New View of Relativity Theory

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Abstract. This article results from *Introducing the Dimensional Continuous Space-Time Theory* that was published in reference 1. The Dimensional Continuous Space-Time Theory shows a series of facts relative to matter, energy, space and concludes that empty space is inelastic, absolutely stationary, motionless, perpetual, without possibility of deformation neither can it be destroyed or created. A elementary cell of empty space or a certain amount of empty space can be occupied by any quantity of energy or matter without any alteration or deformation. As a consequence of these properties and being a integral part of the theory, the principles of Relativity Theory must be changed to become simple and intuitive.

1. Introduction

The famous Lorentz transformations relating the coordinates of space and time that constitute the bases of relativity theory previse the space and time dilatation [3]. The time dilatation in fact exists but the space dilatation is not contemplated in this New View of the Relativity Theory.

The Lorentz transformations lead to a space contraction in front of a mobile object with v_0 speed and a space dilatation behind this same object. In the New View of Relativity Theory, the dilatation space effect does not exist. In the New View of the Relativity Theory it is not possible that the distances have some contraction or dilatation with the changes of the referential.
Also according to the New View of Relativity Theory there is no distinction between inertial and accelerated referentials.

In this New View of the Relativity Theory the empty space is the absolute referential which the origin point would be fixed in the center of the Big-Bang. However the existence of an absolute referential does not interfere in the Relativity Principle [4][5].

1.1. Postulates in the New View of the Relativity Theory

1.1.1. Postulates:

Generalization of the Einstein Postulate:
The Light Speed in the empty space is almost the same to the inertial and accelerated referentials.
Invariance space postulate:
The space is undeformable and always the same. The route in every referential is always the same.

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Absolute Referential Postulate:
Inside the Universe there is an absolute referential. This referential is in all parts of the universe and is fixed inside the empty space which is totally stationary, invariant, perpetual and undeformable without the possibility of movement of its absolutely stationary position.

Any empty space point can be fixed as an absolute referential. A stationary origin of the absolute referential can certainly be found in the Big-Bang center. The Light speed and the length of the space set the time relations in every referentials.

2. Primary relation between the absolute referential and a referential moving with v_0 speed relative to the absolute referential

Considering the simplest case of a mobile object moving at v_0 velocity inside the empty space.

Fixing two referentials, the first one is absolute in the empty space and the other one is fixed at v_0 speed relative to the empty space.

To establish the time relations between these two referentials it is necessary to get a moving point at the speed of light. As this point is moving at the speed of light using the Einstein Relativity Principle its velocity is the same in all referentials and the point will be able to set the time relations between the two referencials.

To get a better comprehension suppose a point in the empty space. From this point two mobile objects will travel, the first one at v_0 speed and the second one at the speed of light c.

In the absolute referential the mobile object at the speed of light runs a length s given by $s = ct$; t is the time into the absolute referential. In this same absolute referential this point will be distant from the referential fixed at the v_0 speed by a distance given by $s_1 = ct - v_0 t$.

In the New View of the Relativity Theory, using the postulate of the invariance space into the referential fixed in v_0 speed the distance is the same as the absolute referential $s_1 = ct_0 = [c - v]t$. In this case t_0 is the time that the point at the light speed will be taking to move the distance s_1 in the referential fixed at the v_0 speed.

So the relation between t_0 and t will be given by $t_0 = \left(1 - \frac{v_0}{c}\right)t$.

3. Time instantaneity, Lorentz Factor and the independence of the absolute referential.

Considering two referentials, the first one at v_0 speed and the other one at $-v_0$ speed; both relative to the absolute referential.

To establish a time relation between the two referentials it must be considered a point moving at light speed during an interval time t into the absolute referential. Considering t_{0_1} the time spent by the object at light speed to run the s_1 length in the referential fixed at v_0, and considering t_{0_2} the time spent by the object at light speed to run the s_2 length in the referential fixed at $-v_0$,

$$s_1 = ct_{0_1} \tag{1}$$

$$s_2 = ct_{0_2} \tag{2}$$

Considering t the time spent in the absolute referential,

$$s_1 = ct - v_o t \tag{3}$$

$$s_2 = ct + v_0 t \tag{4}$$

Than

$$t_{0_1} = \left(1 - \frac{v_0}{c}\right) t \tag{5}$$

and

$$t_{0_2} = \left(1 + \frac{v_0}{c}\right) t \tag{6}$$

in the absolute referential there is time instantaneity but there is no instantaneity between t_{0_1} and t_{0_2}.

This situation occurs because s_1 is different than s_2, so t_{0_1} is different than t_{0_2}.

To make $t_{0_1} = t_{0_2}$, s_1 must be equal s_2. In this case the times in the absolute referential will be different from each other.

Making that $t_{0_1} = t_{0_2} = t_0$, than

$$t_0 = \left(1 - \frac{v_0}{c}\right) t_1 \tag{7}$$

and

$$t_0 = \left(1 + \frac{v_0}{c}\right) t_2 \tag{8}$$

in this case it is possible to obtain instantaneity between t_{0_1} and t_{0_2}, but not between t_1 and t_2.
To obtain time instantaneity in every referentials, multiplies the equations:

$$t_{0_1} t_{0_2} = \left(1 - \left(\frac{v_0}{c}\right)^2\right) t^2 \tag{9}$$

and after

$$t_0^{\,2} = \left(1 - \left(\frac{v_0}{c}\right)^2\right) t_1 t_2 \tag{10}$$

Getting the relation:

$$t_{0_1} t_{0_2} t_1 t_2 = t_0^{\,2} t^2 \tag{11}$$

concluding:

$$t_0^{\,2} = \left(1 - \left(\frac{v_0}{c}\right)^2\right) t^2 \tag{12}$$

The above equation must be the relation between time t_0 with v_0 module speed referential and time t in the absolute referential.

The must be no confusion between t_{0_1} or t_{0_2} with t_0 and t_1 or t_2 with t.

$t_{0_1}, t_{0_2}, t_1, t_2$ are times spent by an object at light speed to run certain distances according to its own referentials.

On the other hand t and t_0 are the times in its own referentials. The explanation of this relation between t and t_0 is justified in the Dimensional Continuous Space-Time Theory because the time is transverse to the mobile movement and it is caused by the relation between time and space.

3.1. The Relativity Principle is satisfied and it is not necessary to consider the absolute referential.
The absolute referential is only necessary to find the time of the Universe and not the matter time relatively to its own referential. The Universe time is the empty space time and it is the one that runs faster than times relative to the others referentials.

Considering one referential fixed at v_0 speed and other one at v speed both relative to absolute referential.
On the base of the referentials there will be

$$t_0 = \sqrt{\left(1 - \left(\frac{v_0}{c}\right)^2\right)} \cdot t \tag{13}$$

and

$$t_v = \sqrt{\left(1 - \left(\frac{v}{c}\right)^2\right)} \cdot t \tag{14}$$

Considering the referential fixed on the v_0 speed. The question is how to determinate the v' speed of the mobile object at v speed relative to the referential fixed at v_0.

To solve this question it is necessary to find the lengths

$$s_1 = vt - v_0 t \tag{15}$$

$$s_2 = vt + v_0 t \tag{16}$$

multiplying the two equations:

$$s_1 s_2 = \left(v^2 - v_0^2\right) t^2 \tag{17}$$

doing $s_1 s_2 = s^2$ and $s = v' t_0$.

The length will be:

$$s = \sqrt{\left(v^2 - v_0^2\right)} \cdot t \tag{18}$$

So v must satisfy

$$s = v' t_0 = v' \sqrt{1 - \left(\frac{v_0}{c}\right)^2} \cdot t \tag{19}$$

so

$$v' = \frac{\sqrt{v^2 - v_0^2}}{\sqrt{1 - \left(\frac{v_0}{c}\right)^2}} \tag{20}$$

Therefore the two equations below must be satisfied

$$tv = \frac{\sqrt{1 - \left(\frac{v}{c}\right)^2}}{\sqrt{1 - \left(\frac{v_0}{c}\right)^2}} \cdot t_0 \tag{21}$$

and

$$t_v = \sqrt{1 - \left(\frac{v'}{c}\right)^2} \cdot t_0 \tag{22}$$

From the last equation it easy to show the equality between equation 21 and that

$$t_v = \sqrt{1 - \frac{\left(\frac{v^2 - v_0^2}{c}\right)}{1 - \left(\frac{v_0}{c}\right)^2}} \cdot t_0 \tag{23}$$

4. Solution of the electromagnetism laws in all inertial referentials

In the 13th chapter of the reference 2 is presented a equivalence solution of the electrostatic and electromagnetic forces between inertial referentials using the Special Relativity Theory.

In the Feynman Book [2] there is an q elementary moving charge running to the right with v_0 speed in parallel with a conducting wire with negative charges moving to the right however with v speed. So the conventional electric current charges is moving with $-v$ speed to left and the distance from the q charge to the wire is r.

In the Feynman book shown that there is no electrostatic force in the fixed referential on the stationary wire, but there is a magnetic force in action on the q charge

$$F = \left(\frac{1}{4\pi\varepsilon_0 c^2}\right)\frac{2qA\rho_-}{r} v v_0 \tag{24}$$

where $\mu_0 = \varepsilon_0 c^2$.

Feynman analyzed the particular case when $v_0 = v$ obtaining

$$F = \left(\frac{q}{2\pi\varepsilon_0}\right)\left(\frac{A\rho_-}{r}\right)\frac{v^2}{c^2} \tag{25}$$

It is known that $F = q v_0 B$, where B is

$$B = \left(\frac{1}{4\pi\varepsilon_0 c^2}\right)\frac{2Av}{r}\rho_- \tag{26}$$

In the referential fixed in the stationary wire there is no electrostatic field because the negative moving charges inside the wire are neutralized by the positive charges of the atomic structure of the wire.

For the referential fixed on the q charge there Will be no magnetic field because in this referential the charge speed is $v' = 0$ so $F = q v' B = 0$.

On the other hand, using the relativity theory the Feynman book shows that there will appear the electrostatic force given by

$$F_0 = F' = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \cdot F \tag{27}$$

where F is the magnetic force when the referential is the stationary wire.
The New View of the Relativity Theory will show that

$$F_0 = F \tag{28}$$

The Lorentz Factor does not appear in the above equation. It Will be demonstrated that above result between forces is also valid when v_0 is different than v .

These results have great importance because the New View of the Relativity Theory changes some ideas about the Relativity Theory e.g. the length of a way is not elastic and it remains the same independently of the referential, only the elapsed time changes with the referential.

The relation between the t time fixed on the stationary wire and the time t_0 fixed on the v_0 speed of the moving charge q is controlled by the light speed and the length way.

4.1. *Developing computation using de new view of Relativity Theory*.

Analyzing the same situation in the Feynman book using now de New View of the Relativity Theory. The t time and the s_q length course traveled by the q charge are related by $s_q = v_0 t$.

The t_0 time fixed on the moving q charge can be found using a point traveling at c light speed and the s length way.

In the fixed wire referential the s length way between the point at light speed from the point at v_0 speed is $s = ct - v_0 t$.

The same space s in the q charge referential is $s = ct_0$ and it will be found that $t_0 = \left(1 - \frac{v_0}{c}\right) t$

On the other hand there is no point traveling at c speed.

There are only positive and negative charges in the wire, and the charge q outside the wire, traveling in parallel with the wire.

The common point in both referentials is the q charge.

It will be necessary to fix a point at c velocity above the q charge. So the t' time in the stationary wire referential to a point traveling at light speed on the q charge has a length s :

$$s = ct' \tag{29}$$

the t time in the same stationary referential wire is corresponding to the q charge at v_0 speed is

$$s = v_0 t \tag{30}$$

than

$$t' = \frac{v_0}{c} t \tag{31}$$

Now considering the charges with v speed inside the wire and the same wire referential. The distance between a point at c light speed and a point fixed in a charge inside the wire at v speed is $s' = ct' - vt'$.

The same length in the fixed v_0 referential is $s' = ct_0$ than

$$t_0 = \left(1 - \frac{v}{c}\right) t' = \left(1 - \frac{v}{c}\right)\left(\frac{v_0}{c}\right) t \tag{32}$$

Now considering the positive charges inside the wire and at $-v_0$ speed relative to the q charge moving with c speed.

So the space length will be $s_1 = ct' = c\left(\frac{v_0}{c}\right) t = v_0 t$.

To the positive charges relative to the q charge referential it is done $s_1 = ct_{0_1}$. Then

$s_1 = ct' = c\left(\frac{v_0}{c}\right)t$ then $t_{0_1} = \left(\frac{v_0}{c}\right)t$, t_{0_1} is the elapsed time of the moving positive charges relative to the q charge.

Now all it is prepared to compute the calculations that results on the force F_0.

In two referentials the positive charges and negative charges will be conserved.

To the stationary wire referential the current of negative charges is $i_e = \frac{dq_e}{dt} = (\rho_-)A\frac{dl}{dt}$ and the current of positive charges is $i_p = 0$.

Into the fixed q charge referential there will be $i_{e_0} = \frac{dq_{e_0}}{dt_0}$.

As the area and the length are the same in both referentials there will be

$$i_{e_0} = (\rho'_-)\left[\frac{1}{\left(1-\frac{v}{c}\right)\left(\frac{v_0}{c}\right)}\right]A\frac{dl}{dt} \tag{33}$$

The charges and its variations must be preserved because compressing or expanding the time more or less charges goes through the cross section but the variation charges remains the same. $\frac{dq}{dt} = \frac{dq'}{dt'}$.

It means that incremental charges must be different dq_{e_0} is different than dq_e

$$dq_0 = \left(1-\frac{v}{c}\right)\left(\frac{v_0}{c}\right)dq \tag{34}$$

So the negative density of the charges in the v_0 referential is

$$\rho'_- = \left(1-\frac{v}{c}\right)\left(\frac{v_0}{c}\right)\rho_- \tag{35}$$

The positive charges relative to the wire referential will be resting and its time variation is zero. Relative to the fixed referential on the q charge, the positives charges are moving. This is a convection current.

In this case will be getting

$$i_{p_0} = \frac{dq_{p_0}}{dt_{0_1}} = \frac{d(A\cdot l\cdot\rho'_+)}{dt_{0_1}} \tag{36}$$

where

$$dt_{0_1} = \frac{v_0}{c}dt \tag{37}$$

as A and l are the same

$$i_{p_0} = \rho'_+\left(\frac{1}{v_0/c}\right)A\cdot\frac{dl}{dt} \tag{38}$$

Considering the convection current equal to ip current $\rho'_+ = \rho_-\left(\frac{v_0}{c}\right)$

The charges contribution on the fixed q referential will be $dq_0 = dq_{p_0} + dq_{e_0}$ that results

$$dq_0 = -(\rho_-)\left(\frac{v v_0}{c^2}\right) = (\rho_+)\left(\frac{v v_0}{c^2}\right) \tag{39}$$

The electrostatic force F_0 that exist in the fixed q referential now can be computed by the same procedure used in this chapter

$$F_0 = 2kq(\rho_+)A\left(\frac{1}{r}\right)\left(\frac{v v_0}{c^2}\right) \tag{40}$$

where $k = \frac{1}{4\pi\varepsilon_0}$.

That is

$$F_0 = F \tag{41}$$

If the q charge is negative the force will be an attraction force. If the negative charges inside the wire goes to the left it can be shown that the force is a repulsion force.

5. Accelerated referential

Considering the same case in the Feynman book, but the charge q will be with a_0 constant acceleration: $v_0 = a_0 t$ running to the right.

The distance between the charge and the conduction wire is r.

The negatives charges inside the wire has v speed to the right.

In the fixed wire referential the magnetic force will be

$$F = \left(\frac{k}{c^2}\right)2Aq(\rho_-)\left(\frac{v a_0 t}{r}\right) \tag{42}$$

considering A is the cross section area of the wire.

The space length will be $s = \frac{a_0}{2}t^2$, to the fixed referential at v_0 speed, it will be fixed again the point at c speed on the moving q charge. So, to the fixed q charge referential the same considered point with c speed $ct' = s$, considering that t' is the time fixed on the stationary wire referential $t' = \frac{a_0}{2c}t^2$ then $ct_0 = ct' - vt'$.

Considering that t_0 is the time on the referential fixed in the $v_0 = a_0 \cdot t$ speed of the q charge

$$ct_0 = c\left(\frac{a_0}{2c}\right)t^2 - v\left(\frac{a_0}{2c}\right)t^2 \tag{43}$$

so

$$t_0 = \left(\frac{a_0}{2c}\right)t^2 - \left(\frac{v a_0}{2c^2}\right)t^2 \tag{44}$$

The electric current will be $i = \frac{dq_e}{dt}$ but

$$dt_0 = \left(\frac{a_0}{2c}\right)dt - \left(\frac{a_0 v}{c^2}\right)dt \tag{45}$$

So the densities positive and negative of the charges will be

$$\rho'_+ = \left(\frac{a_0 t}{c}\right)\rho_+ \tag{46}$$

and

$$\rho'_{-} = \left[\left(\frac{a_0 t}{c}\right) - \left(\frac{v a_0 t}{c^2}\right)\right]\rho_{-} \tag{47}$$

then

$$\rho' = \rho'_{+} + \rho'_{-} \tag{48}$$

that results

$$\rho' = \left(\frac{v a_0 t}{c^2}\right)\rho_{+} \tag{49}$$

so it will get that

$$F_0 = k\left(\frac{2 A q(\rho_{-})}{r}\right)\left(\frac{v a_0 t}{c^2}\right) = F \tag{50}$$

6. Conclusion

Based in the Dimensional Continuous Space-Time Theory that shows the empty space is invariant, this necessary New View of The Relativity Theory is presented.

In this article there were many conclusions:

It was shown that the New View of The Relativity Theory the time elasticity is conserved but the empty space elasticity is not conserved resulting the invalidation of the Lorentz transformations.

Based in the length conservation and the light speed conservation it was demonstrated that the electromagnetism laws are conserved in all referentials including the accelerated ones.

It was shown that the electrostatic force F_0 in the q charge referential has the same intensity of the magnetic force in the stationary wire referential and is possible to find F_0 when v is different from v_0.

Finally it was demonstrated that the New View of The Relativity Theory is valid for inertial and accelerated referentials.

7. References

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