} + i\frac{1}{\sqrt{\frac{17}{16}}}$
$c/3$	$3c$	$\frac{1}{\sqrt{\frac{8}{9}}} + i\frac{1}{\sqrt{\frac{10}{9}}}$	$\frac{1}{\sqrt{\frac{8}{9}}} + i\frac{1}{\sqrt{\frac{10}{9}}}$
$c/2$	$2c$	$\frac{1}{\sqrt{\frac{3}{4}}} + i\frac{1}{\sqrt{\frac{5}{4}}}$	$\frac{1}{\sqrt{\frac{3}{4}}} + i\frac{1}{\sqrt{\frac{5}{4}}}$

Table 2. Quantum Probability State

Tardyon Velocity	Tachyon Velocity	QPS (Tardyon)	QPS (Tachyon)
0	∞	2	2
$c/4$	$4c$	2.0078	2.0078
$c/3$	$3c$	2.0250	2.0250
$c/2$	$2c$	2.1333	2.1333
c	c	∞	∞

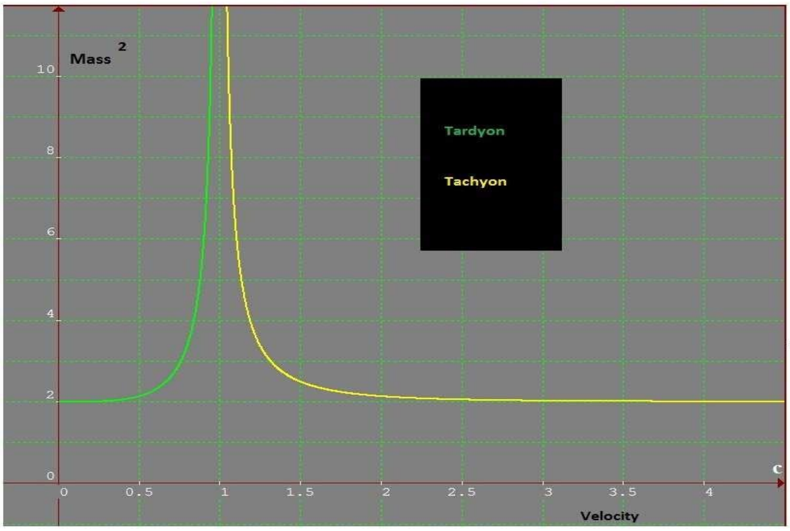

Figure 1. M 2 vs. Velocity(c)

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