Subtle Mistakes in Maxwell Equations that Altered Reality: No Aether Deity Required (Light Does Not Propagate in a Medium or on a Moving Frame)

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Abstract—The ingrained need for a medium in Maxwell equations is a result of hidden mistakes in Maxwell equations. Light does not propagate in any medium. Light propagates in empty space. A medium is not a carrier of light. The empty space is the carrier of light. A medium is an obstacle to the propagation of light. The claim in Maxwell equations that the propagation of light is determined by the permittivity and permeability of a medium is false, illogical, and incorrect. Propagation of light is only affected by a medium, not determined by a medium.

The problem with Maxwell equations is that the Light propagates in a vacuum, but Maxwell equations do not. Maxwell equations are incompatible with propagation of light due to the invalid representation of Coulomb constant as the permittivity, and Ampere constant as the permeability of a medium. Coulomb constant is not permittivity. Ampere constant is not permeability. Coulomb and Ampere constants exist in vacuum, and they do not require a medium while permittivity and permeability have no existence without a medium. Aether is not a solution to this incompatibility. Even an Aether deity cannot provide permittivity and permeability to a vacuum while maintaining a vacuum a vacuum. Vacuum is not a vacuum if it has permittivity and permeability.

Obvious incompatibility of Maxwell equations with propagation of light is a result of mistakes in the Maxwell equations. Formulation of Maxwell equations based on dielectric constants is both unwarranted and incorrect. Properties of a medium do not belong in the Maxwell equations since propagation of light is not determined by a physical medium. Propagation of light is only affected by a medium. Maxwell equations must be determined exclusively by the parameters of a vacuum since propagation of light takes place in the space even when a medium is present. When light is propagating in the presence of a medium, if the medium is pulled out, light does not move with the medium, light remains bound to the space indicating that the light does not propagate in a medium.

Ampere-Maxwell equation is incorrect since current has no existence without a nonzero time gradient of the electric flux. Asymmetry in Maxwell equations is a result of this mistake. Correct Maxwell equations are anti-symmetric and not determined by the parameters of a medium. Propagation of light and speed of light can only be determined by parameters that can exist in a vacuum. What determines the propagation of light is Coulomb and Ampere constants, which do not require a medium. Coulomb and Ampere constants exist in a vacuum. Permittivity and permeability of a medium are defined using the Coulomb and Ampere constants, and hence permittivity and permeability are not primary constants. Permittivity and permeability have no existence without a medium. Speed of light is determined by the Coulomb and Ampere constants. Coulomb and Ampere constants are fundamental to the propagation of electromagnetic waves. Coulomb and Ampere constants of the space, the vacuum, are universal and hence the speed of light is universal.

Propagation of light takes place in space even when a medium is present, not in the medium itself. Propagation of light is absolute. Empty space is the absolute frame, which is stationary. Space can neither expands nor contracts. It is a medium that expands or contracts, not the space itself. The presence of a medium only alters the propagation parameters of the space. A medium is a hindrance to the propagation of light. Electric flux density is directly related to electric field by Coulomb constant, not by the permittivity. Magnetic flux density is directly related to the magnetic field by Ampere constant, not by the permeability. Coulomb and Ampere constants do not require a medium, whereas the permittivity and permeability have no existence without a medium. What must be fundamental to Maxwell equations should be Coulomb and Ampere constants, not permittivity and permeability of a medium.

Speed of light measured by any observer on any moving frame is independent of the speed of the frame. Light cannot be carried away by a moving frame or by a flowing medium since light propagates in space, not on a frame or in a medium. A flowing medium cannot drag light. An inertial frame cannot move light. Speed of a flowing medium has no direct effect on the speed of light. Any effect of a flowing medium on light is due to the change of Coulomb and Ampere constants with the change in medium density along the flow. Light does not hitchhike. Motion of masses is relative; propagation of waves is not. You cannot increase or decrease the speed of light by running with or against the light. Light cannot be given a ride on a moving frame, train, or on a caravan.

Hypothetical magnetic vector potential does not exist. Abstract canonical momentum obtained using the LaGrange based on magnetic vector potential is not real. Any entity with momentum cannot propagate. No entity can be subjected to both motion and propagation. Only the stationary fields contain potential energy. Propagating fields do not have potential energy. Electromagnetic waves have neither kinetic energy nor potential energy and hence LaGrange does not apply for electromagnetic waves. Light has no momentum. Electromagnetic waves have no momentum.

The need for Aether stems from mistakes in Maxwell equations. Correct Maxwell equations are anti-symmetric and exclusively determined by Coulomb and Ampere constants, which do not require a medium but are affected by a medium and by the density variation of the medium. No man-made hypothetical Aether deity is required for propagation of light or for measurement of the speed of light. Measured speed of light on a moving frame is independent of the speed of the frame since a moving body undergoes volume contraction. When a moving body approaches the speed of light, it turns into a black hole since mass density becomes infinite while mass remains the same. Black holes are real; they are not spacetime singularities. There is no spacetime.

What the Newton gravitation constant to gravitation is what are Coulomb and Ampere constants to electromagnetism. Just as the Newton gravitation constant requires no medium for its existence, Coulomb and Ampere constants require no medium for their existence. Coulomb and Ampere constants are unit-conversion parameters that require no medium. Reformulated Maxwell equations based exclusively on Coulomb and Ampere constants are always compatible with propagation of light and require no medium.

Maxell equations should not be medium based. Correct Maxwell equations must be space based. Maxwell equations and propagation of light are not relative. Correct Maxwell equations and light propagate in empty space, which is the absolute frame of reference for light. Lorentz Transform and Special Relativity are both invalid.

Keywords—Permittivity; Permeability; Coulomb; Ampere; Aether; Maxwell; Force; Lorentz; Relativity; Einstein; Light; Spacetime; Black Holes; Vacuum;

I. INTRODUCTION

Speed of light is affected by a medium, not determined by a medium. Electromagnetic fields are space-bound, not medium-bound. Electromagnetic fields exist in space even when a medium is present. Effect of a medium on the propagation of light is always through the effect of the medium on the parameters of propagation of light in space, vacuum.

Light propagates in space, which is the absolute frame of reference. Hence, correct Maxwell equations must be formulated to have the empty space, the vacuum, as the absolute frame of reference. What is required for the propagation of light is space, the empty space, nothing else. Although the Maxwell equations are medium-based by mistakes, the correct Maxwell equations must be space-based naturally. The fact that Maxwell equations cannot exist in space without a man-made hypothetical medium Aether is a good indication that there are fundamental mistakes with Maxwell equations that must be corrected.

Axiom:

Electromagnetic waves propagate in the space, in the vacuum, and hence equations for propagation of light should contain only the parameters and fields that can exist in a vacuum.

Property:

The propagation of electromagnetic waves is space-based, not medium-based, and hence the genesis of Maxwell equations should also be space-based, not medium-based.

Definition: Almighty Aether, Aether Deity

Aether is non-material non-physical imaginary whatever that provides a vacuum the required permittivity and permeability for the existence and propagation of the Maxwell equations in a vacuum without altering the vacuum itself, an almighty task that can only be achieved by an Aether deity. Maxwell equations have no existence in a vacuum without the assistant of a hypothetical man-made Aether deity.

Lemma: Non-Relative Light

Light does not propagate relative to a medium, object, moving train, or observers. Light propagates in space. The presence of a medium is an unnecessary obstacle to the propagation of light. Speed of light and electromagnetic fields are unaffected by the motion of frame. Propagation of light is absolute, not relative.

Property: No Hitchhiking

Light does not take a ride on a moving frame. Light cannot be dragged by a flowing medium. Light does not take free rides. Piggybacking light is strictly prohibited by nature.

Lemma: Medium is Never a Friend, always a Foe

Light cannot be carried away by a flowing medium. Light always propagates in space against the resistance of any medium present. For propagation of light, even a flowing medium is never a friend, always a foe. For the propagation of light, flowing medium is a position dependent resistance.

Property: Problem with Maxwell Equations

Maxwell equations cannot propagate in a vacuum. Maxwell equations do not represent the propagation of electromagnetic waves in a vacuum. Maxwell equations have no existence without a medium. Maxwell equations require a foundational correction. Aether is a temporary pain reliever, not a cure.

Property: Vacuum Based Light

Speed of light must be determined by parameters that exist in a vacuum. Speed of light must be determined by universal vacuum parameters, not by secondary parameters such as dielectric properties of a medium. Vacuum is universal, a medium is local. Although the speed of light is affected by a medium, speed of light is not determined by a medium.

Property:

Coulomb constant α and Ampere constant β are universal constants that require no medium.

Theorem: Correct Maxwell Equations for Light

Correct Maxwells equations for light are exclusively determined by Coulomb constant α and Ampere constant β . Speed of light c is determined exclusively by the Coulomb constant α and Ampere constant β . Unlike the original Maxwell equations, correct Maxwell equations are anti-symmetric and do not require an Aether deity.

Lemma: Problems with Lorentz Transform

Lorentz Transform does not apply for nonpropagating electric fields and magnetic fields. Lorentz Transform for propagating electromagnetic waves does not exist since Lorentz Transform is not unique. There is no Lorentz force. Lorentz Transform is not real.

Property: Uselessness of Lorentz Transform

No electromagnetic device was ever engineered using Lorentz Transform. Design of electric motors and electric generators predates Lorentz Transform by several decades.

Property: Do Not Go with the Flow

Flowing medium cannot carry the light with the flow since the light is not relative and light propagates in space even when a medium is present. The change of speed of light in a flowing medium is solely due to the change of Coulomb constant α and the Ampere constant β with the position in a flowing medium.

Property: Adaptable

Coulomb constant α and the Ampere constant β are position dependent in an inhomogeneous medium. Coulomb and Ampere constants are position dependent in a flowing medium due to the density variation along the flow, and hence the speed of light is position dependent in a flowing medium.

Lemma: Riding My Own Wave

The change of speed of light in a flowing medium is not a result of light being carried by the flowing medium. Light cannot be given a ride by any mean since light is not relative. Light cannot be piggybacked. The variation of the speed of light in a flowing medium is due to the inhomogeneity of the flowing medium.

Lemma: No Standing-Light

There is no standing-light. If there is so-called standing-light, perpetual light bulb that consumes no power will be a reality. Light has no existence without propagation. So-called standing-light is a reality blind mathematically illusional fallacy, not a reality.

Corollary:

Light always propagates in free space even in the presence of a medium. The presence of medium only alters the parameters Coulomb and Ampere constants of the propagation of light.

Corollary:

Light does not exist for the synchronization of clocks. Simultaneity has nothing to do with light. Time has nothing to do with light.

So far, we had a quick glance at what is about to come. Now, let us begin with an introduction to how all that started and what brought us here.

Even though Britten had openly used its technical advancements to rob the resources of other nations and to strip off their dignity by enslaving them (Britten was not alone in this), in hindsight, we cannot undermine Britten's contribution to the advancement of science and technology at a very fundamental level. There is nothing "Great" about invading and enslaving other nations using technological might, and hence naming Britten as "the Great Britten" is completely inappropriate and unwarranted. You cannot become Great by beating up and enslaving the weaker. Despite those historical wrongdoings, the most noteworthy of all to the technical advancement came out of Britten is the contributions of Faraday and Maxwell to the electromagnetic theory.

Around 1865 AD in Edinburgh, Scotland, James Clerk Maxwell formulated the Maxwell equations for electromagnetic wave propagation based on the permittivity and permeability of a medium. However, the use of permittivity ϵ and permeability μ of a medium in the formulation of Maxwell equations is unwarranted, and incorrect. It is this mistake that led Maxwell and others to look to an Aether deity.

In Maxwell equations, the speed of light is falsely and inappropriately determined by the permittivity ϵ and permeability μ . The problem is that there cannot be a permittivity ϵ and permeability μ without a medium. A vacuum has no permittivity or permeability. As a result, Maxwell equations have no place in a vacuum. Maxwell equations do not propagate in a vacuum. Maxwell equations only propagate in a medium.

However, propagation of light does not require a medium. Light propagates in a medium as well as in a vacuum. So, there is an incompatibility between Maxwell equations and propagation of light since Maxwell equations have no existence in a vacuum. This incompatibility problem has been there from the inception of Maxwell equations to this day.

Property: Maxwell Cannot Breathe in a Vacuum

Maxwell equations cannot live without dielectric constants. Vacuum has no dielectric constants. Despite all the beauty of the Maxwell equations, Maxwell equations' inability breath in dielectric constants permittivity and permeability in a vacuum remains a major hurdle to overcome for Maxwell equations.

Maxwell equations and the speed of light were determined by the dielectric properties, permittivity ϵ and permeability μ . The problem is that a vacuum does not have dielectric properties. An empty space cannot have dielectric constants, permittivity ϵ and permeability μ .

If a vacuum has dielectric constants, then, it is no longer a vacuum. Maxwell equations and speed of light have no existence in a vacuum since Maxwell equations, as expressed by Maxwell, are determined by the dielectric properties, permittivity ε and permeability μ , which have no existence in a vacuum.

If there are physical stuff in space, space is no longer a vacuum, it is a medium. Maxwell equations and Speed of light are compatible in a medium since medium can provide much needed permittivity and permeability for the existence of Maxell equations in a medium as described by Maxwell. If there is a medium in space providing the dielectric constants needed for the Maxwell equations for propagation of light and the speed of light, then it is no longer the speed of light in a vacuum or the propagation of light in a vacuum and that is the dilemma we must deal with in Maxwell equations. That is the enigma in Maxwell equations.

The contradiction in Maxwell equations formulated by Maxwell based on permittivity and permeability is evident when we consider the Maxwell equations in a vacuum. Maxwell equations as formulated by Maxwell need permittivity and permeability for their existence in a vacuum without having a physical medium to provide the dielectric constants. Maxwell tried to resolve this contradiction by introducing a hypothetical non-material man-made medium Aether. Aether is a provider of permittivity and permeability to a vacuum without altering the vacuum, a job for a deity.

Aether provides the required dielectric constant for the existence of Maxwell equations in a vacuum without itself being a physical medium. In other words, Maxwell equations need an Aether deity for their existence in a vacuum, because Maxwell equations, as formulated by Maxwell, have no existence without dielectric properties permittivity and permeability.

So, a hypothetical Aether Deity came to the rescue providing much needed permittivity and permeability to a vacuum while maintaining the vacuum, a vacuum. Well, God can do anything since no actual physical doing is involved. It is only a hypothetical Aether God that can fulfill this task, nothing else can. It is only a hypothetical God that can be anything that we want him/her/it to be since God exists only in misguided human psychic as an illusion, not in reality as a physical entity; surprisingly, there are many believers.

Nobody has any idea what Aether is. Maxwell did not know what Aether was. However, everybody can say volumes about Aether even though nobody has any idea what Aether is, just like preachers of any religion can say volumes about their God even though they have no clue what/who God is. Therefore, it is important to get the definition of Aether right.

Definition: Aether

Aether is non-material non-physical whatever that provides a vacuum the required permittivity and permeability for the existence and propagation of the Maxwell equations in a vacuum without altering the vacuum itself, an almighty task.

Aether must be a hypothetical non-material deity to carry out a such a task of providing the required permittivity and permeability for the Maxwell equations in a vacuum from the sideline while maintaining a vacuum a vacuum. It is only a hypothetical man-made deity that only exists in human psychic can fulfill such an impossible task in nature. If you are someone who believes religiously without evidence that an unknown entity, a deity, created the universe and everything in it, this task of providing dielectric constant to a vacuum from the sideline without affecting the vacuum is not a that big task for the guy/gal/it, the Aether deity. No physical entity cannot carry out such a task. No vacuum has the permittivity and permeability to support Maxwell equations. No physical entity can provide a vacuum permittivity and permeability without altering the vacuum. Aether cannot be a physical entity.

Property: Vacuum is a Vacuum

If vacuum has permittivity and permeability, it is no longer a vacuum.

Ampere-Maxwell equation in Maxwell equations has a current even when the time gradient of the electric flux density is zero. This is not possible. Ampere-Maxwell equation is not completely correct since current has no existence without a nonzero time gradient of the electric flux.

The asymmetry in Maxwell equations is a result of this mistake in Ampere-Maxwell equation. Correct Maxwell equations should not have anything to do with permittivity and permeability. Correctly reformulated Maxwell equations for propagation of light are anti-symmetric and do not have any dependence on permittivity and permeability.

Light is not relative. No medium is required for the propagation of light. Maxwell equations should not be determined by the permittivity and permeability. A vacuum is not dielectric and has no permittivity or permeability, yet light propagate in a vacuum even though Maxwell equations have no existence in a vacuum since vacuum has no permittivity and permeability. What led to the need for Aether was a mistake in Ampere-Maxwell equation in the Maxwell equations, and the inappropriate use of the dielectric constants in the Maxwell equations where they do not belong.

Dielectric constants do not belong in Maxwell equations. You cannot reconcile the incompatibility of Maxwell equations and propagation of light in a vacuum by inventing hypothetical Aether.

Property: Dielectric Constants are Not Needed

Dielectric properties of a medium have no place in Maxwell equations. Maxwell equations should not contain parameters that are specific to a medium.

The need for Aether is a result of several mistakes in Maxwell equations. No Aether is required when the Maxwell equations are correctly formulated. To correct the mistakes in Maxwell equation, let us revisit the derivation of Maxwell equations and reformulate them appropriately without the use of dielectric constants permittivity and permeability. When the Maxwell equations are correctly reformulated without permittivity and permeability, as they should realistically be, there is no requirement for nonmaterial hypothetical Aether. As expected, No Aether deity is required.

Property: Space-Based Start

Maxwell equations for propagation of light should be space-based from the start, not medium-based.

Around 1831 AD in Surrey, England, Michael Faraday discovered that the change of magnetic flux Φ_M through surface area S with time generates an electric field **E** encircling the magnetic flux Φ_M that opposes the change,

 $\oint \mathbf{E} \bullet d\boldsymbol{\ell} = -\partial \Phi_{\mathsf{M}}(t) / \partial t \qquad (1.1)$ where, • indicates the dot product, $\delta \ell$ is a small length of the path ℓ that encircles the surface area *S*.

Around 1819 AD in Lyon, France, Andre-Marie Ampere discovered that the flow of current generates a magnetic field encircling the path of the current. Maxwell showed that it is not just the flow of current that generates a magnetic field that encircles the path of the current but also the change of electric flux with respect to time also generates a magnetic field that encircles the flux.

However, Maxwell failed to grasp the fact that there cannot exist any current without a non-zero change of electrical flux with time. Otherwise, he would not have identified drift current I_d as a separate entity from the current I. He should not have written Ampere-Maxwell equations as the sum of the current I and a drift current I_d .

In other words, there cannot be any current if $\partial \Phi_{\rm E}(t)/\partial t=0$. When $\partial \Phi_{\rm E}(t)/\partial t=0$, current I must also be zero, I=0. This failure led to the incorrect Ampere-

Maxwell equation,

 $\oint \mathbf{H} \bullet d\boldsymbol{\ell} = \mathbf{I} + \partial \Phi_{\mathsf{E}}(t) / \partial t \qquad (1.2)$ where, I=current, d ℓ is a small length of the path ℓ encircling the surface S.

Maxwell named the term $\partial \Phi_E(t)/\partial t$ as drift current I_d. However, it is noteworthy that the current is current, and there is no separate entity called drift current. It is only that when the change of electric flux with time is a constant, $\partial \Phi_E(t)/\partial t$ =constant, we have current I. It is noteworthy that the current I=0 when $\partial \Phi_E(t)/\partial t$ =zero. This is where Ampere-Maxwell equation is incorrect. We will consider what is wrong with the Ampere-Maxwell equation and how to correct it later.

If the magnetic flux through a small area δS is $\delta \Phi_{\rm M}({\rm t})$, then,

$$\Phi_{\mathsf{M}}(\mathsf{t}) = \iint \delta \Phi_{\mathsf{M}}(\mathsf{t}). \tag{1.3}$$

By defining dS as a vector with magnitude δS and the direction orthogonal to δS , we have,

$$\Phi_{\mathsf{M}}(\mathsf{t}) = \iint \left[\partial \Phi_{\mathsf{M}}(\mathsf{t}) / \partial S \right] \bullet dS \tag{1.4}$$

 $\Phi_{\mathsf{M}}(\mathsf{t}) = \iint \mathbf{B} \bullet dS \tag{1.5}$

where, **B** is the magnetic flux density given by,

$$\mathbf{B} = \partial \boldsymbol{\Phi}_{\mathsf{M}}(\mathsf{t}) / \partial S \tag{1.6}$$

Similarly, if the electric flux $\Phi_{E}(t)$ through a small area δS is $\delta \Phi_{E}(t)$, then,

$$\Phi_{\mathsf{E}}(\mathsf{t}) = \iint \delta \Phi_{\mathsf{E}}(\mathsf{t}) \tag{1.7}$$

$$\Phi_{\mathsf{E}}(\mathsf{t}) = \iint \left[\partial \Phi_{\mathsf{E}}(\mathsf{t}) / \partial S \right] \bullet dS \tag{1.8}$$

$$\Phi_{\mathsf{E}}(\mathsf{t}) = \iint \mathbf{D} \bullet dS \tag{1.9}$$

where, **D** is the electric flux density given by,

$$\mathbf{D} = \partial \mathbf{\Phi}_{\mathsf{E}}(\mathsf{t}) / \partial \mathsf{S} \tag{1.10}$$

Substituting for $\Phi_B(t)$ in Faraday equation given in eqn. (1.1) and for $\Phi_E(t)$ in Ampere equation in eqn. (1.2), we have,

$$\oint \mathbf{E} \, d\boldsymbol{\ell} = -d[\iint \mathbf{B} \bullet d\boldsymbol{S}]/dt \tag{1.11}$$

$$\oint \mathbf{H}.\,d\boldsymbol{\ell} = \mathbf{I} + d[\iint \mathbf{D} \bullet dS]/d\mathbf{t}$$
(1.12)

$$\oint \mathbf{E}. d\boldsymbol{\ell} = - \iint (d\mathbf{B}/dt) \bullet dS \qquad (1.13)$$

 $\oint \mathbf{H}.\,d\boldsymbol{\ell} = \iint \mathbf{J} \bullet d\mathbf{S} + \iint (d\mathbf{D}/d\mathbf{t}) \bullet d\mathbf{S} \tag{1.14}$

where, $J = \partial I / \partial S$, the current density. From Stokes theorem, we have,

$$\oint \mathbf{E} \, d\boldsymbol{\ell} = \iint \, (\nabla \times \mathbf{E}) \bullet d\boldsymbol{S} \tag{1.15}$$

$$\oint \mathbf{H}.\,d\boldsymbol{\ell} = \iint \,(\nabla \times \mathbf{H}) \bullet dS \tag{1.16}$$

where, ℓ is the path that encircles the area S.

Equating eqn. (1.13) with eqn. (1.15) and eqn. (1.14) with eqn. (1.16), we have,

$$(\nabla \times \mathbf{E}) = -d\mathbf{B}/dt \tag{1.17}$$

$$(\nabla \times \mathbf{H}) = \mathbf{J} + d\mathbf{D}/d\mathbf{t}$$
 (1.18)

Equations (1.17) and (1.18) are the well-known garden verity Maxwell equations that you can find in any physics or electrical engineering textbook. We presented here to demonstrate later that the Maxwell equations has nothing to do with the permittivity ε and permeability μ of a medium, as well as to show that the Ampere-Maxwell equations are not completely correct. It is the mistakes in Maxwell equations that led to the need for a man-made hypothetical medium of Aether.

Larger is the magnetic flux density **B**, larger is the magnetic field **H**, and as it currently stands, Maxwell equations define the relationship between the magnetic flux density **B** and the magnetic field **H** so that,

Β =μ Η	(1.19)

The proportionality constant μ is known as the permeability of the medium. Similarly, Maxwell equations define the relationship between the electric flux density **D** and the electric field **E** so that,

 $D=\epsilon E$ (1.20) The proportionality constant ϵ is known as the permittivity of the medium.

In the absence of a medium or in a vacuum,

B=µ₀H	(1.21)
D=ε _Ε	(1.22)

Proportionality constant ε_o is known as the permittivity of the free space or a vacuum. Proportionality constant μ_o is known as the permeability of the free space or a vacuum.

It is here the problem arises. A vacuum is just the space. There is nothing in a vacuum. A vacuum has no dielectric properties. There is no permittivity or permeability without a medium. There is no vacuum permittivity. There is no vacuum permeability. There is no vacuum energy. If there is something in space, it is not a vacuum. Vacuum is the space containing nothing. Vacuum energy, vacuum permittivity, vacuum permeability are oxymorons.

a) Why Aether was Needed

If there is something in space, it is not a vacuum. A vacuum cannot have a permittivity ε_o and permeability μ_o . To have a permittivity and permeability, a material medium is required. Maxwell equations for propagation of light require a vacuum to be equipped with permittivity ε_o and permeability μ_o . It is here the need for an artificial, hypothetical, and totally mysterious medium of Aether arises.

Without a medium, there is no justification for the Maxwell equations to exist in a vacuum since Maxwell equations and the speed of light are incorrectly determined by the permittivity and permeability. To address the need for a medium for the permittivity ε_o and permeability μ_o , Maxwell invented the medium of mysterious hypothetical Aether, an easy way out. A pain reliever, not a cure by any standard.

b) Wave Equation

Electric field **E** represents a direction of a force on a charge q. Therefore, the use of electric field **E** in place of electric flux density **D** in Maxwell equations is more appropriate. However, the magnetic field **H** does not represent a direction of a force on a moving charge q. In fact, the force on a moving charge q due to a magnetic field **H** is orthogonal to the plane of the **H** and **v**, where **v** is the velocity of the charge q. As a result, there is no reason to use the magnetic field **H** over the magnetic flux density **B** since it is the change of the magnetic flux density **B** with respect to time that generates an electric field **E**. It is more appropriate and physically realistic to use the magnetic flux density **B** and the electric field **E** in Maxwell equations, $(\nabla \times \mathbf{H}) = \mathbf{J} + d\mathbf{D}/d\mathbf{t}$ (1.24)

Since **J** is time invariant, differentiating eqn. (1.24) with respect to time and substituting from eqn. (1.23), we have the electromagnetic wave equation.

$$\nabla^2 \mathbf{E} = (1/c_o^2) d^2 \mathbf{E}/dt^2$$
 (1.25)

where, c_o is the speed of light in a vacuum, $c_o^2 = 1/\epsilon_o \mu_o$ (1.26)

 $\nabla^2 \mathbf{D} = (1/c_o^2) d^2 \mathbf{D} / dt^2$ (1.27)

$$\nabla^{2} \mathbf{H} = (1/c_{o}^{2}) d^{2} \mathbf{H} / dt^{2}$$
(1.28)

$${}^{2}\mathbf{B} = (1/c_{o}^{2})d^{2}\mathbf{B}/dt^{2}$$
 (1.29)

These equations are equivalent and describe the propagation of electromagnetic waves in a vacuum.

c) Speed of Light c

 ∇^2

The speed of light c_m in a medium with permittivity ϵ and permeability μ are given by,

$$c_m^2 = 1/\epsilon \mu$$
 (1.30)

If we describe permittivity ϵ and permeability μ of a medium relative to the permittivity ϵ_o and permeability μ_o of a vacuum so that,

$$\sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{$$

$$\mu = \mu_o \mu_r$$
 (1.32)
where, ϵ_r is referred to as the relative permittivity and μ_r is referred to as the relative permeability of the medium.

Substituting for ε and μ in eqn. (1.30), we have,

$$c_{\rm m}^2 = c_{\rm o}^2 / \epsilon_{\rm r} \mu_{\rm r}$$
 (1.33)

In Maxwell equations, it appears as if the speed of light in space or vacuum is determined by the permittivity ε_o and permeability μ_o of a vacuum even though vacuum have no dielectric properties.

d) Trouble with Aether

To justify or to reconcile the use of permittivity ε_o and permeability μ_o of a vacuum that is inherently present in Maxwell equations, Maxwell invented a hypothetical artificial medium of mysterious Aether. In addition, if we measure speed of an object, we measure it relative to another object. As a result, question arises when we state that the speed of light is c.

With respect to what the light travels at speed c? With respect to what the speed of light is measured? This question is also indirectly taken care of with the introduction of the mysterious and hypothetical Aether. So, they went on claiming that the light propagates at the speed c with respect to man-made or more appropriately man-assumed hypothetical Aether. If they had known that the light is not relative [2], they would have not invented an Aether deity.

However, with the introduction of Special Relativity, the need for mysterious Aether to define the speed of light with respect to was not needed since Special Relativity falsely assume that the propagation of light is relative. As a result, in Special Relativity, light travels at speed c relative to any observer. In fact, in Special Relativity, it is not the light itself that is used, it is a mass travelling at speed of light c that is used. Special Relativity uses a mass travelling at speed of c

 $(\nabla \times \mathbf{E}) = -d\mathbf{B}/dt$

(1.23)

and falsely claim that it uses light itself [5]; and this is what gave a false momentum to light in Special Relativity even though massless cannot have a momentum and light has no momentum. If light has a momentum, speed of light cannot be a constant under gravity even in a vacuum.

e) Fallacy of Special Relativity

Special Relativity uses the Lorentz Transform that is based on another false assumption that the time is relative. Neither Lorentz nor Einstein had any idea that the Lorentz Transform is not unique [2]. In addition, neither Lorentz nor Einstein had any idea that if the time is relative, then, time would be directional and not unique. Time cannot be directional. Time must be unique. Time cannot be relative. Time is a definition. A clock is an engineered device to display our definition of time.

Although Einstein claimed that the Special Relativity is founded on the fact that the speed of light is a constant that must be frame independent, if Special Relativity holds true, speed of light will not be frame independent since Special Relativity generates Shear Electromagnetic (SEM) waves that are frame dependent. Special Relativity is in contradiction with its own premise that it is founded on [2]. Einstein either did not notice this fact or he purposely ignored it and pushed it into the closet. His faithful followers were religiously blind to the facts and blindly followed his teaching religiously that they failed to check what was in the Einstein's closet.

Even though the followers of archaic religions are strictly prohibited to check the closets of their founders, in the case of Special Relativity, the followers had all the opportunity check the founder's closet without restrictions. Archaic religions maintain its authority by inducing fear into their followers. Special Relativity and Modern Physics also maintain its hold by making it a requirement for getting a degree in physics and a job in the area. So, just like the lie of any archaic religion, the lie of Special Relativity and Quantum Mechanics is also remained institutionalized through fear of different sort.

A quick peek into the Einstein's closet would have prevented a century long bogus mathematical fallacy in Modern Physics such as Special Relativity, Spacetime, General Relativity, Quantum Mechanics, Particle Waves, Wave Particles, Big Bang, Universe Expansion, Dark Matter, Dark Energy, Gravitational Waves (Fantasy Waves), LIGO, Spin 1/2, Standing Light, Electromagnetic Waves Generating Mass, Relative Time, Gravity Bending Light, Light Altering Gravity, Colliding Charge Particles to Reveal Fundamental Particles of Nature, LHC (Billion Dollar Blunder), and many more.

Lorentz Transform is not unique. Spacetime is not unique. Relative time is not unique. Special Relativity does not hold true. Special Relativity is not a mechanism of nature. Propagation of light is not relative. When the Lorentz Transform is not unique, whole of Modern Physics falls apart under its very foundation. Special Relativity is false, time cannot be relative, spacetime is not unique. Hence, relative time and spacetime are superficial mathematical psychopaths that have no existence outside a notepad, archaic journal, university course, or textbook.

When the propagation of light is not relative, it is not possible to claim light has a momentum. Massless has no momentum. Light does not have to be relative for the speed of light to be independent of the frame of reference. Propagation of light is always independent of the frame of reference. It does not matter which observer on which frame measures the speed of light, the measured speed of light will be independent of the speed of the frame of the observer. In contemporary science, there is a wider acceptance that the Special Relativity and Lorentz Transform are illogical and false both mathematically and conceptually. In the future, Special Relativity and Lorentz Transform may only exist as an ancient religious text, nothing more.

When fallacies of Special Relativity are out in the open and gaining acceptance, we can see the resurgence of Aether. The fact is that the Maxwell equations for propagation of light is not determined by the dielectric parameters of a medium or non-existent dielectric parameters of a vacuum. Speed of light is not determined by the dielectric parameters even though the speed of light is affected by the dielectric properties of a medium.

f) Speed of Light c Cannot be Determined by Dielectric Properties of a Medium

In the absence of a medium, speed of light has nothing to do with the dielectric constants since a vacuum does not have any associated dielectric constants. It is only a medium that has dielectric properties. It is only a medium that has dielectric constants. As we are going to show, permittivity and permeability have nothing to do with the propagation of light or Maxwell equations. No Aether is required for the propagation of light.

What led to the hypothetical concept of Aether is some foundational mistakes in the Maxwell equations. Maxwell equations should not contain any parameter associated with a medium. Formulation of Maxwell equations using the parameters that are exclusive to a medium is the main problem with Maxwell equations. Maxwell equations should be space-base, not medium-based.

Property: Constraints Needed for Maxwell Equations

Only the parameters and fields that can exist in a vacuum or empty space should be in correct Maxwell equations for propagation of light, nothing else.

g) Major Mistakes of Maxwell:

Maxwell formulated the Maxwell equations for propagation of electromagnetic waves in a medium using the dielectric constant of the medium, and then tried to extend it to a vacuum that does not have dielectric constants. He had to invent Aether to support his formulation for a vacuum. If Maxwell had started his formulation of equations for the propagation of light in a vacuum and then extended them to a medium, he would have avoided the need for hypothetical Aether. This is a fundamental mistake of Maxwell in the formulation of the Maxwell equations for propagation of electromagnetic waves.

When you start formulating the equations for propagation of light in a medium, you are making implicitly the assumption that light requires a medium for propagation, which is indeed not true. In this case, this implicit false assumption prevents you to extend the formulation to a vacuum. The formulation of Maxwell equations should not be medium based.

Instead, if you start the formulation of equations for propagation of light in a vacuum, you are making the implicit assumption that light always propagates in a vacuum, which is indeed true since light does not require a medium for the propagation. In this case, the propagation of light is only affected by the presence of a medium, not determined. The formulation of Maxwell equations must be space based or vacuum based.

Equations for propagation of light and the speed of light should not be determined by the properties of a medium. Equations for propagation light and the speed of light should be such they could exist in a vacuum, and they could propagate in a vacuum. What we are going to do here is to correct this fundamental mistake of Maxwell in Maxwell equations for propagation of light. We are also going to correct another fundamental mistake of Maxwell in the Ampere-Maxwell equation in Maxwell equations that led to the asymmetry in Maxwell equations.

II. AMPERE-MAXWELL EQUATION IN MAXWEL EQUATIONS IS NOT COMPLETELY CORRECT

Maxwell extended the Ampere's work by introducing drift current as a separate entity. However, current is current. There cannot be a separate entity called drift current as an extra to the current. It is here the problem lies in Ampere-Maxwell equation. There is only one current, and it is determined by the rate of change of the electric flux density with respect to time. It is the nature of change of the electric flux density that determines whether the current is drift current or not.

a) What is Wrong with Ampere-Maxwell Equation

Asymmetry in Maxwell equations is a result of a mistake in the Ampere-Maxwell equation. The need for a mysterious Aether is also partially a result of this mistake. Maxwell equations consists of the Faraday equation and the Ampere-Maxwell equations given by,

$$(\nabla \times \mathbf{E}) = -d\mathbf{B}/d\mathbf{t}$$
(2.1.1)
$$(\nabla \times \mathbf{H}) = \mathbf{J} + d\mathbf{D}/d\mathbf{t}$$
(2.1.2)

where, B=magnetic flux density, H=magnetic field, D=electric flux density, E=electric field, and J=current density that is time-invariant.

Maxwell equations (2.1.1) and (2.1.2) are neither symmetric nor anti-symmetric due to the presence of current density **J**. This asymmetry is due to a conceptual and mathematical mistake of the Ampere-Maxwell equation. Let us see what that mistake is.

In Ampere-Maxwell equation (2.1.2), if the change in electric flux density with respect to time is zero, we have.

$$(\nabla \times \mathbf{H}) = \mathbf{J}$$
, when $d\mathbf{D}/dt = 0$ (2.1.3)

However, if $d\mathbf{D}/dt=0$, then there cannot be any current **J**. For time-invariant current **J** to exist, the change of electric flux density with respect to time, $d\mathbf{D}/dt$ must be a non-zero constant,

 $d\mathbf{D}/dt$ =constant, for $\mathbf{J}\neq 0$ (2.1.4) As a result, Ampere-Maxwell equation is not completely correct. This mistake led for some to go to the extent of hypothesizing an artificial magnetic current to make the maxwell equations artificially symmetric. There is no such thing as magnetic current. Magnetism is a result of the motion of charges, current. Although electromagnetic bursts cannot come to existence without a motion of charges, once generated, electromagnetic wave bursts or radiation can exist independent of the charges that generated them. Electromagnetic radiation is not anchored to a source.

b) Correct Ampere-Maxwell Equation

∬ **D**∙d**S**=q

Let us consider the Gaussian equation, the first equation of the Maxwell equations where the divergence of electric flux density **D** is equal to the charge density ρ ,

∇●D =ρ	(2.2.1)

For a given volume V. we have,	
∭ (∇ •D)dV=∭ pdV	(2.2.2)

where,

 $q = \iiint \rho dV \qquad (2.2.4)$

 $\iiint (\nabla \bullet \mathbf{D}) dV = \iint \mathbf{D} \bullet d\mathbf{S}$ (2.2.5) Differentiating eqn. (2.2.3) with respect to time t, we have,

•,		
	<i>d</i> [∬ D ∙d S]/dt=dq/dt	(2.2.6)
	∬ (d D /dt)∙dS]=dq/dt	(2.2.7)

Since
$$I=dq/dt$$
, we have,

$$\iint (d\mathbf{D}/dt) \bullet d\mathbf{S} = I \qquad (2.2.8)$$

$$\iint (d\mathbf{D}/dt) \bullet d\mathbf{S} = \iint \mathbf{J} \bullet d\mathbf{S}$$
(2.2.9)

wherre,

 $I= \iint J \bullet dS$ (2.2.10) From eqn. (2.2.9), we have, dD/dt=J (2.2.11)

where, **J** is the current density over surface area *S*. We can also obtain the current density **J** using the Ampere Law. From the Ampere Law, for a circular path ℓ encircling the surface area *S*, we have,

∮ H . d ℓ =l	(2.2.12)
$\iint (\nabla \times \mathbf{H}) \bullet dS = \iint \mathbf{J} \bullet d\mathbf{S}$	(2.2.13)

$(V \times H) = JJ = JJ$	(2.2.13)
$(\nabla \times \mathbf{H}) = \mathbf{J}$	(2, 2, 14)

- From eqns. (2.2.11) and (2.2.14), we have, $(\nabla \times \mathbf{H})=d\mathbf{D}/d\mathbf{t}$ (2.2.15)
- If $d\mathbf{D}/dt$ =constant, then, the constant will be the

(2.2.3)

current	density	J that	at is	time	invariant	and	we	have
the Amp	bere Law	/ for I	ion-	propa	gating fiel	ds,		

 $(\nabla \times \mathbf{H}) = \mathbf{J}$ (2.2.16)When $d\mathbf{D}/dt\neq 0$, and $d\mathbf{D}/dt\neq$ constant, we have the Ampere-Maxwell law in the correct form for propagating fields.

$(\nabla \times \mathbf{H}) = d\mathbf{D}/d\mathbf{t}$	(2.2.17)
Ampere-Maxwell equation as given in	Maxwell
equations is not completely correct,	
(∇ × H)≠J+dD/dt	(2.2.18)
Now, the correct Maxwell equations are given	by,
$(\nabla \times \mathbf{E}) = -d\mathbf{B}/d\mathbf{t}$	(2.1.19)
$(\nabla \times \mathbf{H}) = d\mathbf{D}/d\mathbf{t}$	(2.1.20)

Maxwell equations are anti-symmetric in general.

Corollary:

Propagation of light is absolute. Light propagates in the space or the vacuum, which is the absolute frame of reference. For the Maxwell equations to represent the propagation of light, Maxwell equations must also be formulated so that they propagate in the space or the vacuum, in the absence of a medium.

III. COULOMB CONSTANT α

Coulomb constant α is simply a unit-conversion parameter and hence requires no medium for its existence. Coulomb constant exists in a vacuum. Although the existence of Coulomb constant requires no medium, Coulomb constant is affected by a medium since the forces are affected by the presence of a medium. Coulomb constant in the presence of a medium is greater than the Coulomb constant in a vacuum since the presence of a medium reduces the electric flux between charges. Denser the medium, higher is the Coulomb constant.

Coulomb constant is a property of a vacuum or a medium even though its existence requires no medium. Coulomb constant in a medium can be used to define the electrical properties of a medium with respect to the Coulomb constant in a vacuum.

a) Coulomb Constant α_0 for Vacuum

Let us consider two charges separated by distance r placed in vacuum. The force F exerted between charges is directly proportional to the charges Q and q, and inversely proportional to the square distance,

 $\mathbf{F} \propto 0 q \hat{\mathbf{r}} / (4 \pi r^2)$ (3.1.1) where, $\mathbf{r}=\mathbf{r}\hat{\mathbf{r}}$, $\hat{\mathbf{r}}$ is the unit vector, \mathbf{r} is the distance, \mathbf{F} is the force between the charges.

Using a proportionality constant α_0 , we have,

 $\mathbf{F}=(1/\alpha_{o})Qq\hat{\mathbf{r}}/(4\pi r^{2})$ (3.1.2)The proportionality constant α_o is the Coulomb constant for a vacuum. The force F exerted by charge Q on a unit charge g=1 is given by,

$\mathbf{F}/\mathbf{q} = (1/\alpha_o)Q\hat{\mathbf{r}}/(4\pi r^2)$	(3.1.3)
The force per unit charge is the electric field E	,
E=F/q	(3.1.4)
Substituting for F, we have the electric	field E
described by the Coulomb constant α_o ,	
$\mathbf{E} = (1/\alpha_0) \mathbf{O} \hat{\mathbf{r}} / (4\pi r^2)$	(3.1.5)

$\mathbf{E}=(1/\alpha_{o})\mathbf{D}$	(3.1.6)
---------------------------------------	---------

where, the electric flux density **D** is given by, $\mathbf{D}=Q\hat{\mathbf{r}}/(4\pi r^2)$ (3.1.7)

The stronger is the electric flux density **D**, the stronger is the electric field **E**.

$$\mathbf{D} = \boldsymbol{\alpha}_{o} \mathbf{E} \tag{3.1.8}$$

Electric flux density **D** and electric field **E** are related by the Coulomb constant α_o for a vacuum or empty space. The existence of electric flux density **D** and electric field **E** do not depend on a medium; they exist in a vacuum, in empty space. Coulomb constant is not determined by a medium. Coulomb constant is determined by space, vacuum. Although Coulomb constant is not determined by a medium, Coulomb constant is affected by the presence of a medium.

Coulomb constant is the same everywhere in the medium if the medium is homogenous. In the case of non-homogenous media, Coulomb constant depends on the position. For a flowing medium, Coulomb constant is position dependent. Coulomb constant varies with the density of the medium. If the density of the medium varies with the position, then, Coulomb constant varies with position, as it is in the case of flowing medium.

b) Coulomb Constant α in a Medium

If we have same two charges Q and g separated by distance r in a dielectric medium, the presence of two charges polarizes the medium generating an opposing force. As a result, the presence of a medium reduces the force between two charges Q and q separated by distance r compared to the two charges Q and q separated by distance r in a vacuum or in empty space. The force per unit charge F/q in a medium is given by,

$\mathbf{F}/q = (1/\alpha)Q\hat{\mathbf{r}}/(4\pi r^2)$	(3.2.1)
$\mathbf{E} = (1/\alpha) Q \hat{\mathbf{r}} / (4\pi r^2)$	(3.2.2)

(3.2.2)

E=(1/α)**D** (3.2.3)

where, **E=F**/q, and electric flux density **D** is given by, $\mathbf{D}=Q\hat{\mathbf{r}}/(4\pi r^2)$ (3.2.4)

The constant α is the Coulomb parameter for a medium. The name Coulomb constant for α is especially suitable since $\boldsymbol{\alpha}$ relates the charges in Coulomb to electric field E. There is nothing mysterious about Coulomb constant a. It is just a parameter that brings the units of electric field E into same units of electric flux density **D** and hence no medium is required for its existence.

In the presence of a medium, the force between the charges Q and q will be weaker due to the presence of opposing polarization force. As a result, the Coulomb constant for a dielectric medium will be higher than the Coulomb constant for a vacuum or the empty space,

(3.2.5)

The ratio of Coulomb constant α in a medium to the Coulomb constant α_0 in a vacuum is a property of the medium and given by, $\epsilon_m = \alpha / \alpha_o$ (3.2.6)

 $\alpha > \alpha_o$

 ε_m is the permittivity of the medium and it is greater

than one,

ε_m>1 For any medium, its dielectric constant $\epsilon_{\rm m}$ is greater than one. Coulomb constant of a medium, α is related to the Coulomb constant of the vacuum or free space, α_{o} by the permittivity of the medium ε_{m} ,

 $\alpha = \epsilon_m \alpha_o$ (3.2.8)A vacuum or free space does not have an associated dielectric constant, permittivity. Dielectric constant, permittivity of a medium is defined as a ratio of Coulomb constant of a medium to the Coulomb constant of a vacuum. For a dielectric constant to exist, there must be a medium. There is no dielectric constant without a medium. There is no permittivity ϵ without a medium. Permittivity of a vacuum or empty space is meaningless; no such thing exists. It is the Coulomb constants α and α_0 that define the dielectric property permittivity ε_m of a medium.

Definition: Permittivity ε of a Medium

Permittivity ε of a medium is the Coulomb constant of the medium per unit Coulomb constant in a vacuum or empty space, $\varepsilon = \alpha / \alpha_o$.

Coulomb constant α does not require a medium for its existence. Coulomb constant exists in a vacuum. No hypothetical medium Aether is required for the existence of α . Coulomb constant that relates the Electric flux density D to electric field E by the relationship,

$$D = \alpha E$$
 (3.2.9)

Property: Vacuum-Bound D and E

Electric flux density D and electric field E always exist in space even when a medium is present. It is only that the presence of a medium affects the Coulomb constant a.

Property: Medium-Free Existence

The existence of electric flux density **D** and electric field **E** do not require a medium.

IV. BIOT-SAVART OR AMPERE CONSTANT β

Ampere constant β is simply a unit-conversion parameter and hence requires no medium for its existence. It is a property of a vacuum or free space. Although its existence requires no medium, it is affected by a medium since the forces are affected by the presence of a medium. Ampere constant for a medium is greater than the Ampere constant for a vacuum since the presence of a medium enhances the magnetic flux. Denser the medium, higher is the Ampere constant.

Ampere constant is a property of a vacuum or empty space, and its existence requires no medium. Ampere constant is determined by the space or vacuum. Ampere constant is not determined by a medium. It is only that the Ampere constant is affected by the presence of a medium. Since the presence of a medium affects the Ampere constant, Ampere

constants β of a medium and β_{\circ} of a vacuum can be used to define the magnetic property permeability µ of a medium. Ampere constant β is a primary constant of the universe while the permeability μ is a secondary parameter.

a) A moving Charge in a Vacuum

An accelerating charge generates electromagnetic radiation. A moving charge q at constant speed v generates a magnetic flux that encircles the path of the moving charge. Magnetic flux density **B** at distance r is given by the Biot-Savart relationship,

 $\mathbf{B} \propto [q/(4\pi r^2)] \mathbf{v} \times \hat{\mathbf{r}}$ (4.1.1)where, $\hat{\mathbf{r}}$ is the unit vector so that, r=rr (4.1.2)

Using a proportionality constant β_o , we have,

$$\mathbf{B} = \beta_0 [q/(4\pi r^2)] \mathbf{v} \times \hat{\mathbf{r}}$$
 (4.1.3)

If we have a conductor or a beam carrying charges at a constant rate, the magnetic field δB at distance r due to a small length $\delta \boldsymbol{\ell}$ is given by,

$$\delta \mathbf{B} = \beta_{o} [qv/(4\pi r^{2})] \delta \boldsymbol{\ell} \times \hat{\mathbf{r}}$$
(4.1.4)

If we assume a beam of charges moving at constant speed, we have I=qv. Then, the flux density at distance r on an orthogonal plane to the direction of motion of the beam of charges is given by,

$$\mathsf{B} = \int \beta_{o} [qv/(4\pi r^{2})] d\ell \qquad (4.1.5)$$

If the length of the beam is larger than distance r, then, the magnetic flux density **B** at distance r is independent of the length of the beam and the magnetic flux density **B** is given by,

$$B = \beta_0 I / (2\pi r)$$
 (4.1.6)

This is the Ampere relationship that links the current on a wire or current due to a beam of charges moving at constant speed v to the magnetic flux density **B** that encircles the current. The proportionality constant β_0 that relates the current to the magnetic flux density **B** that encircles the wire is the Ampere constant β in a vacuum. Even though β_o is the Biot-Savart constant for a vacuum, it is not the Biot-Savart relationship that is used in practice. It is the Ampere relationship that is used in practice. And hence, it is more appropriate to call β_0 the Ampere constant for a vacuum. Ampere constant β_0 relates the current in Amperes to the magnetic flux density B in a vacuum.

Equation (4.1.6) can be written as,

$$\mathbf{B} = \beta_{o} \mathbf{H} \tag{4.1.7}$$

where, **H** is the magnetic field at distance r given by, $H=I/(2\pi r)$ (4.1.8)

The direction of \mathbf{H} is the same as the direction of the magnetic flux density B, which is given by the experimentally verified right-hand rule. If $\delta \ell$ is a small length of the path of radius r that encircles the current I, we have from eqn. (4.1.8),

$\oint \mathbf{H} \bullet d\boldsymbol{\ell} = \mathbf{I}$	(4.1.9)
From Stokes theorem, we have,	
$\oint \mathbf{H}. d\boldsymbol{\ell} = \iint (\nabla \times \mathbf{H}) \bullet dS$	(4.1.10)
Substituting in eqn. (4.1.9), we have,	
∬ (∇ × H)∙dS = ∬ J∙dS	(4.1.11)
$(\nabla \times \mathbf{H}) = \mathbf{I}$	(1 1 1 2)

From eqn. (2.2.11), we already have,			
dD/dt=J	(4.1.13)		
We now have,			
$(\nabla \times \mathbf{H}) = d\mathbf{D}/d\mathbf{t}$	(4.1.14)		
From eqn. (3.1.8) and eqn. (4.1.7), we also have,			
D =α₀ E	(4.1.15)		
B =β _o H	(4.1.16)		
Substituting for H and D in eqn. (4.1.14), we have,			
$(\nabla \times \mathbf{B}) = \alpha_0 \beta_0 d\mathbf{E}/dt$	(4.1.17)		
where			

 α_0 =Coulomb constant for a vacuum,

 β_0 =Ampere constant for a vacuum.

b) Moving Charge in a Medium

The magnetic flux encircling a moving charge at distance r is affected by the presence of a medium. The presence of a medium increases the magnetic flux. The magnetic flux density at distance r due to a moving charge q at speed v is given by,

$\mathbf{B} \propto [q/(4\pi r^2)] \mathbf{v} \times \hat{\mathbf{r}}$	-	(4.2.1)
$\mathbf{B}=\beta[q/(4\pi r^2)]\mathbf{v}\times\hat{\mathbf{r}}$		(4.2.2)

where, β is the Biot-Savart constant or Ampere constant for the medium.

For a beam or a conductor carrying charges at constant speed, constant current I=qv. The magnetic flux density **B** at distance r on a plane orthogonal to the **v** is given by,

$B=\beta I/(2\pi r) $ (4)	.2.3)
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This is the Ampere relationship in the presence of a medium. Calling the proportionality constant β Ampere constant especially makes a sense since parameter β relates magnetic flux density B to the current in Amperes.

We can write the magnetic flux density **B** as, പരവ

where, **H** is the magnetic field at distance r given by,

$$H=I/(2\pi r)$$
 (4.2.5)

Since the magnetic flux density **B** and the magnetic field **H** are in the same direction, we have,

Β=βΗ (4.2.6) ${\bf H}$ is the magnetic field encircling the current I. The direction of **H** and **B** are given by the experimentally verified right-hand rule. The existence of the magnetic flux density **B** and magnetic field **H** do not depend of the presence of a medium. It is the Ampere constant of the free space that is affected by the presence of a medium.

Property: Vacuum-Bound B and H

Magnetic flux density **B** and magnetic field **H** exist in space even when a medium is present. It is only that the presence of a medium affects the Ampere constant β.

Property: Medium-Free Existence

The existence of magnetic flux density B and magnetic field **H** do not require a medium.

There is nothing mysterious about Ampere constant β ; it is just a parameter that brings the units

of magnetic field H into the same units of magnetic flux density **B**.

Since the presence of a medium enhances the magnetic flux compared to the flux in a vacuum or the free space,

 $\beta > \beta_0$

We define µ as the ratio of Ampere constant in the medium β to the Ampere constant β_o in the free space or vacuum,

 $\mu = \beta / \beta_o$ (4.2.8)The ratio µ is the permeability of the medium. A vacuum or empty space does not have a permeability. It is only a medium that has a permeability. Permeability of a medium is a definition; it is defined as the ratio of the Ampere constant β in the medium to the Ampere constant β_{o} in a vacuum or empty space. It is only a medium that has a permeability. The permeability of a vacuum or empty space is meaningless; no such thing exists.

Definition: Permeability µ of a Medium

Permeability μ of a medium is defined as the Ampere constant of the medium per unit Ampere constant in a vacuum or empty space, $\mu = \beta/\beta_o$.

The permeability μ of a medium is always greater than one,

(4.2.9)u>1 Ampere constant of a medium, β is related to the Ampere constant of the vacuum or empty space, β_o by the relationship,

β=μβ (4.2.10)A vacuum does not have dielectric properties. Vacuum does not have an associated permeability. Permeability has no existence without a medium. Permeability $\boldsymbol{\mu}$ is only present in the presence of a medium. Permeability of a medium is a definition based on Ampere constant of the medium β and the Ampere constant in the vacuum β_0 .

On the other hand, the Ampere constant β does not require a medium for its existence. It is only that the Ampere constant β is affected by the presence of a medium. No hypothetical medium of Aether is required for the existence of Ampere constant β . Maxwell equations must be determined by the Coulomb constant α and Ampere constant β , not by the permittivity ε and the permeability μ .

Law of propagation: Spaced-Based Light

Propagation of electromagnetic waves and the speed of propagation are determined by the Coulomb and Ampere constants, which do not require a medium for their existence.

V. CORRECT MAXWELL EQUATIONS WITH COULOMB CONSTANT α AND AMPERE **CONSTANT** β

Maxwell equations for propagation of light are described by the Faraday relationship and the corrected Ampere-Maxwell relationship,

$$\oint \mathbf{E} \bullet d\boldsymbol{\ell} = -\partial \Phi_{\mathsf{M}}(\mathsf{t}) / \partial \mathsf{t}$$

$$\oint \mathbf{H} \bullet d\boldsymbol{\ell} = \partial \Phi_{\mathsf{F}}(\mathsf{t}) / \partial \mathsf{t}$$
(5.1)
(5.2)

When the Ampere-Maxwell equation is corrected, Maxwell equations are anti-symmetric. Using the Stokes theorem, we have.

$$\iint (\nabla \times \mathbf{E}) \bullet dS = - \iint [d\mathbf{B}/dt] \bullet dS \tag{5.3}$$

$$\iint (\nabla \times \mathbf{H}) \bullet dS = \iint [d\mathbf{D}/dt] \bullet dS$$
(5.4)
where $\mathbf{D} = \partial \Phi_{\mathsf{F}}(t)/\partial S$ and $\mathbf{B} = \partial \Phi_{\mathsf{M}}(t)/\partial S$.

From eqns. (5.3) and (5.4), we have,

$$(\nabla \times \mathbf{E}) = -d\mathbf{B}/dt \tag{5.5}$$

 $(\nabla \times \mathbf{H}) = d\mathbf{D}/dt$ (5.6) We already have seen that the electric flux density \mathbf{D} and electric field \mathbf{E} are related by the Coulomb constant α , and the magnetic flux density \mathbf{B} and the magnetic field \mathbf{H} are related by the Ampere constant β so that,

$$D=\alpha E$$
 (5.7)
 $B=\beta H$ (5.8)

The fields **D**, **E**, **B**, and **H** do not require a medium for their existence; they exist in space even in the presence of a medium. The fields **D**, **E**, **B**, and **H** do not exist in the medium. Propagation of electromagnetic fields and the speed of propagation are affected by the medium through Coulomb constant α and Ampere constant β .

Property: Space-Bound Fields

Propagating electromagnetic fields **D**, **E**, **B**, and **H** exist in the space. Even when a medium is present, propagating electromagnetic fields exist in space.

Property: Space-Bound Light

When light is propagating in the presence of a medium, if you take the medium away, light does not go with medium, light remains propagating in the space. Light propagates in space, not in a medium.

Electric field **E** represents the direction of force on a charge. However, the magnetic field **H** does not represent a direction of a force. As a result, it is more meaningful to use the magnetic flux density **B** directly in place of magnetic field **H**. Since electric field **E** represents the direction of force, it is more appropriate to use the **E** instead of the electric flux density **D**.

Substituting for **H** and **D** in the corrected Maxwell equations, we have,

$$(\nabla \times \mathbf{E}) = -d\mathbf{B}/dt \tag{5.9}$$

 $(\nabla \times \mathbf{B}) = (\alpha\beta) d\mathbf{E}/dt$ (5.10) Differentiating equation (5.10) with respect to time t and substituting from equation (5.9), we have, $\nabla^2 \mathbf{E} = (1/2^2) a^2 \mathbf{E} (a^2)$

$$\nabla^2 \mathbf{E} = (1/c^2) d^2 \mathbf{E}/dt^2$$
 (5.11)

$$c^2 = 1/(\alpha\beta)$$
 (5.12)

As usual, we have used the fact that,

 $\nabla \times (\nabla \times E)=-\nabla^2 E$ since $\nabla (\nabla \bullet E)=0$ in the absence of a source or sink.

Similarly, we have

where,

(5.13)
(5.14)
(5.15)

These are wave equations for the propagation of electromagnetic waves or light. The speed c of light or electromagnetic waves is given by,

$$c=1/(\alpha\beta)^{1/2}$$
 (5.16)

The presence of a medium increases the Coulomb constant α and the Ampere constant β . As a result, the speed of light c decreases with the presence of a medium. Higher the density of the medium, higher are the Coulomb constant α and the Ampere constant β , and hence, the speed of light decreases with the density of the medium. This is the reason why a gravitational object diffracts light in the presence of a medium. Density of a medium increases towards the gravitational object and hence decreases the speed of light as light approaches a gravitational object. In the absence of a medium, gravity has no effect on light. Gravity cannot diffract light in the absence of a medium. Gravity has no effect on massless.

The diffraction of light near the sun indicates that there is a medium surrounding the sun with increasing density gradient towards the sun. The diffraction of light near a gravitational object is a secondary effect of the gravitational object, not a direct effect on light. Gravity has no direct effect on light. Gravity does not diffract light in the absence of a medium.

Speed of light is defined by the Coulomb constant α and the Ampere constant β . The existence of Coulomb constant α and the Ampere constant β does not depend on a medium. The presence of a medium simply alters the Coulomb constant α and the Ampere constant β .

Maxwell equations for propagation of light should not depend on the permittivity ε and the permeability μ of a medium. It is the Coulomb constant α and the Ampere constant β that define the dielectric properties permittivity ε and the permeability μ of a medium,

$\epsilon = \alpha / \alpha_o$	(5.17)
μ=β/β₀	(5.18)

where,

 α =Coulomb constant of the medium

 β =Ampere constant of the medium

 α_{o} =Coulomb constant of the vacuum or empty space β_{o} =Ampere constant of the vacuum or empty space.

As a result, there is no need of a hypothetical Aether for the propagation of light. Propagation of light or electromagnetic waves do not require a medium. The presence of a medium is an obstacle, unwanted impediment, to the propagation of light. The presence of a medium not only reduces the speed of light but also alters the path of light. If light is diffracted on its path, it only means that there is a density change in the medium or a change in the medium.

Gravity cannot diffract the light. However, gravity can change the density gradient of the medium surrounding the gravitational object. The change in the density of the medium near a gravitational object in turns affect the propagation of light. A change in the density gradient of the medium changes the speed of light and hence the direction of propagation.

The effect of gravity on light is always indirect,

through a medium. Gravity has no direct effect on light. Gravity has no effect on light whatsoever in the absence of a medium. The only way to influence the propagation of light is through the Coulomb constant α and the Ampere constant β . Coulomb constant α and the Ampere constant β vary with the density gradient of the medium or from one medium to another.

Corollary:

What is Newton gravitation constant G to gravitation is what are Coulomb constant α and the Ampere constant β to electromagnetism. Just as Newton gravitation constant G requires no medium for its existence, Coulomb constant α and the Ampere constant β require no medium for their existence.

Theorem: Properly Derived Maxwell Equations

Properly rederived Maxwell equations for the propagation of light is given by,

$(\nabla \times \mathbf{E}) = -d\mathbf{B}/d\mathbf{t}$		(5.19)
$(\nabla \times \mathbf{B}) = (1/c^2) d\mathbf{E}/dt$		(5.20)

where, $c=1/(\alpha\beta)^{1/2}$, α is the Coulomb constant and β is the Ampere constant.

The beauty of the properly defined Maxwell equations is that they are always naturally antisymmetric without any additional assumptions, and they are determined by the speed of light c. Electromagnetic fields do not require a medium for their existence. The speed of light c is determined by the Coulomb constant α and the Ampere constant β , which do not require a medium for their existence. Speed of light c is a universal constant in a vacuum since the Coulomb constant $\boldsymbol{\alpha}$ and the Ampere constant β for a vacuum are universal constants. The presence of a medium is felt by the propagating electromagnetic waves only through the Coulomb constant α and the Ampere constant β . Coulomb constant α and the Ampere constant β are affected by the presence of a medium.

Property:

The existence of electric field **E** and the magnetic flux density **B** do not require a medium, and hence the propagation of electromagnetic waves or light does not require a medium. It is only that the presence of a medium affects the Coulomb constant α and Ampere constant β , and hence the speed of light.

Lemma:

Correctly formulated Maxwell equations based on the Coulomb constant α and Ampere constant β exist in a vacuum or in empty space, and hence Correct Maxwell equations are perfectly compatible with propagation of light both in a vacuum and a medium.

Theorem:

Light propagates in empty space even in the presence of a medium. A medium simply alters the Coulomb constant α and Ampere constant β .

Since light propagates in space even in the presence of a medium, light cannot be given a ride on a moving frame. Special Relativity is false. Light does not propagate relative to a moving frame. A flowing medium cannot carry light with the flow. Any effect on the light by a flow of the medium is a result of the position dependent Coulomb constant a and Ampere constant β in the flowing medium.

Maxwell equations are not medium bound. Maxwell equations are space bound. Light propagates in empty space. Empty space is the absolute frame for the propagation of light. Light propagates relative to empty space even when there is a medium. Speed of light is relative to any position in empty space, the absolute space. Maxwell equations exist in the empty space. Coordinates in Maxwell equations are relative to the absolute space, the empty space. There is no Aether. No Aether is required. We can use Maxwell equations on a moving frame as an approximation for frames moving at much slower speeds compared to the speed of light. A moving body contracts in all direction leading to density dilation [7]. When a moving body reaches the speed of light, its mass density reaches infinity resulting a black hole. Black holes are not spacetime singularities. Spacetime does not exist. Time is absolute [2,7]. Light does not propagate relative to moving frames.

In Special Relativity, mass moving at speed of light relative to a moving frame has been falsely interpreted as light propagating relative to a moving frame. Special relativity has nothing to do with light itself. Special relativity is based on a mass moving at the limiting speed of speed of light, not the light itself.

VI. PERMITIVITY ϵ and permeability μ are NOT PRIMARY CONSTANTS

In a vacuum, electric field E and electric flux density **D** are related by Coulomb constant α_0 while the magnetic field H and the magnetic flux density B are related by Ampere constant β_{o} ,

D=α₀E	(6.1)
Β =β₀Η	(6.2)

Β=β₀Η In the presence of a medium

ie	presence	or a medium,
		D =α E

(6.3)**Β**=βΗ (6.4)

The ratio α/α_o describes the electric properties of the medium while the ratio β/β_{o} describes the magnetic properties of the medium. The ratio α/α_0 is defined as the permittivity ε of the medium while the ratio β/β_{o} is defined as the permeability μ of the medium,

ε=α/α ₀	(6.5)

u=β/β₀	(6.6)
	· ·

- ε>1 (6.7)µ>1
 - (6.8)

The permittivity ε and permeability μ of a medium are not primary constants since they are defined using the Coulomb constant α and the Ampere constant β . Permittivity ϵ and permeability μ of a medium are secondary constants. Propagation of light should not

be described by secondary constants. Speed of light should not be described by secondary constants.

Propagation of light is universal. Speed of light is a universal parameter in the propagation of light. Propagation of light and speed of light must be determined by the primary universal parameters. Propagation of light and the speed of light cannot be described by the permittivity ε and the permeability μ of a medium.

A material medium is not required for Coulomb constant α and the Ampere constant β to exist. No medium is required for the propagation of light or electromagnetic waves. As a result, no medium should be required for proper Maxwell equations that represent the propagation of light. No man-made hypothetical medium of Aether is required for proper Maxwell equations that describe the propagation of light or electromagnetic waves.

Required Properties for Maxwell Equations to be a Valid Representation of Propagation of Light:

- 1. Maxwell equations that represent the propagation of light should not be determined by a medium.
- 2. Although the speed of light is affected by a medium, speed of light should not be determined by the dielectric properties of a medium.
- 3. Existence of the Maxwell equations should not depend on the dielectric properties, permittivity, and permeability, of a medium.
- 4. Maxwell equations must have an existence in a vacuum, where there is nothing but the empty space.
- 5. Existence of Maxwell equations must be independent of a medium.
- 6. Maxwell equations should have the ability to propagate in a vacuum without the support of a hypothetical medium Aether, or Aether deity.
- Electric field E, electric flux density D, magnetic field H, and Magnetic flux density B must exist in the vacuum or empty space.
- 8. Electromagnetic fields must exist in space even in the presence of a medium. If you pull out the medium, the fields do not move with the space. The fields must remain in the space.
- 9. Maxwell made the mistake of formulating original Maxwell equations starting with a medium, or medium based. Medium based Maxwell equations do not propagate in empty space or in a vacuum. That was the mistake of Maxwell. That is why Aether was needed for Maxwell equations. Formulation of equations for propagation of electromagnetic waves must strictly be vacuum based. When Maxwell equations are vacuum based, no Aether is required.
- 10. Genesis of correct Maxwell equations should be space based or vacuum based, not dielectric medium based.
- 11. Space based correct Maxwell equations can propagate both in a vacuum and a medium.

Lemma:

Correct Maxwell equations determined by Coulomb and Ampere constants propagate in a vacuum. No Aether is required.

VII. ELECTROMAGNETIC FIELDS ARE NOT RELATIVE, LIGHT IS NOT RELATIVE, LIGHT DOES NOT HITCHHIKE

Lemma: Observer Independent Radiating Fields

Propagating electric field and a magnetic field are observer independent. Propagating magnetic field does not appear as an electric field or propagating electric field does not appear as a magnetic field for moving observers.

In Special Relativity, it has been falsely claimed that "what is an electric field and what is a magnetic field are observer dependent". Special Relativity claims that electromagnetic fields are relative, and magnetic field can appear as an electric field, and electric field can appear as a magnetic field to a moving observer. This claim is false. This claim stems from the Lorentz Transform that applies only for propagating electromagnetic waves,

$$x'=r(x-vt)$$
 (7.1)
 $t'=r(t-vx/c^2)$ (7.2)

where $\mathbf{r}=1/(1-\mathbf{v}^2/\mathbf{c}^2)^{1/2}$, c is the speed of light, (x',t') is the distance and time pair on a moving frame *F*', (x,t) is the distance and time pair on a stationary frame *F*. Frame *F*' is moving along the x direction at constant speed v relative to the frame *F*.

Lemma: Limitations of Lorentz

Lorentz Transform only applies for propagating electromagnetic wave fields. Lorentz Transform does not apply for non-propagating electric and magnetic fields.

When the Lorentz Transform was used in Maxwell equations for propagation of light, it is not just the (E,B) pair that satisfy the maxwell equations, the pair (E',B') also satisfy the Maxwell equations, where (E',B') pair is given by [1,2],

E _x '=E _x	(7.3)
$E_{y}'=r(E_{y}-(v/c)B_{z})$	(7.4)
$E_z'=r(E_z+(v/c)B_v)$	(7.5)

B _x '=B _x	(7.6)
$B_y' = r(B_y + (v/c)E_z)$	(7.7)

$$B_{z}'=r(B_{z}-(v/c)E_{y})$$
 (7.8)

where, \mathbf{E} =(E_x,E_y,E_z), \mathbf{B} =(B_x,B_y,B_z), \mathbf{E} '=(E_x',E_y',E_z'), \mathbf{B} '=(B_x',B_y',B_z'),

Since the pair $(\mathbf{E}', \mathbf{B}')$ satisfies Maxwell equations, one may use this to proclaim that the magnetic flux density **B** can appear as an electric field **E**, and electric field **E** can appear as a magnetic flux density **B** to a moving observer. This is the result one could expect if the Lorentz Transform is true. However, Lorentz Transform is not real. Time is not relative. Lorentz Transform is not unique [2]. There are Lorentz fields. Lorentz Transform does not exist.

In addition, there is another myth that comes with the Lorentz Transform, the Lorentz force **F**. Consider the case \mathbf{E} =(0,E,0) and \mathbf{B} =(0,0,B). Lorentz force **F** is given by.

e F is given by,	
F=qE'	(7.9)
F=q[E±(v/c)B]	(7.10)

where, v is the speed of the charge particle. Force **F** is in the direction of **E** or against **E** on the y axis.

Lorentz Transform and Special Relativity makes two false claims:

- 1. For a moving observer, magnetic field can appear as an electric field, and electric field can appear as a magnetic field. This is not true.
- 2. Lorentz force $F=q[E\pm(v/c)B]$. This does not exist.

For these claims to be true, Lorentz Transform must exist. Time must be relative for Lorentz Transform to exist. Besides the imaginary concept of relative time must hold true, for Lorentz Transform to exist, Lorentz Transform must be unique. Lorentz Transform is not unique. In fact, there are infinite number of Lorentz Transforms that can transform the Maxwell equations on to a moving frame [2]. Consider the General Transform,

$$x'=x^{n}(x-vt)$$
 (7.11)
 $t'=x^{n}(t-vx/c^{2})$ (7.12)

where $r = 1/(1-v^2/c^2)^{1/2}$, n=1, 2, 3, ...

This General Transform also transforms Maxwell equations onto a moving frame [2]. When n=1, the General Transform is the same as the Lorentz Transform. As a result, Lorentz Transform is not unique. Lorentz Transform is not the only Gaucho in the outback that can transform the Maxwell equations onto a moving frame. All the Transforms in the General Transform are equally valid and can transform Maxwell equations onto a moving frame. There are infinite number of distinct transforms for the same job.

For Lorentz Transform to be a valid Transform, Lorentz Transform must be unique. Unless the Lorentz transform is unique, Lorentz Transform cannot exist. Lorentz Transform is not unique and hence Lorentz Transform has no existence. All the claims associated with the Lorentz Transform, including Special Relativity, become false as a result.

Time is not relative. Time has nothing to do with the speed of light. Time does not stop if an observer reaches the speed of light. It is only when a clock is engineered using the light as a part of the mechanism that the display on the clock depends on the propagation of light. Otherwise, a display on a clock has nothing to do with the propagation of light. Any effect on the display of a clock is not an effect on time itself. Time itself is not relative. Time itself does not depend on the speed of the observer or the gravity. It is the mechanism of a clock that depends on the gravity and the environment the clock is in.

Two clocks in two different temperatures do not give the exact same readings. It is not because time

has any dependence on temperature, it is because the mechanism of a clock is affected by the temperature and hence the display on the clock. A clock with a weak battery does not give the correct time. It is not because time itself is dependent on the strength of the battery, it is because the mechanism of the clock is affected by the strength of the battery and hence the display on the clock. Clocks accelerating or moving in different directions do not have the same readings since the mechanisms are under different operating environments. It is not the time itself that is affected by the motion of a clock, it is the mechanism of the clock that is affected.

A clock is a device engineered to display our definition of time. A clock displays the correct time only when the clock is in an environment where the design specifications are met. Time itself is not relative. The display of a clock is relative since the mechanism of a clock is affected by the environment the clock is in. The display on any engineered device varies with the environment the device is in since the mechanism of the device is affected by the environment the device is in.

Propagating electromagnetic field with magnetic flux density **B** is not relative. Electromagnetic fields do not propagate relative to observers on moving frames. Propagating magnetic flux density **B** generates a force only in the presence of a moving charge particle. The force that is exerted by a magnetic field density **B** is only on a charge particle. The force $q\mathbf{v} \times \mathbf{B}$ only exists on a charge particle. The field $\mathbf{v} \times \mathbf{B}$ does not exist in space independent of the presence of a charge particle. There is no space-filling field $\mathbf{v} \times \mathbf{B}$.

A propagating magnetic flux density **B** does not move with an inertial frame. A propagating magnetic field on a moving frame of speed v cannot generate an electric field $\mathbf{v} \times \mathbf{B}$ all over the space. A moving frame cannot transform a magnetic flux density **B** into an electric field. The field $\mathbf{v} \times \mathbf{B}$ has no existence in space. The force $q\mathbf{v} \times \mathbf{B}$ exists only on a charge particle moving at speed v. It does not matter at what speed a charge particle is moving, relative to the particle, the speed of electromagnetic wave is the speed of light c, a constant.

The force $(q/c)\mathbf{v} \times \mathbf{B}$ does not exist. What exists is $q\mathbf{v} \times \mathbf{B}$ on a moving charge particle of speed v. The force $(q/c)\mathbf{v} \times \mathbf{B}$ in Lorentz Transform is only for propagating magnetic fields; it is not the same as $q\mathbf{v} \times \mathbf{B}$ for any magnetic field. The force $q\mathbf{v} \times \mathbf{B}$ for moving charge particle at speed v in a magnetic flux density **B** has been known long before Lorentz. Lorentz fields and Lorentz force do not exist,

E'≠E±(1/c)v×B	(7.13)
B'≠B±(1/c)v×E	(7.14)
F ≠q[E ±(1/c) v × B]	(7.15)

Lorentz force $(q/c)\mathbf{v} \times \mathbf{B}$ does not have the units of a force. It is only the $q\mathbf{v} \times \mathbf{B}$ that has units of a force. Since c is the speed of light with unit m/s, the units do not match in the Lorentz force, which is a further indication that the Lorentz force is false.

Lorentz Transform does not exist. Light is not relative. Motion of an observer cannot change the propagation of light. Motion of an observer cannot change the field strengths of propagation of light. A motion of a frame or an inertial frame cannot change the field strengths of light. A motion of an observer cannot chance the energy density of a propagating electromagnetic wave.

A moving frame has no effect on the propagation of light. Light does not propagate relative to moving frames or stationary frames. Light does not propagate relative to a medium. Light propagates in the empty space even when a medium is present. Light feels the effect of medium through the Coulomb and Ampere constants since the Coulomb and Ampere constants are affected by the presence of a medium.

Propagation of light is absolute. Light propagates in empty space. Light is not relative. Electromagnetic waves are not relative. Electric field **E** and the magnetic flux density **B** are not relative,

E'=E	,	(7.16)
B '= B		(7.17)

For a charge q moving at speed v, the force exerted on the charge by magnetic field **B** is given by,

$F=q(v \times B)$	-	-	(7.18)
v × B =0 if q=0			(7.19)

Without charge q, $\mathbf{v} \times \mathbf{B} = 0$, or $\mathbf{v} \times \mathbf{B}$ has no existence without a charge q. $\mathbf{v} \times \mathbf{B}$ is not a space-filling field. It is only on a charge q that $\mathbf{v} \times \mathbf{B}$ exists.

Electric motors and electric generators founded on the electromagnetic force $\mathbf{F}=q\mathbf{v}\times\mathbf{B}$ predate Lorentz Transform by many decades. Lorentz Transform was for propagating fields, not for non-propagating fields used in electric machines and generators. No electromagnetic device is possible based on the Lorentz force $\mathbf{F}=q(1/c)\mathbf{v}\times\mathbf{B}$ since all the practical devices operates at speed v<<c and Lorentz force $(1/c)\mathbf{v}\times\mathbf{B}\simeq 0$.

Lorentz Transform was derived for radiating fields, not for non-propagating fields. Lorentz force does not exist for non-propagating fields. For electromagnetic radiating fields, magnetic field is already negligible compared to electric field since B=E/c. Lorentz Transform does not apply for non-propagating fields. Lorentz Transform does not exist. Lorentz field does not exist. Lorentz force does not exist. Lorentz Transform has never been used in the design of any electromagnetic device.

Time has nothing to do with the speed of light. Time is a definition. It is we who define the time. If time is relative, time will be directional since the motion of a frame or observer is directional. Time cannot be directional. Time must be non-directional. Relative time was necessary for the Lorentz Transform. If time is relative, relative time must be unique. Since Lorentz Transform is not unique, relative time is not unique. When Lorentz Transform has no existence since Lorentz Transform is not unique, relative time has no existence.

Time and the display on a clock are not the same.

Time itself is absolute. The display of a clock is relative since the display on a clock is determined by the mechanism of the clock. The mechanism of a clock depends on the environment a clock is in. The mechanism of a clock depends on the temperature, pressure, gravity, strength of the battery, tension on the winding, the speed of the clock if the clock is moving, and the medium the clock is in, in general to name a few. Clocks of different mechanisms are affected differently by the environment. The display of a clock is relative since display is determined by the mechanism of a clock, which is relative. Time itself is not relative.

When Lorentz Transform has no existence, it is not just the relative time that has no existence, Special Relativity, and General Relativity have no existence. When Special Relativity has no existence, waveparticle duality has no existence. When wave-particle duality has no existence, Quantum Mechanics have no existence.

So called Modern Physics or most of the Physics in the first half of the twentieth century requires a complete overhaul [3], which must start with the disposal of the Lorentz Transform. Lorentz Transform has no place in science or anywhere in reality. Lorentz Transform is the foundation of all the non-reality in Modern Physics. Lorentz Transform is the mother of all ills in Modern Physics.

VIII. MAXWELL EQUATIONS WITH NORMALIZED ELECTRIC FIELD

Maxwell equations associated with Coulomb and Ampere constants are given by,

$$(\nabla \times \mathbf{E}) = -d\mathbf{B}/dt \tag{8.1}$$

$$(\nabla \times \mathbf{B}) = (1/c^2) d\mathbf{E}/dt$$
 (8.2)

where, $c=1/(\alpha\beta)^{1/2}$, α =Coulomb constant, and β =Ampere constant.

We know that for plane waves, the magnitude of the electric field E is related to the magnitude of the magnetic flux density B by the relationship,

Since c is a quite large value, magnitude of the flux density **B** is quite minute. Though the magnitude of the flux density is negligibly small, the presence of a non-zero **B** is essential for the propagation of light. We can bring both **E** and **B** to compatible magnitudes by normalizing **E** with respect to the speed of light c.

Dividing eqn. (8.1) by the speed of light c, we have,

$$[\nabla \times (\mathbf{E}/\mathbf{c})] = -(1/c)d\mathbf{B}/dt \qquad (8.4)$$

$$(\nabla \times \mathbf{B}) = (1/c)d(\mathbf{E}/c)/dt \qquad (8.5)$$

$$7 \times \mathbf{B} = (1/c) \mathbf{d} (\mathbf{E}/c) / d\mathbf{t}$$
 (8.5)

By substituting E in place of E/c, we are using the normalized E in place of the electric field in Maxwell equations. As a result, the normalized Maxwell equations for propagation of light is given by,

$$\nabla \times \mathbf{E} = -(1/c) d\mathbf{B}/dt \qquad (8.6)$$

$$\nabla \times \mathbf{B} = (1/c) d\mathbf{E}/dt \qquad (8.7)$$

$$\times \mathbf{B} = (1/c) d\mathbf{E} / dt \tag{8.7}$$

It is the normalized Maxwell equations that is used in the Lorentz Transform. The electric field in the Lorentz Transform is in fact \mathbf{E}/c and hence the Lorentz force is given by,

$F=(q/c)(E\pm v\times B)$

(8.8)

Since c is large, the Lorentz Transform on a charge q is negligibly small and nearly zero, $F \approx 0$. In addition, Lorentz Transform applies only for electromagnetic radiation or propagating electromagnetic waves, not for any other fields. Lorentz Transform does not apply to non-propagating electric and magnetic fields.

Electromagnetic fields are not relative. Lorentz force does not exist. No electromagnetic device, no electric motor, no electric generator can be designed using the Lorentz force $F=(q/c)(E\pm v \times B)$ since $F\simeq 0$ due to large c and negligible B. All the electromagnetic devices are designed using the force relationship $\mathbf{F}=q(\mathbf{E}\pm\mathbf{v}\times\mathbf{B})$ that existed many decades prior to the Lorentz Transform, where B is a nonpropagating magnetic field. No speed of light c is involved with the electromagnetic forces. No speed of light factor 1/c is involved in the design of motors and generators. The design of electric motors and generators involve non-propagating electric and magnetic fields. Lorentz force has never been used and cannot be used in the design of electromagnetic devices. Lorentz force does not exist for nonpropagating fields.

Historical Mistake:

Design of electric motors and generators predates the Lorentz Force by many decades. The claim that the electromagnetic force is a result of Lorentz force from Lorentz Transform is false. Electromagnetic force had been known many decades prior to Lorenz Transform. Lorentz Transform is false [2]. Lorentz Transform does not exist.

Corollary:

Lorentz Transform only deals with propagating waves. Lorentz Transform and Lorentz force do not apply to non-propagating electric and magnetic fields that are used in the electric motors and generators.

Theorem: Normalized Correct Maxwell Equations

Reformulated normalized Maxwell equations for the propagation of light is given by,

$\nabla \times \mathbf{E} = -(1/c) d\mathbf{B}/dt$	-	(8.9)
$\nabla \times \mathbf{B} = (1/c) d\mathbf{E}/dt$		(8 10)

 $\nabla \times \mathbf{B} = (1/c) d\mathbf{E}/dt$ (8.10) where, $c=1/(\alpha\beta)^{1/2}$, α is the Coulomb constant and β is the Ampere constant. The existence of Coulomb constant α and Ampere constant β does not depend on the existence of a medium.

Theorem: Speed of Light c

Reformulated correct Maxwells equations are determined solely by the speed of light c. The speed of light c is exclusively determined by the Coulomb constant α and Ampere constant β , which are universal constants.

Properties of Correct Maxwell Equations:

Reformulated correct Maxwell equations are antisymmetric. Unlike the original Maxwell equations formulated by Maxwell, there is no need for an Aether deity in the reformulated correct Maxwell equations. Although the original Maxwell equations do not propagate in a vacuum, reformulated correct Maxwell equations propagate in a vacuum. Unlike the original Maxwell equations that are incompatible with the propagation of light in a vacuum, reformulated correct Maxwell equations are totally compatible with the propagation of light in a vacuum. Reformulated correct Maxwell equations propagate in vacuum as well as in a medium with no additional requirements or assumptions.

IX. DIELECTRIC CONSTANTS ϵ AND μ HAVE NO PLACE IN ELECTROMAGNETIC THEORY

Maxwell equations, electromagnetic wave propagation, speed of light, capacitance and inductance of electrical circuit elements are determined by the Coulomb constant α and Ampere constant β . Some of the important relationships involving Maxwell equations are given by,

D =α E	(9.1)
Β =βΗ	(9.2)
1/2	()

$$c=1/(\alpha\beta)^{n/2}$$
(9.3)
$$\nabla \times \mathbf{E}=-(1/c)d\mathbf{B}/dt$$
(9.4)

$$\nabla \times \mathbf{B} = (1/c) d\mathbf{E}/dt$$
 (9.5)

where, c is the speed of light in a medium. **E** is the electric field, **D** is the electric flux density, **B** is the magnetic flux density, **H** is the magnetic field,

Electrical energy density= $(1/2)\alpha E^2$	(9.7)
Magnetic energy density= $(1/2\beta)B^2$	(9.8)
Energy density= αE^2 or $(1/\beta)B^2$	(9.9)

Speed of light in a vacuum c_0 is given by,

$$c_o = 1/(\alpha_o \beta_o)^{1/2}$$
 (9.10)

where,

 α_o =Coulomb constant in a vacuum

 β_{o} =Ampere constant in a vacuum.

Coulomb constant and Ampere constants do not require a medium. Since $\varepsilon = \alpha/\alpha_o$ and $\mu = \beta/\beta_o$, we have,

$$=c_{o}/(\epsilon\mu)^{1/2}$$
 (9.11)

where,

 $\epsilon = \alpha/\alpha_o > 1$ (9.12)

 $\mu = \beta/\beta_{o} > 1$ (9.13) $n = c_{o}/c = (\alpha\beta/\alpha_{o}\beta_{o})^{1/2} = (\epsilon\mu)^{1/2} > 1$ (9.14)

 $n=c_o/c=(\alpha\beta/\alpha_o\beta_o)^{1/2}=(\epsilon\mu)^{1/2}>1$ (9.14) where n is the refraction index of a homogeneous medium.

The refraction index n of a medium is related to the Coulomb and Ampere constants. The definition of the refraction index of a medium does not require the permittivity ε and the permeability μ of a medium. It is through Coulomb constant α and Ampere constant β that the refractive index n relates to the permittivity ε , and permeability μ of a medium.

Capacitance C of a parallel-plates capacitor with area A, and the separation distance d of the parallel plates is given by,

$$C = \alpha_o(A/d)$$
(9.15)

In the presence of a medium, the parallel plate capacitance C is given by,

$C=\alpha(A/d)$

(9.16)

As we can see from eqns. (9.12) and (9.13), the permittivity ε and the permeability μ of a medium are defined by the Coulomb constant α and the Ampere constant β . The permittivity ε and the permeability μ of a medium play no role in electromagnetic theory and electrical circuits. Even the definition of the refractive index n of a medium does not require the permittivity ε and the permeability μ of a medium.

The permittivity ε and the permeability μ of a medium are secondary parameters defined by the Coulomb constant α and Ampere constant β . The permittivity ε and the permeability μ have no existence without a material medium. The permittivity ε and the permeability μ have no existence in a vacuum or in empty space, where electromagnetic wave exists, and propagation of electromagnetic waves takes place. The presence of a material medium is an obstruction to the propagation of light.

Propagation of light through a medium is not an absorption and reemission process by the atoms in the medium. The change of speed of light in the presence of a medium does not take place at the boundary. The change of speed of light takes place at every point where there is a density gradient or the change of the medium. The claim that the change of speed of light only occurs at the boundary applies exclusively for light that is entering a homogeneous medium. In the case of an inhomogeneous medium the change of speed of light is position dependent since the medium density is position dependent. Coulomb and Ampere constants of a homogeneous medium are position independent. As a result, the permittivity and permeability of a homogeneous medium also position independent. Similarly, Coulomb and Ampere constant of an inhomogeneous medium is position dependent, and hence permittivity and permeability of a medium is position dependent.

Electromagnetic wave propagation takes place in space even when a medium is present. The effect of the presence of medium is the slowing of the speed and the change of the direction or diffraction. The mechanism of the propagation of light does not require a medium. Light is not carried by a flowing medium. Light has no direct effect by the flow of a medium. A medium flowing in the direction of light cannot increase the speed of light by the speed of the flow. A medium flowing against the direction of the light cannot decrease the speed of light by the speed of the flow. However, there is a secondary effect on light in the presence of a flowing medium since a flowing medium is inhomogeneous.

In a flowing medium, Coulomb and Ampere constants are position dependent. The variation of the Coulomb and Ampere constants along the flow bends the direction of light with the flow due to the density variation along the flow. As a result, it may appear as if the light is carried away with the flow of a medium.

The speed of the flow of a medium has no direct effect on the speed of light. The effect of a flowing

medium on light is always a secondary effect due to the variation of the density along the flow of the medium. The change of density of the medium along the flow of the medium changes the Coulomb and Ampere constants, which in turn affect the speed of light and the direction of the light.

Einstein's use of Fizeau's experiment in a frivolous attempt to justify Special Relativity is meaningless, inappropriate, false, incorrect, and unwarranted; quite simply preposterous. Fizeau's conclusions are incorrect, and it is a result of experimental misinterpretation. Fizeau failed to realize the fact that a flowing medium is inhomogeneous, and the dielectric properties of a flowing medium are position dependent. Light propagates in space even in the presence of a medium. The effect of a medium on light is simply through the change of propagation parameters by the medium. You can make the medium to flow, remain standstill, or even remove the medium, but light will continue to propagate in space despite what you do to the medium. It is only the direction and the speed of light that is altered by the presence of a medium. It is only the Coulomb constant α and the Ampere constant β that vary with the state of a medium.

Lemma:

Light is not carried by a flowing medium at the speed of the medium. Speed of light in a flowing medium is position dependent. The change of speed and direction of light in a flowing medium is always a result of position dependent density variation in the flowing medium.

Coulomb constant α and the Ampere constant β do not require a medium for their existence, and hence propagation of light does not require a medium. No Aether is required for the propagation of light or the propagation of electromagnetic waves. There is no Aether.

Lorentz Transform is only involved with the propagation of light or electromagnetic radiation waves. Lorentz Transform does not apply to non-propagating electric and magnetic fields. Lorentz force does not apply to non-propagating electric fields and magnetic fields. Speed of light is not involved in the force exerted on a moving charge by a magnetic field. There is no Lorentz force. Lorentz force $\mathbf{F}=(q/c)(\mathbf{E}+\mathbf{v}\times\mathbf{B})$ has never been used, and cannot be used, in designing any electromagnetic device.

Lorentz force does not apply for non-propagating electric and magnetic fields. Alas, Lorentz force is approximately zero and useless for any engineering application. If electric devices are designed using Lorentz fore, they will be useless, none of them will work. On the other hand, Lorentz Transform and Lorentz force does not exist. Relative time is a religious ideology, not a practical reality.

Due to the presence of factor 1/c, the Lorentz force

is nearly zero. No electromagnetic device can be designed using the Lorentz force. What has been used in the design of electromagnetic devices such as motors and generators is the electromagnetic force relationship $\mathbf{F}=q(\mathbf{E}+\mathbf{v}\times\mathbf{B})$, which predates the Lorentz Transform in many decades. The force relationship $\mathbf{F}=q(\mathbf{E}+\mathbf{v}\times\mathbf{B})$ has been existed since the first half of the 1800 AD, long before Lorentz came into the seen. Engineers have been designing electric motors and generators long before Lorentz Transform was invented.

The claim in textbooks that electromagnetic force was introduce by Lorentz is false; simply preposterous. Lorentz used the Lorentz Transform to Transform electromagnetic waves onto a moving frame. Lorentz Transform do not apply to nonpropagating fields. Electric motors and generators are based on non-propagating electric and magnetic fields, where Lorentz Transform does not apply. Lorentz force does not apply to non-propagating fields. Lorentz Transform is not unique. Lorentz Transform does not exist. Lorentz force does not exist. Lorentz Transform based on relative time does not hold true since time cannot be relative, and Lorentz Transform is not unique.

It is only that a magnetic field, irrespective of whether it is propagating or non-propagating, exerts a force on a moving charge particle. Similarly, moving non-propagating magnetic field exert a force on a stationary charge particle. This force is only present in the presence of a charge particle. $q\mathbf{v} \times \mathbf{B}$ has no existence without a charge. There is no $\mathbf{v} \times \mathbf{B}$ field. $\mathbf{v} \times \mathbf{B}$ is not an electric field present in space. $\mathbf{v} \times \mathbf{B}$ is a force per unit charge that is only present in the presence of a charge particle. If q=0, $\mathbf{v} \times \mathbf{B}$ is zero. If $q\neq 0$, $F=q\mathbf{v} \times \mathbf{B}$.

Motion of an observer does not turn a magnetic field into an electric field and vice versa. Irrespective of the speed of an observer, no observer can transform a magnetic field into an electric field and electric field into a magnetic field. It is only a moving charge particle that experiences a force in the presence of a magnetic field. A moving charge particle in the presence of a propagating or non-propagating magnetic field experiences a force. A force exerted by a non-propagating magnetic field on a moving charge particle is not a Lorentz force since Lorentz force applies only for propagating electromagnetic fields.

There is no such force called Lorentz force. There is no real transform called Lorentz Transform. Neither a non-propagating electric and magnetic fields nor a propagating electromagnetic wave can exert a force on a stationary charge.

Moving non-propagating magnetic field **B** at speed **v** exerts a force $q\mathbf{v} \times \mathbf{B}$ on a stationary charge q. Propagating magnetic field **B** does not exert a force on a stationary charge. You cannot give a ride to light or electromagnetic waves on a moving frame. Light or electromagnetic waves do not hitchhike.

X. REASONS FOR INVENTING A HYPOTHETICAL MAN-MADE MEDIUM AETHER AND WHY AETHER DOES NOT EXIST

1) The Ampere-Maxwell equation has a constant current term,

$$\nabla \times \mathbf{B} = \beta \mathbf{J} + (1/c) d\mathbf{E}/dt$$
 (10.1)

Here, **E** is normalized. For the current **J** term to exist, there must be a medium. Invention of a hypothetical medium is an easy solution.

As we have seen, the Ampere-Maxwell equation in Maxwell equations for the propagation of light is incorrect. The constant current **J** term cannot exist in the Ampere-Maxwell equation since no current can exist if $d\mathbf{E}/d\mathbf{t}=0$. The correct Maxwell equations for normalized **E** are given by,

$$\nabla \times \mathbf{E} = -(1/c) d\mathbf{B}/dt \tag{10.2}$$

 $\nabla \times \mathbf{B} = (1/c)d\mathbf{E}/dt$ (10.3) Maxwell equations are anti-symmetric and there is no constant current **J** term unless $d\mathbf{E}/dt$ =constant. When $d\mathbf{E}/dt$ =constant, there is no wave to propagate, and Ampere relationship holds. When $d\mathbf{E}/dt$ ≠constant and $d\mathbf{E}/dt$ ≠0, Maxwell relationship holds. A medium is not required for the correctly reformulated Maxwell equations. No hypothetical Aether is required.

Properly redrived Maxwell equations are determined by the speed of light c. Speed of light c is determined by the Coulomb constant α and Ampere constant β . The existence of properly rederived Maxwell equations does not depend on the existence of a medium. Unlike the original Maxwell equations, properly rederived Maxwell equations are not at the mercy of a medium. No Aether deity is required.

2) A long-held belief in measuring the speed of any entity is that the speed of an entity must be measured with respect to something else. In fact, this belief is true for the measurement of the speed of any mass since motion of a mass is relative. However, this cannot be extended to massless electromagnetic waves or light. Light is not relative. Massless cannot be relative. Light has no momentum.

Law of Nature:

There is no Relative Motion without Absolute Motion [5].

3) A long-held claim that the speed of light in a vacuum c_o is determined by the permittivity ε_o and the permeability μ_o of the vacuum, $c_o=1/(\varepsilon_o\mu_o)^{1/2}$, necessitated a hypothetical medium Aether since permittivity and the permeability have no existence without a medium. As we have seen, the speed of light is not determined by the permittivity and the permeability have no existence without a medium. Maxwell equations for propagation of electromagnetic waves and the speed

Lemma: No Hitchhiking

of light are determined by the Coulomb constant α and the Ampere constant β , which do not require a medium for their existence.

Speed of light c is given by $c=1/(\alpha\beta)^{1/2}$, where α is the Coulomb constant and β is the Ampere constant. Since the existence of α and β do not require a medium, no Aether deity is required for the correct Maxwell equations for propagation of light in a vacuum.

4) Even in the presence of a medium, light does not propagate relative to a medium. Light propagates in the space, empty space irrespective whether a medium is present or not. A medium is an obstacle to the propagation of light. No medium is required for the propagation of light. No Aether is required for the propagation of light.

5) A vacuum is a vacuum is a vacuum. There are no two separate vacuums called mathematical vacuum and physical vacuum. Separation of vacuum into a mathematical vacuum and a physical vacuum is simply a bogus attempt to justify original Maxwell equations that cannot exist in a vacuum. Original Maxwell equations have no existence in a vacuum since dielectric properties permittivity and permeability have no existence in a vacuum.

The attempt to separate vacuum into mathematical vacuum and a physical vacuum shows the confused state of Modern Physics, Modern Physics is in complete disarray. Modern Physics is in a dire state requiring a total no-hold bar overhaul.

A vacuum is a vacuum because there is nothing in it. A vacuum is simply the empty space. If there is something in it, it is not a vacuum. Quantum vacuum is an oxymoron. The concept of quantum fluctuations in a vacuum is purely hypothetical, not real, exists only on papers, not in reality. Quantum Mechanics is not real, hypothetical [3], not a mechanism of nature. Quantum fluctuations do not exist.

A hypothetical quantum vacuum is not required for the propagation of light. Light propagates in a vacuum. Vacuum contains nothing. Light requires nothing for the propagation. Original Maxwell equations do not propagate in a vacuum. Original Maxwell equations cannot exist or propagate without a medium. Original Maxwell equations do not represent the propagation of light in a vacuum. Original Maxwell equations requires a correction, reformulation. Reformulated Maxwell equations based on Coulomb constant and Ampere constant exist in a vacuum and propagate in a vacuum. Reformulated Maxwell equations represent propagation of light both in a vacuum and in any medium.

6) Light does not have a stand-still existence. Light has no existence without propagation. If there are standing light, we should be able to have perpetual light without expending energy. If you want perpetual light for free, all you must to do is construct a standing light tube. It will keep lighting the house day and night with no energy cost. Problem is there are no standing light waves except in misguided minds and textbooks.

The claim that the standing electromagnetic waves generate mass is simply bogus, meaningless, pure fantasy, blindness, nothing more to it. Electromagnetic waves cannot generate particles of mass. A particle or mass is not electromagnetic waves. Electromagnetic fields do not have existence without a charge. A charge has no existence without a mass. As a result, electromagnetic waves have no existence without a mass. Both gravitational field and electromagnetic field have no existence without a mass.

The claim that a field generates a mass is simply false and meaningless. The fact is that fields have no existence without a mass. Electromagnetic fields cannot generate a mass. Electromagnetic energy is not kinetic energy. Electromagnetic energy has no associated mass. Energy of a mass has nothing to do with the speed of light. The mass energy relationship in Special Relativity is false, $E \neq mc^2$.

Special Relativity assumes that the time is dependent on the speed of an object or a frame. Special Relativity claims that it is based on propagation of light, yet, Special Relativity have no way to prove that it is dealing with the light itself and not a mass moving at speed c. In hindsight, in fact, what Special Relativity deals with is a mass moving at the speed of light c, not the light itself. There is no way to bring a motion of a mass and propagation of light under a unified framework. Any attempt to do that will end up bringing the motion of a mass and motion of a mass at the speed of light under a single frame, nothing more; that is exactly what is happening in Special Relativity. That is how light got a fake momentum in Special Relativity.

Since Special Relativity is based on Lorentz Transform, the frame or object of mass must start with constant speed, which is impossible. To use the Lorentz Transform, an object or fame of mass must start at the constant speed and remain at the same speed. In addition, a mass moving at the speed of light c must also start at the speed of light c. As a result, if a mass start at speed of light c and continues at that speed c, it has kinetic energy $E=mc^2$, which is the Einstein's mass energy relationship. No mass can start at constant speed, $E\neq mc^2$.

XI. SPECIAL RELATIVITY HAS NO INVOLVEMENT WITH PROPAGATION OF LIGHT

Special Relativity [1] is a result of a confusion between simultaneity and propagation of light, which have no apparent connection [2,5]. Time itself has nothing to do with propagation of light. Simultaneity has nothing to do with propagation of light. What an observer sees or hears as simultaneous says nothing about the simultaneity of events. Observers do not determine simultaneity of events. Physical events are observer independent. Simultaneity of events are

observer independent.

Time of an occurrent of an event is observer independent. Time is observer independent. Events happen irrespective of we are there to witness them or not. Our observation of events has nothing to do with events themselves. Time is speed independent. Mass is speed independent. Gravity does not alter time. Clocks display what we want them to display. It is we who design clocks do display our definition of time.

Gravity does not bend light. Original Maxwell equations do not represent the propagation of light in a vacuum. Time is not relative. Lorentz Transform is not real. There is no Lorentz force. Lorentz Transform only deals with propagating electromagnetic waves. Lorentz force does not describe a force on a moving charge in the presence of non-propagating magnetic field. The claim that "the force on a moving charge in the presence of a magnetic field is Lorentz force" is false since Lorentz Transform does not deal with static fields.

Force on a moving charge in a magnetic field had been known many decades before Lorentz. Generators and motors had been designed way before Lorentz Transform. No electric device can be designed using the Lorentz force. Lorentz force does not apply to non-propagating magnetic fields. Propagating magnetic field does not generate a force on a stationary charge. Force on a moving charge particle in the presence of a stationary magnetic field is not a Lorenz force; it does not involve speed of light. Lorentz Transform does not apply to stationary electric and magnetic fields.

The claim that the Special Relativity is based on the propagation of light sounds fancy, but it is simply false [5,6]. Propagation of light is never involved in Special Relativity. What is involved in the Special relativity is an object of mass moving at the speed c, the speed of light. It is the speed c that is involved, not the light itself. Special Relativity is grounded on the false assumption that the light is relative, which is based on the false assumption that time depends on the frame of reference. Time is not relative. Light is not relative.

Lorentz Transform is false, mathematical fancy, not reality. You cannot mix waves and mass under the same dynamics. Wave propagates. Masses move. Masses have a momentum, waves do not. Only possibility is to consider a mass or frame moving hypothetically at the speed of light. And that is exactly what is taking place in Special Relativity.

The claim in Special Relativity that every motion is relative is false. It is true that the motion of a mass can be considered relative to the motion of another mass. However, relative motion of a mass cannot exist without an absolute motion. Without absolute motion, there is no relative motion. Propagation of light or propagation of electromagnetic waves is absolute, not relative. Motion of a mass relative to the propagation of light is the absolute motion of a mass. Absolute speed of a mass can be measured [5]. Special Relativity claims that it is founded on the fact that the speed of light is frame independent. It is true that the speed of light is frame independent. However, Special Relativity is not required for light to be frame independent.

Special Relativity itself is contradictory. If Special Relativity is true, it contradicts the claim that speed of light is a constant and frame independent. If Special Relativity hold true. it generates Shear Electromagnetic (SEM) Waves that depends on the frame of reference [2]. The presence of SEM waves in Special Relativity defeats the claim in Special Relativity that the speed of light is frame independent. Although Transversal Electromagnetic (TEM) waves are frame independent, the SEM waves generated in the Special Relativity are frame dependent making Special Relativity false.

The space time function in Special Relativity is not unique [2]. As a result, Special Relativity and General Relativity are false; they are not mechanisms of nature. There is no spacetime. Spacetime is meaningless. When spacetime function is not unique Lorentz Transform have no existence. Since General Relativity is false, black holes as mathematical singularities of spacetime in General Relativity do not exist.

However, black holes are real. Black holes are not necessarily massive objects. Black holes are objects of large mass densities. When an object, any object, reaches the speed of light, its volume decreases and mass density increases resulting a black hole [7]. Black holes are not spacetime singularities from General Relativity. General Relativity is false. Black holes have nothing to do with General Relativity. Black holes as a fast-moving object with very high mass density are real and they exist. When an object is fast moving, it leads to a volume contraction, which result in an increase mass density. When the speed of the object approaches speed of light, the mass density of the object approaches infinity resulting a black hole [7].

Special Relativity uses a mass moving at speed of light and falsely claims that it uses light itself. It is this mischievous claim that gave an artificial momentum to light and steered physics into a hypothetical and unrealistic abyss [3]. Light has no mass. Light has no momentum. Any entity with a momentum cannot have a constant speed under gravity. If light has a momentum, light cannot have a constant speed under gravity. Momentum without a mass is not real. N massless momentum. Electromagnetic waves have no kinetic energy. Masses move, waves propagate; two different processes. If light has a momentum, light cannot propagate. Motion in propagation is orthogonal to the direction of propagation. Massless has no momentum. Massless momentum is an oxymoron, mathematical fantasy.

Time is a definition. Time is a moment, this very instant, not a dimension. Past does not exist. Future does not exit. What is there is the present, this moment. There is no physical entity call time. Clock is a device we engineer to display our definition of time. Time does not determine how a clock run. How a clock is engineered to run determines the time on a clock. Gravity affects the mechanism of a clock, not the time. Gravity has no effect on massless.

Our use of light to synchronize clocks does not mean the simultaneity has any dependence on light. Simultaneity of two events has nothing to do with propagation of light. Simultaneity is observer independent. Whether two events occurred simultaneously or not is not determined by observers.

A clock or any engineered device gives the correct measurement if the design specifications are met. Light has no mass and hence gravity has no effect on light. A clock under different environment conditions produces different time because the effect of different environment conditions on the mechanism of the clock is different. Time itself is not influenced by different environment conditions. Time itself is unaffected by speed or gravity. It is simply the experimental misinterpretations that have led to meaningless false claims that time is relative and affected by gravity. Time itself is unaffected by gravity and motion.

Time is not relative. Time cannot be relative. Anything without a mass cannot be relative. Any entity without a mass cannot have a momentum. If time is relative, time will be directional. If time is relative, time will not be unique. Time cannot be directional. Time must be unique. Time cannot be relative. Without time being relative, there cannot be a spacetime. Without Lorentz Transform being unique, there cannot be a spacetime. Lorentz Transform is not unique [2,5]. There is no spacetime. The concept of spacetime is meaningless, it is not science. Special Relativity, General Relativity, Spacetime are not scientific-paths, they are psycho-paths to nowhere, to nirvana, nothing more. Bogus Lorentz Transform is the mother of all ills in Modern Physics.

Corollary:

There is no relative motion without an absolute motion. There is no motion without a mass.

Physicists have always been avoiding the word absolute. They always avoid even any mention of the absolute motion of an object as if it is a forbidden subject. However, it is time to address the elephant in the room. We have been avoiding the absolute motion because we did not know how to define the absolute motion since Special Relativity considered the light to be relative and almost all the physicists have been riding the Special Relativity bandwagon.

Now it is clear that the Special Relativity is wrong, and light is not relative [2], we finally can address the absolute motion, a fact of nature. Without absolute motion of a mass, there cannot be a relative motion. Motion of a mass is relative. Propagation of electromagnetic waves is not relative. Massless cannot be relative. Light is not relative and as a result, the absolute motion of an object of mass is the motion of the mass with respect to the speed of light. Absolute motion can be determined using the propagation of light [5].

XII. TIME: IT IS THIS INSTANT, NOTHING MORE

For nature, time is this instant, nothing more. We define the progression of time and engineer clocks to measure it. Time is not a dimension for nature. This instant is that is all in existence as time for nature. It is we who define the progression of time using the changes in nature. There is no progression of this instant unless we define it using the changes in nature.

What is real is the change of objects in nature. We define the progression of this instant or time using the cyclic changes in the nature. We engineer clocks to do that. Nature does not engineer clocks. The clocks we engineer have no meaning for nature. A clock is not a clock for nature. The clocks we engineer have no meaning for somebody living in a cave in isolation. A clock is not a clock for a cave man. A moving hand or changing display on a dial is not the time unless we are taught that it is. A clock is a clock for someone who is aware of what it is designed for.

Definition: Time

Time is this instant. This instant is this instant on earth, this instant on mars, this instant on any planet, this instant on any galaxy irrespective of their motion. This instant is this instant everywhere in the universe.

Simultaneous Events:

All the events happen at the same instant are simultaneous events. All the events happen at this instant anywhere in the universe are simultaneous. Simultaneity is observer independent.

If an observer does not see or hear two events at the same instant, that does not mean they cannot be simultaneous; they may or may not be simultaneous. However, if any observer sees or hears two events to be simultaneous, they are indeed simultaneous. If a stationary observer is at the same distant from the two events sees or hears the events at the same instant, they are simultaneous. Simultaneity is not determined by observers. Irrespective of observers, if two events take place at the same instant, they are simultaneous.

There is no arrow of time in nature. It is we who define the progression of time, an arrow of time. What is present is this instant and the changes in the environment that is taking place. Yester-second is not present. Future-second is not present. Changes are taking place at this instant and we use those to define the progression of this instant or time and the arrow of time. There is no progression of this instant unless we define it. Arrow of time only exists as a definition. Arrow of time is not an axis you can travel on; it does not exist except in our outdated notebooks and textbooks. Arrow of time is the progression of this

instant we have defined.

It is not the time that is changing. It is what is present in the universe that is changing. We use the change to engineer clocks to indicate the progression of this instant or time. Time does not change things. The change of things is used to define the progression of time, progression of this instant.

Clock displays whatever it is design to display. It is we who give the label "time" to what is on the dial. For nature, what is displayed on the dial of clock has no specific meaning. What is displayed on the dial of the clock is decided by the engineer who designed it. Nature has no clue to what is on the dial of a clock. Gravity has no clue to what is on a dial of a clock. A clock is just a counter that we design.

Gravitational field of a mass only feel the gravitational field of another mass. Gravity act on the mechanism of the clock, mass, not what it displays. The reading on a clock has no meaning unless we, designers, give it a meaning. Reading on a clock varies by anything that affect the mechanism of a clock, temperature, pressure, speed, wind, gravity, etcetera. Any engineered device gives the correct reading on the dial when the device is in an environment that it is designed to operate.

When we have clocks in different places, we like to set them to a same time remotely. So, we use light or electromagnetic waves to achieve that since light travel much faster than the speeds we are dealing with. A method we use to synchronize clocks has nothing to do with simultaneity of events. Light has its own limitations for the synchronization of clocks. Limitation of a method we use to synchronize clocks is our problem; it is not a problem of time, light, clocks, or nature. Light does not exist for us to synchronize clocks.

Light has nothing to do with this moment, the time. This moment, time, is same everywhere in the universe. Nature does not use light to synchronize time, this moment. Simultaneity should not be defined to reflect our difficulty in synchronizing clocks with light that takes time to travel; it is an engineering problem, not a problem of nature. Nature does not use propagation of light to define simultaneity. We should not use our engineering problems to define physical laws of nature. Use the physical laws of nature to solve engineering problems.

Corollary:

What is displayed on a clock is time only for a person who is taught it to be time. For nature, for any other species, and for anybody else who were not taught what is displayed on a clock is time, what is displayed on a clock has absolutely no meaning. What is displayed on a clock has no meaning for a cave man. What is displayed on a clock has no meaning for a gravitational field. How can gravity affect time when gravity has no clue to what time is?

Einstein tried to define the simultaneity using the propagation of light. Propagation of light has nothing to with simultaneity. Nobody defines simultaneity. Simultaneity is a word with a meaning. Simultaneity is not a definition. Events happen at this instant anywhere in the universe are simultaneous. Simultaneity is independent of observers. What an observer sees does not determine the simultaneity. Observers do not determine the simultaneity of events. Observers have nothing to do with simultaneity. Simultaneity nothing has to do electromagnetic waves or light.

Lemma:

Time, this instant, has nothing to do with light. Simultaneity has nothing to do with light.

Nature does not use light to determine simultaneity. If we employ light to determine simultaneity of events, its limitations are our problems, not nature's problems. Nature does not use light to determine simultaneity. Nature did not invent light to determine simultaneity. Observer's use of light to determine simultaneity of events says nothing about the simultaneity of actual events happening.

If lightning strikes at this instant at two places, it is not a surprise that an observer close to one lightning strike sees it first; there is nothing special about it. An observer closer to one lightning strike sees two strikes as not simultaneous does not mean they are not simultaneous.

Corollary:

Observers do not determine the laws of nature; they just observe.

In other words, time, which is this instant, has nothing to do with light. A clock has nothing to do with this instant. A clock has nothing to do with light unless the mechanism of the clock is based on light. Clock is an engineered device to indicate the progression of time for the people who know what a clock does and how to read its dial. Nature does not read the dial. Readings on dials of clocks are immaterial for this instant since this instant is same everywhere. Despite what dials of the clocks indicate, this instant is the same everywhere in the universe.

Time itself has nothing to do with the propagation of light. Clocks themselves have nothing to do with propagation of light unless the design mechanism of the clock involves the propagation of light. Time is not relative. Time does not stop at the speed of light. Time and the speed of light are mutually independent. Time on a clock is a definition. It is we who define the time on a clock. Time is not a dimension since neither the past, nor the future exist. Time is this moment, not a dimension. Light is not relative. Despite what is being said by Lorentz Transform, no motion can turn a magnetic field into an electric field and electric field into a magnetic field.

Simultaneity: Not a Definition

Corollary:

An engineering difficulty of synchronizing clocks using light is our problem, not a problem for the nature since nature does not use light for clock synchronization. Observers do not determine the fundamental law of nature. The purpose of the existence of light in the nature is not for clock synchronization.

Since a source releases light in wave bursts of finite durations, light is not anchored to a source and there is no standing light. If you try to bring the motion of a mass and propagation of light under a unified framework, in effect, what you end up bringing together is a motion of a mass and a mass moving at the speed of light, not the light itself. Light has no momentum. Motion and propagation cannot be unified. There are no standing-light waves. A burst of light has no existence without propagation. Massless momentum is pure mathematical fantasy. Nonexistence of a massless moment is clear from the fact that the magnetic potential vector used in the LaGrange in the derivation of the canonical momentum is not real. Magnetic potential vector is hypothetical. LaGrange based on the Magnetic potential vector is hypothetical. The canonical momentum derived as the derivative of a hypothetical LaGrange with respective to velocity is also hypothetical.

Simultaneity of events are not determined by light or observers. The use of light as a mechanism to engineer clocks to display the progression of time is not an indication of any dependence of time on light. Although Special Relativity claims that it is based on propagation of light, propagation of light is never involved in Special Relativity. What is involved in Special Relativity is a mass moving at the speed of light, not the light itself [5]. Time is this instant. Progression of time is a definition. Time is not relative. Time does not stop at the speed of light or in a black hole. Black holes are objects of infinite densities. Spacetime has nothing to do with black holes. Spacetime is not unique and has no existence. No matter how strong the gravity is, gravity cannot bend light. Space and time are mutually independent.

Light cannot be used to synchronize clocks. We use the light for approximate clock synchronization. Any entity that takes time to travel cannot be used for clock synchronization. Any entity, such as light, whose speed is dependent of the density variation of the medium or the change of medium, cannot be used for clock synchronization. Best way to synchronize clocks is in the factory setting at the same place so the propagation delay and the medium changes can be neglected.

XIII. CORRECT PATH TO NIRVANA Original Maxwell Equations:

 $(\nabla \times \mathbf{E}) = -d\mathbf{B}/d\mathbf{t}$

where	$(\nabla \times \mathbf{H}) = \mathbf{J} + d\mathbf{D}/d\mathbf{t}$	(1.24)
where,	D=εΕ	(4.1.15)
	σ -μπ	(4.1.10)

The Problem-1:

Maxwell equations are incompatible with propagation of light in a vacuum.

The Reason for Incompatibility:

Maxwell equations require dielectric constants permittivity ε and permeability μ for their existence. Vacuum has no dielectric constants. Maxwell equations do not propagate in a vacuum. Light propagates in a vacuum. As a result, Maxwell equations do not represent propagation of light in a vacuum.

The Problem-2:

Ampere-Maxwell equation is incorrect.

The Reason for Incorrectness of Ampere-Maxwell:

There is a current density **J** even when $d\mathbf{D}/dt=0$. This is not possible. There cannot be any current when $d\mathbf{D}/dt=0$.

Solution to Both Problems:

Reformulation of the Maxwell Equations without permittivity ϵ and permeability $\mu.$

Reformulated Correct Maxwell Equations:

$(\nabla \times \mathbf{E}) = -d\mathbf{B}/d\mathbf{t}$	(5.19)
	(5.00)

$(\nabla \times \mathbf{B}) = (1/c^2) d\mathbf{E}/dt$	(5.20)
D=aE	(57)

_		(••••)
B=	β H	(5.8)

where, $c=1/(\alpha\beta)^{1/2}$, α is the Coulomb constant and β is the Ampere constant.

Coulomb constant α and Ampere constant β do not require a medium for their existence. Coulomb constant α and Ampere constant β exist in a vacuum. Reformulated correct Maxwell equations propagate in a vacuum. Reformulated Correct Maxwell Equations are anti-symmetric. Reformulate correct Maxwell equations are compatible with the propagation of light.

Normalized Reformulated Maxwell Equations:

$\nabla \times \mathbf{E} = -(1/c) d\mathbf{B}/dt$	(8.9)
$\nabla \times \mathbf{B} = (1/c) d\mathbf{E} / dt$	(8.10)
D =α E	(5.7)
Β =β Η	(5.8)
$c=1/(\alpha\beta)^{1/2}$	(5.12)

where, α is the Coulomb constant and β is the Ampere constant.

The existence of Coulomb constant α and Ampere constant β does not depend on the existence of a medium.

Nirvana: Final Enlightenment (The True Light)

Reformulated Maxwell equations are compatible with propagation of light everywhere in a vacuum

(1.23)

or in a medium.

- No Aether is required.
- Light always propagates in space even when a medium is present.
- A flowing medium cannot drag light with its flow. Any effect of a medium on light is through Coulomb constant α and Ampere constant β.
- The existence of Coulomb constant α and Ampere constant β does not require a medium.
- Speed of light varies with the Coulomb constant α and Ampere constant β.
- The illusion of a medium in motion carrying light with it is simply a result of position dependent Coulomb constant α and Ampere constant β in a flowing medium, not a medium carrying light.
- Light cannot be given a ride on a frame, train, or in a caravan. Light cannot be dragged directly by any mean.
- You cannot piggyback light.
- Light does not take free rides.
- Light does not hitchhike.

Light is not particles. Einstein photons, by definition, are spatially random. Coherent light cannot consist of spatially random photons. Einstein photon, which is just mathematical trickery, does not represent light. Light comes in continuous wave bursts of finite duration. There are no standing light waves except as blind reality oversight in textbooks. If there are standing light, we should be able to have a perpetual light stick to light our houses at no cost.

XIII. LIGHT HAS NO MOMENTUM

Light is not relative [2]. Massless cannot be relative. Massless has no momentum. Speed of any entity that has a momentum cannot be determined by the space or the vacuum. If you cannot increase or decrease the speed of an entity by applying an external force, that entity cannot be relative. Speed of electromagnetic waves cannot be increased or decreased by applying an external force and hence light is not relative.

Any entity that has a momentum must be able to bring to a standstill by applying an equal and opposite momentum [5]. Light cannot be brought to a standstill by applying an equal and opposite momentum and hence light has no momentum. Electromagnetic waves have no existence without propagation and hence electromagnetic waves have no standstill existence. There is no standing light. Canonical momentum is not real. Canonical momentum is a hypothetical mathematical abstraction.

The claim that light and electromagnetic waves in general have a momentum is false. There cannot be a momentum without a mass. Just because we define a canonical momentum using an abstract LaGrange does not mean that it is going to have a real existence. Abstract magnetic potential vector is not real. Any potential is not unique, and hypothetical magnetic potential vector is no exception; it is not unique. Magnetic potential vector based abstract LaGrange is hypothetical, not real; it exists only on paper.

LaGrange does not apply to mass-less, it only applies to kinetic energy and potential energy of masses. LaGrange does not apply to electromagnetic waves since electromagnetic waves do not constitute neither a real magnetic potential energy nor kinetic energy. Concept of magnetic vector potential energy is hypothetical, not real. Without a real magnetic vector potential, there cannot be a canonical momentum.

Propagation of massless electromagnetic waves and motion of massless cannot be unified under a single frame since propagation of light and motion of masses are two different processes with nothing in common, they are orthogonal, Motion in propagation is orthogonal to the direction of motion while motion in a motion of a mass is in the direction of motion [5].

Lemma:

Electromagnetic energy does not belong in the LaGrange. Abstract magnetic vector potential is hypothetical and has no existence. Electromagnetic energy cannot be mixed with mechanical energy in LaGrange. LaGrange is limited to mechanical energy.

Property:

LaGrange does not apply to propagation. LaGrange only applies for the motion of masses.

LaGrange is defined for mechanical energy. You cannot mix magnetic potential vector with mechanical energy in LaGrange. Mechanical potential and magnetic vector potential are not compatible. Mechanical energy and electromagnetic energy are compatible. Electromagnetic potential and not mechanical potential are the not same. Electromagnetic potential does not do any work on a mass whereas mechanical potential does. Mechanical potential does not do any work on a charge whereas electromagnetic potential does.

LaGrange is only applicable for mechanical energy, not for electromagnetic potential. Abstract magnetic vector potential is hypothetical, not real; it does not exist. Canonical momentum for electromagnetic waves obtained using LaGrange is not real, it does not exist. You cannot arbitrarily include a non-existing magnetic potential vector into the LaGrange. Electromagnetic energy does not belong in the LaGrange. LaGrange only applies for motion of masses, not for propagation of waves.

Propagating waves cannot have potential energy. The phrase "potential energy of light" is meaningless. Potential energy applies only for stationary fields, not for propagating fields. There cannot be a propagating magnetic vector potential. The abstract mathematical magnetic vector potential goes against the very definition of the potential. Propagating fields are not vector potentials. LaGrange has no existence without kinetic energy and potential energy. Electromagnetic waves do not have kinetic energy or potential energy. La Grange does not apply for electromagnetic waves since electromagnetic waves have no kinetic energy or potential energy. Canonical momentum has no existence without LaGrange. Propagating light has no kinetic energy. Propagating light has no potential energy. LaGrange does not exist for light. Light has no momentum. Electromagnetic waves have no momentum. Propagation cannot have a momentum. Momentum cannot have propagation.

The pretense of unifying the motion of mass and propagation of light in Special Relativity does not unify the motion of a mass with light itself; it cannot be done. Instead, what Special Relativity does is to consider the motion of a mass and a mass moving at the speed of light, not the light itself. It is this mistake that gave a false momentum to light in Special Relativity.

Lemma:

Massless momentum is an abstract mathematical fallacy. Massless momentum is an outcome of the fallacious Special Relativity, not the reality.

Light does not propagate relative to a mass, frame, or a medium. Light always propagates in space even in the presence of a medium. Light is not relative. When the light is not relative, the speed of light measured on any frame will be independent of the motion of the frame. Michelson and Morley experiment is an indication of that. The measurement of the speed of light does not require a medium to measure it relative to since light is not relative. No hypothetical medium of Aether must be invented for the measurement of the speed of light.

When we say, speed of an object is v, it is fair to ask "with respect to what" since the motion of an object of mass is relative. However, the same question is meaningless with regards to propagation of light since light is not relative. The question "speed of light c with respect to what" has no meaning since the speed of light cannot be measured with respect to a medium, an object, or a moving frame. Propagation of light is absolute, not relative.

Property: No Pick-Up Bylaw

You cannot move a propagating electromagnetic field at a speed \mathbf{v} you want by any mean. You cannot pickup light either by train or by caravan.

XIV. CONCLUSIONS

Maxwell equations do not represent the propagation of light in a vacuum. It is the mistakes in the Maxwell equations that made Maxwell equations inconsistent with the propagation of light in a vacuum. Maxwells equations for propagation of light cannot and should not be determined by the permittivity ε and the permeability μ of a medium. Equations representing propagation of light must be independent

of the parameters of a medium since light travels in a vacuum.

Equations for propagation of light should not be determined by the permittivity and permeability. Permittivity ϵ and the permeability μ are parameters of a medium. There is no permittivity and permeability without a medium. A vacuum has no dielectric properties. A vacuum has no permittivity and permeability. Permittivity ϵ and the permeability μ have no existence in a vacuum. There must be a medium for dielectric properties permittivity and permeability to exist.

Maxwell equations cannot propagate in a vacuum even though light propagates in a vacuum. By formulating the Maxwell equations based on permittivity and permeability of a medium, Maxwell disregarded the fact that light propagates in a vacuum. Maxwell equations are incompatible with the propagation of light in their very foundation. Maxwell equations require a foundational correction.

Permittivity ε and the permeability μ are not primary parameters of a medium. Permittivity ε and the permeability μ are not fundamental parameters; they are secondary parameters defined by using other parameters. Equations for propagation of light do not require a material medium or dielectric constants permittivity ε and the permeability μ of a medium. The presence of a material medium is, in fact, an obstacle to the propagation of light formulated by Maxwell using permittivity and permeability of a medium require a reformulation without the use of the medium dependent permittivity and permeability. Maxwell equations require a correction at fundamental level.

What should determine the correct Maxwell equations for propagation of light is the Coulomb constant α and the Ampere constant β . No material medium is required for the existence of Coulomb constant α and the Ampere constant β . Speed of light is solely determined by the Coulomb constant α and the Ampere constant β . Coulomb constant α and the Ampere constant β . Coulomb constant α and the Ampere constant β exist in space despite space is a vacuum or contains a medium. The presence of a medium increases the Coulomb constant α and the Ampere constant β .

It is the Coulomb constant α that defines the permittivity ε of a medium as the ratio $\varepsilon = \alpha/\alpha_o$, where α is the Coulomb constant of the medium and α_o is the Coulomb constant of the vacuum or empty space. Similarly, it is the Ampere constant β that defines the permeability μ of a medium as the ratio $\mu = \beta/\beta_o$, where β is the Ampere constant of the medium and β_o is the Ampere constant of the medium and β_o is the Ampere constant of the vacuum or empty space. Permittivity and permeability of a medium are secondary parameter, not fundamental parameters of nature.

Reformulated correct Maxwell equations for propagation of light using the Coulomb and Ampere constants are consistent with the propagation of light in a vacuum as well as in a medium. Coulomb constant α and Ampere constant β are fundamental parameters of nature and require no medium for their existence. Speed of light is determined by the Coulomb constant α and Ampere constant β .

Since the existence of Coulomb constant α and the Ampere constant β does not require a medium, the propagation of light or electromagnetic waves do not require a material medium. Propagation of light or electromagnetic waves are not relative and hence the speed of light is independent of the frame of reference. As a result, no hypothetical medium Aether is required for the light to propagate relative to or for the measurement of propagation of light relative to. Measured speed of the propagation of light is independent of the speed of the speed of the speed of the speed of the measuring device or the observer.

Since light is not relative, no hypothetical medium of Aether is required for the measurement of the speed of light relative to. Light propagates in the empty space. The presence of a medium is an unwanted obstacle or burden for the propagation of light or electromagnetic waves. A material medium is an unnecessary presence for light even though light is perfectly capable of bearing the presence of a medium. The presence of a medium hinders the propagation of light. The presence of a medium not only impedes or reduces the speed of light, the presence of a medium also diffracts the path of light. The presence of a medium is a partial roadblock for the propagation of light. Light not only has to slow down in the presence of a medium, but it also must make an unexpected and unplanned detour. For light, propagating in a medium is just like driving in a construction zone. Certain mediums can be a dead end for propagation of light where light must take a complete turn back.

probability Electromagnetic not waves are distributions that Quantum Mechanics claim to be. Probability distributions are mathematical construct, which have no real existence. Nature does not use probability. Pascal invented probability to divide the winner's prize for a match between the two contestants when the match had to be ended without completion due to bad weather. Probability and statistics are just data analysis tools. Unlike probability distributions. Electromagnetic waves are real. Electromagnetic waves exist in space. Probability distributions exist only on paper or in textbooks. Electromagnetic propagate. Probability waves distributions cannot, and do not, propagate. If it propagates, it is not a probability distribution. Electromagnetic waves have nothing to do with particles. There are no wave particles or particle waves. Waves propagate. Particles move. Motion of a particle and propagation of waves are orthogonal mechanisms; there is nothing in common.

For transversal electromagnetic waves, E=cB and hence the electric field in the Maxwell equations can be normalized so that E/c take the place of E. As a result, the normalized Maxwell equations becomes,

$\nabla \times \mathbf{E}=-(1/c)d\mathbf{B}/dt$ $\nabla \times \mathbf{B}=(1/c)d\mathbf{E}/dt$ The so-called Lorentz force is given by,

$\mathbf{F}=(q/c)(\mathbf{E}+\mathbf{v}\times\mathbf{B}).$

This Lorentz force is an outcome of the Lorentz Transform that is only applicable for electromagnetic radiation and light. Lorentz force is not applicable for non-propagating stationary electric and magnetic fields. This Lorentz force is nearly zero for all practical purposes due to the factor 1/c. Lorentz force is never used in the design of electromagnetic devices. Lorentz force cannot be used in the design of electromagnetic devices. Electric devices such as motors and generators are based on stationary magnetic fields, where Lorentz force does not exist.

Electromagnetic force had been known several decades before Lorentz Transform was introduced. The claim that the electromagnetic force was invented by Lorentz is preposterous. Lorentz Transform only deals with propagating waves. Lorentz Transform does not apply to non-propagating static electric fields and magnetic fields. Lorentz force does not exist for non-propagating fields.

Electric motors and electric generators have been there well before the introduction of the Lorentz Transform. Electric motors and electric generators existed several decades before the Maxwell equations were developed. Electric motors and electric generators are designed using the force relationship $F=q(E+v\times B)$ that was known many decades before the Lorentz Transform. The fields **E** and **B** in the force relationship for motors and generators are not propagating fields, they are static fields.

The force relationship $F=q(E+v\times B)$ that is used in the design of electric motors and generators has nothing to do with Lorentz, nothing to do with light or electromagnetic propagation, nothing to do with Maxwell equations. Non-propagating static electric field and magnetic field have nothing to do with Lorentz Transform. Lorentz Transform does not apply to non-propagating or non-radiating electromagnetic fields.

Corollary:

Non-propagating static electric and magnetic fields are relative. Propagating electromagnetic fields or radiating waves are not relative [2,5.6].

The Lorentz force was derived for the electromagnetic waves. Lorentz force does not exist for the non-propagating static electric and magnetic fields. A moving charge experiences a force in the presence of any magnetic field, which is $F=q(E+v\times B)$. This relationship has nothing to do with Lorentz. Lorentz Transform does not exist. Non-propagating static electric and magnetic fields are relative. On the other hand, propagating electromagnetic fields are not relative. A motion of an observer does not turn electric field into a magnetic field or a magnetic field into an electric field,

E'≠E±(v/c)B B'≠B±(v/c)E F≠q(E±(v/c)B)

Observer speed does not determine what an electric field is and what a magnetic field is. Electric and magnetic fields are independent of the observers. You cannot turn propagating electric field into propagating magnetic field or vice versa by running.

Motion of a non-propagating magnetic field does not generate an electric field that is present everywhere. It is only that the motion of a nonpropagating magnetic field exerts a force on a charge, $F=q\mathbf{v}\times\mathbf{B}$. This force is not there in the absence of a charge. No force per unit charge is present in the absence of a charge. Motion of a non-propagating magnetic field does not generate a space filling electric field. It is only that the motion of a nonpropagating magnetic field generates a force on a charge. Propagating magnetic field also generate a force on a moving charge. Although moving nonpropagating magnetic field generate a force on a stationary charge, propagating magnetic field does not generate a force on a stationary charge.

Lorentz Transform is not unique. Lorentz Transform based on bogus relative time is not real and has no existence. Time cannot be relative. Light is not relative. Lorentz fields do not exist. There is no such thing called Lorentz force. Electromagnetic fields are independent of the frame of reference,

E'=E, B'=B

where, \vec{E} ', \vec{B} ' are the fields on the moving frame and \vec{E} , \vec{B} are the fields on the stationary frame. Lorentz Transform does not exist. Lorentz Force does not exist.

The permittivity ε and the permeability μ have no existence without a medium. It is the incorrect use of the permittivity ε and the permeability μ in the Maxwell equations that led to the false idea that electromagnetic wave propagation cannot takes place without a medium. It is this false concept that led to the introduction of bogus Aether, Aether deity, a manmade hypothetical deity, a religion. Maxwell equation for propagation of light should not have any association with the permittivity ε and the permeability μ of a medium. Maxwell equations must be formulated without a medium. Maxwell equations must be a space-based formulation, not a medium-based formulation.

Lemma:

Propagation of light and the speed of light are not determined by a medium. It is only that the propagation of light and the speed of light are affected by a medium when a medium is present. Hence, equations for propagation of light should not be determined by dielectric properties of a medium. It is only that propagation of light is affected by the properties of a medium when a medium is present.

Correct Maxwell equations that represent the

propagation of light are associated with the Coulomb constant α and the Ampere constant β . The existence of Coulomb constant α and the Ampere constant β does not require a material medium. As a result, the reformulated correct Maxwell equations for propagation of electromagnetic waves or light do not require a medium. No man-made hypothetical medium of Aether is required for propagation of light. Permittivity ε and the permeability μ of a medium are not required in the reformulated correct Maxwell equations for the propagation of light as well as in circuit theory since the propagation of light and electrical circuit elements such as capacitance and inductance are determined by the Coulomb constant α and the Ampere constant β .

Permittivity ε and the permeability μ of a medium are also determined by the Coulomb constant α and the Ampere constant β . Coulomb constant α and the Ampere constant β are fundamental constants of nature. Permittivity ε and the permeability μ of a medium are secondary parameters, not fundamental constants of nature.

Maxwell equations cannot exist without a dielectric medium while propagation of light can. Aether was invented to camouflage this incompatibility and make Maxwell equations legitimate. Aether is a non-material hypothetical deity that provides permittivity and permeability to a vacuum while maintaining a vacuum a vacuum, an impossible task even for a deity. Spacefilling hypothetical Aether deity that is being used to legitimize Maxwell equations in a vacuum is illogical and unnecessary.

When we talk about the speed of light, people always ask, "speed of light with respect to what?" This question indicates the lack of understanding of the propagation of light. The question, "speed of light with respect to what" is the wrong question to ask since light is not relative [2]. Irrespective of on what frame of reference the speed of light is measured in a vacuum, the result will always be the same since the propagation of light is independent of the frame of reference.

However, speed of light is affected by a medium since the Coulomb constant α and the Ampere constant β are affected by the medium. The measured speed of light in the presence of a medium is independent of the position if the medium is homogeneous. However, in the case of a nonhomogeneous medium, speed of light depends on the position. When the slight discrepancies in the Michelson-Morley experiment due the to inhomogeneity of the medium air is discounted, the measured speed of light must be independent of the frame of reference in the Michelson-Morley experiment.

In the case of a flowing medium, Coulomb constant α and the Ampere constant β vary with the position and hence the speed of light depends on the position. If the speed of light is measured on earth, the measured speed of light will vary with the position due

to the flow of the air. Coulomb constant α and the Ampere constant β vary with the flow of air and hence the speed of light also varies with the flow of air. This is the reason for the minor variations in the measured speed of light in the Michelson and Morley experiment. If the Michelson and Morley experiment had been carried out in a vacuum or in a homogeneous medium, there would not be any minor variations in the measured speed of light in the different setting of the experiment.

Light does not propagate relative to a medium. A medium in motion cannot move electromagnetic waves or light along with the motion of the medium. Special Relativity is false. Light does not move with a medium in motion. A moving frame cannot give light a ride. Light has no momentum. It is only a mass in motion that has a relative motion. Light has no relative motion. Propagation of light is absolute, not relative. Coulomb constant α and the Ampere constant β of a flowing medium vary with the position. Hence, the speed of light varies with the position in a flowing medium. It is this change in speed along the flow of the medium that makes light to bend in a flowing medium with the flow of the medium. The change of speed of light in a flowing medium is not a result of flowing medium directly carrying the light with it.

Flowing medium cannot carry the light with it since the light is not relative. The change of speed of light in a flowing medium is solely due to the change of Coulomb constant α and the Ampere constant β with the position in a flowing medium. Einstein's use of Fizeau's experiment to justify Special Relativity simply wrong, meaningless. Fizeau's experiment has nothing to do with Special Relativity. Result of Fizeau's experiment is not a result of light hitchhiking the flowing water. Light does not hitchhike.

The result of the Fizeau's experiment is due to the variation of the Coulomb constant α and the Ampere constant β with the position in a flowing medium. A moving medium cannot move light that propagates in empty space. The claim in Fizeau's experiment that light is carried by the speed of the flowing medium is wrong, meaningless, short sighted, and a very common misinterpretation mistake in modern physics. It is the misinterpretation of experiments that has always been used to justify Special Relativity, General Relativity, Quantum Mechanics, and Modern Physics in general. Without misinterpretation of experiment, there would be no Special Relativity or Quantum Mechanics.

Neither the Maxwell equations for the propagation of electromagnetic waves nor the speed of light or electromagnetic waves are determined by the permittivity ε and the permeability μ of a medium. Maxwell equations for propagation of light and the speed of light have nothing to do with a medium or the permittivity ε and the permeability μ of a medium.

Vacuum has no dielectric properties. Vacuum has no permittivity ϵ and the permeability μ . The fact that

the light propagates in vacuum even though vacuum has no permittivity ε and the permeability μ is a good indication that permittivity ε and the permeability μ are not required for the propagation of light. It is in fact the Coulomb constant α and the Ampere constant β that determine the permittivity ε and the permeability μ of a medium. Permittivity ε and the permeability μ of a medium are not primary parameters. Permittivity and permeability of a medium are derivatives of Coulomb and Ampere constant β are primary fundamental parameters of nature.

There is nothing mysterious about Coulomb constant α . It is just a parameter that brings the electric field **E** into the same units as the electric flux density **D** just as the Newton gravitational constant G brings gravitational field to the same units as a gravitational mass flux density. Similarly, there is nothing mysterious about Ampere constant β . It is just a parameter that brings the magnetic field **H** into the same units as the magnetic flux density **B**. No medium whatsoever is necessary for the existence of unit-conversion parameters such as Coulomb constant α and Ampere constant β . Coulomb constant α and Ampere constant β exist in space and they are affected by the presence of a medium.

What determines the correct Maxwell equations for propagation of light and the speed of light is the Coulomb constant α and the Ampere constant β , which require no medium for their existence. Light is not relative. Speed of light is independent of a frame of reference. Any observer measures the same speed for the speed of light in a vacuum irrespective of the speed of the observer. Speed of light is independent of the speed of the frame of measurement, speed of measuring instrument or speed of an observer.

Electromagnetic waves do not generate mass. Mass is not generated by standing electromagnetic waves. There are no standing electromagnetic waves or standing light since light has no existence without propagation and light is not anchored to a source. It is only a wave that is anchored to a source that can generates a standing wave. Light is not anchored to a source and hence there is no standing light.

A source releases light releases light in bursts of finite duration. Electromagnetic waves are not particles; they are continuous waves of finite duration. There is no standing light. Light has no existence without propagation. Mass has nothing to do with electromagnetic waves except the fact that the charges that are required for the generation of electromagnetic waves have no existence without a mass, and hence electromagnetic waves have no existence without a mass.

There are no light particles or photons. Einstein derived the photons based on the assumption that the photons are spatially random. The problem is that spatially random photons cannot produce coherent light waves. Light cannot be random particles or photons. Light comes in continuous wave bursts of finite duration. Light carries no momentum. Massless has no momentum. You cannot bring electromagnetic wave mechanics and motion dynamics of masses under one frame. If you try to include electromagnetic waves into an inertial frame, in hindsight, what you are incorporating is a mass moving at speed of light, not light itself, and that is the fallacy of Special Relativity [5,6].

Canonical momentum is an abstract notion that is not real. Canonical momentum only holds true for masses, not for waves. LaGrange does not apply for propagation of waves. LaGrange only applies for the motion of masses. Abstract mathematical magnetic vector potential is not real and hence the canonical momentum derived by incorporating a magnetic vector potential in LaGrange has no existence.

You cannot determine mechanics of propagation using the LaGrange designed for motion of masses. Motion and propagation are not the same. Motion and propagation cannot be combined in LaGrange. Not all the energies are created equally. You cannot combine electromagnetic energy and mechanical energy in LaGrange. Canonical momentum does not exist for propagation of waves. Propagating electromagnetic fields have no potential energy or kinetic energy. It is only a static electromagnetic field that has potential energy. The term "potential energy" is meaningless for propagating waves. LaGrange has no existence without kinetic energy and potential energy. Without kinetic energy and potential energy, LaGrange is not defined for electromagnetic waves and hence canonical momentum does not exist for electromagnetic waves. Light has no momentum. Electromagnetic waves have no momentum.

Property:

Any entity with momentum cannot propagate. Propagation of light has no momentum.

A vacuum is a vacuum is a vacuum is a vacuum and contains nothing. You can call a vacuum physical vacuum, mathematical vacuum, or whatever you want, but the name is just a label, and it does not change the fact that vacuum contains nothing. Mathematical vacuum must contain nothing; if it contains something, it is not a vacuum. Physical vacuum must contain nothing; if it contains something, it is not a vacuum.

If vacuum contains Aether, then it is no longer a vacuum. There is no physical medium that can provide dielectric constants to a vacuum while maintaining a vacuum a vacuum. There is no physical entity called Aether. Aether can only exist in human psychic, nowhere else. No hypothetical man-made medium Aether is required for the propagation of light in a vacuum since the propagation of light is determined by Coulomb and Ampere constants that require no medium for their existence. The concept of Aether is voodoo science, not science. Any entity that can provide a vacuum dielectric constants permittivity ϵ permeability μ while maintaining a vacuum a vacuum must be a deity that exists only in human imagination just like any religious doctrine, where deity exist only in the mind of blind believers. All the religions were founded by men for the benefit of men to justify their open and widespread discrimination of women in the name of a religion doctrine. Otherwise, why should any deity, if there is one, allow a man to have multiple wives with no regards for age limit and prohibit women the same right to have multiple husbands. It shows that religious doctrines are shams. It shows who created religions for whose benefit. Aether seem to have blind following, just like any religious doctrines. The concept of Aether is so outrages and unrealistic that the followers of Aether warrants the designation, a religious cult; hare Aether, hare Ether.

Correct Maxwell equations formulated by the Coulomb and Ampere constants describe the propagation of light without restriction everywhere in the universe including a vacuum as well as any medium. Speed of light is determined by the Coulomb and Ampere constants. No Aether deity is required. There is not Aether deity. There are no deities. Deities are in the mind of believers, not in reality. Mostly for the worst, it is the man who created God, not the other way around. We never know how different would it have been if God was created by a woman?

Although physics textbooks represent Coulomb constant as permittivity of a medium, Coulomb constant has nothing to do with permittivity of a medium. Similarly, Ampere constant has nothing to do with the permeability of a medium. It is only that the permittivity of a medium is defined using Coulomb constant, and permeability of a medium is defined using the Ampere constant. Coulomb constant and Ampere constants are parameters of empty space that determine the propagation of light in empty space.

Light does not travel in a medium, light travels in the empty space. It is only the presence of a medium affect the propagation of light through parameters Coulomb constant and Ampere constant. Empty space is the absolute frame that propagation of light takes place. Space coordinates in Maxwell equations are relative to the absolute frame, the empty space. Maxwell equations cannot be defined relative to moving local frames. Light does not propagate relative to inertial frames. In Special Relativity, x=ct and x'=ct' do not represent path of a light beam; they represent a path of a mass moving in two different frames. Special Relativity does not involve the propagation of light. What Special Relativity involves in hindsight is a mass moving at speed of light in different.

Absolute frame is the empty space. Propagation of light takes place in empty space irrespective of whether a medium is present or not. A medium is an unwelcome obstruction to the propagation of light. The presence of a medium affects the Coulomb and Ampere constants, which in turn affect the propagation of light. Maxwell equations are defined in the absolute space, the empty space. Light propagates at speed c is in the empty space. Speed c is determined by the Coulomb and Ampere constants. Absolute motion of a mass can be defined relative to the propagation of light. The claim that the speed of an inertia frame cannot be obtained from within is false. Speed of an inertial frame can be determined from within the inertial frame using a beam of light [5].

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