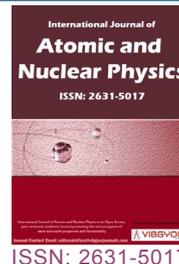


Lorentz's Factor Violation by Neutrinos Moving with the Speed of Light



Wladimir Guglinski^{1*} and Cláudio Nassif Cruz²

¹*Escola de Engenharia da Universidade Federal de Minas Gerais, Brazil*

²*Universidade Federal de Ouro Preto (UFOP), Campus Morro do Cruzeiro, Brazil*

Abstract

Newton proposed the first theory on the dynamics of moving bodies. Later, facing the paradox of the light behavior discovered by Michelson-Morley experiment, Einstein felt himself constrained to conclude that Newton's theory was a particular case of a most general theory, and he proposed the electrodynamics of moving bodies, based on the Lorentz's factor. Nowadays there is a new paradox and we are facing a similar situation of that faced by Einstein, because the discovery that neutrino has mass constrains us to suppose that Einstein's theory is a particular case of a most general theory on the electrodynamics of moving bodies, and in this new theory Einstein's old concept of mass must be replaced. Such new theory is presented in "On the electrodynamics of moving particles in a quasi-flat spacetime with Lorentz violation and its cosmological implications" [1], where there emerges a vacuum energy density of gravito-electromagnetic origin (non-linear effects on the electrodynamics due to gravity), leading to an anti-gravity at cosmological scales in agreement with observations.

Introduction

When the theorists had faced, in the beginning of the 20th Century, the challenge of developing a theory for the description of the atom, soon they realized that it was impossible to develop a theory based on physical mechanisms. The words of the Nobel Laureated Jacob Bronowski summarize how the Modern Physics was developed since then: "An objective of physical sciences has been to give an accurate image of the material world. One of the accomplishments of the physics in Century twenty was to show that the objective is unattainable" [2].

The first theory for explaining the mystery

of the Balmer lines had been proposed by the physicist Voigt. He did not discover any law neither any physical phenomenon regarding the emission of the hydrogen spectrum. Instead of, he used the mathematical formalism for two linked linear oscillators, and he has obtained a satisfactory theory, which reproduced the experimental results with good accuracy. If Bohr had not discovered his model of hydrogen atom, the Quantum Mechanics would be developed from the Voigt's theory, and Schrödinger would have never discovered his famous equation.

From this historical fact, we realize that,

***Corresponding author:** Dr. Wladimir Guglinski, Escola de Engenharia da Universidade Federal de Minas Gerais, Av. Presidente Antonio Carlos, 6627, Pampulha, Belo Horizonte-MG, Brazil

Accepted: December 04, 2018; **Published:** December 06, 2018

Copyright: © 2018 Guglinski W, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Guglinski and Cruz. *Int J At Nucl Phys* 2018, 3:010

ISSN 2631-5017



9 772631 501003

sometimes, physical models help us in the process of discovery of some fundamental laws and mechanisms existing in nature, because in spite of we know that Bohr theory on the hydrogen atom is wrong, however thanks to his wrong model he has discovered a fundamental mechanism, adopted in Quantum Mechanics: The emission of photons when the electron changes its position between two levels in the atom.

There are two hypotheses we may consider about the nature:

1. First hypothesis: There are physical mechanisms in the nature, and the phenomena are produced by physical structures which obey to some fundamental laws.
2. Second hypothesis: There are no physical structures in nature.

In the case the second hypothesis is the correct, the current method of discovery adopted for the development of Modern Physics is the correct one, and soon or later the theorists will reach a final theory of everything, free of paradoxes.

In the case the first hypothesis is the correct, we have two alternatives:

1. There is no need any worry in discovering what are the physical structures existing in nature. Our aim is developing a theory via mathematics, adopting laws that we are not sure if they are really the laws existing in nature, and our aim is advancing the technology. In this case we abdicate our desire of finding how nature produces the phenomena, and we will never understand nature in deep. This was the method used by Voigt, and it had failed, because he did not discover, for instance, the physical mechanism of photon emission, when the electron jumps from two energy levels in the atom. Soon of later the method will fail, because as we are not developing a theory with the true laws of nature, the laws adopted for the development of our theory will be denied by new experiments.
2. We need to face the challenge of discovering the physical models existing in nature. Of course the task is very hard, but, if we give up, we will never understand how nature works in deep.

Bohr proposed a hydrogen atom with the adoption of some strange postulates, and later

the experiments had shown that his model does not work for other atoms. Then Schrödinger decided to develop a theory by discovering an equation for the atom, using the mathematics and a physical model: The electron inside the potential of a nucleus. Schrödinger's attempt was successful from mathematical viewpoint, because his equation describes with good accuracy the atom when it emits photons. However his attempt has failed from the viewpoint of the philosophical coherence, because, for the development of his equation, he had started from the equation for a free electron. But his equation is applied for an electron submitted to a potential, moving inside the electrosphere of atoms. The theorists try justifying this puzzle by proposing an unacceptable postulate, with no sense: According to the postulate, an equation developed from a free electron can be applied for the case of an electron inside a potential, because the experiments show that Schrödinger equation describes with accuracy the atom behavior. Obviously such postulate cannot be considered seriously, implying that it is impossible to eliminate the paradox by considering the atom model adopted in Quantum Mechanics. The unsolved puzzle, concerning the development of the Schrödinger equation, is a clear evidence that something very serious is missing in the atom model of Quantum Mechanic. Besides, it is hard to believe that Bohr theory is completely wrong. As said Schrödinger on the Bohr's successes, "*It is difficult to believe that this result is merely an accidental mathematical consequence of the quantum conditions, and has no deeper physical meaning*" [3]. And as Bohr's successes cannot be merely accidental, and because he has considered a centripetal acceleration on the electron in his theory, then the electron must be submitted to a centripetal acceleration inside the hydrogen atom, in spite of we don't know why, and probably such centripetal acceleration of the electron has not any connection with the mechanism responsible for the emission of photons by the atom. Therefore there must be a mysterious mechanism responsible for the existence of the centripetal force on the electron, in spite of according to Quantum Mechanics any centripetal acceleration on the electron is inadmissible. Thereby the atom model of Quantum Mechanics cannot be entirely correct, and something very serious is missing in the atom model of the theory.

Perhaps what is missing in the atom model of Quantum Mechanics has connection with the interaction aether-matter, since we do not know yet what are the laws of such interaction, and the mystery of the neutrino mass is a strong evidence corroborating that is poor our understanding of such a subject. For instance, suppose that the aether inside the hydrogen atom is anisotropic (in contrast with the isotropic space in the atom model of Quantum Mechanics). Perhaps there is a radial gradient of the aether energy, in order that in the vicinity of the proton the “density” of energy is very big.

Suppose that the electron moves with z_{bw} inside the atoms [4]. According to Nassif's Symmetric Special Relativity, there is not absolute rest, and inside an isotropic aether a free electron moves with a minimum speed, with z_{bw} whose radius R_0 is very big (tending to infinite). Let us call “quantum rest” such motion with minimum speed proposed by Nassif, for the isotropic space. If a magnetic field is applied and the free electron starts to accelerate in this isotropic aether, the radius of its z_{bw} is submitted to a process of shrinkage, because the speed is increasing. Now suppose that we put the electron (in quantum rest) near the vicinity of a proton, where the aether is anisotropic. In that anisotropic aether near to the proton, the electron (in quantum rest) would move with z_{bw} , but with radius R_z very shorter than the radius R_0 of the z_{bw} in the isotropic aether (far away the proton's vicinity): $R_z \ll R_0$. So, possibly the anisotropic aether pushes the electron, in order to dilate the radius of its z_{bw} . Therefore it is possible that a force F_r of repulsion is applied on the electron, trying to expel it outside the proton potential. By this way the electron would be submitted to two contrary forces, the electric attraction with the proton, and the force due to the anisotropy of the aether. Submitted to two contrary forces, the electron would behave as a free electron, in spite of it is inside the hydrogen atom. Such mechanism could be the answer why Schrödinger's equation is successful. And as the electron moving with z_{bw} is submitted to a centripetal acceleration, perhaps this is the reason why the centripetal acceleration appears in the Bohr's calculus, in spite of he had wrongly considered that such centripetal acceleration is regarding the electron orbit around the proton. In the case such centripetal acceleration is really due to electron motion with z_{bw} , then it

has not relation with the mechanism of photon emissions by the atom, in spite of some mysterious coincidence connects it with the Bohr theory.

No matter if these speculations have merit or not, nevertheless it is out of doubt that something very fundamental is missing in the atom model of Quantum Mechanics, and it can be related to the fact that the aether is not considered in the theory. And thus we realize that it is very poor our understanding of the laws of interaction matter-aether.

The neutrino mysteries, in special the invalidation of the fundamental postulate of the Special Relativity, seems to point out that we must change the method adopted up to now, and we cannot neglect anymore the participation of the aether as a fundamental agent for the generation of some unknown laws existing in nature. So, we will try to decipher the neutrino mystery by considering physical models, and we start from the photon interacting with the aether. Even if the future will show that some initial physical models are not entirely correct, however we hope they may help us to discover some fundamental laws which rule the neutrino behavior. If the neutrino puzzle may be solved by such a research method, we will know that we are in the correct way.

A Model of Photon

In paper [5], we propose a structure for the neutrino, by considering that Gell Mann's gluon with spin 1 is composed by two gluons with spin 1/2. So, Gell Mann's gluon is called big gluon “G”, and the others are called gluons “g”. And the paper also proposes that the mass of all the elementary particles is generated by the interaction of their electric fields with the aether, where the particles move with (z_{bw}).

In a paper [6], published in 2013, it is shown that the vacuum permeability and permittivity may originate from the magnetization and the polarization of continuously appearing and disappearing fermion pairs. Herein we call “singleton” each fermion of the aether, a name coined by Dirac.

The most elementary photon (Figure 1 and Figure 2) is composed by two fermions $Q(+)$ and $Q(-)$ and two gluons g , as follows:

$Q(+)$ is composed by two singletons $s(+)$ and one singleton $s(-)$

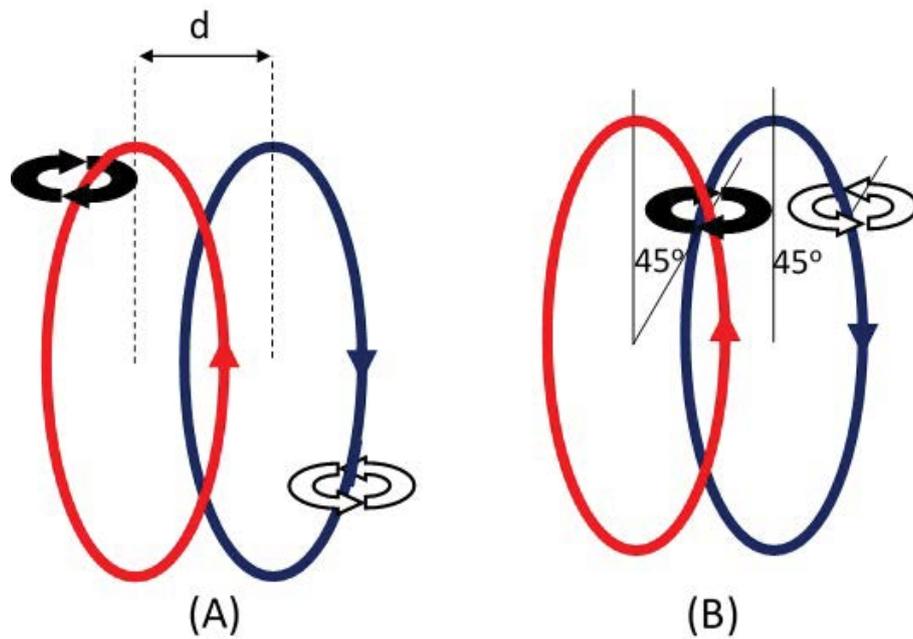


Figure 1: Polarization of a photon A) Unknown polarization; B) 45° polarization.

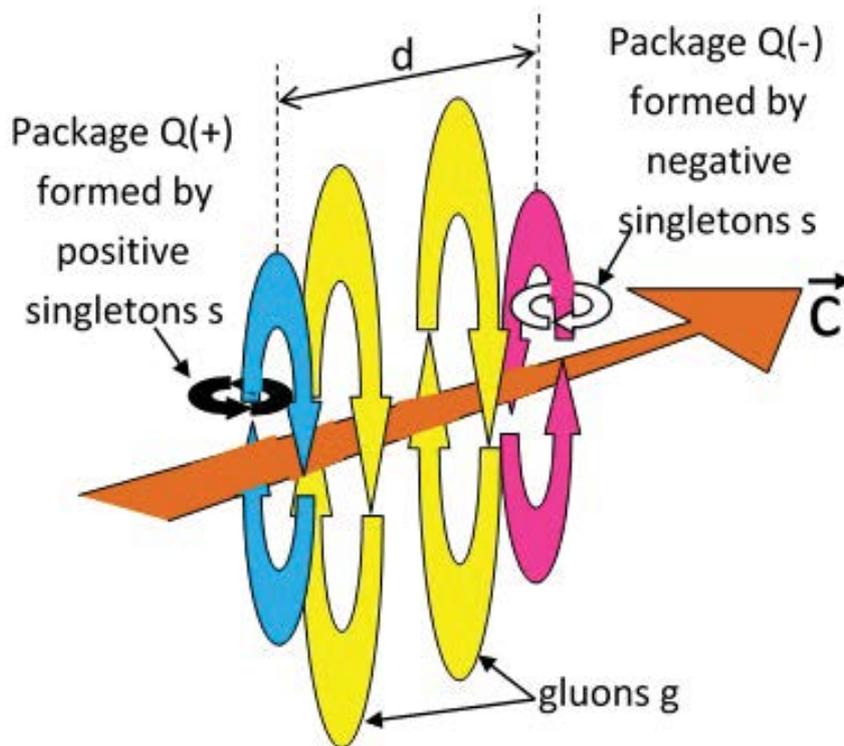


Figure 2: The photon formed by two packages Q(+) and Q(-) composed by singletons.

Q(-) is composed by two singletons s(-) and one singleton s(+)

Such most elementary photon is the first one of the infrared spectrum. It has the minimum energy which a photon can have.

A quantity “n” of elementary singletons s(+)

can be glued, and they form a composed heavier singleton S(+), and the same occurs with the singletons s(-), they form a heavier singleton S(-). The mass of a singleton S depends on the quantity of singletons s which compose it.

So, a photon, heavier than the most elementary

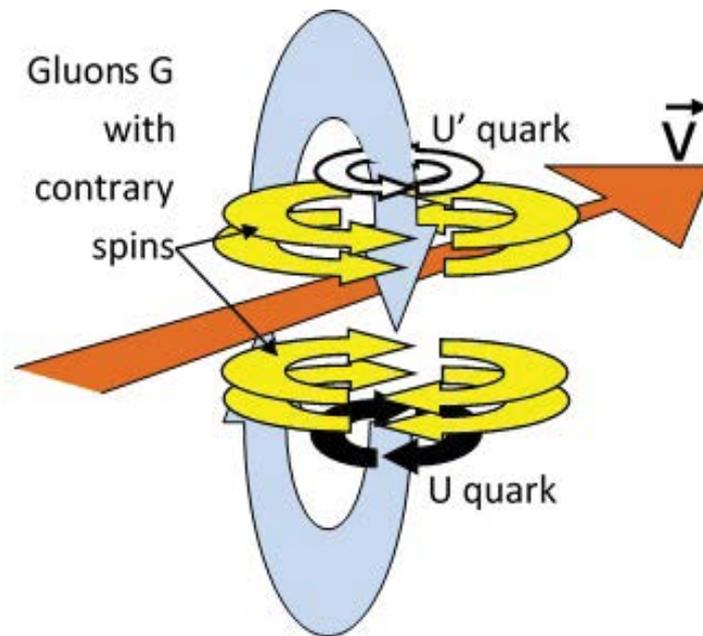


Figure 3: Structure of the neutral π^0 pion.

Gluons G are unable to promote the stability of the π^0 pion, because the zbw rotation of the quarks U and U' does not induce two contrary magnetic fields B_1 and B_2 , as occurs inside the photons and neutrinos. Thus, U and U' meet together, and annihilate one each other. Fields B_1 and B_2 are shown in the [Figure 5B](#).

photon, has the following structure:

- Q(+) composed by two singletons S(+) and one singleton S(-)
- Q(-) composed by two singletons S(-) and one singleton S(+)
- Two gluons g. As will be shown in [Figure 5B](#), beyond the electric attraction between Q (+) and Q(-), there is also a magnetic repulsion between them, preventing they meet together and annihilate one each other. The gluons contribute for the stability of the photon, as will be explained later.

[Figure 1](#) shows the structure of the photon (gluons g are not shown) as follows:

- Q(+) and Q(-) have contrary spins
- The two zbw rotate in contrary directions

The creation of photons, composed by Q(+) and Q(-), inside an atom, occurs as follows:

1. When the electron jumps between two energy levels of the atom, a negative package Q(-) is extracted from the aether together with a gluon g, leaving a positive "hole" in the aether.
2. Due to Coulomb repulsion with the electron, the Q(-) starts to move.
3. In order to plug the hole dug in the aether, a positive package Q(+) is extracted together with a gluon g, and it forms with the negative package the body of the photon, which immediately begins to move with the speed of light, with two zbw in contrary directions.
4. As the fermions Q(+) and Q(-) were induced by interaction with a lepton (the electron), the capture of gluons "g" with spin 1/2 occurs as follows:
 - When the atom emits a photon, the energy of the photon is an entire multiple of the Planck's constant. This means that the electron's angular momentum in the atom orbit varies by an entire value. In order to keep the total angular momentum before and after the emission of the photon, it must be emitted with entire spin 1.
 - Inside the atom, when the electron changes its place from a level n to a level n + 1, the fermion Q(-) with spin 1/2 is extracted from the aether. As the electron is very heavier than Q(-), the recoil of the electron, due to the Coulomb repulsion with Q(-), is very short, compared with the displacement "d" of Q(-).
 - When Q(+) is captured from the aether, its spin is cancelled with the spin of Q(-). In order to

keep the total angular momentum the newborn photon (yet without gluons), it captures two gluons g , thus acquiring spin 1 (the two gluons g have spins orthogonal to the spins of $Q(+)$ and $Q(-)$, as seen in [Figure 5C](#).

5. The fermions $Q(+)$ and $Q(-)$ gyrate independently in contrary direction in the z bw because the gluons g are weak and are not able to oblige the two z bw to move together, in the same direction.

6. There is a distance “ d ” between the two packages $Q(+)$ and $Q(-)$, as shown in [Figure 1](#), due to the delay of the extraction of the positive package from the aether, and the length of the distance “ d ” depends on the following:

- The size of the package $Q(-)$, because, the more heavier is its size, the electron recoil is larger, and so the displacement “ d ” of $Q(-)$ is shorter.
- The energy level of the aether where the “hole” is dug. Nearest the atomic nucleus the electron is situated, shorter is the distance “ d ”, because the time delay for the extraction of the fermion $Q(+)$ decreases with the growth of the energy level of the aether around the nucleus. For instance, X-rays have a very short distance “ d ”, not only because the recoil of the electron is large, but also because the X-rays are produced in the most inner levels of the atom.
- The distance “ d ” is responsible for the ability, or not, of the photon to be polarized, because the distance “ D ” between the atomic plans of the crystal must be a multiple of the distance “ d ” in the photon, in order to have a suitable resonance which allows the occurrence of the polarization. [Figure 1A](#) shows a photon emitted by an atom, which never has entered a polarizer, and thus it is unknown the angle where the fermions $Q(+)$ and $Q(-)$ cross one in front of the other. If that photon enters inside a polarizer 45° , and the resonance occurs, the fermions $Q(+)$ and $Q(-)$ change their relative position, as shown in [Figure 1B](#). Otherwise, if the resonance does not occurs, the photon will not be polarized.
- As the neutrino is a special sort of photon with spin $\frac{1}{2}$, the distance “ d ” for antineutrinos created in the beta-decay is practically zero, because the recoil of the electron is large and the displacement of the quark u' of the antineutrino is practically null, since the quark u' is very

heavier than the electron. And because the antineutrino is produced in a region with very high energy level of the aether (few femtometers close to the proton), this is other reason why the distance “ d ” is practically almost zero for neutrinos and antineutrinos, when neutrons are formed by the capture of an electron by a proton, and also in the neutron beta-decay.

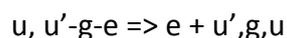
7. As the packages $Q(+)$ and $Q(-)$ of the photon were created by weak interaction with a lepton (the electron), each one captures gluons “ g ” with spin $\frac{1}{2}$. Unlike, quarks as u , u' , d , and d' , capture gluons “ G ” with spin 1, produced via strong interaction.

Pions

The neutral pion π^0 has structure u', GG, u , where the quarks u and u' have antiparallel spins, as also the two gluons G , as shown in [Figure 3](#). The u and u' quarks move with a unique z bw because the strong gluons G , induced via strong interaction, does not allow them to take two independent z bw.

In spite of the neutral pion has charge zero, note that the negative u' quark interacts with the aether independently of the interaction between the aether and the positive u quark. So, the interaction between the negative electric field of u' and the aether induces the half of the mass of the pion, and the positive electric field of the u also interacts with the aether, inducing the other half mass of the pion.

The structure of the negative π^- pion is $u, u'-g-e$, shown in [Figure 4](#), and it decays in one electron and one antineutrino, as follows:



According to the Standard Model, the structure of negative pion is u', d , and, if it would be indeed formed by two quarks u' and d (without a lepton between them), its mean lifetime would have to be in the order of 10^{-17} s (the lifetime of neutral pion with structure u, u'), and not with 2.6×10^{-8} s, as the experiments detect.

The structure of the positive pion is similar, $u, u'-g-e'$, where e' is a positron.

The structures for the bosons Z and W are proposed in the paper "Reevaluation of Fermi's theory of beta-decay", [5] where it is shown how the W boson is created during the neutron beta-decay, and the Z boson is created when a neutron is formed.

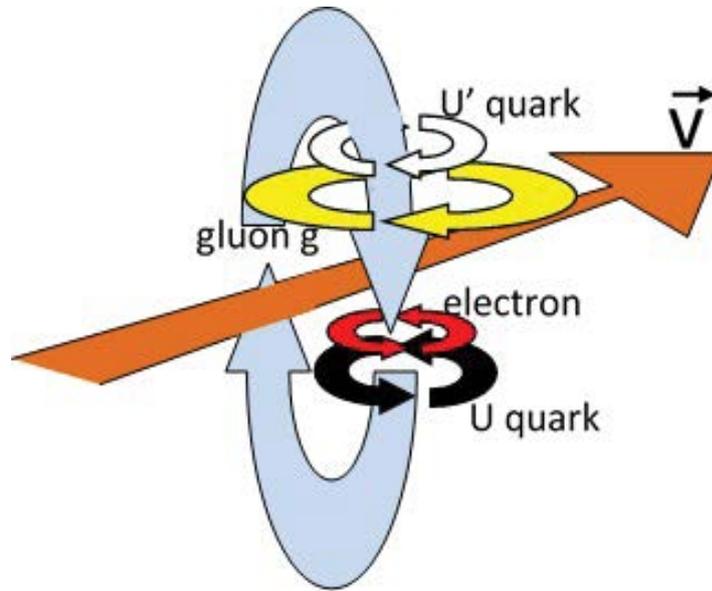


Figure 4: Structure of the negative π^- pion. Electron takes the same spin of U quark, and gluon g takes the spin of U' antiquark.

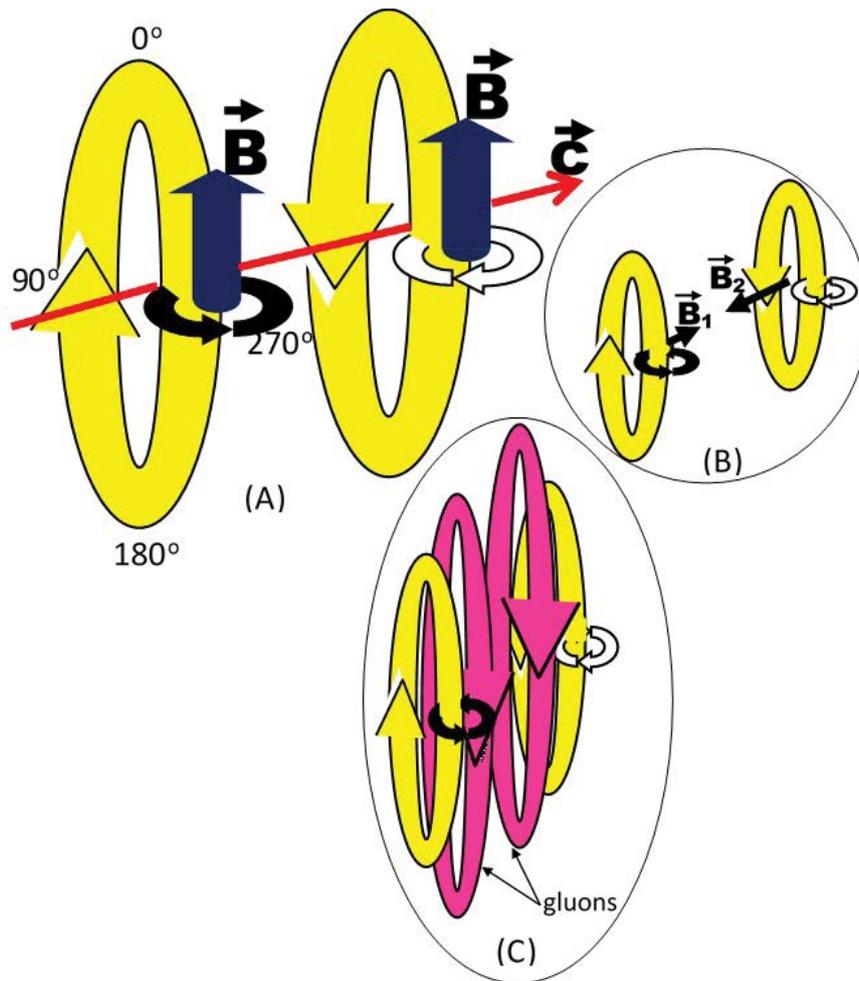


Figure 5: Magnetic fields induced by the electric charges in the photon. A) Transverse magnetic fields B induced by spins; B) Longitudinal magnetic fields B_1 and B_2 induced by charges rotations in the zbw; C) Structure of photon showing the gluons.

Neutrino Faster than Light in the 2012 LHC Experiment?

In 1987, approximately two to three hours before the visible light from SN 1987A reached Earth, a burst of neutrinos was observed at three separate neutrino observatories. In 2012 an experiment was performed in the LHC, in order to verify the result obtained in 2011 (which has detected for neutrinos speed a time 60ns shorter than that expected from light speed [6]). In the paper the authors of the 2012 experiment say:

“The time of flight difference between the speed of light and the arriving neutrino LAr-TPC events has been analysed. The result is compatible with the simultaneous arrival of all events with equal speed, the one of light. This is in a striking difference with the reported result of OPERA that claimed that high energy neutrinos from CERN should arrive at LNGS about 60 ns earlier than expected from luminal speed”.

Consider that neutrinos produced in the 2012 experiment have moved 2 ns faster than light, and let us calculate how many time it represents if they were coming from the supernova 1987A. which is 168.000 years-light distant from the Earth:

$$168.000 \text{ years} = 168.000 \times 365.4 \times 24 \times 60 \times 60 = 5.3 \times 10^{12} \text{ s}$$

$$5.3 \times 10^{12} \text{ s} \times 2 \times 10^{-9} \text{ s} = 1607.7 \text{ s} = 2.94 \text{ h}$$

And so is the same time detected in the 1987 astronomical observation.

As the two to three hours of light delay in arriving to Earth coming from the supernova 1987A violates the Special Relativity, then in 1987 the theorists had avoided the breakdown of the Einstein's theory by alleging that the light was retarded by cosmic dust, and since nothing is able to retard the neutrinos, this was the reason why they arrived two to three hours earlier, and therefore in fact they had traveled the space, between 1987A and Earth, with speed a little slowly than that of the light, as expected from Einstein's theory. The experiment conducted in 2012 in the LHC seems belie the interpretation for the two to three hours of light delay. It seems there was not any delay of light due to cosmic dust.

In 1987 the neutrinos were considered massless, because it is required by the Standard Model. And thus there was no problem to consider that they move with the speed of light. But faster than light

they could not be, and so the theorists had justified that light moves slowly than neutrinos because they are retarded by cosmic dust. But with the detection of neutrinos mass in 1999, even neutrinos with the speed of light invalidate the fundamental postulate of the special relativity. Therefore it is crucial for the development of Theoretical Physics discovering the true about the neutrinos speed, by performing more experiments in the LHC. After all, billion dollars were applied for building the large hadron collider, and the scientific community hopes that the discoveries in the LHC must be applied for the advancement of the Physics.

Maxwell Equation Generated by the Singletons of the Photon

As tribute to Dirac, instead of to call $Q(+)$ and $Q(-)$ the packages of singletons of the photon, let us call them $S(+)$ and $S(-)$. Figure 5 shows the two singletons $S(+)$ and $S(-)$ of the photon moving with z_{bw} , and the their spins induce two magnetic fields B transverse to the displacement of the photon. In the Figure 3A the two singletons pass in front each other in the position 270° , giving a resultant $R_b = 2B$. As they move in contrary direction, when $S(-)$ is in the position 0° , the position of $S(+)$ will be in 180° , with the two fields B with contrary direction, giving the resultant $R_b = 0$.

In Figure 6 the electric vector E_R is the resultant of the several small electric vectors E surrounding the singletons $S(+)$ and $S(-)$. These small vectors E are around only the external side of the singletons (outer side of the z_{bw}), because the inner side of the z_{bw} works as a Faraday cage, and thus inside the z_{bw} the electric resultant, for each singleton $S(+)$ and $S(-)$, is null, $E_R = 0$.

From Figure 6, we realize that, in the position 270° , the two E_R resultants have contrary directions, and therefore in 270° the total electric resultant of the photon is $R_E = 0$. The same happens when $S(+)$ and $S(-)$ arrive together to 90° . In the positions 0° and 180° the two E_R resultants have the same direction, and thus the total resultant for the photon is maximum, $R_E = 2E$. Then we conclude that the vectors E and B will take the form shown in the Figure 7.

Note in Figure 5B that $S(+)$ induces a longitudinal magnetic field B_1 , and $S(-)$ induces a field B_2 in contrary direction, because:

- Suppose $S(-)$ and $S(+)$ moving with the same

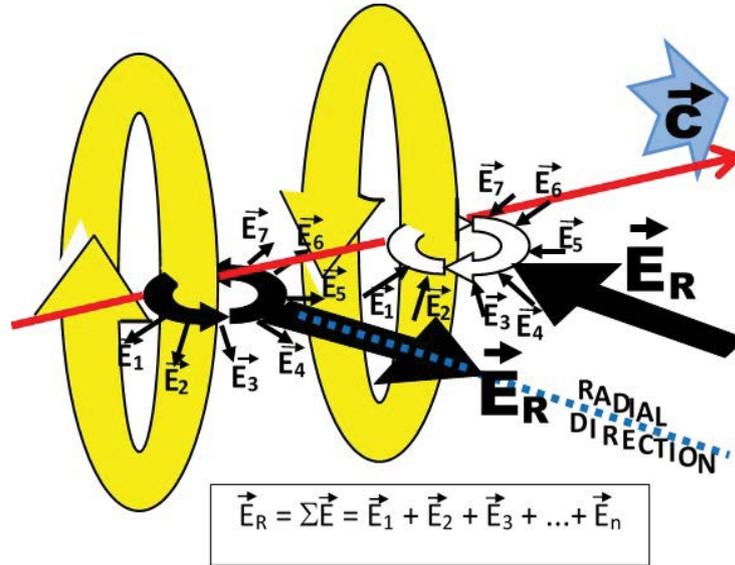


Figure 6: Photon with circular polarization: The two E_R vectors have radial direction regarding the zbw. They are the resultant of the several short E_n vectors surrounding the singletons $S(+)$ and $S(-)$. Inside the zbw the two resultants are null, $E_R = 0$, because the short E_n vectors do not exist inside the zbw, which works as a Faraday Cage.

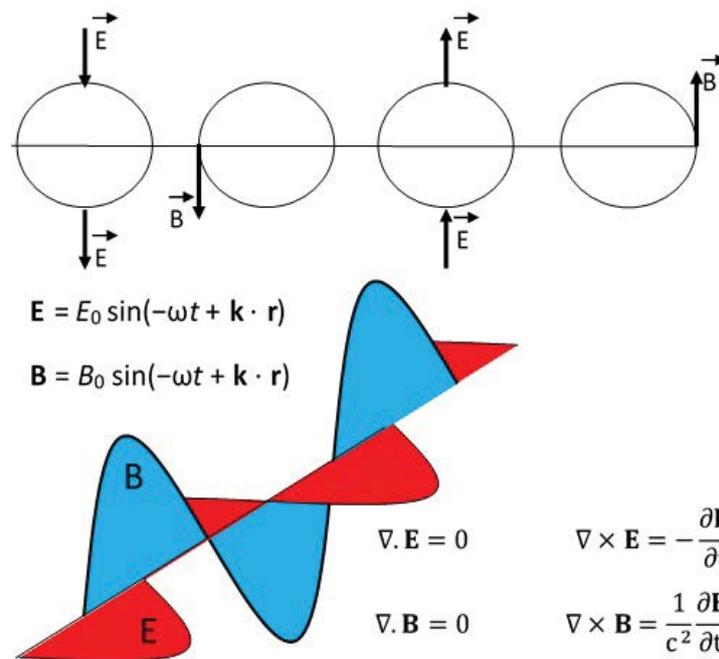


Figure 7: Electromagnetic waves of the photon.

spin and also with the same direction of their zbw. They would induce two magnetic fields B_1 and B_2 in contrary direction, because they have opposite electric charges. But as $S(-)$ and $S(+)$ have contrary spins in the photon, then B_1 and B_2 take the same direction (considering that $S(+)$ and $S(-)$ move in the same direction in their zbw). However $S(-)$ and $S(+)$ move with contrary zbw, and thus B_1 and B_2 take opposite directions.

Therefore, $S(-)$ and $S(+)$ have magnetic repulsion and electric Coulomb attraction due to their opposite electric charges. As there is repulsion, it prevents the annihilation of the photon, by avoiding that $S(+)$ and $S(-)$ meet together, and the photon gets its stability thanks to the following mechanism: When we try with a force F bring a south pole of a magnet near to the south pole of other magnet, the two magnets experience the

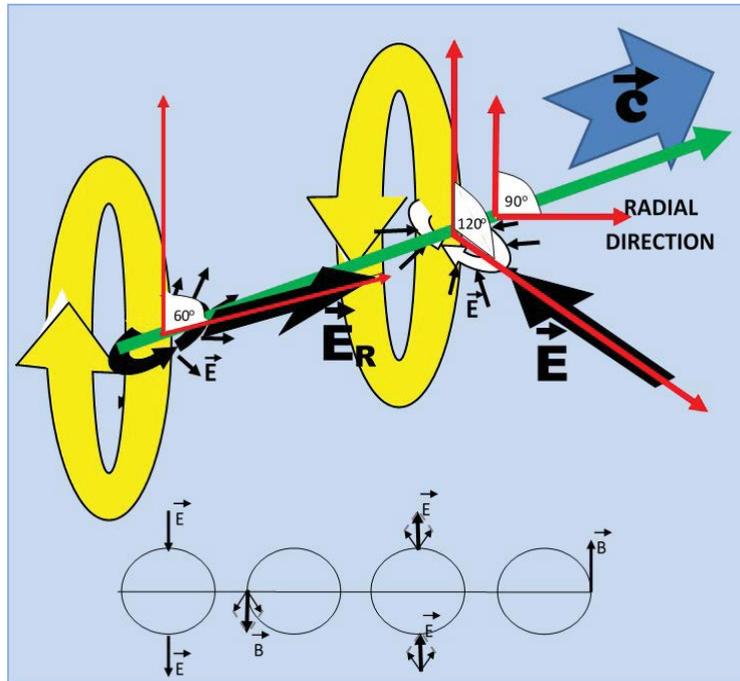


Figure 8: Photon with elliptical polarization. Whereas in the circular polarization the E_R vectors have radial direction regarding the zbw, in the photon with elliptical polarization there is oscillation of the direction of the E_R vectors (30° for the photon considered in the **Figure 8**) around the radial direction, and this oscillation causes different amplitudes of the electric and magnetic fields E and B.

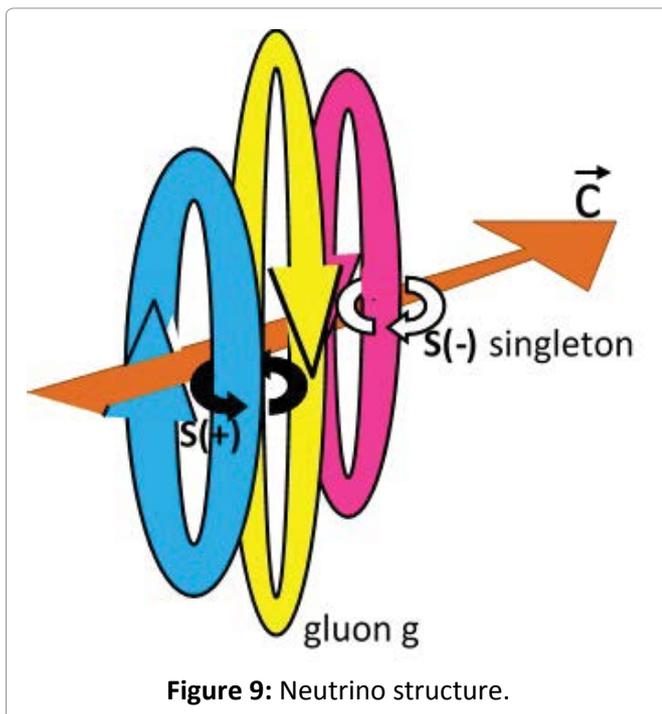


Figure 9: Neutrino structure.

tendency (transverse to the force F) of slipping. The gluons have the function of preventing such slipping. The longitudinal fields B_1 and B_2 exist also in the neutrinos (**Figure 8** and **Figure 9**), and it explains their stability.

Looking at **Figure 5A** and **Figure 6** we realize that

the magnetic field B is orthogonal to the electric field E , and B is maximum when E is zero, and E is zero when B is maximum, as shown in the **Figure 7**.

Neutrino structure is shown in **Figure 9**, and we note that both the photon and neutrino induce the two longitudinal magnetic fields B_1 and B_2 (with contrary directions) whose repulsion prevents the singletons $S(+)$ and $S(-)$ meet together, avoiding they annihilate each other, as seen in **Figure 5B**.

Lorentz Factor Violation by Neutrinos

The fact that neutrinos have a large energy spectrum is the reason why we are suggested to suppose that they have a structure composed by packages of singletons: S, g, S' . The heavier are the masses of S and S' , more energetic is the neutrino. When a singleton S is created in special conditions, as for instance in the vicinity of a proton as happens in the beta-decay, possibly singletons $S(+)$ take the form of quarks u or d , and $S(-)$ take the form of antiquarks u' or d' .

The laws of the electromagnetism were discovered by Faraday, thanks to several experiments which he undertook with magnets and electric currents, getting the unification between electricity and magnetism. Unfortunately

the laws that rule the neutrino behavior cannot be discovered by undertaking experiments, like Faraday did. In spite of some experiments with neutrinos help us in the discovery of those laws, however the discovery of the laws require a knowledge of the neutrino physical model. Then we have to get inspiration on what said Rutherford when facing the troubles, in order to undertake his experiments for the detection of the atomic nuclei: *"Gentlemen, we Have Run Out of Money; Now we Have to Think"*. However, instead of money, what we do not have are experiments with neutrinos, able to give us tracks for the discovery of their secrets. Because any experiment with neutrinos does not give any information about their structure. For instance, nowadays new experiments are being performed so that to discover if sterile neutrinos really exist. However, even if the experiments prove that they exist, what will this information add about them? The answer is: This information will add more mystery about them, if we neglect the fact that neutrinos violate the Lorentz factor. Therefore, the most important information about neutrinos, which can be obtained via experiments, is the following: have neutrinos the speed of light? Do they violate the Lorentz factor?

By considering that the mass of elementary particles as the electron, proton, quarks, or any particle, is induced by the interaction of their electric field with the aether, and in the case the neutrino structure proposed here is the true structure existing in nature, we reach to the following fundamental law regarding the mechanism responsible for the Lorentz factor violation by neutrinos:

Law of the absence of mass induction when two opposite elementary electric charges move with perfect symmetry along the longitudinal displacement of the particle:

- If a particle composed by two singletons S and S' , having electric charges $+q$ and $-q$ and contrary spins moving through two independent contrary z bw, which is perfectly symmetric regarding the direction of the displacement of the particle, there is no electric interaction with the aether along the longitudinal direction, and therefore the mass of the singletons S and S' does not manifest itself.

This law is in essence the law for the Lorentz factor violation by neutrinos.

A recent paper quoted in [1] deserves a special

attention in the present context, because this research [1] states that there should be a generation of artificial gravitational fields with strong electric currents, which could be in principle detected through the induced change in spacetime geometry that results in a purely classical deflexion of light (and also neutrinos) by strong magnetic fields. In spite of such a very weak effect, this could be detectable. In sum, the amplitude of the spacetime deformation due to electric currents (I) is extremely tiny [1]. And, as it was shown in the mentioned paper [1], where a strong electromagnetic field deforms spacetime, the assumption of reciprocity was also considered in the sense that there is a nonlinearity which is inherent to gravitational fields, thus leading to think that the electromagnetic fields E and B produced by a non-null net charge should undergo tiny shifts like δE and δB due to the presence of gravity. Such perturbations δE and δB in the space around the charge have purely gravitational origin, thus creating a uniform gravito-electromagnetic energy density in the whole space, which plays the role of new kind of aether (a non-luminiferous aether) connected to a preferred reference frame (background field) unattainable by any particles due to the existence of an invariant minimum speed V (see Eq. (43) in [1]) with the same status of the speed of light c (see Eqs. (20), (33) and (44) in the paper of the [1]).

Therefore it was shown in [1] that the whole flat spacetime is not empty as the Minkovisky space of Special Relativity (SR) since the new spacetime of Symmetrical Special Relativity (SSR) with a minimum speed [1] is filled by a new aether of gravito-electromagnetic origin interacting dynamically with a net charge having a certain inertial mass, so that its mass increases when its speed increases. In other words, SSR explains the origin of the increasing of inertial mass and thus it states that the Lorentz factor has now a dynamical origin from the interaction of the net charge with the "vacuum", since a given pressure (energy density) of the gravito-electromagnetic aether (Eq. (44) in [1]) acts over the mass-charge, leading to the increase of the inertial mass close to the speed of light c . Of course, depending on the way in which the net charge vanishes, the pressure of the aether over the particle can be suppressed in such a way that the Lorentz factor that leads to the increase of inertial mass is violated (e.g: the case of neutrinos with speeds faster than those predict by SR, the

own speed c or perhaps even faster than the speed of light). In short, whereas Lorentz factor has purely kinematic origin in SR, being never violated, it is violated in some special cases as the neutrinos in SSR [1].

Conclusions

The neutrinos mystery will be solved only when the scientific community get understanding that it is indispensable to give a final answer for this question: Do neutrinos move with the speed of light? ... or even faster than light...

Acknowledgments

The author dedicates this work to his father Jerzy and mother Maria, and the ship Canberra which brought them to Brazil.

References

1. C Nassif Cruz (2016) On the electrodynamics of moving particles in a quasi-flat spacetime with Lorentz violation and its cosmological implications. Int J Mod Phys D25 10: 1-67.
2. J Bronowski (1973) The Ascent of Man, a 13-part documentary television series produced by the BBC and Time-Life Films first transmitted in 1973.
3. E Schrödinger (1992) Über eine bemerkenswerte eigenschaft der quantenbahnen eines einzelnen elektrons. Zeitschrift für Physik 12: 13-23.
4. D Hestenes (1990) The zitterbewegung interpretation of quantum mechanics. Found Physics 20: 1213-1232.
5. W Guglinski (2018) Reevaluation of Fermi's theory of beta decay. International Journal of Fundamental Physical Sciences 8: 19-43.
6. M Urban, F Couchot, X Sarazin, A Djannati-Atai (2013) The quantum vacuum as the origin of the speed of light. European Physical Journal D.
7. M Antonello, P Aprili, B Baibussinov, M Baldo Ceolin, P Benetti, et al. (2012) Measurement of the neutrino velocity with the ICARUS detector at the CNGS beam.

ISSN 2631-5017



9 772631 501003