

Title: A discussion related to the uniqueness of the velocity of Light

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Abstract: Light velocity, when measured by Humans, would always result in a constant value and the maximum possible velocity that humans can measure, a claim that was presented by Einstein's Special Relativity Theory as an axiom, without any proof.

The above demonstrates the uniqueness of the velocity of Light.

But it should be also emphasized that the velocity of Light also presents a severe peculiarity, which is presented as follows:

When a moving Human spectator measures the velocity value of any tangible substance, for example, the velocity of a moving Massive Body, the velocity, and the direction of motion of this spectator, relative to the velocity and the direction of motion of this Massive Body, *does affect* the measured velocity value of this Massive Body, by this Human spectator.

But, when a moving Human spectator, measures the velocity value of a Light beam, the velocity, and the direction of motion of this spectator, relative to the direction of motion of this Light beam, *does not affect at all*, the measured velocity value of this Light beam, by this Human spectator, which always results in a constant Light velocity value, which is also the maximum velocity value that Humans can measure.

This should be regarded as a severe peculiarity, in any velocity value measurements of Light beams, by Humans, which must be also explained.

Because it seems reasonable that the velocity of a Light beam measured by Humans, when the Light beam and the Human travel at opposite directions, should be bigger as compared to the velocity of a Light beam measured by Humans, when the Light beam and the Human travel on the same directions.

This paper presents a prediction that Space and Time, as Humans perceive these notions, do not really exist, and Velocities (and Movements and Changes in general) are only the result of *Interactions* between *Energies*.

The author of this paper presented this prediction in an additional paper titled: “A discussion related to the existence of the entities of Space and Time” (12) which is referenced in this paper.

The details related to this prediction are also presented in this paper.

In view of the above-mentioned prediction, that Velocities (and Movements and Changes in general) are only the result of *Interactions between Energies*, this paper proposes a tentative explanation, to the uniqueness and the severe peculiarity mentioned above, relating to measurements of the velocity of Light by Humans.

The referenced paper mentioned above, (12) also suggests an experiment, which if implemented, and its result will be successful, might provide validity, or disprove, the predictions presented in that referenced paper, and, as a result, also might provide validity, or disprove, what is presented in this paper.

That experiment is also presented in this paper.

1. Space and Time, as Humans perceive these entities, might be entities that do not really exist.

The author of this paper is the author of an additional paper titled: “A discussion related to the existence of the entities of Space and Time” (12) , which presented the following prediction:

Space and Time, as Humans perceive these entities, are entities that do not really exist.

The notions of Space and Time are crucial notions, which Humans need them, to perceive, understand and calculate Motions and Changes. Thus, that paper (12) , argues that Humans invented these notions to be able to understand and calculate Motions and Changes.

The prediction presented above, that Space and Time, as Humans perceive these entities, are entities that do not really exist, is based on another prediction, also presented in the paper (12) , which is:

Electric (or Magnetic) Fields are forms of Accelerations, like the Gravitational Field, which is already recognized as a form of Acceleration.

The next chapter of this paper presents the arguments which are the basis of the prediction that Electric (or Magnetic) Fields are forms of Accelerations.

However, the following first elaborates on the issue of why the Gravitational Field is already recognized as a form of Acceleration, which is the basis for the arguments that also the Electric Field should be also recognized as a form of Acceleration:

Newton's Universal Gravitational Law $F = G \cdot (m_1 \cdot m_2) / r^2$ (1), explained the magnitude of the Force of attraction between two spherical Massive Bodies.

But Newton could not provide a complete explanation as relating to the *origin* of this Force.

Attempts to explain the *origin* of the attraction force between Massive Bodies introduced the concept of the Gravitational Field.

The Gravitational Field concept stated that a Massive Body creates a Gravitational Field around it, which generates the Force presented in the Universal Gravitational Law.

However, the concept of the Gravitational Field could not explain how any Field, including the Gravitational Field, can cause the attraction forces between bodies.

The Gravitational Field strength, which is defined as the Gravitational Force, of the Gravitational Field, in Newtons, that acts on a Mass of one Kg, is presented by the following equation:

$$g = G \cdot m_g / r^2 \quad (2)$$

Where g is the Gravitational Field strength, G is the Gravitational Constant, which was already presented above in the Universal Gravitational Law, m_g is the Gravitational Mass magnitude of the Massive Body which creates this Gravitational Field strength g , and r is the distance between the center of Mass of this Massive Body, m_g , and the point in Space, where this Gravitational Field strength g is measured.

Thus, from Newton's Universal Gravitation Law, presented above, the attraction Force between a Massive Body of Gravitational Mass magnitude m_g , which generates its Gravitational Field strength g , at a distant point r in Space, from its center of Mass, and another Massive Body of Inertial Mass Magnitude m_i , at this distant point r is Space, from the center of Mass of the Massive Body m_g , is presented by:

$$F = G \cdot (m_g \cdot m_i) / r^2$$

Thus, the Universal Gravitational Law can be reformulated as:

$$F = m_i \cdot g$$

Where m_i is the Inertial Mass magnitude of the Massive Body on which the Gravitational Field strength g exerts the force F .

In addition to the above, Newton's Second Law of Motion (4) states, that a force F exerted on a Massive Body of Inertial Mass magnitude m_i obeys the following equation:

$$F = m_i \cdot a$$

Where a is the Acceleration that this Massive Body of Inertial Mass magnitude m_i acquires because of the force F exerted on it.

However, the above already presented, that a Gravitational Field strength g exerted on a Massive Body of Inertial Mass magnitude m_i also results in a force F exerted on this Massive Body:

$$F = m_i \cdot g$$

Thus, from the above follows that: $g = a$

Thus, the Gravitational Field must also be a form of Acceleration.

However, as already stated above, the notion of a Field, does not provide a complete answer to the question: how can a Field generate the Forces that it is assumed to create?

Thus, the question:

What is the **origin** of the Force presented by the Universal Gravitational Law?

Remained an unanswered question, until the introduction of Einstein's General Relativity Theory (3).

Einstein succeeded to explain the **origin** of the attraction forces between Massive Bodies by introducing the concept, that Gravitational Forces are related to the Space and the Time entities, which can be also presented as a curved Interwoven Space/Time construct, if Mass can be assumed to induce a curve into that Interwoven Space/Time construct.

This led Einstein to introduce the concept of the Four-dimensional Interwoven Space/Time (3) which does explain the **origin** of the attraction Force between Massive Bodies.

Einstein concluded that if it can be assumed, that Space and Time are not independent entities, and they are always **interweaved** into a four-dimensional construct, which replaces the three-dimensional Space entity, then, this four-dimensional Interwoven Space/Time entity already embeds an Acceleration at each point of it, because the second derivative of Space in relation to Time can be calculated at each point of it, because this four-dimensional Interwoven Space/Time entity already embeds the Space **and** the Time entities at each point of it.

Thus, Einstein concluded, that if a form of this four-dimensional Interwoven Space/Time entity can be assumed to be Newton's Gravitational Field, then, this Interwoven Space/Time entity, will exert an Acceleration, on any Massive Body, residing in it, which is the Acceleration embedded in the point of this Interwoven Space/Time entity, where this Massive Body resides.

It might be also added, that, because an Interwoven Space/Time construct, embeds both the Space and the Time entities in it, which implies that at each point of this curved Interwoven Space/Time construct, an Acceleration can be calculated, the understanding that the Gravitational Field is also a form of Acceleration, helped Einstein to develop this concept, of a curved

Interwoven Space/Time construct, which succeeded to explain the *origin* of the attraction between Massive Bodies.

Einstein's four-dimensional *Interwoven Space/Time* notion does succeed to explain the *origin* of the attraction between Massive Bodies, as presented above.

However, that notion embeds also an important additional implication:

By stating that the Space and the Time notions are *always* interweaved into one four-dimensional entity, this also implies that the Space and the Time notions, are not independent notions, as Humans perceive such notions.

Moreover, because Einstein's four-dimensional Interwoven Space/Time notion replaces the Newton's Gravitational Field, which should be recognized as a form of Energy, then, the Space and the Time notion, are not only not independent notions, but they are also just attributes (or facets) of a form of Energy (the Gravitational Field Energy).

In a speech, in the University of Leiden on May 5th, 1920, (6), Einstein claimed that the Ether should exist to provide physical properties to his Space/Time entity, to enable its deformation, which implies, that Einstein also agreed that his Space/Time Entity is a form of Energy.

Thus, Einstein's four-dimensional Interwoven Space/Time notion implies that the Space and the Time notions are not independent notions, are just attributes (or facets) of a form of Energy, which also implies that the Space and the Time notions, as Humans perceive such notions, do not really exist.

In addition to the above, the following presents additional arguments which might imply that Space and Time are entities which might not be regarded as entities that really exist:

Einstein assumed that the Universe embeds only *one, single* three-dimensional Space entity, and also only *one, single* one-dimensional Time entity, resulting in only *one, single* four-dimensional Interwoven Space/Time entity.

This implies that Einstein's Interwoven Space/Time entity, should be the *only* entity which dictates Accelerations, because the Acceleration is defined as the second derivave of Space in relation to Time, and if Einstein's Interwoven Space/Time entity is the *only* entity in the Universe which *embeds* the Space and the Time entities, it is, thus, also the *only* entity which is able to dictate the Accelerations in the Universe, especially Accelerations embedded in motions which are the result of activities originating by all Energy Fields in the Universe, for example, Gravity *and* Electric Fields.

Thus, if the Electric Field might be also recognized as a form of Acceleration, as mentioned already before in this paper, then, because the Electric Field might exist together with the Gravitational Field, in the same locations defined by Einstein's Interwoven Space/Time entity, then, the Acceleration embedded in that Electric Field, should be also dictated by the *one, single* Interwoven Space/Time entity, just described above.

However, as will be immediately presented in the following, if the Acceleration embedded in Electric Fields, must be also dictated by the *one single* Interwoven Space/Time entity just described above, this might pose a severe difficulty, relating to the concept of Einstein's Interwoven Space/Time concept, as described in the following paragraphs:

According to Einstein's General Relativity theory, Massive Bodies, which are the cause of Newton's Gravitational Field, are able to induce a deformation into Einstein's Interwoven Space/Time entity, which *causes* the attraction between Massive Bodies.

Thus, if the Electric Field might be also recognized as a form of Acceleration, as this paper suggests, then, also Electric Charges, which are the cause of the Electric Fields, *must also be able* to induce a deformation into Einstein's Interwoven Space/Time entity, in order to cause the Acceleration embedded in the Electric Fields, as this paper suggests, because, as just presented above, Einstein's Interwoven Space/Time entity, is the *only entity* which causes Accelerations, because it is the *only entity* which embeds the Space and the Time entities.

The assumption made by Einstein, that there is *only one, single* entity of Einstein's Interwoven Space/Time entity, *enabled* Einstein to develop his General Relativity theory, because it is possible to envision, how a proper deformation into that *one, single* Einstein's Interwoven Space/Time entity, can generate the required Acceleration, at each point of it, for explaining the *origin*, of Massive Bodies attraction.

However, Electric Charges might attract *or* repel each other, and it seems *impossible* to envision a proper deformation, induced into a *single* Einstein's Interwoven Space/Time entity, composed of only a *single* Space entity and a *single* Time entity, which will be able to generate the proper Accelerations which will be able to explain the *origin* of Electric Charges attractions, *and*, also to explain the *origin* of Electric Charges repulsions.

Thus, since Einstein's Interwoven Space/Time entity is the *only entity* that can generate Accelerations, because it is the *only entity* that embeds the Space and the Time entities, if Electric Fields might be also recognized as a form of Acceleration, that Acceleration seems to be *problematic*, because it *cannot be related* to Einstein's Interwoven Space/Time entity, as presented above, although, as also presented above, this Acceleration *must* be related to Einstein's Interwoven Space/Time entity.

The resolution of the above presented difficulty, is based on the prediction, presented already above, that the Space and the Time entities might be entities which do not really exist.

The statement that Space and Time do not really exist sounds as an extraordinary, unbelievable, and out of line statement, at first.

This is because the notions of Space and Time are crucial notions, which Humans need them, to perceive, understand and calculate Motions and Changes.

However, in view of the arguments presented above, if Space and Time cannot be considered any longer as independent entities, and if Space and Time are just embedded in a form of Energy (the Gravitational Field Energy), the statement that Space and Time might not really exist does not sound so detached any more.

Moreover, the above actually indicates that what *does exist* are Energies which *Interact* with each other, and these *Interactions* cause, what Humans perceive as Motions and Changes.

For example, the attraction (Motions) between Massive Bodies is a result of the *Way* a form of Energy (the Gravitational Field) *Interacts* with another form of Energy (Massive Bodies), which leads Humans to attribute attributes (or facets) of Space and Time to the Gravitational Field Energy.

The understanding that Space and Time might not really exist, and what causes Motions and Changes are the *Ways* Energies *Interact* with each other, is used to explain the *origin* of the attraction or the repulsion between Electric Charges, which is still a mystery today.

Analogous to Newton's Universal Gravitational Law, which provides the force of attraction between Massive Bodies, Coulomb's Law $F = Ke \cdot (q_1 \cdot q_2) / r^2$ (5) provides the force of the attraction or the repulsion between Electric Charges.

As in the case related to the attraction between Massive Bodies, the *origin*, or the cause of Coulomb's Law is attributed to an Electric Field that each Electric Charge generates, which, as explained already, in relation to the attraction between Massive Bodies, this cannot provide a complete explanation to the question: why Electric Charges attract or repel each other?

It should be noticed that the *structure* of the Newton's Universal Gravitational Law $F = G \cdot (m_1 \cdot m_2) / r^2$ and the *structure* of the Coulomb's Law $F = Ke \cdot (q_1 \cdot q_2) / r^2$ are identical.

Thus, the following question might be asked:

Since the *structure* of the Newton's Universal Gravitational Law and the *structure* of the Coulomb's Law are identical, why the *origin* of the attraction between Massive Bodies was resolved via Einstein's General Relativity Theory, and its concept of a four-dimensional Interwoven Space/Time entity, and the *origin* of the attraction or the repulsion forces between Electric Charges, is still a mystery?

The author of this paper published an additional paper (7) which predicts that Electric (or Magnetic) Fields are also forms of Accelerations, as Newton's Gravitational Field is already recognized as a form of Acceleration, and that prediction provided also an explanation to the *origin* of the Attraction or the Repulsion between Electric Charges, as will be presented later in this paper.

In the following chapter, significant arguments are presented, which imply, that the Electric Field should be also recognized as a form of Acceleration.

2. Arguments which imply that the Electric Field should be also recognized as a form of Acceleration

As already presented above, the fact that the Gravitational Field is already recognized as a form of Acceleration, can be derived directly from a version of Newton's Universal Gravitational Law, $F = m_i \cdot g$, and Newton's Second Law of Motion, $F = m_i \cdot a$.

But this conclusion might be also obvious from analyzing *only* Newton's Universal Gravitational Law, $F = G \cdot (m_1 \cdot m_2) / r^2$, without using Newton's Second Law of Motion, $F = ma$.

During the attraction process between the Massive Bodies the Force F in $F = G \cdot (m_1 \cdot m_2) / r^2$ is dependent only on the distance r between these Massive Bodies, since G is a constant and the Mass magnitudes of the Massive Bodies also do not change, assuming that the velocities in the attraction process are negligible in comparison to the velocity of Light, implying that the Mass increase with velocity, implied by Einstein's Special Relativity Theory, is also negligible.

Thus, during the attraction process, the force F continuously increases, as the distance r between the bodies continuously decreases.

Since this Force F is what causes the attraction between the Massive Bodies, the fact that during this attraction process the Force F continuously increases, this should imply, that during the attraction process, the velocities of the attracting Massive Bodies also continuously increase, which implies that during the attraction process, the Massive Bodies are also Accelerating towards each other.

Since the Gravitational Field is what causes the Force F , and thus, is actually the cause of the attraction between the Massive Bodies which, as concluded above, are Accelerating towards each other, it should be concluded that the Gravitational Field is a form of Acceleration.

And this conclusion is the result from an analysis done *only* on Newton's Universal Gravitational Law, $F = G \cdot (m_1 \cdot m_2) / r^2$, without using Newton's Second Law of Motion, $F = ma$, as presented above.

However, the analysis done only on Newton's Universal Gravitational Law, $F = G \cdot (m_1 \cdot m_2) / r^2$, without using Newton's Second Law of Motion, $F = ma$, reveals more than what was presented above.

Since the Gravitational Field strength itself, presented by the equation: $g = G \cdot m / r^2$, also continuously increases during the attraction process, as the distance r between the bodies continuously decreases, then, the Gravitational Field strength, which is the cause of the attraction between the Massive Bodies, is not only a form of Acceleration, it is a form of Acceleration which increases continuously, during the attraction process between the Massive Bodies.

The nowadays Science of Physics, does not recognize (yet) the Electric Fields as being also a form of Acceleration, as the Gravitational Field is already recognized as a form of Acceleration.

But, similar to what was presented, that Newton's Gravitational Field is a form of Acceleration, which can be derived *only* from analyzing Newton's Universal Gravitational Law, $F = G \cdot (m_1 \cdot m_2) / r^2$, without using Newton's Second Law of Motion, $F=ma$, similar arguments might apply also to the claim, that Electric Fields might also be concluded to be forms of Acceleration, only by analyzing the Coulomb's Law.

Analogous to Newton's Universal Gravitational Law, which provides the Force of attraction between Massive Bodies, Coulomb's Law provides the Force of the attraction or the repulsion between Electric Charges.

Coulomb's Law is presented by the following formula (5) :

$$F = K_e \cdot (q_1 \cdot q_2) / r^2$$

Where K_e represents the Coulomb's Constant and is equal to $8.99 \times 10^9 \text{ N} \cdot \text{m}^2 \cdot \text{C}^{-2}$, q_1 is the amount of Electric Charge in the first Electric Charge, q_2 is the amount of Electric Charge in the second Electric Charge and r is the distance between the center of Mass of the bodies that carry these two Electric Charges, assuming that the Electric Charges embedded in the Electrically Charged Bodies used in a Coulomb's Law experiment, are spread uniformly on these Electrically Charged Bodies.

It should be noticed that the *structure* of the Newton's Universal Gravitational Law and the *structure* of the Coulomb's Law are *identical*.

Thus, as already stated above, similarly to the arguments presented above, that Gravity can be recognized as a form of Acceleration *only* by analyzing Newton's Universal Gravitational Law, without using also Newton's Second Law of Motion, similar arguments apply, which imply, that the Electric Field should be also recognized as a form of Acceleration, only from analyzing Coulomb's Law.

These arguments are:

During the attraction or the repulsion process between the Electrically Charged Bodies the Force F in $F = K_e \cdot (q_1 \cdot q_2) / r^2$ is dependent only on the distance r between these Electrically Charged Bodies, since K_e is a constant and the Electric Charges magnitudes embedded in the Electrically Charged Bodies also do not change.

Thus, during the attraction or the repulsion process, the force F continuously increases or decreases, as the distance r between the Electric Charges continuously decreases or increases (depending if the Electric Charges attract or repel each other).

Since this Force F , presented by Coulomb's Law, is what causes the attraction or the repulsion between the Electrically Charged Bodies, the fact that during this attraction or repulsion process the Force F continuously increases or decreases, (depending if the Electric Charges attract or repel each other), this should imply, that during the attraction or the repulsion process, the velocities of the attracting or repelling Electrically Charged Bodies also continuously increase or

decrease, which implies that during the attraction or the repulsion process, the Electrically Charged Bodies are also Accelerating towards each other, or Decelerating from each other.

Since the Electric Fields involved in the above-described process are the cause of the force F and thus, also the cause of the attraction or the repulsion between the Electrically Charged Bodies which, as concluded above, are accelerating towards each other, or decelerating from each other, it should be concluded that these Electric Fields are also forms of Accelerations or Decelerations (depending if the Electrically Charged Bodies attract or repel each other).

And this conclusion is the result from an analysis done *only* on Coulomb's Law, $F = Ke \cdot (q_1 \cdot q_2) / r^2$, as presented above.

However, the analyzing done only on Coulomb's Law, $F = Ke \cdot (q_1 \cdot q_2) / r^2$, reveals more than what was presented above.

Since the Electric Fields strength involved, presented by the equation: $e = Ke \cdot q / r^2$, also continuously increase or decrease during the attraction or the repulsion process, as the distance r between the Electrically Charged Bodies continuously decreases or increases, then, the Electric Fields strength, which are the cause of the attraction or the repulsion between the Electrically Charged Bodies, are not only forms of acceleration or deceleration, these Electric Fields strength are forms of acceleration or deceleration which increases continuously, during the attraction or the repulsion process between the Electrically Charged Bodies.

But since Coulomb's Law *does not* contain any Mass component in its equation, it is reasonable to conclude that the above-described Acceleration or Deceleration property, derived from analyzing *only* the Coulomb's Law, is caused *only* by the Electric Fields created by Electric Charges embedded in the Electrically Charged Bodies presented in the Coulomb's Laws, which implies that Electric Fields are also forms of Acceleration.

3. Explaining the Attraction/Repulsion between Electric Charges.

Based on the prediction that the Electric Field should be also recognized as a form of Acceleration, the paper (7) explains the *origin* of the attraction or the repulsion between Electrically Charged bodies like Einstein's General Relativity explains the *origin* of the attraction between Massive Bodies.

That explanation is based on the understanding, presented above, that Space and Time, as Humans perceive these entities, do not really exist.

This enabled the prediction that there are two *additional* and *separate* four-dimensional Interwoven Space/Time entities, in *addition* to Einstein's four-dimensional Interwoven Space/Time entity.

One of these *additional* four-dimensional Interwoven Space/Time entity replaces the Electric (or Magnetic) Fields generated by the Positive Electric Charges.

The second of these **additional** four-dimensional Interwoven Space/Time entity replaces the Electric (or Magnetic) Fields generated by the Negative Electric Charges.

And thus, these three **separate** four-dimensional Interwoven Space/Time entities are all forms of Energies, and each of these three **separate** four-dimensional Interwoven Space/Time entities embeds its own **separate** Space and its own **separate** Time attributes (or facets).

The author of this paper is also the author of an additional paper titled: “Dark Energy and Electromagnetism” (13) which concludes, among other conclusions, that Electric Charges are also forms of Energy, like Mass is already recognized as a form of Energy, following the introduction of Einstein’s Special Relativity Theory.

Thus, like the attraction (Motions) between Massive Bodies is a result of the **Way** a form of Energy (the Gravitational Field Energy) **Interacts** with another form of Energy (Massive Bodies), which leads Humans to attribute attributes (or facets) of Space and Time to the Gravitational Field Energy, like the above, the attraction or the repulsion between Electric Charges is a result of the **Way** a form of Energy (the Electric Field Energy) **Interacts** with another form of Energy (Electric Charges), which leads Humans to attribute attributes (or facets) of Space and Time to the Energies embedded in the **additional** two four-dimensional Interwoven Space/Time entities presented in the paper (7) (or, in other words, to the Electric Fields Energies).

The paper (7) provides detailed explanations of the above, which also results in a simple unification of Gravity and Electricity, because, if the materials presented in the paper (7) will be found valid, then, Gravity and Electricity operations are governed by the same processes.

From what was already presented above the following can be stated:

Humans need the entity of Space to perceive relative positions between objects. Humans also need the entities of Space and Time to calculate values that Humans attribute to Motions, such as Velocity or Acceleration. The entities of Space and Time are also the entities that compose the four-dimensional Interwoven Space/Time entity, introduced by Einstein’s General Relativity theory, which provided an explanation to the **origin** of the attraction between Massive Bodies.

However, although the notions of Space and Time, as Humans perceive these notions, do provide the significant explanation of the **origin** of the attraction between Massive Bodies, via Einstein’s General Relativity theory, the notions of Space and Time, as Humans perceive these notions, are **not sufficient** for providing explanations to additional similar unanswered questions, such as : what is the **origin** of the attraction or the repulsion between Electrically Charged bodies? Or, why the velocity of Light, measured by Humans, always results in a constant value and the maximum velocity that Humans can measure?

As presented above, the papers (7) and (12) present the following prediction: Electric (or Magnetic) Fields are forms of Accelerations, like the Gravitational Field, which is already recognized as a form of Acceleration.

This prediction also leads to the following thesis: Changes and Movements are the result of **Interactions** between Energies, and the entities of Space and Time, as Humans perceive these entities, are not entities that exist.

The entities of Space and Time are notions (or entities), invented by Humans, because Humans need such notions to perceive Changes and Motions.

For some Interactions between Energies, which result in Changes or Motions, Humans can attribute, to these Interactions, attributes of Space and Time, which will assist in providing explanations to why these Changes or Motions are the result of these Energies Interactions.

However, this paper predicts, that different sets of Interactions between Energies, should be assigned **separate and independent** attributes of Space and Time, **different and independent** from the Space and the Time attributes, assigned to other sets of **Interactions between Energies**, to provide an explanation for the **origin** of motions which are yet unexplained, such as: what is the **origin** of the attraction or the repulsion between Electrically Charged bodies?

Because **different and independent** Space and Time attributes should be assigned to different sets of Interactions between Energies, then, Space and Time, as Humans perceive these notions, cannot exist, because the above implies, that there should be **multiple, independent** notions of Space, and **multiple, independent** notions of Time, and not just one universal Space entity, and just one universal Time entity, as Humans perceive the Space and the Time entities.

By abandoning the conclusion that the entities of Space and Time, as Humans perceive these entities, exist, and by concluding that Changes and Motions are only the results of **Interactions** between Energies, the **origin** of the attraction or the repulsion between Electrically Charged bodies can be explained, in addition to the explanation, already provided by Einstein's General Relativity theory, relating to the **origin** of the attraction between Massive Bodies.

Also, by abandoning the conclusion that the entities of Space and Time, as Humans perceive these entities, exist, and by concluding that Changes and Motions are only the results of Interactions between Energies, a possible **partial, tentative** explanation might be also provided to the question: why the velocity of Light, measured by Humans, always results in a constant value and the maximum velocity that Humans can measure?

As already stated above, the prediction that the entities of Space and Time, as Humans perceive these entities, do not really exist sounds as an extraordinary, unbelievable, and out of line statement, at first. This is because, as presented above, the notions of Space and Time are crucial notions, which Humans need them, to perceive, understand and calculate Motions and Changes.

However, papers (7) and (12) also propose a relatively simple experiment, which if implemented, and its results will be successful, as this paper predicts, this will either validate or disprove, what is presented in the papers (7) and (12) and, as a result, also might provide validity, or disprove, what is presented in this paper.

This proposed experiment is also presented in this paper, in its next chapter.

4. An Experiment for Validating or Disproving that Electric Fields are also a form of Acceleration.

The prediction presented above, that Electric (or Magnetic) Fields are also forms of Accelerations also implies that the Acceleration between Electrically Charged bodies, attracted to, or repelled from each other, because of Coulomb's Law, is dependent mainly on the amount of the Electric Charge that these bodies carry and not on the Mass magnitudes embedded in these bodies, as Newton's Second Law of motion ($F=ma$) states.

Electrically Charged bodies always embed Electric Charge *and* Mass. However, the Coulomb's Force is much more potent than the Gravitational Force. This can be demonstrated by the following:

The Gravitational Force between two 1-kg Mass Objects that are 1 meter apart is $6.67 \cdot 10^{-11}$ (8) Newtons, while the Attraction or the Repulsion Force caused by the Coulomb's Law, between two 1 Coulomb Electrically Charged Bodies, held 1 meter apart, is $9 \cdot 10^9$ (9) Newtons.

The above clearly indicates that the Coulomb's Force might be more *potent*, as compared to the Gravitational Force, by a magnitude factor of $1.35 \cdot 10^{20}$!

Thus, if Electric (or Magnetic) Fields are also forms of Accelerations, the Acceleration between Electrically Charged bodies, attracted to, or repelled from each other, because of Coulomb's Law, should be dependent mainly on the amount of the Electric Charge that these bodies carry and not on the Mass magnitudes embedded in these bodies, as Newton's Second Law of motion states, which also implies that Newton's Second Law of motion should undergo a suitable modification, as is described in the paper (7) .

The paper (7) also suggest a physical experiment that might prove or disprove the prediction that the Acceleration between Electrically Charged bodies, attracted to, or repelled from each other, because of Coulomb's Law, is dependent mainly on the amount of the Electric Charge that these bodies carry and not on the Mass magnitudes embedded in these bodies, as Newton's Second Law of motion ($F=ma$) states.

That experiment suggests letting two Electrically Charged bodies, at a specific distant L apart, being attracted to each other under Coulomb's Law.

In the first phase of the experiment the bodies should be of equal Mass magnitudes, embedding equal amounts of Electric Charges, each of a different polarity, to enable the attraction between the bodies under the Coulomb's Force.

The experiment should measure the time it takes for these bodies to collide.

Then, the experiment is repeated with two additional Electrically Charged bodies with the same amount of Electric Charge but with a much bigger Mass magnitude (for example, twice the Mass magnitude that the Electrically Charged bodies had in the first phase of the experiment).

Newton's Second Law of motion predicts that the time to collision, in that second phase of the experiment, would be different (bigger), because the Forces exerted on the bodies will be the same, as in the first phase of the experiment, because the Electric Charges are the same in both phases of the experiment, but the Mass magnitudes embedded in the bodies are bigger in the second phase of the experiment, which will result in a smaller Acceleration.

This paper, on the other hand, predicts that the time to collision in both phases of the experiment would be virtually the same, because this paper predicts that the Acceleration between Electrically Charged bodies, attracted to, or repelled from each other under the Coulomb's Law, is dependent mainly on the amount of the Electric Charge that these bodies carry and not on the Mass magnitudes embedded in these bodies, as Newton's Second Law of motion ($F=ma$) states.

If the experiment will prove that the time to collision will be virtually the same, in both phases of the experiment, this will provide validity to what is presented in this paper.

5. A tentative explanation to the uniqueness of the Light velocity which might also imply that the entity of Time does not exist.

Motions in the universe can be classified as presented below:

- The motions of Planets, which can be identified mainly as Massive Bodies, are subjected to the laws of Gravitation as presented by Einstein's General Relativity Theory through its Gravitational Interwoven Space/Time concept.
- The motions of Electric Charges embedded in Electrically Charged bodies are subjected to the laws that governs the operations of Electric and Magnetic Fields, and as already presented, can be explained by proposing the two *additional* Interwoven Space/Time entities, as proposed by the paper (7).
- Apart from Massive Bodies or Mass plus Electric Charges, two pure Energy entities travel in the universe, Electromagnetic and Gravitational Waves, both at the speed of Light, and as will be mentioned in a following section of this paper, these waves are also affected by the Interwoven Space/Time entities.

It was presented before, in this paper, that an additional paper titled: "Dark Energy and Electromagnetism" (13) by the author of this paper, concluded that Electric Charges are also just forms of Energies.

Thus, it can be concluded that the only distinct entity in the Universe might be the entity of Energy, because Mass and Electric Charges are shown already, to be forms of Energies, and Space and Time, as Humans perceive these entities, might not really exist, and are replaced by the three *separate* Space and Time entities attributed to the three *separate* Interwoven Space/Time entities proposed by the paper (7), which are also just forms of Energies.

From the above also follows that the three Interwoven Space/Time entities are the Energies that usually govern the motions of all the above-mentioned Energy entities: Mass, Electric Charges and Electromagnetic or Gravitational Waves.

In addition to movements, caused by the three Interwoven Space/Time entities, as presented in this paper, Energies might start moving, or change their movement, because of other causes.

For example, when a moving Particle bumps into a non-moving Particle, the non-moving Particle starts moving, and the movement of the Particle that bumped into the non-moving Particle, acquires a change in its movement.

However, what was just described above, is just an *instantaneous* transfer of Energies between these two Particles (or these two Energies), and after this instantaneous transfer of Energies occurs, the *non-instantaneous* movements of these Particles are continued to be controlled only by the three Interwoven Space/Time entities, until some of these Particles undergo another *instantaneous* transfer of Energy.

As related to Mass or Electric Charges, Humans don't need to attribute, to these forms of Energies, any facets of Space or Time, because Mass or Electric Charge do not move, unless they interact with each other *instantaneously* which causes just an *instantaneous* Energy transfer, (as presented above), or interact with either one or more of the three Interwoven Space/Time Energy entities, mentioned above, to undergo *non-instantaneous* movements.

Thus, apart from the *instantaneous* transfer of Energies presented above, and because after this instantaneous transfer of Energies occur, the motions in the Universe return to the state in which what governs these motions are the three Interwoven Space/Time entities, then, it can be established, that the three Interwoven Space/Time entities, are the Energies that *usually* governs the motions of all the Energy entities in the universe.

Then, the ability to measure the velocity value of a specific Energy movement by Humans, is dependent on how this Energy *interacts* with the three Interwoven Space/Time entities (or any one of them).

As already presented in this paper, by attributing *separate* Space and Time attributes to the three *separate* four-dimensional Interwoven Space/Time entities presented in the paper (7), Humans are able to understand, the *origins* of motions related to Massive Bodies or Electrically Charged bodies, and reliably established the velocities or accelerations existing in these motions.

However, Light (or Gravitational Waves) are special, as will be elaborated in the following:

Light velocity is unique because when Humans measure the velocity of Light, this measurement always results in a constant value and the maximum possible velocity that Humans can measure, a claim that was also presented by Einstein's Special Relativity Theory as an axiom, without any proof.

Also, as already presented before in this paper, the velocity of Light also presents a severe peculiarity, which was already presented before in this paper, and is presented again as follows:

When a moving Human spectator measures the velocity value of any tangible substance, for example, the velocity of a moving Massive Body, the velocity, and the direction of motion of this spectator, relative to the velocity and the direction of motion of this tangible substance, **does affect** the measured velocity value of this Massive Body, by this Human spectator.

But, when a moving Human spectator, measures the velocity value of a Light beam, the velocity, and the direction of motion of this spectator, relative to the direction of motion of this Light beam, **does not affect at all**, the measured velocity value of this Light beam, by this Human spectator, which always results in a constant Light velocity value, which is also the maximum velocity value that Humans can measure.

This should be regarded as a severe peculiarity, in any velocity value measurements of Light beams, by Humans, which must be also explained.

Based on the prediction that the Space and Time are not entities which actually exist, as it was already presented in this paper, this paper provides a tentative explanation to the peculiarity of Light velocity mentioned above which can be presented as follows:

Humans are used to perceive any velocity only by using the terms Time and Space, as Humans perceive these notions, because velocity is perceived (and calculated) by humans as the first derivative of Space as related to Time ($v_x=dx/dt$).

Thus, velocity values, measured by Humans, can be considered as reliable velocity values only if each of these velocities is **affected** by **both**, the **Space**, and the **Time** entities, as Humans perceive these entities, and as measured by means that Humans utilize for measuring the Space and the Time entities, as Humans perceive these entities.

However, if the statement, presented in this paper, that motions are only the result of Energies **Interactions**, is found to be a valid statement, (by a successful implementation of the experiment proposed in this paper), then, for Humans to be able to calculate reliably the velocity of a moving object, Humans must be able to do the following:

1. Conclude what are the Energies **Interactions** which cause this object movement.
2. Conclude which of these Energies should be attributed with a Space and a Time attributes, which Humans need to perceive, understand, and calculate motions.
3. Explain the movement of this object based on the above two conclusions, by also concluding that **both** the Space **and** the Time **attributes**, which **attributed** to a specific form of Energy, as mentioned above, affect this object movement.

For example, Humans can explain the **origin** of the movements related to the attraction between Massive Bodies, and calculate reliably the velocities (and accelerations) in such movements, based on the explanation provided by the four-dimensional Interwoven Space/Time concept, introduced by Einstein's General Relativity theory, because:

1. Humans can conclude that the Energies **Interaction** involved in these movements are the Interaction between the Energy embedded in Einstein's four-dimensional Interwoven Space/Time entity (or, expressing that in other words: the Energy embedded in Newton's

Gravitational Field), which Interacts with the Energy embedded in the attracted (moving) Massive Object.

2. Humans can conclude to attribute a Space and a Time attribute to the Energy embedded in Einstein's four-dimensional Interwoven Space/Time entity.
3. Humans can conclude that in the attraction movements between Massive Bodies, **both** the Space **and** the Time **attributes, attributed** to the Energy embedded in Einstein's four-dimensional Interwoven Space/Time entity, affect these movements, which enable Humans to understand the **origin** of these movements and arrive at a reliable measurement of the velocities (and accelerations) that occur in these movements.

Humans can also explain and understand the **origin** of the movements related to the attraction or the repulsion between Electrically Charged bodies, and calculate reliably the velocities (and accelerations) in such movements, based on the **additional** two four-dimensional Interwoven Space/Time, entities, introduced in the paper (7), as already presented in this paper, because:

1. Humans can conclude that the Energies **Interaction** involved in these movements are the Interaction between the Energies embedded in the **additional** two four-dimensional Interwoven Space/Time entities, introduced in the paper (7), (or, expressing that in other words: the Energies embedded in the Electric Fields), which **Interact** with the Energy embedded in the attracted or repelled (moving) Electrically Charged objects.
2. Humans can conclude to **attribute** Space and Time **attributes** to the Energies embedded in the **additional** two four-dimensional Interwoven Space/Time entities. However, it should be emphasized again, that the Space and the Time **attributes, attributed** in this paper, to the Energies embedded in the Electric Fields, (via the two **additional** Interwoven Space/Time concepts presented in the paper (7)) are **separate and different** from the Space and the Time **attributes attributed** to the Energies embedded in the Gravitation Fields (via Einstein's Interwoven Space/Time concept), which implies that **all** Space and Time **attributes** do not really exist, and are just **attributes, attributed** by Humans to forms of Energies, to enable Humans to perceive, understand and calculate the movements of bodies.
3. Humans can conclude, as presented in this paper, that in the attraction or the repulsion movements between Electrically Charged bodies, **both** the Space **and** the Time **attributes, attributed** to the Energies embedded in the **additional** two four-dimensional Interwoven Space/Time entities, affect these movements, which enable Humans to understand the **origin** of these movements and arrive at a reliable measurement of the velocities (and accelerations) that occur in these movements.

However, the process of the measurement of the velocity of Light by Humans is different.

As presented already before, in this paper, the measurements of the velocity of Light beams by Humans does embed a severe peculiarity, which should be explained.

In view of the prediction presented already in this paper, that velocities are only the result of **Interactions** between Energies, this paper proposes a tentative explanation to the severe peculiarity mentioned above, relating to the measurements of the Light velocity by Humans.

Einstein's General Relativity Theory predicted, and that prediction was supported later by observations, that Light beams which pass near a star are bended according to the Space bending that this star Mass induces by its Gravitational Interwoven Space/Time entity.

However, the measured velocity of these Light beams, by Humans, remains the same constant velocity attributed to the speed of Light.

This should imply that the movement of Light beams is also affected by the **Interaction** between the Energy embedded in the Light beams with the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, and the above should also imply that the **attribute** of Space, that Humans **attribute** to the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, affects the Light beam movement which does explain the above-described Light beams bending when these Light beams pass near a star.

However, because the measurement of the velocity of a Light beam, always result in the severe peculiarity described above, in which that measurement, is not affected at all, by the velocity or the direction of the movement, of the spectator which measures that Light beam velocity, this should imply, that the **Interaction** between the Energy embedded in a Light beam and the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, is **significantly different** as compared to the **Interaction** between the Energies embedded in Massive bodies and the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, such that in the **Interaction** between the Energy embedded in a Light beam and the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, the value of the first derivative of Space in relation to Time (which are Space and Time **attributes** that Humans **attribute** to the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity) always results in a **constant value**.

This paper proposes the assumption (or prediction) that the **attribute** of Time, that Humans **attribute** to the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, **does not affect** at all, the **Interaction** between the Energy embedded in a Light beam and the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, and this causes any measurement of Light beams velocity, by Humans, to result in a **constant value** as presented above.

Because, in measurements of Light beams velocity, by Humans, Humans are trying to measure the first derivative of Space in relation to Time (Space and Time **attributes** that Humans **attribute** to the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity), and if that Time **attribute** does **not affect** at all that measurement, it is reasonable to conclude, that this measurement, of the first derivative of Space in relation to Time, will always result in a **constant value**.

The fact that a Light beam, in its Wave facet is composed of propagating Electric and Magnetic Fields, which, as also presented already in this paper, might be also Energies which Humans need to **attribute** to them Space and Time attributes (but different and separate from the Space and the Time **attributes** which Humans might need to attribute to the Gravitational Field), and

because these Energies, embedded in a Light beam, are *very significantly different* than the Energies embedded in Massive Bodies, which Humans *do not need* to *attribute* to them Space and Time *attributes*, this might also *support* the prediction, presented above, that in the *Interaction* between Light beams and Einstein's Gravitational Interwoven Space/Time entity, the value of the first derivative of Space in relation to Time always results in a *constant value*.

The above actually implies, that although the Time *attribute, attributed* by Humans, to the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, was a successful *attribute* to explain and understand the motions of Massive Bodies, that same Time *attribute*, is *not a successful attribute* for the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, in order to understand and explain the motion of Light beams.

Thus, if the first derivative of Space in relation to Time (which Humans define as velocity) always results in a *constant value*, in *Interactions* between the Energy embedded in Light beams and the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, then, this does explain why the velocity of a Light beam, measured by Humans, always results in a *constant value*, because that first derivative of Space in relation to Time, is perceived by Humans as the velocity of this Light beam.

The above also explains the severe peculiarity in Humans measurements of the velocity of Light beams, because, the severe peculiarity in measurements of Light beams velocity by Humans is manifested in the fact that Humans cannot detect *an increase* in the Light beams velocity when the direction of travel of the measured Light beams and the direction of travel of the Human spectator, are opposite to one another, as compared to the measured Light beams velocity when both, the measured Light beams and the Human spectator, travel on the same direction.

But if measurements of the Light beams velocity by Humans *always* result in a *constant value*, then, the *expected increase*, in the measurement of the Light beams velocity, presented in the scenario described above, *cannot occur*, which does provide a tentative explanation to the severe peculiarity presented above in measurements of Light beams velocity by Humans.

And, the above also implies that the above-mentioned *constant value*, which is the result of Humans measurements of the velocity of Light beams, must be the *maximum velocity values* that Humans can measure.

Because, there are only two possibilities that measurements of Light beams by Humans will *always* result in a *constant value*.

These possibilities are either a zero-velocity value or a maximum velocity value. Since a Light beam is always detected as moving, the zero-velocity value cannot be considered. Thus, the only possibility left is the *maximum velocity value*.

Thus, the above presented the prediction, that the Time *attribute, attributed* by Humans to the Energy embedded in Einstein's Gravitational Interwoven Space/Time entity, *does not affect* at all the measured velocity value of a Light beam, by Humans, which provided a tentative explanation to the uniqueness and the peculiarities in measurements of Light beams, by Humans, but this might also imply that, in such a situation, Humans *are not able* at all to achieve a reliable measurement of the velocity of a Light beam.

6. Summary and Conclusions

This paper addresses the Uniqueness relating to the velocity of Light, which is manifested in the statement presented by Einstein's Special Relativity Theory, which state, that Light velocity, when measured by Humans, would always result in a constant value and the maximum possible velocity.

This claim was presented by Einstein's Special Relativity Theory as an axiom, without any proof.

This paper also presents a severe peculiarity in the measurements of Light velocity by Humans, which is manifested by the fact that the velocity and the direction of the motion of a Human spectator, who measures the velocity of a Light beam, *does not affect at all* the result of this measurement.

Based on an additional prediction, presented in this paper, that the entities of Space and Time, as Humans perceive these entities, do not really exist, this paper proposes a tentative explanation to the above-mentioned uniqueness and the above-mentioned peculiarity in measurements of Light velocity by Humans.

That prediction mentioned above, that the entities of Space and Time, as Humans perceive these entities, do not really exist, is based on another prediction, presented in this paper, which predicts that Electric (or Magnetic) Fields are forms of Accelerations, like the Gravitational Field, which is already recognized as a form of Acceleration.

The above-mentioned predictions, presented in this paper, are also related to the following unanswered question:

Since the *structure* of the Newton's Universal Gravitational Law and the *structure* of the Coulomb's Law are identical, why the *origin* of the attraction between Massive Bodies was resolved via Einstein's General Relativity Theory, and its concept of a four-dimensional Interwoven Space/Time entity, and the *origin* of the attraction or the repulsion forces between Electric Charges, is still a mystery?

The prediction that Electric (or Magnetic) Fields are also forms of Acceleration resulted in another prediction: Changes and Motions are the results of how *Energies Interact*, and Space and Time, as Humans perceive these entities, are not entities which exist.

Space and Time are notions invented by Humans because Humans needed these notions for perceiving Changes and Motions, and these notions are required to calculate values that Humans attribute to Motions such as Velocities or Accelerations.

Based on the above, the paper provides an explanation to the *origin* of the attraction or the repulsion between Electrically Charged bodies, in addition to the explanation already provided by Einstein's General Relativity theory, to the *origin* of the attraction between Massive Bodies.

The prediction that the entities of Space and Time, as Humans perceive these entities, do not really exist sounds as an extraordinary, unbelievable, and out of line statement, at first. This is because, as presented above, the notions of Space and Time are crucial notions, which Humans need them, to perceive, understand and calculate Motions and Changes.

However, this paper also proposes a relatively simple experiment, which if implemented, and its results will be successful, as this paper predicts, this will either validate or disprove, what is presented in this paper.

This experiment is based on the conclusion that if Electric (or Magnetic) Fields are forms of Acceleration, then the Acceleration in the attraction or repulsion between two Electrically Charged bodies, under Coulomb's Law, is dependent mainly on the amount of the Electric Charge that these bodies carry and not on their Mass magnitudes, as Newton's second Law of motion states.

This paper assumes that Newton's Second Law of motion was never checked to see if it complies with the Acceleration in scenarios of attraction or repulsion between Electrically Charged bodies.

Instead, this paper assumes that Newton developed his Second Law of motion based on the trajectories existing in the Solar System (10) , (11) , (12) . Newton used these trajectories to prove that his laws are valid, by showing that his laws of motion forecasted these trajectories.

Thus, this paper predicts that Newton's Second Law of motion is valid only for very Massive Bodies (such as planets) or Uncharged Bodies, or for Electrically Charged bodies that do not move because of Coulomb's Force, and for Electrically Charged bodies attracting or repelling under Coulomb's Force, Newton's Second Law of motion should undergo a suitable modification.

Based on the prediction, presented in this paper, that Space and Time, as Humans perceive these entities, do not exist, and motions in the Universe are only the result of how *Energies Interact*, this paper concludes, that the motion of Light is also a result of how Light *Interacts* with the Energy embedded in Einstein's four-dimensional Interwoven Space/Time entity.

However, this paper predicts that the Interaction between Light and Einstein's four-dimensional Interwoven Space/Time entity is *significantly different* from the way Massive Bodies Interact with Einstein's four-dimensional Interwoven Space/Time entity.

Because the velocity of moving Massive Bodies can be reliably established by Humans, but the measurements of the velocity of Light by Humans always embed the severe peculiarity presented above, in this paper.

Thus, based on the prediction that the *Time (and Space) entities* might *not really exist*, this paper concludes that the Time *attribute*, which Humans *attribute* to Einstein's four-dimensional Interwoven Space/Time entity, *does enable* Humans to understand the *origin* of Massive Bodies attractions, but this same *Time attribute*, which Humans *attribute* to Einstein's four-dimensional Interwoven Space/Time entity, might *not affect* at all the *Interaction* between Light and Einstein's four-dimensional Interwoven Space/Time entity.

Based on the above, this paper presents a tentative explanation to the uniqueness and the peculiarity of measurements of Light velocity by Humans.

But this tentative explanation also implies, that there is also a possibility, that Humans might *not be able* to achieve a reliable measurement of the velocity of Light, which points to an *intrinsic severe disability* that Humans might have.

However, as presented above, if the experiment proposed in this paper will be implemented, and its results will be successful, this might either provide validity to what was presented in this paper or disprove it.

The experiment proposed by this paper is relatively simple to implement, but still requires means and funds which are beyond the reach of the author of this paper, thus, the author of this paper hopes, that this paper will bring about the execution of this experiment, and, hopefully, the validation of what is presented in this paper.

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