

Energy – Momentum of the Armenian Special Relativity Theory

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Abstract
In this paper, the energy and momentum of the Armenians Special Relativity Theory (ASRT) and Special Relativity Theory (SRT) are obtained and their comparison is also carried out. SRT through the Muhelson-Morlay experiment proved that aether does not exist in space, but ASRT reincarnates the aether as a universal reference medium. The mathematical existence of aether has already been proven. In his work, by comparing energy and momentum of both SRT and ASRT, the results obtained indicate that difference is in the time-space or subatomic aether medium which is represented by space coefficient (s) and geometrical space (g). The theory brings together followers of absolute aether theory, relativistic aether theory and the dark matter theory. The energy and momentum in SRT can be deduced from ASRT by substituting $s = 0$ and $g = -1$. This implies that, SRT is a limiting case of ASRT.
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1.0 Introduction

Galileo and Newton developed the concept of absolute space but absolute time was retained [1, 2]. In the nineteenth century, it became inconceivable to physicist that electromagnetic wave could propagate without a medium (the aether) [3, 4]. Michelson – Morley experiment showed that no aether (absolute reference frame) existed for electromagnetic phenomena [5]. This result opened a way for a new approach which is Einstein relativity [6]. He postulated that speed of light is invariant in all inertial frames which lead to a new relationship between space and time (Lorentz transformation).

According to Einstein, for invariant of light speed, time itself has to slow down and space must contract to give almost the same value [7]. But the interpretation of Lorentz transformation and its kinematical effects has long been questioned and misunderstood. Today, paradox [8, 9], criticism [10, 11] still continue to receive attention, as a result many physicist believe that a new interpretation or even a theory alternative to Special Relativity Theory (SRT) may be needed [12].

Armenian Special Relativity Theory (ASRT) assumes that the universal invariant velocity was not fully defined using the properties of anisotropic time-space [13]. The principles of relativity is the core of relativistic theory and it requires that the inverse time-space transformation between two inertial systems assume the same functional forms as the direct transformations. The principle of homogeneity of time-space is also necessary to furnish linear time-space transformation with respect to time and space [14,15].

To build the most general theory of special relativity in one physical dimension. The following three postulates are employed [16]

1. All physical laws have the same mathematical forms in all inertial system
2. There exist a universal, not limited and invariant boundary speed c, which is the speed of time
3. In all inertial systems, time and space are homogeneous (special relativity)

Because of the first and third postulates, we finally get the most general transformation equation in one physical dimension which we call Armenian transformation equations. These equations contrary to the Lorentz transformation equations has two new constant namely space coefficient (s) and geometrical space (g) which characterize anisotropy and homogeneity of time-space.

The direct transformations are:

$$\left.\begin{aligned} t' &= \gamma_z\left[\left(1+s\frac{v}{c}\right)t + g\frac{v}{c^2}x\right] \\ x' &= \gamma_z(x - vt) \end{aligned}\right\} \quad (1)$$

With inverse transformation

$$\left.\begin{aligned} t &= \gamma_z\left[\left(1+s\frac{v'}{c}\right)t' + g\frac{v'}{c^2}x'\right] \\ x &= \gamma_z(x' - v't') \end{aligned}\right\} \quad (2)$$

where γ_z is the Armenian gamma function given as

$$\gamma_z = \frac{1}{\sqrt{1 - s\frac{v}{c} + g\frac{v^2}{c^2}}} > 0 \quad (3)$$

The relationship between reciprocal and direct relative velocities are

$$\left.\begin{aligned} v' &= \frac{v}{1 + s\frac{v}{c}} \\ v &= \frac{v'}{1 + s\frac{v'}{c}} \end{aligned}\right\} \quad (4)$$

where

$$\left(1 + s\frac{v}{c}\right)\left(1 + s\frac{v'}{c}\right) = 1 \quad (5)$$

2.0 Relativistic Energy and Momentum (SRT)

The relativistic space-time symmetries introduces changes in the description of energy and momentum as compared to that of non-relativistic physics [17, 18]. The new understanding of the energy is captured by the famous Einstein formula $E = mc^2$.

To find the correct relativistic form of energy and momentum, we apply the formalism of four vectors which makes the expression independent of any particular inertial frame.

The expression for the four-momentum is

$\underline{P} = m\underline{u}$, where m = mass, $\underline{u} = velocity$

If we consider the non-relativistic limit of four-vectors and separate the time component from the space component, then:

$$\begin{aligned} &\underline{P} = (\gamma mc, \gamma mv) \\ &P = \gamma mv - mv \\ &v << c \end{aligned} \quad (6)$$

where γ is the Lorentz gamma function given as

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} > 0 \quad (7)$$

We therefore conclude that the correct three-vector part of the relativistic momentum is:

$$P = \gamma mv = \frac{mv}{\sqrt{1 - \frac{v^2}{c^2}}} \quad (8)$$

When we make transition from non-relativistic to relativistic theory then:

$$P^0 = \gamma mc = \frac{m_0 c}{\sqrt{1 - \frac{v^2}{c^2}}} \quad (9)$$

Taking Taylors expansion on Eq. (8) and multiplying through by c, thus we have

$$cP^0 = m_0 c^2 + \tfrac{1}{2} mv^2 + \ldots \quad (10)$$

The second term is identical to non-relativistic kinetic energy. The first term is the rest energy. Hence, the relativistic energy is

$$E = \gamma m_0 c^2 = \frac{m_0 c^2}{\sqrt{1 - \frac{v^2}{c^2}}} \quad (11)$$

To sum up, the relativistic four momentum can be separated in a time component which is the energy of the particle divided by c, and a space component.

$$\underline{P} = \left(\tfrac{E}{c} \cdot P\right) = \left(\frac{m_0 c}{\sqrt{1 - \frac{v^2}{c^2}}}, \frac{mv}{\sqrt{1 - \frac{v^2}{c^2}}}\right) \quad (12)$$

3.0 Armenian Energy and Momentum

Armenian formula for acceleration between k^1 and K inertial system are

$$\left.\begin{aligned} a' &= \frac{1}{\gamma_z^3\left(1 - s\frac{v}{c} + g\frac{uv}{c^2}\right)^3} a \\ a &= \frac{1}{\gamma_z^3\left(1 - g\frac{uv}{c^2}\right)} a' \end{aligned}\right\} \tag{13}$$

Equation (13) is invariant for given movement and is defined as

$$a_2 = \gamma_z^3 a = \gamma_z^3 a' \tag{14}$$

So that the Armenian relativistic energy and momentum formulas for free particles with velocity ω is

$$E_z = \gamma_z\left(1 + \tfrac{1}{2}s\tfrac{\omega}{c}\right)m_0c^2 = \frac{1 + \frac{1}{2}s\frac{\omega}{c}}{\sqrt{1 + s\frac{\omega}{c} + g\frac{\omega^2}{c^2}}} m_0c^2 \tag{15}$$

with momentum

$$P_z = -\gamma_z\left(g\tfrac{\omega}{c} + \tfrac{1}{2}s\right)m_0c = -\frac{g\frac{\omega}{c} + \frac{1}{2}s}{\sqrt{1 + s\frac{\omega}{c} + g\frac{\omega^2}{c^2}}} m_0c \tag{16}$$

From approximation of the Armenian relativistic energy and momentum formula

$$\left.\begin{aligned} E_z &\approx m_0c^2 - \left(g - \tfrac{1}{2}s^2\right)\left(\tfrac{1}{2}m_0\omega^2\right) = m_0c^2 + \tfrac{1}{2}m_{z0}\omega^2 \\ P_z &\approx -\tfrac{1}{2}sm_0c - g\left(-\tfrac{1}{2}s^2\right)\left(m_0\omega\right) = -\tfrac{1}{2}sm_0c + m_{z0}\omega \end{aligned}\right\} \tag{17}$$

where m_{z0} is the Armenian rest mass given as

$$m_{z0} = -\left(g - \tfrac{1}{4}s^2\right)m_0 \geq 0\,. \tag{18}$$

Armenian momentum formula for rest particle $(\omega = 0)$ which is a very new and bizarre result is

$$P_z(0) = \tfrac{1}{2}sm_0c \tag{19}$$

From Eq. (19) we obtain Armenian dark energy and dark mass formula as

$$E_{Av} = \frac{P_z^2}{2m_0} = \tfrac{1}{8}s^2m_0c^2 = \tfrac{1}{8}s^2E_0 \tag{20}$$

and

$$m_{Av} = \tfrac{1}{8}s^2m_0 \tag{21}$$

where E_0 and m_0 is the rest energy and mass in the limit of SRT

4.0 Rest Particle Energy and Momentum

Table 1: Energy and momentum of Galilean, Lorentz transformations and Armenian Theory

Galilean transformation	Lorentz transformation	Armenian theory
$E_a(0) = 0$	$E_L(0) = m_0c^2$	$E_z(0) = m_0c^2$
$P_a(0) = 0$	$P_L(0) = 0$	$P_z(0) = \frac{1}{2}sm_0c$

The rest particle energy $E = m_0c^2$ gives us nuclear power while the rest momentum in Armenian theory signifies that humidity is a clean and free energy source [19, 20]. From the comparison of Armenian and Lorentz relativistic formula, Armenian transformation formula is full of asymmetry because of the coefficient asymmetry s. Therefore, a new geometrical space g is defined to satisfy ASRT, where s and g account for time-space symmetry.

The Armenian gamma function is given as:

$$\gamma_z = \frac{1}{\sqrt{1 + s\frac{w}{c} + g\frac{w^2}{c^2}}} > 0 \quad (22)$$

So that the free moving particle with velocity ω in the inertial system k has three extreme situations.

I. $\omega = 0 \Rightarrow \gamma_z(0) = 1$ (23)

II. $\omega = -\frac{2}{3}c = \omega_1 \Rightarrow \gamma_z(\omega_1) = \frac{\frac{1}{2}s}{\sqrt{g - \frac{1}{4}s^2}}$ (24)

III. $\omega = -\frac{1}{2}\frac{s}{g}c = \omega_2 \Rightarrow \gamma_z(\omega_2) = \frac{1}{\sqrt{1 - \frac{1}{4}\frac{s^2}{g}}}$ (25)

Therefore, using the velocities and Armenian gamma function values given in Eqs (23) – (25) we can obtain from Eqs (15) and (16) the particles Armenian energy and momentum values for these extreme cases.

I. $E_z(0) = m_0c^2 \qquad P_z(0) = -\frac{1}{2}sm_0c$ (26)

II. $E_z(\omega_1) = 0 \qquad P_z(\omega_1) = \sqrt{g - \frac{1}{4}s^2}\,m_0c$ (27)

III. $E_z(\omega_2) = \left(1 - \frac{1}{4}\frac{s^2}{g}\right)m_0c^2 \qquad P_z(\omega_2) = 0$ (28)

5.0 Discussion

For the first case, when a particle is resting in the inertial system $k = (\omega = 0)$, the particle still has a momentum which is dependent on space co-efficient s. Meaning that there exist an aether medium which is silently dragging the particle back in the opposite direction of the inertial system k.

For the second case, when a particle is moving with respect to the inertial system k with velocity ω_1 its energy equals zero, when the geometrical space is infinitesimal $g = 0$ and $P_z(\omega_1) = \frac{1}{2}sm_0c$ which drags the particle forward with respect to k' inertial system signifying the presence of aether. Lastly, when particles move with velocity ω_2 with respect to inertial system k, this time momentum equals zero.

6.0 Conclusion

We have compared the relativistic energy and momentum in SRT and ASRT and observed that all the facts in SRT can be obtained by using Armenian formula. We also deduced the Armenian dark energy and dark mass formula which is applicable in nuclear physics, high energy and particles physics. In Eqs (26) – (28) we obtain some momentum and energy values at rest and arbitrary velocities for free moving particles in the k inertial system which proved the existence of aether in space. We observed that energy-momentum of SRT can be deduced through Armenian energy-momentum formula by substituting $s = 0$ and $g = -1$. In choosing some velocities (ω) for the Armenian gamma function at $\omega = 0$ the particle possesses rest energy and rest momentum.

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