Accurate determining of muon lifetime based on the theory of quantized space and time when the muon has the most possible speed for charged particles

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Abstract:
In this article, muon lifetime is calculated by using the theory of quantized space-time and the internal structure of the elementary particles. First, we assume that the muon and the particles produced due to its decay in the decay mode of $\mu \rightarrow e + \nu + \bar{\nu}$ in an accelerator reach to their maximum possible speed for charged particles, is $V_{muon} = V_{\nu} = V_{\bar{\nu}} = 299792407.5 m/s$. Then, the gradual decay time of muon is calculated by using the energy they have in such speed.

Keywords: muon – space and time quanta – decay – muon lifetime

1- Introduction

In the theory of quantized space-time, we penetrate the internal structure of the elementary particles and realize why particles like electron having spin and electric charge have masses different from each other as muons are so [1].
In the theory of quantized space-time, a super dimension exists, that acts like a ladder the width of which is equal to the Planck length:

$$\ell_p = \sqrt{\frac{\hbar G}{c^3}} = 1.616252 \times 10^{-35} m \quad [1] \qquad (1)$$

Using the formula for muon spin, the length of the ladder is obtained [1][3].
Each moton [1] uses a step of this ladder, which is made of dark matter, to separate the light inside the muon and form the dark energy caused by the muon decay.This conversion of dark matter, or the same super dimension, into energy takes place during the period of $T = 2\mu s$. We should note that the energy produced by muons is so greater than the energy of the electrons and neutrinos resulting from the decay. According to the theory of quantization of time and space, charged particles can have a maximum speed of $V_{max} = 299792407.5\, m/s$ [3]. For a particle that has a mass of the order of neutrino mass, there exists the limitation of maximum momentum; its formula will be presented in the continuation. Considering these two limitations of momentum and energy, we can understand that 40.06 percent of the muon energy converts to electron and neutrino and the rest converts to dark energy.

2-1: Internal structure of each muon is a quantized structure, so muon radius is calculated by the following formula [3].

$$R_{muon} = \sqrt[3]{\frac{M_{muon}}{M_e}} = 5.9 \times l_0 = 8.33 \times 10^{-15} m \qquad (2)$$

Using the formula of muon radius and the formula of spin, we calculate the length of the super dimension of muon that has been defined within a 45 degrees angle:

$$S = mvL_{Dm} = \frac{1}{2} h \qquad (3)$$

$$L_{Dm} = \frac{45}{180} \times \pi \times 8.33 \times 10^{-15} = 6.54 \times 10^{-15} m \qquad (4)$$

L_{Dm} is the length of the ladder of dark matter.

Motion velocity of this dark matter around motons of muon is equal to

$$S=\frac{1}{2}\times h\Rightarrow v=\frac{1}{2}(\frac{45}{180}\times\pi\times8.33\times10^{-15}m\times M_{meon})^{-1}\times h=268855092\bullet 3m/s$$

v=0.897c (c is speed of light.) (5)

By dividing this length by the Planck length, the number of dark matter rungs can be obtained:

$$N_{lp}=\frac{6.5\times10^{-15}}{1.6\times10^{-35}}=4\times10^{20} \quad (6)$$

By multiplying this number by the length quanta of each moton [1], the length of the dark energy will be obtained. The length of the dark energy string which is obtained from a muon is as follows

$$L_{Darkenergy}=4\times10^{20}\times l_0=572394m \quad (7)$$

In fact the dark energy is a dark matter which its spiral has been opened by a radius of a space quanta.

2-2: Dark matter is in fact a super dimension that has surrounded the motons inside the elementary particles and regarding to the light absorbance ability causes the longer life time for the elementary particles.

Speed for the dark matter of electron is:

$$S=\frac{1}{2}\times h\Rightarrow v=(\frac{45}{180}\times\pi\times1.40897\times10^{-15}m\times M_e)^{-1}\times\frac{1}{2}h=3\bullet 286\times10^{11}m/s \quad (8)$$

v =1096c (c is speed of light)

The why that electron does not decay is just its dark matter speed greater than the one related to muon, so, the dark matter does not allow the light of the motons of electron to exit. So we calculate an infinite lifetime for electron.
the speed of motons of muon is greater than the speed of dark matter and this can be a proof of moton existance axiom[1] in the elementary particles which have the speed of light. Beside, the speed of dark matter of muon is less than the speed of light and the speed of motons of the muon, so decay happens for muon.
Conversion of dark matter into dark energy is almost the main question of the modern physics. Its importance is this fact that after Big Bang, dark matter is the great portion of the total matter in the universe, and at present this portion is about 25 percent. This leads us to this idea that in fact dark matter is being converted into

dark energy through baryon particles while the baryon matter consist of the same elementary particles that have muotons. But the question is that, without any laboratory data, how this conversion can give us knowledge about dark matter and dark energy considering lack of any action-reaction between them.
Basis of the realization of conversion of dark matter into dark energy is in the zero Kelvin condition. In the zero Kelvin, motion can be considered zero, and so, by using Einstein's formula for converting matter into energy, we will have for electron:

$$E = mc^2 = M_e \times c^2 = 510998 \bullet 9027 ev \quad (9)$$

$$p_{\max} \times C = \frac{c \times h \sqrt{1 - \frac{v_{\max}{}^2}{c^2}}}{l_0 \sqrt{1 - \frac{v^2}{c^2}}} = 510757 \bullet 8023 ev \quad [1]\ (10)$$

And through the formula for the momentum exerted on the motond, we can obtain potential energy of the motons exerted on the dark matter through the super dimension [3].
We subtract these numbers from each other to obtain 241ev. This number means that elementary particles can radiate some energy during each time quanta, and if this energy exceeds the radius of a space quanta and such radiation occurs consecutively, and the super dimension couldn't return the energy to the particle because of having smaller speed than the speed of light, the particle will decay as is the case for muon.

3-1: Let's assume that we have a linear accelerator which can cause the muon to reach the maximum speed of 299792407.5 m/s by the potential difference between the two heads (being equal 4.4 Gev). Then, we can calculate the maximum energy of the muon by using the following formula. This formula is in fact for obtaining the maximum energy of muons in their maximum velocity for charged particles [3]:

$$E \frac{1}{q_0 \times \sqrt{\gamma}} = V \quad (11)[3]$$

$$\gamma = \frac{1}{\sqrt{1 - \frac{299792407.5^2}{c^2}}} = 1722.9 \quad (12)[3]$$

$$\sqrt{\gamma} = \frac{1}{4\sqrt{1-\frac{299792407^2}{c^2}}} = 41.51 \quad (13)[3]$$

$$q = \frac{\sqrt{8\pi\varepsilon_0 m_0 c^2 l_0}}{4\sqrt{1-\frac{v^2}{c^2}}} C = \frac{1.602\times10^{-19}}{4\sqrt{1-\frac{v^2}{c^2}}} C \quad (14)[1]$$

In this formula, V is the voltage between the two heads of the accelerator, q is the charge of the muons, and E is the maximum energy of the muons.
Considering the following decay mode of

$$\mu \rightarrow e + \nu + \bar{\nu} \quad (15)[4][5]$$

$$E_{mx} = (m_{moun} \times c^2) \times \frac{1723.9}{41.51} \times \frac{1}{1.602\times10^{-19}}) \quad (16)$$

$$= 4.384 Gev$$

$$V_{muon} = V_e = V_\nu = V_{\bar{\nu}} = 299792407.5 m/s$$

$$T_{muon} = ((\frac{241ev}{h})^{-1} \times (((M_{muon} - M_e) \times C^2 \times 41.5)) - (2\times h \times V\max \div l_0) \div 241ev)$$

$$\times 1722.9 \times (2\times\pi) = 2\mu s)$$

(17)

And that in the following formula, considering the decay mode, the muon is decayed into an electron and two neutrinos,

$$M_{muon} - M_e = 1\bullet 874421708\times10^{-28} kg$$

(18)

The maximum energy of the neutrinos is calculated using the relation of the maximum momentum and energy:

$$E\nu + E\bar{\nu} = 2\times h\times V\max \div l_0 = 2\bullet 82\times10^{-10} j = 1\bullet 76 Gev$$

(19)

Considering the momentum of muon and spin of the particle, the track of decay is spiral, and the time recorded by the experimenter as the decay time is in fact what that has been multiplied by $2\times\pi$.

And, by using the following relation and numbering the Lorentz coefficient, we can extract the muon lifetime diagram.

$$T_{muon} = ((\frac{241ev}{h})^{-1} \times (((M_{muon} - M_e) \times C^2 \times \sqrt{\gamma})) - (2 \times h \times V\max \div l_0) \div 241ev)$$

$$\times \gamma \times (2 \times \pi) = 2\mu s)$$

(20)[4]

Conclusion:

The process of conversion of dark matter into dark energy by elementary particles takes place according to the Standard Model. The amount of baryons has remained nearly constant from the beginning of Big Bang until now, and this has caused the law of conservation of matter and energy to be held. However we need to perform many studies in the topic of conversions of dark matter and dark energy.

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