Journal of Multidisciplinary Engineering Science and Technology (JMEST)
ISSN: 2458-9403
Vol. 8 Issue 5, May - 2021

Reality-Blind Special Relativity:Energy Mishap

(Catastrophic Mass-Energy Oversight in Special Relativity)

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Abstract—Although the propagation of light and Maxwell's equations are proclaimed to be the foundation of Special Relativity, propagation of light itself is never involved in Special Relativity. For a moving frame of mass in Special Relativity, it is the same frame of mass moving hypothetically at the speed of light that is involved. Despite the false claim in Special Relativity that the light is relative, what is in effect relative at the speed of light is never the light itself, it is the same frame of mass hypothetically moving at the speed of light that is relative. Special Relativity is exclusively for masses, not for massless.

Although it appears as if the proper time of a moving frame of mass in Special Relativity is taken as the excess time with reference to the propagation of light, the propagation of light itself is never the reference in Special Relativity. It is the hypothetical motion of the same frame of mass at the speed of light that is the reference. It is this incongruous reference in Special Relativity that has given an artificial rest energy equivalent to the kinetic energy of the same frame of mass moving at the speed of light from the start, which is indeed hypothetical.

For the laws of physics to be frame independent, it is not just the general momentum (relative momentum) that must be defined to be frame independent, the rate of change of general momentum must also be defined to be frame independent. The failure to define the rate of change of general momentum with respect to the frame independent proper time has led to an improper mass-energy relationship creating a mass-energy catastrophe in Special Relativity. Mass-energy relationship in Special Relativity is improper, illogical, and incorrect, and the conclusions drawn are false.

Mass-energy relationship in Special Relativity cannot stand alone without its foundational general momentum, and hence any mass-energy analysis must be based on both equations. It is the analysis of mass-energy relationship in isolation without its foundational general momentum relationship that has led to the wrong incongruous conclusions in Special Relativity. When the rate of change of general momentum is properly defined with respect to the proper time, the resulting proper mass-energy relationship is realistic with factor half taking its rightful place in the kinetic energy while making apparent the nonexistence of any massless momentum.

A moving frame must have a constant speed from the start to apply Lorentz Transform. If the frame must accelerate from the rest to reach the constant speed, Lorentz Transform does not apply. In Special Relativity, general momentum is a constant for any frame of mass from the start, and the speed cannot be incremented. As a result, the rate of change of general momentum is zero. The derivation of kinetic energy speed-incrementally as the work done to reach the constant speed from the rest within Lorentz Transform is incorrect and invalid. As a result, Mass-energy relationship in Special Relativity is incorrect, and the conclusions drawn are false, which makes the very foundation of the twentieth century physics to crumble.

True mass-energy relationship in Special Relativity must be derived by using the fact that the rate of change of general momentum is zero within the Lorentz Transform. True mass-energy relationship demonstrates that the total energy is zero when the general momentum is zero. A mass does not have motionless kinetic energy or rest kinetic energy equivalent to as if the mass is moving at the speed of light from the start. Further, when the mass is zero, both momentum and total energy are zero, and hence there is no massless momentum. Without massless momentum, massless light particles or photons have no existence. Light is wave-bursts, not particles.

The goal of Lorentz Transform was to transform Maxwell's equations for propagation of light on to a hypothetical moving frame. Moving frame in Lorentz Transform is not an inertial frame, it is a massless hypothetical empty space itself. No momentum or mass is ever involved in Lorentz Transform. Lorentz Transform is completely hypothetical since space itself can neither move nor propagate. Lorentz Transform has no real existence since it is not unique. Light propagates in the empty space. Light does not propagate relative to a frame of mass or relative to material medium. Propagation of light does not require a hypothetical medium of aether. There is no aether.

Galileo Transform is strictly for motion of masses, not for propagation of waves. Lorentz Transform is strictly for propagation of electromagnetic waves and hypothetically moving massless frames, not for the motion of masses. Special Relativity forced Lorentz Transform on an inertial frame to limit the relative speed of a mass to the speed of light by replacing the propagation of light in the Lorentz Transform with the same frame of mass hypothetically moving at the speed of light. Propagation of Light is never a part of the Special Relativity. Special Relativity is exclusively

for the motion of masses, not for the massless light.

The only property common for both masses and waves is that they both travels. However, the mechanisms of travelling are not the same. Motion of a mass is direct travelling, where momentum is involved. Propagation of light is indirect travelling, where no direct motion or momentum is involved. Propagation of light and the motion of a mass cannot be unified under Lorentz Transform since the mechanisms of motion of a mass and the propagation of massless light are mutually exclusive. In effect, what have been brought together in Special Relativity are a moving frame of mass and the same frame of mass hypothetically moving at the speed of light.

Lorentz Transform is not unique and hence the Lorentz factor is not unique. As a result, proper time is not unique. When the proper time is not unique, proper time is not frame independent. Time cannot be relative when proper time is not unique. Spacetime has no existence when proper time is not unique. There is nothing observers can agree upon in Special Relativity when the proper time is not frame independent except the speed of light that is solely determined by the medium and the mass of an object. Mass of an object and speed of light are observer independent.

Light does not hitchhike. Light cannot be given a free ride on a moving frame even if the source is on a moving frame since the light is not relative. Electromagnetic radiation does not have a Lorentz field. For Lorentz field to exist, the electromagnetic radiation field must be able to be altered by a moving frame, which is impossible since no moving frame can change radiation energy. Field strength of radiation is independent of the motion of the source or a frame of reference since radiation is tethered to neither a source nor a frame. However, static electromagnetic fields are relative, and can only be given a free ride by placing the source on a moving frame. Static electromagnetic fields always hitchhike along with the source. For static fields, Lorentz fields are just Faraday fields. Lorentz forces do not exist.

Light is not affected by gravity. However, a mass moving at the speed of light is affected by gravity. What is present in Special Relativity is a frame of mass moving hypothetically at the speed of light, not the light itself. It is the misinterpretation of the hypothetical motion of a mass at the speed of light in Special Relativity as the light itself that has led to the false claim that the light itself is affected by gravity. Gravity has no effect on the light and vice versa.

No massless entity can be relative. No massless entity with a speed that is solely determined by the medium can be relative. Any entity with no standstill existence cannot be relative. Light has no existence without propagation and hence light cannot be relative. Any entity that is not relative has no momentum. Light has no momentum. Any entity without momentum cannot be particles. Light is not particles or photons. Massless are unaffected by gravity and vice versa.

In effect, for an inertial frame, the foundation of Special Relativity is based on the same frame of mass moving hypothetically at the speed of light. The false claim that Special Relativity is based on the propagation of light is simply deceiving and illogical. Light itself is never a part of Special Relativity. Motion of masses and the propagation of light cannot be unified under Lorentz Transform without altering the reality itself as it is evident from Special Relativity. Special Relativity is blind to the reality, totally.

Keywords—*Mass-Energy; Special Relativity; Spacetime; Lorentz Force; Proper Time; Relative Time; General Relativity; Lorentz Transform; Einstein;*

I. INTRODUCTION

Mass-energy relationship used in Special Relativity is neither the proper mass-energy relationship nor the true mass-energy relationship. The mass-energy relationship in Special Relativity is improper and incorrect. Improper and incorrect well-known mass-energy relationship currently used in Special Relativity, and the proper but still not true mass-energy relationship as well as the true mass-energy relationships for Special Relativity can be summarized in the following three theorems for quick preview. Detail derivations are given later.

For a frame of mass moving at speed v, what is involved in Special Relativity is the same frame of mass hypothetically moving at the speed of light c, NOT the LIGHT itself.

Theorem-1: Improper and Incorrect Mass-Energy in Special Relativity

Special Relativity properly defines the general momentum (relative momentum) with reference to proper time τ. However, Special Relativity improperly and incorrectly defines the rate of change of general momentum. When the rate of change of general momentum is improperly defined with respect to time t as it is done in Special Relativity, it led to an improper and incorrect mass-energy relationship. For a frame of mass m moving at constant speed v, the improper mass-energy relationship currently used in Special Relativity is given by [1],

$E=\mathfrak{r}mc^2$ (improper) (1.1.1)

$E^2=(mc^2)^2+(pc)^2$ (improper) (1.1.2)

$p=m\partial x/\partial\tau$ (proper) (1.1.3)

$F=\partial p/\partial t$ (IMPROPER) (1.1.4)

$p=\mathfrak{r}mv$ (proper) (1.1.5)

where, $\mathfrak{r}=1/(1-v^2/c^2)^{1/2}$, $t=\mathfrak{r}\tau$.

Here, $E=mc^2$ when $p=0$. However, $E=0$ when $m=0$ since $p=0$ when $m=0$. The factor 1/2 that must be associated with the kinetic energy of any mass is absent in this mass-energy relationship is a good

indication that it is incorrect. Although there is an incongruent rest energy in this improper and incorrect mass-energy formulation, rightfully, there is no massless momentum if it is evaluated correctly.

This mass-energy relationship in Special Relativity is improper and incorrect. Despite its use in Physics, this mass-energy relationship is neither the proper nor the true mass-energy for the Special Relativity.

Theorem-2: Proper, But Still Not True, Mass-Energy for Special Relativity

When both the general momentum and the rate of change of general momentum are properly defined with respect to the proper time τ, it leads to the proper mass-energy relationship in Special Relativity. For a frame of mass m moving at constant speed v, the proper mass-energy relationship for Special Relativity is given by,

$E=(1/2)\mathfrak{r}^2mc^2$ (proper) (1.2.1)
$E=(p^2/2m)+(1/2)mc^2$ (proper) (1.2.2)
$p=m\partial x/\partial\tau$ (proper) (1.2.3)
$F=\partial p/\partial\tau$ (PROPER) (1.2.4)
$p=\mathfrak{r}mv$ (proper) (1.2.5)

where, $\mathfrak{r}=1/(1-v^2/c^2)^{1/2}$, $t=\mathfrak{r}\tau$.

Here, $E=(1/2)mc^2$ when p=0. However, E=0 when m=0 since p=0 when m=0. Although there still is an incongruent rest energy in this proper mass-energy formulation, it carries the factor 1/2 for kinetic energy of a mass at its rightful place making it proper kinetic energy. The presence of factor 1/2 for the kinetic energy of a mass is an indication that it is the proper mass-mass energy relationship for Special Relativity. There is no massless momentum.

Although this mass-energy relationship is the proper mass-energy relationship for Special Relativity, it is still not the true mass-energy relationship for Special Relativity for not including one critical property of Lorentz Transform, the property that the frame must have a constant speed from the start. No acceleration is allowed within the Lorentz Transform. It is the exclusion of this property in the mass-energy calculation in Special Relativity that led to a motionless kinetic energy or rest energy of a mass.

Theorem-3: True Mass-Energy for Special Relativity

The speed v in Lorentz Transform is a constant from the start t=0. Speed v is not allowed to be incremented withing the Lorentz Transform. The general momentum in Special Relativity is not an instantaneous momentum. For Lorentz Transform and Special Relativity, the general momentum must be a constant $\forall t$ from t=0 to any time t. As a result, the rate of change of general momentum is nil and hence the force F=0 in Special Relativity. The true mass-energy relationship in Special Relativity is achieved when F=0. For a frame of mass m moving at the speed v, the true mass-energy relationship for Special Relativity is given by,

$E=(1/2)\mathfrak{r}^2mv^2$ (true) (1.3.1)
$E=p^2/2m$ (true) (1.3.2)
$p=m\partial x/\partial\tau$ (proper) (1.3.3)
$p=\mathfrak{r}mv=$constant (true) (1.3.4)
$\partial p/\partial t=0$, $\partial p/\partial\tau=0$ (true) (1.3.5)
$F=\partial p/\partial\tau=0$ (proper and true) (1.3.6)

where, $\mathfrak{r}=1/(1-v^2/c^2)^{1/2}$, $t=\mathfrak{r}\tau$.

E=0 when p=0. A mass does not have a motionless kinetic energy or rest energy, $E\neq mc^2$; There is no massless momentum since p=0 when m=0.

The aim of Special Relativity was to bring together the motion of masses and the propagation of light under a single framework using the Lorentz Transform. However, it is not possible to bring the motion of masses and the propagation of electromagnetic waves under unified framework. Motion of a mass and the propagation of light are two distinctly different mutually orthogonal mechanisms and cannot brought into a unified framework under the Lorentz Transform.

You may be thinking you are bringing the motion of a mass and the propagation of light into a unified framework using the Lorentz Transform in the Special Relativity, but what you are doing, in effect, in Special Relativity is simply the incorporation of the motion of a mass together with the same mass moving hypothetically at the speed of light under the same framework. Propagation of light is never involved in Special Relativity. The use of speed of light in Special Relativity does not bring the light itself into the Special Relativity.

Using a mass moving at the speed of light and claiming that it is the propagation of light that is involved does not bring light into Special Relativity. Propagation of light is not involved in Special Relativity. What is involved in Special relativity is a frame of mass moving at speed v and the same frame of mass moving hypothetically at the speed of light, nothing more.

A mass is never involved in the transformation of the Maxwell's equations on to another moving frame using Lorentz Transform. Moving frame involved in the transformation of the Maxwell's equations using the Lorentz Transform is simply a hypothetical motion of space itself, not a frame of mass. Space cannot be moved by any means. Space itself has neither a motion nor a propagation. As a result, the whole concept of transforming the Maxwell's equations onto another moving space or massless frame is simply hypothetical. Lorentz Transform is hypothetical, not real. You cannot FedEx space.

Lorentz Transform is not a mechanism for bringing together the massless electromagnetic wave propagation mechanics with the motion dynamics of objects of mass under a same framework. All that is done in Special Relativity is to introduce the speed of light c as a limiting speed for an object of mass. The use of speed of light c in the Special Relativity as a limiting speed of an object of mass does not bring the propagation of light into the Special Relativity.

Massless cannot be relative. If you cannot stop it by an external force, it is not relative. Light is not relative [2,3]. Any entity that cannot be stopped cannot possess a momentum. Any entity that carries a momentum must be able to be brought to a halt by applying equal and opposite momentum. Light cannot be brought to a halt since light has no existence without propagation, and hence light has no momentum.

An object of mass and light have no direct connection. It is only the charges that have a mutual interaction with light or electromagnetic radiation waves. Motion of charges generates light. Light generates the motion of charges. A mass and light have indirect relation since charges have no existence without a mass. Neutral mass has no effect on light. Light has no effect on a neutral mass. Gravity, which is exclusively a property of a mass, has no effect on light and vice versa.

What is present for a frame of mass in Special Relativity is the same frame of mass moving hypothetically at the speed of light as a limiting case, never the light itself. When the Lorentz Transform is applied to motion dynamics in Special Relativity, what you are dealing with is a motion of a frame of mass moving at a constant speed v and the same frame of mass hypothetically moving at the speed of light c, the limiting speed. Propagation of light itself is never a part of the Special Relativity.

Relativity is only for the motion of objects of mass. Massless cannot be a part of Relativity. Wave propagation is never, can never be, a part of Special Relativity. An object of mass cannot be a part of Lorentz Transform. Lorentz Transform is only for massless frames and propagation of electromagnetic waves. Moving frames in Lorentz Transform only involve the hypothetical motion of massless space itself. Lorentz Transform and Relativity are mutually incongruous. You cannot bring incongruous Relativity of masses and the Lorentz Transform without altering the reality. Special Relativity deformed the reality.

Newton's Laws of motion [4] apply only for objects of mass. Newton's Laws of motion do not apply for massless waves. LaGrange and Action do not apply for massless; they apply only for motion dynamics of masses. Any effort to force LaGrange and Action onto light by forcing an artificial hypothetical momentum on light is futile and reality deforming since light is not relative and has no momentum.

Galileo-Newton Transform applies only for objects of mass. Lorentz Transform is a hypothetical Transform that applies for the massless. The frame in Lorentz Transform is a massless frame, a hypothetical space in motion. Lorentz Transform does not apply for objects of mass. Space neither moves no propagates and hence the frame in Lorentz Transform has no real existence. Lorentz Transform is not real. Lorentz field is not real. There is no Lorentz field.

If there is a Lorentz field, it will increase the light energy on an inertial frame, which is not possible. No moving frame can increase the electromagnetic radiation or light energy. So, the Lorentz field cannot exist. When Lorentz field cannot exist, propagation of light cannot be relative. For Lorentz field to exist light must be relative, which cannot be [2]. Lorentz Transform cannot have physical existence.

A frame of mass moving at the speed of light that is hypothetically present in the Special Relativity cannot be claimed to be the same as the light itself since the motion and propagation are two completely different mechanisms. It is only the motion of a mass that has dynamics. There is no motion dynamics in the propagation of massless. There is no dynamics without a mass. The motion of a mass does not turn into propagation when the mass reaches the speed of light. It is an object of mass hypothetically moving at the speed of light that is present in the Special Relativity, not the light itself.

Light itself has nothing to do with Special Relativity. It is only the speed of light that has everything to do with Special Relativity.

In Special Relativity, proper time of a frame or an object of mass m is the extra time the object takes to travel a certain distance r at speed v over the time taken for the same frame or object of mass m to travel the same distance r at the constant speed of light c from the start. In other words, relative time or proper time is measured in Special Relativity as the time difference with reference to the time taken for the same object moving at the speed of light c. It is not the light that is the reference in Special Relativity, it is the same frame of mass moving at the speed of light c that is taken as the reference in hindsight. For a frame of mass m moving at constant speed v in Special Relativity, propagation of light in the Lorentz Transform is replaced by the same frame of mass m moving hypothetically at the speed of light c.

"*In Special Relativity, it is not the light that is relative, it is the same frame or object moving hypothetically at the speed of light c that is relative*."

The reference in Special Relativity is not the light itself, it is the same frame or object of mass m travelling hypothetically at the constant speed of light c that is the reference; it is hypothetical since no object of mass can reach the speed of light. It is imaginary and hypothetical since no mass can travel at speed v and at speed c at the same time. It is this choice of an implied unrealistic reference as the same frame of mass m travelling hypothetically at the speed of light c from the very start that has given rise to the rest energy equivalent to the kinetic energy of the same frame of mass m travelling at the constant speed of light c from the start without acceleration to reach the speed from the rest. The ubiquitous factor 1/2 associated with the kinetic energy of an object of mass is missing in kinetic energy of an object in Special Relativity since Lorentz Transform requires constant speed from the start, which only holds true

for propagation of light.

When the frame or object of mass is at rest, what that means in Special Relativity is that the object is at the state of reference, where it is moving hypothetically at the speed of light c and hence it still has the reference energy equivalent to the kinetic energy of the object moving at the constant speed of light c from the start which is equal to the presumed rest energy, $E=mc^2$. The factor 1/2 that is ubiquitous for the kinetic energy of an object of mass is absent since the mass must move at constant speed of light c from the beginning or from the start for Lorentz Transform to apply when the same mass hypothetically moving at the speed of light c is taken as a reference.

Lorentz Transform does not apply for accelerating frames. This limitation is not just for the reference that is taken as the same object moving at the speed of light c. If an object moves at constant speed v, it must also move at the same speed v from the start for Lorentz Transform to apply. There is no room for an object to accelerate from the rest to reach the constant speed in Lorentz Transform. It is this incongruous choice of reference as the same object hypothetically moving at the constant speed of light c from the start that gave an object a rest energy $E=mc^2$ in Special Relativity, which not a physical reality.

In reality, since any mass must accelerate to reach the constant speed from the rest, the kinetic energy of a mass m travelling at the speed of light c must be $E=(1/2)mc^2$, not $E=mc^2$. As we are going to see later, when the rate of change of general or relative momentum is properly defined, the factor 1/2 takes its rightful place in kinetic energy. The fact is that no mass can possess kinetic energy when it is at rest. Object of mass has no rest energy $E\neq mc^2$. The rest energy present in the Special Relativity is a result of a mistake in the mass-energy calculation. Mass-energy relationship in Special Relativity is improper and incorrect.

It is the invalid and improper mass-energy relationship in Special Relativity that gave us the incongruent and unrealistic concepts such as the rest energy of a mass and the massless momentum. Without invalid and improper mass-energy relationship in Special Relativity, there would be no rest energy of a mass or massless momentum. Therefore, it is important to take a careful look at the validity of the mass-energy relationship in Special Relativity. This is especially important since the rest energy of a mass and the massless momentum both do not make any physical sense irrespective of many claims that they have been experimentally verified.

The phrase that is recurrent in Modern Physics, “experimentally verified” must be taken with a grain of salt. We must accept the fact that experiments are as good as their data interpretations. Validity of an experimental justification depends on the validity our interpretation of the experimental observations [3]. We cannot forget that there were times people believed earth was flat and sun goes around the earth because they thought they had valid experimental justifications for those claims at the time. But the new observations and conclusions with time have proven to be otherwise and led us to abandon those concepts that was believed to be experimentally proven once. Special Relativity and General Relativity are no exception.

In addition, experiments can be designed, and data can be selectively gathered and be interpreted to aid whatever an experimenter aims to justify. Fake experimental justifications are most common in Special Relativity and Quantum Mechanics [3,5]. In this light, it is important to first determine the theoretical validity of mass-energy relationship that led to the meaningless concepts of rest energy of an object of mass and the massless momentum regardless of the repeated claims that they have been experimentally proven.

If a claim in physics is proclaimed to be experimentally proven, it simply means that the claim is neither proven theoretically nor proven experimentally. It does not matter how outrageous, unbelievable, and out of reality the claim is, if it is officially considered as true, the rest of us are expected to take it as true religiously. We are expected to pay to learn it to get a university degree if we want to work in the field. Special Relativity, General Relativity, Modern Cosmology, and Quantum Mechanics are in this category. Relative time, time dilation, mass dilation, twin paradox, particle waves, wave particles, space expansion, universe expansion, worm holes, quantum tunnelling, dark matter, dark energy, spacetime, gravity bending light, gravity altering the time, speed dependent time, parallel universes, multiple worlds, bubble universes, particle at multiple states concurrently, a cat being both dead and alive concurrently, spin is both up and down concurrently, big bang, light particle or photons are some of such outrageous religious believes in physics. If you want to find a job in the field, you must accept them as true religiously. If you need a career advancement, you must find a way to further the dogma irrespective of how unrealistic it is. So, physicists must live on a lie for a financial gain.

In the mass-energy relationship of a frame of mass m in Special Relativity, what is considered is the energy of the inertial frame of mass m itself, not the motion of a mass on the inertial frame. So, the task in Special Relativity is to define quantities that are associated with the mass-energy relationship for the inertial frame of mass m with respect to the frame independent variables.

In Special Relativity, the general momentum or relative momentum is properly defined as the change of the position with respect to the frame independent proper time to make the definition of the momentum general and frame independent. However, Special Relativity failed to define the rate of change of general or relative momentum, which is the force, with respect

to the frame independent proper time. It is this incoherent and invalid definition of the rate of change of general or relative momentum with respect to frame dependent time that has led to an incongruent and unrealistic improper mass-energy relationship in Special Relativity. The meaningless concepts such as the rest energy of a mass as well as the massless momentum disappear with the proper definition of the rate of change of general momentum or the force with respect to the frame independent proper time in Special Relativity.

"*It is the definition of the force as rate of change of general or relative momentum with respect to the frame dependent time t that has led to the improper and incorrect mass-energy relationship that is used in Special Relativity*."

Although Lorentz Transform was originally developed to transform propagation of massless electromagnetic waves on to a massless hypothetical moving frame at constant speed, Special Relativity applies Lorentz Transform for the motion of masses. In the Lorentz Transform speeds are constant from the start. As a result, when the Lorentz Transform is used for the motion of masses, the speeds must be constants from the start. Although waves and massless hypothetical frames can travel at constant speed from the start, masses have no such luxury. Masses must accelerate from the rest to reach the constant speed and that is the origin of most of the troubles in Special Relativity, which depends on the Lorentz Transform that is designed for massless.

Special Relativity is based on the Lorentz Transform that is limited or applies only for frames moving at constant speed from the very beginning. Acceleration has no place in Lorentz Transform. Lorentz Transform does not apply for frames or objects that must accelerate from the rest to reach its constant speed. Unless a frame or an object is moving at constant speed, Lorentz Transform is not applicable. Waves propagate at constant speed from the start, and hence propagation of waves fulfills the requirements for the Lorentz Transform, motion of masses does not.

"*A Transform such as Lorentz Transform especially custom made for wave propagation cannot be applied to motion of masses without altering the reality. Special Relativity is reality altering*."

Special Relativity failed badly to grasp one important fact. The general or relative momentum in Special Relativity is a constant for a given inertial frame or object of mass, which is moving at a constant speed from the start. The derivative or rate of change of general momentum for a given inertial frame or an object moving at constant speed with respect to both time as well as proper time must be zero. As a result, the mass-energy relationship derived using the force as a non-zero derivative of the general momentum is incorrect.

If the speed v of an object is incremented by small amount Δv, the new speed $v+\Delta v$ cannot be an instantaneous speed. The new speed $v+\Delta v$ must be a constant speed from the start t=0 to any time t. The speed v cannot be incremented while the frame or object is within the Lorentz Transform. If a force is used to increment the speed v by Δv to $v+\Delta v$, then the Lorentz Transform is not applicable within that increment. For Lorentz Transform to be applicable at speed $v+\Delta v$, the frame or object must start at the speed $v+\Delta v$ and remains at the same speed independent of the time.

Since the momentum as well as the general momentum must be time invariant, the rate of change of momentum or general momentum is zero. As a result, the force is zero. Although the general momentum is a nonlinear function of the speed, speed of an inertial frame or object cannot be incremented instantaneously in Lorentz Transform. You cannot accelerate a frame or an object from the rest to its final constant speed within the Lorentz Transform. You cannot accelerate a frame or an object from speed v by an increment Δv to speed $v+\Delta v$ within the Lorentz Transform. General momentum or relative momentum of an inertial frame or an object in Special Relativity is not a time dependent instantaneous momentum. Lorentz Transform does not allow to calculate the kinetic energy of a frame of an object of mass m as the work done to reach the speed v from the rest v=0 speed-incrementally within the Lorentz Transform as it is done in deriving the mass-energy relationship in Special Relativity. The misguided derivation of the mass-energy relationship in Special Relativity is incorrect, improper, invalid, and meaningless.

General momentum is a constant in Special Relativity that is based on Lorentz Transform. Lorentz Transform requires that the frame starts at a constant speed and remains at the same speed all the time. If the frame must accelerate from the rest, v=0, to reach the constant speed v, Lorentz Transform is not applicable.

Lorentz Transform transforms the Maxwell's equations for propagation of light on to a frame moving at constant speed v. Lorentz Transform cannot transform the Maxwell's equations for propagation of light onto an accelerating frame. Maxwell's equations cannot be transformed onto accelerating frames. There is no known transform that can transform Maxwell's equations onto an accelerating frame. Maxwell's equations do not hold their structure or the form relative to accelerating frames.

In fact, Lorentz Transform is not unique, and there are infinite number of Lorentz Transforms that are equally valid for a given frame moving at constant speed v. Any Lorentz Transform with Lorentz factor γ^n, n=1,2,3, …, where $\gamma=(1-v^2/c^2)^{1/2}$ is a valid transform. As a result, Maxwell's equations cannot be transformed onto moving frames either. Propagation

of light is not relative. Light does not propagate relative to moving frames. Lorentz factor γ^n, n=1,2,3, …, for a frame moving at constant speed v is not unique, and it is not a realistic factor when it is not unique. The claim in Special Relativity that the light is relative is a result of a mathematical error, a blind derivation.

"*Lorentz factor γ does not hold if the frame has to accelerate from the rest v=0 to reach the constant speed v of the frame. Lorentz factor γ is not unique for a moving frame. Lorentz factors γ^n, n=1,2,3, …, are all equally valid.*"

It is the incorrect definition of force as the rate of change of general momentum with respect to the frame dependent time t, instead of with respect to the frame independent proper time τ, that has led to the incorrect and improper mass-energy relationship in Special Relativity. Misinterpretation of this incorrectly derived mass-energy relationship in isolation without its foundational general momentum relationship is the reason for strange incongruent and unrealistic massless momentum and unusual rest kinetic energy in Special Relativity.

In deriving the massless momentum in Special Relativity, it has been overlooked the fact that the mass-energy relationship was derived from the general momentum of a mass and the fact that the general momentum has no existence if the mass is zero. If the mass is zero, general momentum is zero. If the mass is zero, there will be no general momentum to derive the mass-energy relationship from. Special Relativity has no existence without a mass. Mass-energy relationship in Special Relativity has no existence if mass is zero. As a result, there cannot be a massless momentum in Special Relativity.

"*Mass-energy relationship in Special Relativity does not apply for massless*."

Conclusions cannot be drawn using mass-energy relationship alone without the general momentum, which has no existence without a mass. Mass-energy relationship in Special Relativity has no isolated existence without the general momentum relationship. Any conclusions made using the mass-energy relationship must be made together with the general momentum relationship as a pair. Since the mass is directly related to the general or relative momentum, when the mass is zero, the general or relative momentum is zero, and hence the energy will also be zero when mass is zero.

There is no massless kinetic energy. It is a series of blind mistakes in the derivation of mass-energy relationship in Special Relativity that has led to the so-called rest energy of a mass, massless momentum, massless kinetic energy, and massless particles. There are no massless particles. Massless particles are mythical, not physical.

"*Massless Kinetic Energy, Massless Momentum, and Massless Particles are results of mistakes due to the blindness to the reality inherent in the core of the Special Relativity*."

Special Relativity altered the reality just to apply the Lorentz Transform, which was specifically designed for the propagation of waves, to the motion of masses disregarding the fact that propagation of waves and motion of masses have nothing in common. Special Relativity disregarded the fact that the propagation of waves and motion of masses are two distinct mechanisms that cannot be unified under a single framework using the Lorentz Transform.

"*Propagation of waves and motion of masses are two distinct mechanisms that cannot be unified under a single framework using Lorentz Transform*."

Special Relativity has no existence if the mass is zero. As a result, there cannot be massless energy in Special Relativity.

II. FRAME-INVARIANT MOMENTUM AND FORCE

Newton's laws of motion have the same form in all inertial frames since the time is frame invariant in Gallian Transform that the Newton's laws are based on. However, Special Relativity is based on the Lorentz Transform where time is dependent on the frame of reference. Although the time is frame dependent, the proper time is frame independent in Lorentz Transform and Special Relativity. So, when we use the Lorentz Transform to switch from one inertial frame to another inertial frame in Special Relativity, to maintain that the laws of nature are frame invariant, we must define not just the general momentum but also the rate of change of general momentum in a frame independent manner with respect to the frame independent proper time τ.

For a frame or object moving along the x axis, the general momentum p is given by,

$$p=m\partial x/\partial\tau \quad \text{(Proper)} \qquad (2.1)$$

where, τ is the frame independent proper time, m is the mass of the frame or object.

The rate of change of general momentum p must also be defined with respect to the proper time τ, which is the force F,

$$F=\partial p/\partial\tau \quad \text{(Proper)} \qquad (2.2)$$

The proper time τ is given by,

$$\tau=(1-v^2/c^2)^{1/2}t \qquad (2.3)$$

where v is the speed of the frame or the object, t is the time for v=0,

$$\tau=t, \text{ when } v=0 \qquad (2.4)$$

Although the rate of change of general momentum must be with respect to the frame independent proper time τ, in Special relativity, the rate of change of

general momentum, the force F, is improperly defined with respect to time t,

$$F=\partial p/\partial t \quad \text{(IMPROPER)} \tag{2.5}$$

This where is problem lies in the mass-energy relationship in Special Relativity. If the general momentum is defined with respect to the proper time τ, the rate of change of general momentum must also be defined with respect to the proper time τ. Failure to do it in Special Relativity is the cause for unrealistic mass-energy relationship leading to unrealistic conclusions.

It is the use of the rate of change of general momentum improperly with respect to the frame dependent time t, instead of using the rate of change of general momentum p properly with respect to the frame independent proper time τ, that has led to an incongruent and unrealistic massless momentum and an inconsistent rest kinetic energy of a mass in Special Relativity.

According to the principle of conservation of momentum, when masses interact together, the total momentum is conserved if there is no external force on the system. So, the definition of the force must be a general one with respect to frame independent proper time τ. Otherwise, the net force acting on the system or the interacting bodies with respect to one reference frame is zero but the net force with respect to another reference frame will not be zero. If the conservation of momentum in a closed system requires the net force to be zero, it must be the case independent of the frame of reference on every inertial frame.

Consider a case where we look at a collision on an inertial frame, we find that the total general momentum is unchanged and net force is zero. Now, we transform it onto another inertial reference frame using the Lorentz Transform. If we define the force F as the rate of change of general momentum p with respect to the frame dependent time t, the net force F=dp/dt will not be zero on this new frame.

So, it is not just the general momentum that we have to define in a general form in a frame independent manner with reference to frame independent proper time τ, we also must define the rate of change of general momentum, which is the force F, in a general form in a frame independent manner with respect to the proper time τ,

$$p=\gamma mv \quad \text{(Proper)} \tag{2.6}$$
$$F=\partial p/\partial \tau \quad \text{(Proper)} \tag{2.7}$$
$$\tau=(1-v^2/c^2)^{1/2}t \tag{2.8}$$
$$\partial t/\partial \tau=\gamma \tag{2.9}$$
$$\gamma=1/(1-v^2/c^2)^{1/2} \tag{2.10}$$

where, v is the speed of the frame or object, γ is the Lorentz factor for a frame or object at constant speed v, and the c is the speed of light.

When v<<c, we have,

$$\tau=t \tag{2.11}$$
$$p=mv \tag{2.12}$$
$$F=ma \tag{2.13}$$

where, v=dx/dt and acceleration a=dv/dt.

When the speed of the frame or object is much less than the speed of light, v<<c, it reduces to Newtonian motion.

The realistically correct proper generalization of the Newton's second law into Special Relativity is,

$$F=\partial(\gamma mv)/\partial \tau \quad \text{(Proper)} \tag{2.14}$$
$$F=\partial(\gamma mv)/\partial t \quad \text{(Improper)} \tag{2.15}$$
$$F\neq\partial(\gamma mv)/\partial t \tag{2.16}$$

Lorentz Transform only applies for frames that travels at constant speed from the start and hence in Special Relativity, the general momentum is a constant from the start. Therefore, the rate of change of general momentum, which is the force F, is zero in the Lorentz Transform and Special Relativity,

$$F=0 \quad \text{(True)} \tag{2.17}$$

As a result, the only energy of the inertial frame or the object moving at constant speed in Special Relativity is the kinetic energy due to the constant general momentum.

III. IMPROPER AND INCORRECT MASS-ENERGY RELATIONSHIP WITH THE IMPROPER DEFINITION OF RATE OF CHAGE OF GENERAL MOMENTUM OR THE FORCE IN SPECIAL RELATIVITY (CURRENTLY IN USE)

For an inertial frame or object of mass m moving at speed v along the x axis, the general momentum or relative momentum p is properly given by,

$$p=m\partial x/\partial \tau \quad \text{(Proper)} \tag{3.1}$$
$$p=\gamma mv \quad \text{(Proper)} \tag{3.2}$$
$$\gamma=1/(1-v^2/c^2)^{1/2} \tag{3.3}$$

where, τ is the frame independent proper time, m is the mass of the frame or object, and γ is the Lorentz factor for frame or object moving at constant speed v.

If the general momentum is defined as the rate of change of position with respect to the frame independent proper time τ, the rate of change of general momentum must also be with respect to the proper time τ. Special Relativity blatantly disregards this fact and incorrectly defines the rate of change of general momentum, which is the force F, with respect to the frame dependent time t,

$$F=\partial p/\partial t \quad \text{(IMPROPER)} \tag{3.4}$$
$$F=m\partial[v/(1-v^2/c^2)^{1/2}]/\partial t \tag{3.5}$$
$$F=m\{\partial[v/(1-v^2/c^2)^{1/2}]/\partial v\}[\partial v/\partial t] \tag{3.6}$$
$$F=\gamma^3 ma \tag{3.7}$$

where, a is the acceleration of the frame or object of mass m,

$$a=\partial v/\partial t \tag{3.8}$$

In Special Relativity, the kinetic energy KE is obtained as the work done to accelerate the frame or object of mass m from the rest v=0 to the speed v,

$$KE=\int F dx \tag{3.10}$$
$$F=\int \gamma^3 ma\, dx \tag{3.11}$$
$$KE=(\gamma-1)mc^2 \tag{3.12}$$
$$E=KE+mc^2 \tag{3.13}$$

where, the total energy E of the frame or object of mass m is given by,

$$E=\gamma mc^2 \tag{3.14}$$
$$E=mc^2/(1-v^2/c^2)^{1/2} \tag{3.15}$$

$$p=mv/(1-v^2/c^2)^{1/2} \quad (3.16)$$

Eliminating v^2 from equations (3.15) and (3.16), Special Relativity obtains the mass-energy relationship,

$$E^2=(mc^2)^2+(pc)^2 \quad (3.17)$$

This is the improper and incorrect mass-energy relationship we find everywhere in Special Relativity.

Since the improper mass-energy relationship is obtained from the general momentum relationship, improper mass-energy relationship itself cannot be analyzed in isolation without the general momentum relationship. The improper mass-energy relationship in Special Relativity is given by the equations pair,

$$E^2=(mc^2)^2+(pc)^2 \quad (3.18)$$

$$p=mv/(1-v^2/c^2)^{1/2} \quad (3.19)$$

When the implications of the mass-energy relationship are analyzed, both equations must be used in unison. Otherwise, the conclusions will be invalid and unrealistic as it is the case with the conclusions made from the mass-energy relationship is Special Relativity.

Special Relativity has used the improper mass-energy relationship $E^2=(mc^2)^2+(pc)^2$ alone in isolation generating incorrect and unrealistic conclusions. If the improper mass-energy relationship $E^2=(mc^2)^2+(pc)^2$ had been used together with the general momentum relationship $p=mv/(1-v^2/c^2)^{1/2}$, conclusions in Special Relativity would have been quite different.

a) **Correct Analysis of Mass-Energy Relationship:**

The correct analysis of improper mass-energy relationship $E^2=(mc^2)^2+(pc)^2$ must be done together with the general momentum relationship $p=\gamma mv$ as a pair. Let us consider what exactly happens to the improper mass-energy relationship when the mass of the object or the frame is zero, m=0, and when the general momentum p is zero, p=0 separately:

Case-1: General Momentum p=0, m≠0

When v=0, the general momentum p=0, and hence the so-called rest energy of the mass m is given by,

$$E=mc^2 \quad (3.20)$$

What does this energy $E=mc^2$ indicate? It indicates the same mass m moving at the speed v is also moving hypothetically at the speed of light c from the start. The rest energy is nothing but the kinetic energy of the same mass m if the mass m is moving at constant speed of light c from the start; it is an anomaly of extending the Lorentz Transform that is specifically designed for propagation of waves and hypothetical massless frames directly into motion of masses in Special Relativity. Propagation of light and hypothetical massless frames can start at constant speed and remain at that speed, but masses cannot and that is the main problem with the Special Relativity.

The factor 1/2 associated with the kinetic energy of any mass m is missing here since the mass-energy relationship used in Special Relativity is improper and incorrect. As we will see later, when the mass-energy relationship is properly and correctly obtained, the factor 1/2 will reappear taking its rightful place.

The appearance of a rest kinetic energy in Special Relativity as the energy of the mass if it is moving at the speed of light is somewhat ironic since Special Relativity is introduced to make sure that no mass exceeds the speed of light. If no mass can reach the speed of light, how can the rest energy of a mass can be the kinetic energy of the mass m if it travels at constant speed equal to the speed of light from the start. No mass can start moving at a constant speed from the rest. Any mass must accelerate from the rest to gain the speed. However, Lorentz Transform and Special Relativity do not apply if a mass must accelerate. Lorentz Transform does not have this problem when it is used for propagation of waves and hypothetical massless frames as it was originally intended for. However, when Lorentz Transform is used for masses as it is in Special Relativity, the inability of mass having a constant speed from the start becomes a problem since Lorentz Transform does not apply for accelerating objects.

Lorentz Transform does not apply for masses in motion. Lorentz Transform only applies for propagation of waves and motion of hypothetical massless frames.

On the other hand, the rest energy equivalent to the kinetic energy of the mass travelling at the speed of light c from the start in Special Relativity is expected since the relative time or proper time of a frame or object of mass m in Special Relativity is taken with respect to the same mass hypothetically moving at the speed of light, not the light itself. The same mass moving at the speed of light from the start is hidden in Special Relativity by assumption that the time t and the relative time t' are the same if the frame of mass m is travelling at the speed of light c. Bizarre rest energy is hidden there in Special Relativity by assumption, not as a natural reality.

As we are going to see later, the rest energy does not appear in the proper true mass-energy relationship in Special Relativity. Lorentz Transform and Special Relativity do not apply if the frame or object must accelerate to reach the constant speed. Lorentz Transform only applies for frames or objects moving at constant speed from the start, which is something no mass can do; it is something only the propagation of light and a hypothetical massless frame can do.

Case-2: Mass m=0

If mass m=0, then v is automatically zero, v=0. Motion speed v of a frame of mass m cannot exist if the mass m=0. There is no massless motion. Massless waves propagate. There is no motion dynamics in propagation. There is no motion dynamics without a mass. Motion dynamics and propagation mechanics have nothing in common.

When m=0, it is also clear that the general momentum p=0 and hence the energy E will be zero,

$$E=0 \text{ when } m=0 \quad (3.20)$$

When the mass m=0, both terms in the mass-energy relationship in Special Relativity are nil,

$$(pc)^2=0 \text{ and } (mc^2)^2=0 \text{ when } m=0 \quad (3.21)$$

As a result, the claim that the energy E=pc when mass m=0 in Special Relativity is incorrect, E≠pc.

Special Relativity does not involve propagation of waves. It only involves a mass hypothetically moving at the speed of light, not light itself. Special Relativity's attempt to use the improper mass-energy relationship to enforce a momentum on light is simply deceiving, mischievous, and a fraudulent effort in the blind. This will make the whole concept of Quantum Mechanics invalid since Quantum Mechanics is grounded on the idea that E=pc. When E≠pc, foundation of Quantum Mechanics collapses.

The whole idea of negative energy stems from the nonexistent relationship E=pc. The argument that E can be both positive and negative since c is a constant and the momentum p can be both positive and negative is false. It is not only the momentum p that can be both positive and negative, but the speed c can also be both positive and negative. If p is negative, c will also be negative, and as a result E is positive. The direction of c is also the direction of p in Special Relativity, and hence E is always positive; there is no negative energy. Besides, as we have seen the relationship E=pc does not hold true, E≠pc. When E≠pc, there will be no negative energy, E is always positive, E≥0.

From the improper mass-energy relationship in Special Relativity, we have, $E=\pm[(mc^2)^2+(pc)^2]^{1/2}$, which indicates that the energy E can be both positive and negative and the negative energy is a possibility in Special Relativity. However, the mass-energy relationship in Special Relativity is IMPROPER and INCORRECT. As we are going to see in the proper mass-energy relationship in Special Relativity the energy E is always positive, E≥0. The energy in Special Relativity cannot be negative. There is no negative energy.

"*There is no massless momentum, p=0 when m=0.*"
"*There is no negative energy, E≥0.*"
"Improper mass-energy relationship in Special Relativity is incorrect, $E^2\neq(mc^2)^2+(pc)^2$."

b) **What went wrong with Mass-Energy Analysis in Special Relativity**

Special Relativity only considers the mass-energy relationship in isolation without the general momentum that the mass-energy relationship was derived from in making conclusions for m=0. If the mass-energy relationship is taken in isolation, when the mass m=0, the energy E=pc. This gives the wrong and invalid impression that there exists a massless momentum p=E/c and massless kinetic energy E=pc. This hides the fact that there is no momentum without a mass since the general momentum p=0 when the mass m=0 and the energy E=0 when the mass m=0.

The mass-energy relationship $E^2=(mc^2)^2+(pc)^2$ has no existence without the general momentum p=ɤmv. As a result, the conclusions that have been made in Special Relativity by the analysis of the mass-energy relationship in isolation without the use of the general momentum defy any mathematical logic, and those conclusions are misleading and deceiving. There is no justification for it. Not only the mass-energy relationship in Special Relativity is incorrect and invalid but also the conclusions derived from it are done blindly to justify unjustifiable claims, which are false.

c) **False Conclusions Derived from the Improper Mass-Energy Relationship in Special Relativity**

It is not possible to disregard general momentum p=ɤmv and treat the mass-energy relationship $E^2=(mc^2)^2+(pc)^2$ independently in isolation. The mass-energy relationship $E^2=(mc^2)^2+(pc)^2$ must be analyzed in unison with its foundational counterpart general momentum p=ɤmv. When the mass-energy relationship is taken together with the general momentum relationship, we have the energy E=0 when the mass m=0 since the general momentum p=0 when the mass m=0. Whatever the way we look at, there is no massless momentum. Massless momentum is an obvious oxymoron.

There is no massless kinetic energy. The only massless energy that is present is the electromagnetic potential energy. Electromagnetic potential energy does not require a mass for its existence. Kinetic energy and mechanical energy in general that includes both kinetic energy and mechanical potential energy do not have any existence in the absence of a mass. Both massless momentum p=E/c and massless kinetic energy $E=mc^2$ in Special Relativity are fraudulent, not real, not existent, simply a result of the blindness to the reality in Special Relativity.

In other words, in Special Relativity, when the mass m=0, what we have are,

$$p=0,\ p\neq E/c \quad (3.22)$$
$$E=0,\ E\neq pc \quad (3.23)$$

It is this senseless blind mistake of not analyzing the mass-energy relationship together with the general momentum relationship in Special Relativity that led to the so-called massless momentum, particle waves, and wave particles in Modern Physics.

Since c=fλ, where λ is a wavelength of light at frequency f, substituting for c in eqn. (3.22), we have,

$$p=0,\ p\neq E/f\lambda \quad (3.24)$$

The energy E of a frame or object of mass m here is kinetic energy. Kinetic energy is continuous. Kinetic energy has no association with a frequency f and wavelength λ. It is simply preposterous to claim that kinetic energy E is equal to hf. Kinetic energy does not come in quanta,

$$E=0,\ E\neq hf \quad (3.25)$$

where h is the Plank constant.

In Special Relativity, an invalid assumption has been made that the kinetic energy of a mass E=hf.

You cannot blindly stick in hf everywhere you see term energy E. Substituting for E in eqn. (3.24), we have,

$$p=0,\ p\neq h/\lambda \quad (3.27)$$

$$f=0,\ \lambda\neq h/p \quad (3.28)$$

The relationship $\lambda=h/p$ linking wavelength of light λ to momentum p of a mass m is simply invalid and meaningless. General momentum $p=\gamma mv$ in Special Relativity has no existence without mass m. General momentum of a mass has nothing to do with the wavelength of light of frequency f. Special Relativity has no existence when mass m=0.

This meaningless relationship $\lambda=h/p$ is widely used in Modern Physics by interpreting the wavelength as a wavelength of imaginary particle waves. As we have seen, relationship that links wavelength of light to the momentum of a mass is a result of a mass-energy interpretation error and the relationship $\lambda=h/p$ is invalid, and it has no existence in Special Relativity.

Special Relativity does not deal with propagation of waves or light. Special Relativity only has a mass hypothetically moving at the speed of light, not the light itself. A mass moving at the speed of light is not a propagation of a wave. Motion of a mass cannot turn itself into a propagating wave when the mass reaches the speed of light; this is a major flaw in the Special Relativity.

The definition of a wavelength λ as the Plank constant h divided by a momentum p of an object is invalid and meaningless. This non-existent and meaningless relationship $\lambda=h/p$ has been used in Special Relativity to claim that the light is a particle and particle is a wave. The wave-particle duality concept is a result of the analysis of improper and incorrect mass-energy relationship in isolation without its founding relationship general momentum $p=\gamma mv$.

There are no light particles. Light has no momentum. Particles are not Waves. Waves are not particles. There is no wave-particle duality. Wave-particle duality is an outcome of mass-energy error as well as mass-energy interpretation error in Special Relativity.

"*When we use the Lorentz Transform to switch from one inertial frame to another inertial frame in Special Relativity, to maintain that the laws of nature are frame invariant, we must define not just the general momentum but also the rate of change of general momentum in a frame independent manner with respect to the frame independent proper time. The failure to do this is one of the fatal mistakes in Special Relativity.*"

Theorem-1: Improper and Incorrect Mass-Energy

For a frame or an object of mass m moving at the speed v, the improper and incorrect mass-energy relationship currently used in Special Relativity is given by,

$$E^2=(mc^2)^2+(pc)^2 \quad \text{(improper and incorrect)} \quad (3.29)$$

$$E=\gamma mc^2 \quad \text{(improper and incorrect)} \quad (3.30)$$

$$p=m\partial x/\partial\tau \quad \text{(proper)} \quad (3.31)$$

$$p=\gamma mv \quad \text{(proper)} \quad (3.32)$$

Summary of all the relationships associated with improper and incorrect mass-energy relationship in Special Relativity:

$$KE=(\gamma-1)mc^2 \quad \text{(improper and Incorrect)} \quad (3.33)$$

$$E=KE+mc^2 \quad \text{(improper and Incorrect)} \quad (3.34)$$

$$F=\partial p/\partial t \quad \text{(Improper and Incorrect)} \quad (3.35)$$

$$F=m\partial^2x/\partial t\partial\tau \quad \text{(Improper and Incorrect)} \quad (3.36)$$

$$F=\gamma^3 ma \quad \text{(Improper and Incorrect)} \quad (3.37)$$

$$a=\partial v/\partial t \quad (3.38)$$

$$\gamma=1/(1-v^2/c^2)^{1/2} \quad (3.39)$$

$$\partial t/\partial\tau=\gamma \quad (3.40)$$

$$v=\partial x/\partial t \quad (3.41)$$

"*Motion of a mass cannot turn itself into a propagating wave when the mass reaches the speed of light; this is a major flaw in the Special Relativity.*"

"*Particle waves and wave particles are oxymorons*."

Special Relativity does not involve the propagation of light. What is involved in Special Relativity is a motion of a mass hypothetically at the speed of light c.

"*Mass-Energy relationship is Special Relativity is IMPROPER and INCORRECT*."

Improper and **Incorrect** mass-energy relationships in Special Relativity:

$$E=\gamma mc^2$$

$$E^2=(pc)^2+(mc^2)^2$$

$$p=\gamma mv$$

IV. PROPER MASS-ENERGY RELATIONSHIP WITH THE PROPER DEFINITION OF RATE OF CHAGE OF GENERAL MOMENTUM OR THE FORCE FOR SPECIAL RELATIVITY

In Galilean Transform, the time is invariant in all frames. However, in Special Relativity based on Lorentz Transform, time is frame dependent. In Lorentz Transform and in Special Relativity, it is the proper time τ that is frame independent. So, the momentum as well as the rate of change of momentum must be defined with respect to the frame independent proper time τ for a given frame or object of mass m.

As it is correctly done in Special Relativity, the general momentum or the relative momentum p is given with respect to the proper time τ by,

$$p=m\partial x/\partial\tau \quad (4.1)$$

$$\tau=(1-v^2/c^2)^{1/2}t \quad (4.2)$$

$$\partial t/\partial\tau=\gamma \quad (4.3)$$

where, τ is the frame independent proper time, v is the speed of the frame or object of mass m, t is the time

for v=o, and the Lorentz factor $\mathfrak{r}$ is given by,

$$\mathfrak{r}=1/(1-v^2/c^2)^{1/2} \quad (4.4)$$

When v=0, or v<<c, we have $\tau=t$ and $\mathfrak{r}=1$.

Although, in Special Relativity, the general momentum is defined correctly as the product of the mass and the rate of change of position with respect to the frame independent proper time τ, Special Relativity failed to define the rate of change of general momentum, which is the force F, with respect to the frame independent proper time τ. The force F must be defined as the rate of change of general momentum or the relative momentum $p=\mathfrak{r}mv$ with respect to the frame independent proper time τ.

There is no reason to define the general momentum with respect to frame independent proper time τ and the rate of change of general momentum with respect to frame dependent time t as it is done in Special Relativity. Both general momentum and the rate of change of general momentum, which is the force F, must be with respect to the frame independent proper time τ.

Properly defined rate of change of general momentum or the force F is given by,

$$F=\partial p/\partial\tau \quad \text{(Proper)} \quad (4.5)$$

$$F=m\partial^2x/\partial^2\tau \quad \text{(Proper)} \quad (4.6)$$

The speed of the frame or the object, v is given by,

$$v=\partial x/\partial t \text{ for } \forall t,\ t\geq 0 \quad (4.7)$$

The general momentum p is given by,

$$p=m(\partial x/\partial t)(\partial t/\partial\tau) \quad (4.8)$$

Since $\partial t/\partial\tau=\mathfrak{r}$, as it is correctly given in the Special Relativity, the general momentum p is given by,

$$p=\mathfrak{r}mv \quad (4.9)$$

It is the definition of the rate of change of general momentum, which is the force, that is incorrect in Special Relativity. Substituting for general momentum p in eqn. (4.5), properly defined rate of change of general momentum or the force F is given by,

$$F=\partial[mv/(1-v^2/c^2)^{1/2}]/\partial\tau \quad (4.10)$$

$$F=\partial[mv/(1-v^2/c^2)^{1/2}]/\partial v](\partial v/\partial t)(\partial t/\partial\tau) \quad (4.11)$$

The acceleration $a=\partial v/\partial t$ and $\partial t/\partial\tau=\mathfrak{r}$. As a result, we have,

$$F=\mathfrak{r}ma\partial[v/(1-v^2/c^2)^{1/2}]/\partial v \quad (4.12)$$

$$F=\mathfrak{r}^2ma\{[(v^2/c^2)/(1-v^2/c^2)]+1\} \quad (4.13)$$

$$F=\mathfrak{r}^4ma \quad (4.14)$$

If we define the kinetic energy KE, as it is done in the Special Relativity, as the work done,

$$KE=\int Fdx \quad (4.15)$$

$$KE=m\int[1/(1-v^2/c^2)^2](dv/dt)dx \quad (4.16)$$

Since dx=vdt, we have integration from v=0 to v,

$$KE=m\int[v/(1-v^2/c^2)^2]dv \quad (4.17)$$

When it is Integrated from v=0 to v, we have,

$$KE=(1/2)mc^2\{[1/(1-v^2/c^2)]-1\} \quad (4.18)$$

$$KE=(1/2)mc^2(\mathfrak{r}^2-1) \quad (4.19)$$

For v=0, $\mathfrak{r}=1$ and hence KE=0.

For v<<c, we have,

$$\mathfrak{r}^2\approx 1+v^2/c^2 \quad (4.20)$$

As a result, for v<<c, kinetic energy KE is given by,

$$KE=(1/2)mv^2 \quad (4.21)$$

For speeds much smaller than the speed of light c, v<<c, the general or relative kinetic energy KE agrees with the Newtonian kinetic energy of an object of mass m moving at speed v.

From eqn. (4.19), we have the proper mass-energy relationship for Special Relativity,

$$E=KE+(1/2)mc^2 \quad (4.22)$$

where, E is the total energy of the object of mass m given by,

$$E=(1/2)\mathfrak{r}^2mc^2 \quad (4.23)$$

$$p=\mathfrak{r}mv \quad (4.24)$$

When KE=0, in other words v=0 or when the mass is at rest, the energy of the mass $E\neq 0$ and the energy E is the so-called rest energy and it is given by,

$$E=(1/2)mc^2 \text{ for } v=o \quad (4.25)$$

This rest energy is inherent in Special Relativity since Special Relativity uses the same frame or mass hypothetically moving at the speed of light c in place of the propagation of light in the Lorentz Transform. Rest energy is present in Special Relativity by assumption, not a consequence of reality.

The total energy E of the object of mass m is the kinetic energy KE plus the constant term $(1/2)mc^2$ that is independent of the speed v of the mass. In Special Relativity, the term $(1/2)mc^2$ that is independent of the speed v is referred to as the rest energy. If the rate of change of general momentum, which is the force F, of the mass m is properly defined with respect to the frame independent proper time τ, the so-called rest energy is not equal to mc^2 in Special Relativity, $E\neq mc^2$. The rest energy E for a mass m is given by much more sensible, $E=(1/2)mc^2$.

If we incorrectly assume that the relative momentum $p=\mathfrak{r}mv$ is the instantaneous momentum, as it was assumed in Special Relativity, in obtaining the mass-energy relationship with total disregard to the fact that the general momentum is a constant from the start for a frame or an object of mass m in the Lorentz Transform based Special Relativity, we have the total energy E given by $E=(1/2)\mathfrak{r}^2mc^2$, which is same as the,

$$E=(1/2)mc^2/(1-v^2/c^2) \quad (4.26)$$

$$p=mv/(1-v^2/c^2)^{1/2} \quad (4.27)$$

Now, by eliminating v^2 from the two equations for E and p, we can obtain the proper mass-energy relationship for Special Relativity,

$$2E/mc^2=1/(1-v^2/c^2) \quad (4.28)$$

$$p^2/(mc)^2=(v^2/c^2)/(1-v^2/c^2) \quad (4.29)$$

Subtracting eqn. (4.29) from eqn. (4.28), we have,

$$2E/mc^2-p^2/(mc)^2=1 \quad (4.30)$$

$$2E-p^2/m=mc^2 \quad (4.31)$$

$$E=(p^2/2m)+(1/2)mc^2 \quad (4.32)$$

$$E=KE+(1/2)mc^2 \quad (4.33)$$

where,

$$KE=p^2/2m \quad (4.34)$$

$$E=(1/2)\mathfrak{r}^2mc^2 \quad (4.35)$$

$$p=\mathfrak{r}mv \quad (4.36)$$

From the proper mass-energy relationship $E=(p^2/2m)+(1/2)mc^2$, the energy E is always positive, $E\geq 0$. There is no negative energy in Special Relativity when the mass-energy relationship is properly defined. The negative energy in Special Relativity is a

result of improper and incorrect mass-energy relationship in Special Relativity.

"*The proper mass-energy relationship contains an extra γ factor in addition to the legitimate factor 1/2 required for the kinetic energy of a mass compared to the improper mass-energy relationship in Special Relativity*."

The proper mass-energy relationship of a frame or an object of mass m moving at speed v is given by the equations pair:

$$E=p^2/2m+(1/2)mc^2 \quad (4.37)$$
$$p=\gamma mv \quad (4.38)$$

Special Cases:

Here, we are going to use the mass-energy relationship E in eqn. (4.37) together with its foundational general momentum p given in eqn. (4.38) to analyze what happens when mass m=0 and p=0 independently.

Case-1: m=0

When the mass m=0, we have p=0 and E=0. There is no massless kinetic energy.

$$E=0 \text{ when } m=0 \quad (4.39)$$

There is no massless momentum since p=0 when m=0. Massless has no momentum. Massless has no kinetic energy. Light has no momentum. Light has no kinetic energy. Light is not a particle. Special Relativity does not deal with propagation of light. Special Relativity only deals with masses. What is moving at the speed of light c in Special relativity is the same frame or the object of mass hypothetically, not the light itself. The use of the hypothetical motion of the frame or the object of mass at the speed of light c does not give permission to make the FALSE claim that the Special Relativity is associated with the propagation of light, it is NOT. Special Relativity has no association with the propagation of light whatsoever.

Case-2: p=0 or v=0 and m≠0

When the momentum p=0 and m≠0, v=0, and we have the rest energy E given by,

$$E=(1/2)mc^2 \text{ for } p=0 \quad (4.40)$$

So, the rest energy of a mass m is the same as the kinetic energy of the mass if the mass is moving at the speed of light c. Although the kinetic energy $E=(1/2)mc^2$ is the energy of the frame of mass m moving at the speed of light c, it is appearing in Special Relativity as the kinetic energy when the frame of mass m is at stand still, v=0. This is contradictory since a mass at stand still cannot have a kinetic energy. However, it is understandable since Special Relativity has a frame of mass m moving at speed v, and the same frame of mass m moving hypothetically at the speed of light c. As a result, even when p=0, Special Relativity still has the same frame of mass m hypothetical moving at the speed of light c giving rise to a rest energy.

In Special Relativity, the proper time τ of a frame or an object of mass m is defined as the extra time taken by the frame or object of mass m to travel any distance at speed v over the time taken for the same frame or object of mass m to travel the same distance at the speed of light c. As a result, in Special Relativity, even though the frame or the object of mass m is at rest when v=0, it still has the hypothetical kinetic energy of the reference, which is equal to the kinetic energy of the frame or object hypothetically moving at the speed of light, $E=(1/2)mc^2$. The rest energy in Special Relativity is there by assumption, by design, not as a reality.

Case-3: v<<c

When v<<c, we have $\gamma \approx 1$ and hence,

$$E=(1/2)mv^2+(1/2)mc^2 \quad (4.41)$$

"*Lorentz Transform only applies for frames moving at constant speed v from the start. If the frame must accelerate from the rest to reach the constant speed v, Lorentz Transform cannot be applied. Rate of change of general momentum, which is the force, is nil in the case of Lorentz Transform and Special Relativity. Failure to apply this fact in obtaining the mass-energy relationship in Special Relativity is a catastrophic mistake in Special Relativity that haunts whole of the Modern Physics*."

Proper but still not true mass-energy relationships in Special Relativity:
$E=(1/2)\gamma^2mc^2$
$E=(p^2/2m)+(1/2)mc^2$
$p=\gamma mv$

Theorem-2: Proper Mass-Energy

For a frame or an object of mass m moving at the speed v, the proper mass-energy relationship for Special Relativity is given by,

$$E=(p^2/2m)+(1/2)mc^2 \quad \text{(proper)} \quad (4.42)$$
$$E=(1/2)\gamma^2mc^2 \quad \text{(proper)} \quad (4.43)$$
$$p=m\partial x/\partial\tau \quad \text{(proper)} \quad (4.44)$$
$$p=\gamma mv \quad \text{(proper)} \quad (4.45)$$

Summary of the proper relationships for Special Relativity:

$$KE=(1/2)mc^2(\gamma^2-1) \quad \text{(proper)} \quad (4.46)$$
$$E=KE+(1/2)mc^2 \quad \text{(proper)} \quad (4.47)$$
$$F=\partial p/\partial\tau \quad \text{(proper but not true)} \quad (4.48)$$
$$F=m\partial^2x/\partial^2\tau \quad \text{(proper but not true)} \quad (4.49)$$
$$F=\gamma^4ma \quad \text{(proper but not true)} \quad (4.50)$$

$$a=\partial v/\partial t \quad (4.51)$$
$$\gamma=1/(1-v^2/c^2)^{1/2} \quad (4.52)$$
$$\partial t/\partial\tau=\gamma \quad (4.53)$$
$$v=\partial x/\partial t \quad (4.54)$$

V. TRUE MASS-ENERGY RELATIONSHIP FOR SPECIAL RELATIVITY

The true mass-energy relationship for an inertial frame or an object of mass m in motion requires the taking into consideration that the speed of a frame in Lorentz Transform must be a constant form the very start t=o. You cannot increment v at any time t. If v is incremented to v+∆v, then speed v+∆v must remain from the very start t=0. Lorentz factor $\mathfrak{r}$ only applies for constant speed v from the very start t=0 to any t.

For an inertial frame or object of mass m moving along the x-axis at constant speed v, the Lorentz Transform is given by,

$$x'=\mathfrak{r}(x-vt) \quad (5.1)$$

$$t'=\mathfrak{r}(t-vx/c^2) \quad (5.2)$$

Using the reversible symmetry, we have,

$$x=\mathfrak{r}(x'+vt') \quad (5.3)$$

$$t=\mathfrak{r}(t'+vx'/c^2) \quad (5.4)$$

where,

$$\mathfrak{r}=1/(1-v^2/c^2)^{1/2} \quad (5.5)$$

Lorentz Transform and Special Relativity guarantees that no object of mass exceeds the speed of light c. Lorentz Transform applies only for frames moving at constant speed v from the very beginning or at the start and remains at the same speed v, ∀t. In Special Relativity, the inertial frame or object of mass m must have the speed v at the very start t=0 onwards. If the inertial frame or the object of mass m must accelerate from the rest v=0 at time t=0 to reach the constant speed v gradually, the Lorentz Transform is not applicable, Special Relativity is not applicable.

This is the reason why Lorentz Transform is limited to massless wave propagation, not for motion of masses. For massless light, speed is a constant from the very beginning. The fact that a mass cannot start at a constant speed makes the derivation of the mass-energy relationship in Special Relativity using the kinetic energy of the mass as the work done to accelerate the mass from the rest to reach the constant speed within the Lorentz Transform invalid. Lorentz Transform does not apply for accelerating frames.

"*Lorentz factor $\mathfrak{r}$ is not applicable for incremental instantaneous speeds.*"

For an inertial frame or object of mass m moving at constant speed v, the frame independent proper time τ is given by,

$$\tau=(1-v^2/c^2)^{1/2}t \quad (5.6)$$

In the mass-energy relationship in Special Relativity, we are not considering an accelerating object on an inertial frame. We are considering the energy of the inertial frame of mass m itself. For an inertial frame or moving object of mass m, the general momentum p, and the rate of change of general momentum, which is the force F, are given by,

$$p=m\partial x/\partial\tau \quad \text{(Proper)} \quad (5.7)$$

$$F=\partial p/\partial\tau \quad \text{(Proper)} \quad (5.8)$$

$$p=\mathfrak{r}mv \quad \text{(Proper)} \quad (5.9)$$

where, $v=\partial x/\partial t$, which is a constant from t=0.

Since v is a constant for all the time from starting time t=0 to any time t, ∀t,

$$p=\text{constant}, \forall t, t\geq 0 \quad \text{(true)} \quad (5.10)$$

$$\partial p/\partial\tau=0 \quad \text{(true)} \quad (5.11)$$

$$\partial p/\partial t=0 \quad \text{(true)} \quad (5.12)$$

As a result, in Special Relativity, the force F is zero,

$$F=0 \quad \text{(true)} \quad (5.13)$$

For a frame or object moving at constant speed, the general momentum is time invariant. As a result, the energy E of the frame or object moving at constant speed v in Special Relativity is the kinetic energy of the frame or object due to the general momentum and it is given by,

$$E=p^2/2m \quad (5.14)$$

Since $p=\mathfrak{r}mv$, we have,

$$E=(1/2)\mathfrak{r}^2mv^2 \quad (5.15)$$

This is the true proper mass-energy relationship for an inertial frame or object of mass m moving at constant speed v in Special Relativity. There is no rest energy, $E\neq mc^2$ when p=0. For an inertial frame or object of mass m moving at constant speed v, the energy E is the kinetic energy KE of the mass moving at the general speed v_g, and can be written as,

$$E=(1/2)mv_g^2 \quad (5.15)$$

where, v_g is the general speed of the frame or object of mass m given by,

$$v_g=\mathfrak{r}v \quad (5.16)$$

$$v_g=\partial x\partial\tau \quad (5.17)$$

$$\tau=(1-v^2/c^2)^{1/2}t \quad (5.18)$$

The mass-energy relationship in Special Relativity is no different from the mass-energy relationship for Newtonian frame or an object of mass m moving at speed v except that in the case of Special Relativity, the speed v is replaced by the general speed v_g, where $v_g=\mathfrak{r}v$.

Definition: General Speed of a Frame

For an inertial frame or object of mass m moving at constant speed v, the general speed v_g of the frame or object is the rate of change of the position x with respect to the proper time τ, where $v_g=\mathfrak{r}v$, v is the constant speed of the frame or object, and $\mathfrak{r}$ is the Lorentz factor.

Proper and **True** Mass-Energy Relationship for Special Relativity:

$E=1/2)\mathfrak{r}^2mv^2$

$E=p^2/2m$

$p=\mathfrak{r}mv$

"There is no rest energy or massless momentum in Special Relativity."

Theorem-3: True Mass-Energy

For a frame or an object of mass m moving at the speed v, the true mass-energy relationship for Special Relativity is given by,

$$E=p^2/2m \quad \text{(TRUE)} \quad (5.19)$$

$E=(1/2)\mathfrak{r}^2mv^2$ (TRUE) (5.20)
$p=m\partial x/\partial\tau$ (PROPER) (5.21)
$p=\mathfrak{r}mv$ (PROPER) (5.22)

The energy E is simply the kinetic energy KE due to the general momentum of the mass m. There is no rest energy. There is no massless momentum.

Summary of the relationships for true proper mass-energy relationship for Special Relativity:

$E=p^2/2m$ (TRUE) (5.23)
$E=1/2)\mathfrak{r}^2mv^2$ (TRUE) (5.24)
$F=\partial p/\partial\tau$ (PROPER) (5.25)
$F=m\partial^2x/\partial^2\tau$ (PROPER) (5.26)
$p=$constant, $\forall t, t\geq 0$ (TRUE) (5.27)
$\partial p/\partial\tau=0$ (TRUE) (5.28)
$\partial p/\partial t=0$ (TRUE) (5.29)

$F=0$ (TRUE) (5.30)
$a=\partial v/\partial t=0$ (TRUE) (5.31)
$\mathfrak{r}=1/(1-v^2/c^2)^{1/2}=$constant (TRUE) (5.32)
$\partial t/\partial\tau=\mathfrak{r}=$constant (TRUE) (5.33)
$v=\partial x/\partial t=$constant (TRUE) (5.34)

VI. LORENTZ FACTOR $\mathfrak{r}$ DOES NOT HOLD FOR INCREMENTAL SPEEDS

In the mass-energy derivation in Special Relativity, Lorentz factor $\mathfrak{r}$ had been blindly integrated for incremental speeds. Lorentz factor $\mathfrak{r}$ cannot be integrated for incremental speeds.

It is noteworthy that $\mathfrak{r}=1/(1-v^2/c^2)^{1/2}$ is valid only for frames moving at constant speed v all the time from the start. Lorentz parameter $\mathfrak{r}$ does not apply for accelerating objects. For accelerating objects $\mathfrak{r}\neq 1/(1-v^2/c^2)^{1/2}$. If an object must accelerate from the rest to reach the constant speed v, Lorentz Transform does not apply, and hence $\mathfrak{r}\neq 1/(1-v^2/c^2)^{1/2}$.

"For instantaneous incremental speeds
$\mathfrak{r}\neq 1/(1-v^2/c^2)^{1/2}$."

For any accelerating object, Lorentz factor $\mathfrak{r}$ no longer holds true. For an accelerating body, Lorentz factor has no existence since Maxwell's equations cannot be transformed onto an accelerating frame using Lorentz Transform. It is the transformation of the Maxwell's equations onto a frame of constant speed v that led to the Lorentz factor $\mathfrak{r}=1/(1-v^2/c^2)^{1/2}$ that is ubiquitous in Special Relativity.

As we are going to see later, Lorentz Transform is not unique and hence the Lorentz factor $\mathfrak{r}$ is not unique. There can be infinitely many Lorentz factors for any given inertial frame moving at constant speed v,

$\mathfrak{r}^n=1/(1-v^2/c^2)^{n/2}, \forall n$

where, n can be any integer or any real value.

Lorentz factor $\mathfrak{r}^n$ with any n value is also a valid Lorentz factor for any given frame travelling at constant speed v in Special Relativity. It is the non-availability of unique Lorentz factor $\mathfrak{r}$ for a given inertial frame or an object of mass m moving at constant speed v that makes the Special Relativity and Lorentz Transform invalid. A non-unique transform cannot be a transform of nature. Nature has no mechanism to choose one Lorentz factor out of infinitely many Lorentz factors that are equally possible. Lorentz Transform is not a transform of nature. Special Relativity founded upon the Lorentz Transform is not a mechanism of nature.

"*In Special Relativity, total energy E of a frame or an object of mass m moving at speed v is simply the kinetic energy due to the general momentum p, $E=p^2/2m$, where $p=\mathfrak{r}mv$. Equivalently, $E=(1/2)\mathfrak{r}^2mv^2$. There is neither a massless momentum nor a physically unsound so-called momentum-less kinetic energy or rest energy in Special Relativity.*"

VII. BLIND SPOTS IN SPECIAL RELATIVITY

There are many improper, ill-logical, unrealistic, and incorrect concepts in Lorentz Transform and Special Relativity. Lorentz Transform and Special Relativity have been bulldozed through as realistic mechanisms of nature either because the problematics spots were unnoticed or just intentionally blind to them. Surprisingly, many experimental observations have been misinterpreted to incorrectly justify Special Relativity. Here are some of the blind spots in Special Relativity. It is incomprehensible how far they have gone to bend the commonsense to justify an ill-logical hypothetical theory, Special Relativity.

Special Relativity has turned physics into an institutionalized religion with a cult of followers who keep repeating what is considered the sacred text. What is in the sacred text is not open to questioning. Everyone is expected to learn the text and chant what is in the text or find some way to justify the text. If you cannot agree with the text, that is because you a not smart enough to understand it; as a result, everybody seems to understand the text. There is no science in Special Relativity, there is no logic to it.

a) Lorentz Transform is Not Unique

Lorentz Transform is not unique. The General Lorentz Transform can be written as [2],

$x'=\mathfrak{r}^n(x-vt)$ (7.1.1)
$t'=\mathfrak{r}^n(t-vx/c^2)$ (7.1.2)
$\mathfrak{r}=1/(1-v^2/c^2)^{1/2}$ (7.1.3)

where, n is any integer or any real value, v is constant speed of the frame.

Maxwell's equations can be transformed on to a frame moving at constant speed v using General Lorentz Transform. As a result, there are infinitely many Lorentz Transforms for a given frame moving at constant speed v. There are infinitely many Lorentz factors for any given frame moving at constant speed v,

$\mathfrak{r}^n, \forall n, n=1, 2, 3, \ldots$

This makes the Lorentz Transform and Special Relativity invalid as a mechanism of nature.

"*Any mechanism of nature must be unique*."
"*Nature abhors non-uniqueness*."

b) **General Speed and Frame Independent Mass**

Mass of an object does not vary with the speed. Mass is speed invariant. If energy is equivalent to mass, mass of an object cannot be frame invariant. Mass must be independent of energy. Mass of an object is frame invariant.

It is the general speed v_g, where $v_g=v/(1-v^2/c^2)^{1/2}$, of a frame or an object of mass m that is a nonlinear function of the constant speed v of the frame or the object. As we have seen, there is no such entity as a rest energy associated with a mass. A mass at rest does not have kinetic energy, $E\neq mc^2$. The rest energy has no existence since the rate of change of general momentum is zero when the general momentum p=0. The mass-energy relationship in Special Relativity has no existence when the general momentum p=0, The general momentum must be non-zero to obtain the mass-energy relationship in Special Relativity,

$E^2=(mc^2)^2+(pc)^2$ only for $p\neq0$.

$E^2\neq(mc^2)^2+(pc)^2$ when p=0.

The rest energy in Special Relativity is a result of conceptual and mathematical error in the derivation and the analysis of the mass-energy relationship in Special Relativity.

At any given time, the actual energy of an inertial frame or an object of mass m moving at constant speed v is given by,

$$E=p^2/2m \quad (7.2.1)$$
$$p=mv_g \quad (7.2.2)$$
$$v_g=\text{ϒ}v \quad (7.2.3)$$
$$\text{ϒ}=1/(1-v^2/c^2)^{1/2} \quad (7.2.4)$$
$$E=(1/2)mv_g^2 \quad (7.2.5)$$

The general speed v_g of an inertial frame or an object of mass m differs from its constant speed v by the Lorentz factor ϒ, where $v_g=\text{ϒ}v$.

The mass of an object is the same whether the object is at rest or in motion. Mass is independent of the speed of the mass. General speed is the speed of a moving frame or an object of mass m defined as the rate of change of the position with respect to the frame independent proper time τ for the frame or the object.

"*Mass is independent of its speed and acceleration*."

c) **Object Moving on a Circular Path**

In Special Relativity, although centrifugal force F for an object of mass m on a circular path is claimed to be $F=\text{ϒ}ma$, it is incorrect, $F\neq\text{ϒ}ma$, where a is the acceleration.

Lorentz Transform and Special Relativity only applies for frames or objects moving on linear paths at constant speed from the start. Maxwell's equations for propagation of light cannot be transformed onto moving frames at constant speed on circular paths. Frames or objects moving at constant speed on circular paths are on acceleration. Maxwell's equations cannot be transformed onto accelerating frames in manner that the form of the Maxwell's equations is maintained. As a result, the Lorentz factor $\text{ϒ}=1/(1-v^2/c^2)^{1/2}$ has no existence for frames or objects moving at constant speed v on circular paths, any non-linear path, or any accelerating frame or object. Special Relativity is not applicable for objects moving at constant speed on circular paths. Special Relativity is only applicable for frames or objects of mass on linear path at constant speed.

"*Lorentz Transform is not applicable for accelerating frames*."

d) **Frame Independent Quantities in Special Relativity**

1. Mass of an Object

Mass m of a frame or object is speed independent. Mass does not depend on the frame of reference. Mass is not a frame specific quantity. Mass of an object is the same irrespective of whether the object is at standstill or in motion. Mass of an object is independent of energy.

In the past, Special Relativity treated the mass of an object as speed dependent or frame dependent. However, now, it appears that Special Relativity is quietly backing away from that claim, which is indeed a correct move. It will not be too long before the Special Relativity itself disappears from physics. There is nothing in Special Relativity that is correct. Mass is not relative. Mass is absolute.

2. Time

Although the time t is assumed to be frame dependent in Lorentz Transform and Special Relativity, the proper time τ is frame independent. Time t on any frame or object moving at constant speed v is related to the frame independent proper time τ by the Lorentz factor ϒ,

$$t=\text{ϒ}\tau, \text{ or } \tau=(1-v^2/c^2)^{1/2}t \quad (7.4.1)$$
$$\tau^2=(1-v^2/c^2)t^2 \quad (7.4.2)$$
$$\tau^2=t^2-v^2t^2/c^2) \quad (7.4.3)$$

Since x=vt, we have,

$$\tau^2=t^2-x^2/c^2 \quad (7.4.4)$$

If the frame or object of mass m is moving in the direction **r**, where **r**=(x, y, z), we have,

$$\tau^2=t^2-r^2/c^2) \quad (7.4.4)$$

where, $r^2=(x^2+y^2+z^2)$.

$$\tau^2=t^2-(x^2+y^2+z^2)/c^2) \quad (7.4.5)$$

The function $\tau^2=t^2-(x^2+y^2+z^2)/c^2$ is the so called spacetime. We can write space time as,

$$\tau^2=t^2-t_c^2 \quad (7.4.6)$$

where, t_c is the time taken for the same object of mass m to travel the same distance r at the speed of light c,

$$t_c^2=(x^2+y^2+z^2)/c^2 \quad (7.4.7)$$
$$t_c^2=r^2/c^2 \quad (7.4.8)$$

In Special Relativity, although time t_c is incorrectly claimed to be the time taken for light to travel the same distance r, the time t_c is in fact the time taken for

the same frame or object of mass m to travel the same distance r if had travelled at the speed of light c.

It is not possible to incorporate the propagation of light into the motion dynamics of a frame or object of mass. You can only incorporate the speed of light onto the motion dynamics of a frame or an object of mass by making the same frame or object of mass to travel hypothetically at the speed of light c. There is no other way to bring the speed of light c onto motion dynamics of masses since the propagation of light and motion of a mass are two completely unrelated processes.

In Special Relativity, it is never the light that is taken as the reference. It is the same frame or object moving hypothetically at the speed of light c that is taken as the reference. That is the reason for the appearance of a rest energy equivalent to the kinetic energy of the same object of mass m travelling at the constant speed of light c from the start, the rest energy $E=mc^2$. No mass at stand still can have kinetic energy, and hence $E\neq mc^2$. No mass can start at a constant speed as it is required by the Lorentz Transform. A mass must start at rest and accelerate to gain the speed. If mass must start at rest and accelerate to gain the speed, Lorentz Transform does not apply. Lorentz Transform can only be applied for propagation of waves. Lorentz Transform is not applicable to the motion of masses.

The time t is the time taken for frame or object to travel distance r at constant speed v,

$$t^2=(x^2+y^2+z^2)/v^2 \quad (7.4.7)$$

$$t^2=r^2/v^2 \quad (7.4.8)$$

The square proper time τ^2 is the difference between the square time t^2 taken for a frame or object to travel distance r at constant speed v over the square time t_c^2 taken for the same frame or object of mass m to travel the same distance r at the speed of light c,

$$\tau^2=t^2-t_c^2.$$

Although Special Relativity treats time t_c as if it is the time taken for light to travel the same distance, time t_c is in fact the time taken for the same frame or object of mass m to travel the same distance r if it had travelled hypothetically at the speed of light.

In Special Relativity, it is never the light that is taken as the reference, it the same frame or object of mass m travelling hypothetically at the speed of light c that is taken as the reference. That is the reason for the appearance of a rest energy equivalent to the kinetic energy of the same object of mass m travelling at the constant speed of light c from the start, the hypothetical rest energy $E=mc^2$. Hypothetical reference is not real. Hypothetical reference energy is not real. The so-called rest kinetic energy does not exist.

No mass at stand still can have kinetic energy equal to as if it is travelling at constant speed c from the start, $E\neq mc^2$. No mass can start at a constant speed as it is required by the Lorentz Transform. A mass must start at rest and accelerate to gain the speed. If mass must start at rest and accelerate to gain the constant speed v, Lorentz Transform does not apply.

3. Proper Time in Hindsight

In Special Relativity, the square proper time is the extra square time a frame takes to travel a certain distance over the square time the same frame takes to travel the same distance at the speed of light c. It is not the propagation of light that has been taken as a reference, it is the same frame moving at the speed of light c that has been taken as the reference implicitly.

It is this use of the frame of mass moving at the speed of light c as an implicitly ingrained reference that leaves a rest energy behind even when the momentum of the frame is zero. In Special Relativity, it is not the light that has been taken as a reference, it is the same frame moving at the speed of light c that has been taken as the reference blind-sightedly.

e) **General Definitions for Motion Dynamics in Special Relativity**

1. General Speed v_g for a Frame:

General speed v_g for a frame moving at constant speed v is defined as the rate of change of the position of the frame with respect to the proper time τ for that frame,

$$v_g=\partial x/\partial\tau \quad (7.5.1.1)$$

$$v=\partial x/\partial t \quad (7.5.1.2)$$

$$v_g=(\partial x/\partial t)(\partial t/\partial\tau) \quad (7.5.1.3)$$

Since $\partial t/\partial\tau=\gamma$,

$$v_g=\gamma v \quad (7.5.1.4)$$

2. General Momentum or Relative Momentum

The general momentum p of a frame of mass m is the mass m times the rate of change of position of the frame with respect to the proper time τ,

$$p=m\partial x/\partial\tau \quad (7.5.2.1)$$

$$p=m(\partial x/\partial t)(\partial t/\partial\tau) \quad (7.5.2.2)$$

Since $\partial t/\partial\tau=\gamma$, $v=(\partial x/\partial t)$, we have,

$$p=\gamma mv \quad (7.5.2.3)$$

3. General Kinetic Energy E

The general kinetic energy E of a frame of mass m is the kinetic energy due to the general momentum (relative momentum) p,

$$E=p^2/2m \quad (7.5.3.1)$$

$$E=(1/2)\gamma^2mv^2 \quad (7.5.3.2)$$

where, $p=\gamma mv$.

This is also the true mass-energy relationship for Special Relativity since the general momentum p is a constant for Special Relativity under Lorentz Transform.

4. General Force F

Special Relativity is only applicable for inertial frames or objects of mass m moving at constant speed v from the start. As a result, the calculation of kinetic energy in Special Relativity as the work done using the force derived as the rate of change of general momentum is incorrect. Special Relativity does not apply if the frame must start at rest and

accelerate to reach the constant speed v. General momentum $p=\mathfrak{r}mv$ for a frame or object of mass m moving at constant speed v is a constant for a given speed v. The rate of change of general momentum in Special relativity is nil,

$$\partial p/\partial t=0,\ \partial p/\partial \tau=0 \quad (7.5.4.1)$$

$$\partial(\mathfrak{r}mv)/\partial \tau=0,\ \partial(\mathfrak{r}mv)/\partial t=0 \quad (7.5.4.2)$$

As a result, general force F is zero,

$$F=0 \quad (7.5.4.3)$$

Special Relativity is not applicable for incremented instantaneous speeds. Lorentz factor is for a constant speed, not for incremental speeds. Lorentz Transform does not apply for accelerating frames or objects. Lorentz factor cannot be integrated for incremental speeds. It is the disregard of this fact that led to an incorrect and incongruent mass-energy relationship in Special Relativity.

Since v must be a constant from the start for Lorentz Transform to hold, the force F obtained as work done in Special Relativity is incorrect.

For linear path,

$$F\neq\mathfrak{r}^3ma \text{ (F and v on the same line).} \quad (7.5.4.4)$$

For a circular path,

$$F\neq\mathfrak{r}ma \text{ (F and v are orthogonal).} \quad (7.5.4.5)$$

Special Relativity does not apply to circular paths.

Special Relativity is not applicable for any path except linear paths. Since the general momentum $p=\mathfrak{r}mv$ is a constant in Special Relativity, the true value of force F is zero,

$$F=0 \quad (7.5.4.6)$$

As a result, the energy E of a frame of mass m moving at constant speed v in Special Relativity is simply the kinetic energy due to the general momentum $p=\mathfrak{r}mv$ of the frame of mass m, which is $E=p^2/2m$ or $E=(1/2)\mathfrak{r}^2mv^2$.

"*It is noteworthy that the Lorentz Transform is not applicable to the motion of masses since no mass can start at constant speed from the rest as Lorentz Transform required to. It is only the waves and hypothetical massless spaces as frames that can start at a constant speed as Lorentz Transform demands. That is why Lorentz Transform is only applicable to hypothetical massless frames and propagation of light, not for objects of mass in motion*."

Maxwell's equations cannot be transformed to accelerating frames. The Lorentz factor $\mathfrak{r}$ has no existence for accelerating frames. Lorentz factor $\mathfrak{r}$ derived for a frame of constant speed cannot be used incremental speeds. Lorentz Transform is not applicable for accelerating frames. Special Relativity based on Lorentz Transform is not applicable for incremental instantaneous speeds. If the speed of a frame or an object of mass is incremented, the new speed must be present from the starting time t=0 to any time t as a constant for Special Relativity and Lorentz Transform to be applicable. A mass cannot start at constant speed, it is only a wave that can start at constant speed. Lorentz Transform is not extendable for frames of mass.

5. General Energy E in Special Relativity

The general energy E in Special Relativity is given by the general momentum, which is a constant for a frame or object of mass m moving at constant speed v in Special Relativity. The true total energy E of an inertial frame or object of mass m moving at constant speed v in Special Relativity is the same as the general kinetic energy and is given by,

$$E=(1/2)\mathfrak{r}^2mv^2 \quad (7.5.5.1)$$

This is the same as the kinetic energy KE part of the proper mass-energy relationship in eqn. (4.37) in Special Relativity when the rate of change of general momentum is properly defined with respect to the proper time.

The fact is that there is no rest energy in Special Relativity. The rest energy in Special Relativity is hypothetical. The rest energy has no real existence. As we have seen before, the rest energy is present hypothetically since the reference for proper time is taken as the time taken for the frame of mass m to move hypothetically at the speed of light c.

There is no massless kinetic energy. The general momentum $p=\mathfrak{r}mv$ in Special Relativity is not an instantaneous momentum. There cannot have instantaneous increment of v in Lorentz Transform or in Special Relativity. The method used in mass-energy relationship calculation in Special Relativity is invalid and incorrect,

$$E^2\neq(mc^2)^2+(pc)^2 \quad (7.5.5.2)$$

The instantaneous increment of v cannot be used in kinetic energy derivation in Special Relativity since v is a constant from the start at t=0 to any time t. Lorentz Transform does not apply if a frame or object of mass m starts at rest v=0 at time t=0 and accelerate to reach the constant speed v. This is the reason why the Lorentz Transform is limited to wave propagation with hypothetical massless space as frames moving at constant speed v. Lorentz Transform does not apply for object of masses since masses cannot start at constant speed physically.

Lorentz Transform does not apply for frames or objects on circular paths or accelerating frames or objects. Lorentz Transform is not applicable for any path other than a linear path at constant speed.

6. General Conclusions in Special Relativity

For a frame or object moving at constant speed v,

E=0, when p=0
E=0, when m=0
p=0, when m=0
p=0, when v=0

where, E is the general energy (total energy) and p is the general momentum.

The true total energy E of an inertial frame or object of mass m moving at constant speed v in Special Relativity is given by,

$$E=(1/2)\mathfrak{r}^2mv^2 \quad (7.5.6.1)$$

$$E=p^2/2m \quad (7.5.6.2)$$

$$p=\mathfrak{r}mv \quad (7.5.6.3)$$

There is no kinetic energy without a mass in motion. There is no massless kinetic energy. There is no rest kinetic energy. Rest kinetic energy is an oxymoron. The so-called rest energy or rest kinetic energy has no existence,

$$E\neq mc^2 \quad (7.5.6.4)$$

$$p\neq E/c \quad (7.5.6.5)$$

Light has no kinetic energy. Light has no momentum. Light is not relative. Light is not a particle. Light is a wave that comes in wave bursts of finite duration. Masses move. Massless propagate. Massless does not move. Masses does not propagate. An entity with a momentum cannot propagate.

"*Propagation is not a motion. Motion is not a propagation*. There is no common ground."

The relationship $E=mc^2$ in Special Relativity is improper, invalid, meaningless, and non-existent, $E\neq mc^2$.

The relationship p=E/c in Special Relativity is simply meaningless, p≠E/c. Kinetic energy E of a mass divided by speed of light does not give the momentum of a mass unless the mass is moving at the speed of light c, which is physically prohibited in Special Relativity. A frame or an object of mass m moving at the speed of light c in Special Relativity only exists as a hypothetical reference, not as a reality.

Despite the false claim in Special relativity that Special Relativity is based on the propagation of light, propagation of light is never a part of the Special Relativity in reality. Light does not propagate relative to other objects. It is only a hypothetical motion of a frame of mass at the speed of light c that is present in Special Relativity as a reference. It is only the hypothetical motion of the frame of mass m at the speed of light c that is relative in the Special Relativity. Object of mass moving hypothetically at the speed of light can be relative even though light itself cannot be relative. Any object of mass is relative irrespective of the speed of the mass. Propagating waves are not relative.

"*Any entity that is massless cannot be relative*."
"*Motion of a mass is relative. Propagation of waves is not relative*."

VIII. LORENTZ TRANSFORM IS NOT UNIQUE

For a frame or object F'(x',t',v), moving at speed v relative to frame F(x,t,v=0) along the x axis, the General Lorentz Transform is given by,

$$x'=\mathfrak{r}^n(x-vt),\ \forall n,\ n=1,2,3,\ \ldots \quad (8.1)$$

$$t'=\mathfrak{r}^n(t-vx/c^2),\ \forall n,\ n=1,2,3,\ \ldots \quad (8.2)$$

$$\mathfrak{r}=1/(1-v^2/c^2)^{1/2} \quad (8.3)$$

Since n can have infinite number of values, there are infinitely many Lorentz Transforms that are equally valid. Any one of these Transforms can transform the Maxwell's equations onto an inertial frame or object moving at constant speed v. Nature does not favor one n value over the others. There is no mechanism in nature to choose one Lorentz Transform with one value n over infinitely many equally valid Lorentz Transforms available with different n values. Since the nature has no reason to favor one n value over infinitely many other n values, Lorentz Transform cannot hold true. No Transform can transform Maxwell's equations unless the Transform is unique.

Since the Lorentz Transform is not unique, Lorentz Transform cannot transform Maxwell's equations onto any frame, neither inertial frames nor accelerating frames. Propagation of light is not relative. Maxwell's equations are not relative. Special Relativity is not a mechanism of nature. Special Relativity does not hold true. Mass-energy relationship in Special Relativity is improper and it is both mathematically and conceptually incorrect. Special Relativity is improper and invalid. As a result, the conclusions derived based on improper and incorrect mass-energy relationship in Special Relativity are incorrect and invalid.

a) General or Relative Momentum is Not Unique

Since the Lorentz Transform is not unique, the Lorentz factor $\mathfrak{r}$ is not unique, $\mathfrak{r}^n$, n=1,2,3, … As a result, the non-unique general or relative momentum is given by,

$$p=\mathfrak{r}^n mv,\ \forall n,\ n=1,2,3,\ \ldots$$

where, $\mathfrak{r}^n=1/(1-v^2/c^2)^{n/2}$ and n can be of any real value; n does not have to be an integer.

b) Proper Time τ is Not Frame Independent

The proper time τ for General Lorentz Transform is given by,

$$\tau=(1-v^2/c^2)^{n/2}t,\ \forall n,\ n=1,2,3,\ \ldots$$

τ is no longer frame independent unless n=1.

"τ *is the frame independent proper time only for n=1.*"

Since the Lorentz Transform is not unique and depends on the value of n, different observers have no agreement on n. Even different observers on the same inertial frame have no agreement on n. As a result, the proper time τ is no longer frame independent or observer independent.

The proper time τ is frame independent only for n=1. Unless there is an agreement between the observers on different frames that n=1, there is no frame invariant proper time τ. Proper time is frame dependent and observer dependent since the Lorentz Transform is not unique.

Proper time τ had been the only frame independent quantity in Special Relativity. When the only frame independent quantity in Special Relativity, the proper time τ, is no longer frame independent, there is nothing in Special Relativity observers can agree upon and hence Special Relativity will become useless.

c) Spacetime is Not Unique

Under the General Lorentz Transform, the proper time τ is given by,

$$\tau=(1-v^2/c^2)^{n/2}t \quad (8.3.1)$$
$$\tau^2=(1-v^2/c^2)^{n}t^2 \quad (8.3.2)$$
$$\tau^2=t^2-x^2/c^2 \text{ only for } n=1 \quad (8.3.3)$$
$$\tau^2\neq t^2-x^2/c^2 \quad \text{for } n\neq 1 \quad (8.3.4)$$

Spacetime only exists if and only if there is an agreement between the observers that n=1. For any other value of n, where n≠1, spacetime function no longer exists, $\tau^2\neq t^2-x^2/c^2$. Spacetime in Special Relativity has no existence when n≠1. Spacetime in Special Relativity has no existence since Lorentz Transform is not unique. The τ is no longer frame independent proper time when n≠1.

The whole concept of Special Relativity and General Relativity is founded on the incorrect assumption that the Lorentz Transform is unique. Relative time has no existence when the Lorentz Transform is not unique. For relative time to exists, relative time must be unique. Relative time in Special Relativity is not unique since the Lorentz Transform is not unique. Spacetime has no existence when the Lorentz Transform is not unique. Both the Special Relativity and the General Relativity have no existence when the Lorentz Transform is proven to be not unique [2].

IX. THE UNTOLD TRUTH ABOUT THE SPECIAL RELATIVITY

Special Relativity is an attempt to bring the propagation of light and the motion of a frame or an object of a mass under a general framework. The fact is that it is not possible to combine the mechanics of propagation of light with the motion of a mass into a general framework of motion dynamics since the motion of a mass and the propagation light are not the same. Motion of a mass is in the direction of travel whereas the motion or the variation in light is orthogonal to the direction of propagation, they are orthogonal mechanisms.

The only thing one can postulate in Special Relativity is that when a mass is moving at the speed of light, not the light itself, the time is frame independent. That is exactly what is done in Special Relativity, nothing more. The reference in Special Relativity is not the light itself, it is the object of mass moving at the speed of light that is the reference. The proper time is Special Relativity is not with reference to the propagation of light. The proper time in Special Relativity is with respect to the same object of mass moving at the speed of light.

In Lorentz Transform, time is speed dependent for the massless wave propagation when the hypothetical frame itself is simply the massless space itself in hypothetical motion. A mass or a motion of a mass is never involved in Lorentz Transform. Special Relativity considers, for no apparent reason, that the Lorentz Transform is equally applicable for objects of mass in motion. Wave propagation is never involved in Special Relativity.

"*Special Relativity completely disregards the fact that an object of mass in MOTION at the speed of light c is NOT the same as the PROPAGATION of light at speed of light c.*"

"*Motion in Propagation of waves is orthogonal to the direction of propagation, while the Motion in an object of mass is in the direction of motion.*"

Special Relativity does not deal with light itself in any manner. Special Relativity assumes the time to be speed dependent. Special Relativity is designed to enforce the boundary condition on the motion dynamics of an object of mass so that when the mass reaches the speed of light, time is speed independent. Propagation of light is not involved in any manner in the Special Relativity. It is only the speed of light c that is involved in Special Relativity, not the light itself.

For any frame or an object of mass, the same mass hypothetically moving at the speed of light, which is the boundary condition, that is involved in the Special Relativity. It is the same mass hypothetically moving at the speed of light that is relative, not the light itself. In Special Relativity, relative time of a frame or an object of mass is speed dependent. However, when the same mass reaches the speed of light c, time is speed independent by design in Special Relativity.

"*In Special Relativity, it is not the propagation of light that is relative, it is the same frame or an object of mass m hypothetically moving at the speed of light c that is relative.*"

In Special Relativity, time is relative, time depends on the speed of a frame or an object of mass. What is hidden in Special Relativity is the assumption that when a frame or an object of mass is travelling at the speed of light, the time is no longer dependent on the speed of the frame.

One cannot incorporate propagation of light onto a moving frame or an object of mass. The only thing one can do is to incorporate the speed of light c with the motion of a frame or an object of mass, not the propagation of light itself. That is exactly what has been done in Special Relativity. Bringing the speed of light c into the motion dynamics of a frame or an object of mass is not the same as the bringing propagation of light and the motion of a mass into a general framework, which is not possible.

Since the guiding premise in Special Relativity is that no mass can exceed the speed of light, the only way to incorporate the speed of light c onto the motion dynamics of a mass m travelling at speed v is by taking the same frame or the object of mass m moving hypothetically at the speed of light c as a reference in defining the proper time for the frame or object of mass. This is exactly what is taking place in Special Relativity.

The proper time or the relative time for a frame or an object of mass m travelling at the speed of v in Special Relativity, in hindsight, is the extra time the frame or the object of mass m takes to travel a distance r at speed v over the time the same frame or object of mass takes to travel the same distance r at the speed of light c. When the frame or the object of mass is at rest, v=0, the hypothetical reference, which is the frame or object moving at constant speed c, is still present. The kinetic energy E of the frame or object of mass m hypothetical moving at the speed of light c is present in Special Relativity even when v=0, which is what is call the hypothetical rest energy in Special Relativity. That is exactly how rest energy appeared in Special Relativity, hypothetically, for choosing the same frame or object of mass hypothetically moving at the speed of light c as a reference, not as a reality.

Wherever there is Special Relativity, there is a real presence of a frame or object of mass travelling at speed v, and the same frame or object of mass moving hypothetically at the speed of light c is also present as a reference. Even when v=o, the hypothetical reference, which is the same frame or object of mass m moving at speed of light c, is always present in Special Relativity. It is this hypothetical reference that led to so-called hypothetical rest energy, $E=mc^2$, which is hypothetical, not real; rest energy has no real existence, $E\neq mc^2$.

> Propagation of light is never a part of Special Relativity. It is the same frame of mass hypothetically moving at the speed of light c that is part of the Special Relativity as a hypothetical reference. The misinterpretation of the frame of mass moving hypothetically at the speed of light c as the light itself is the cause of the ALTERED REALITY in Special Relativity.

"*Indirect implication of Special Relativity is that an object of mass m moving at the speed of light c from the start is the same as light itself. This is one of the major mistakes in Special Relativity. They are not the same*."

"*In spite of many claims in Special Relativity, Light has no momentum. It is only that the Light can generate a momentum in the presence of a medium. Light cannot exert a momentum in the absence of a medium."*

"There is no momentum without a mass."

If the light has a momentum, light must be able to be brought to a complete halt by applying an equal and opposite momentum. Light has no existence without propagation and hence light cannot be brought to a halt by equal and opposite momentum [3]. This is a good indication that light has no momentum.

X. SPECIAL RELATIVITY: CATOSTROPIC MISTAKE

The major mistake in the Special Relativity comes from the use of the Lorentz Transform. Lorentz Transform was developed to transform the Maxwell's equations on to a moving frame. The fame in the Lorentz Transform does not refer to an inertial frame. The frame in Lorentz Transform is a hypothetical frame consisting of massless space moving hypothetically at speed v. The use of moving space as a frame is completely hypothetical since it is not possible to move space. Space itself has no motion. It is only the objects of mass that have motion. There are no massless moving frames. Since space neither moves nor propagates, the massless moving frame in Lorentz Transform is hypothetical. Lorentz Transform that transform Maxwell's equations onto a massless moving frame has no physical existence.

Everything in Lorentz Transform is massless. The moving frame is massless. The propagating light is massless. Lorentz Transform does not apply for entities of mass. Lorentz Transform does not apply for inertial frames such as objects of mass moving at constant speed. Lorentz Transform is momentum-free. The frame, which is just an imaginary frame in empty space, in the Lorentz Transform has no momentum although it is moving hypothetically. The propagation of electromagnetic waves has no momentum. Lorentz Transform does not apply for frames or object of masses that have momentum. The oversight of this is one of the major mistakes in Special Relativity.

Lorentz Transform deals only with massless wave propagation on massless frames. On the other hand, Galileo Transform only deals with the motion of objects of mass. Galileo Transform does not apply for massless waves. Galileo Transform does not apply for light. Galileo Transform and Lorentz Transform are incongruent, incompatible.

The intention of Special Relativity was to bring together the motion of objects of mass and the propagation of light in a unified framework. Special Relativity tried to achieve it by bringing together totally incongruent Galileo Transform and the Lorentz Transform together. It is impossible since the Galileo Transform does not apply for massless frames and massless waves, and the Lorentz Transform does not apply for frames of mass or objects of mass on motion. Motion of masses and propagation massless light are two mutually orthogonal processes. They have nothing in common.

For a frame or an object of mass, Special Relativity combines two completely incompatible and incongruent transforms, Galileo Transform for objects of mass, and Lorentz Transform for massless waves, by using the same frame or object of mass moving hypothetically at the speed of light c in place of light itself in the Lorentz Transform. Special Relativity uses a frame of mass or an object of mass with the same frame or the object of mass hypothetically moving at

the speed of light in the Lorentz Transform. Special Relativity uses the Lorentz Transform for a frame of mass or object of mass together with the same frame of mass or the object of mass moving hypothetically at the speed of light. Propagation of light is never a part of the Lorentz Transform in Special Relativity. Light is never there in action propagating in Special Relativity. Special Relativity is completely free of wave propagation. Special Relativity is completely free of propagation of light.

In Special Relativity, Lorentz Transform is used for frames of mass in collaboration with the same frame of mass moving hypothetically at the speed of light. There is no propagation involved in Special Relativity. All that is involved in Special Relativity is motion, an object moving at speed v and the same object moving at the speed of light hypothetically. Special Relativity is a motion only mechanism, no propagation ever involved in Special Relativity. To claim that propagation of light is involved when in fact there is no propagation of light is involved in any manner in Special Relativity is the biggest deception in Special Relativity from the very start.

Special Relativity blindly combined completely incompatible Galileo Transform and Lorentz Transform together without paying any attention to their total incompatibility. Einstein thought he was bringing together the motion dynamics of objects of mass and the propagation of light under unified framework in Special Relativity, but he did not bring together motion dynamics of objects of mass and the propagation of massless light together, far from it. In effect, what Einstein did in Special Relativity was to bring the motion dynamics of an object of mass together with the same object of mass moving at the speed of light, nothing more.

An object of mass hypothetically moving at the speed of light is not the same as the light. An object moving at the speed of light does not suddenly turn into propagation of light.

Einstein applied Lorentz Transform in Special Relativity to an object of mass moving at speed v together with the same object of mass hypothetically moving at the speed of light. Special Relativity does not deal with the propagation of light in any manner. The claim that the Special Relativity involves the propagation of light when in fact Special Relativity has nothing to do with propagation of light is one of the major disastrous deceptions in Modern Physics.

The frame in Lorentz Transform is hypothetical since what is used as a frame in Lorentz Transform is the massless space itself. Everything involved in Lorentz Transform is massless. No mass is involved in Lorentz Transform. Empty space used as a frame in Lorentz Transform has no mass. Space has no motion. Space can neither move nor propagate. Yet that is exactly what is used in Lorentz Transform as a moving fame, the space, which can neither move nor propagate. Lorentz Transform cannot be applied to objects of mass. Adopting the Lorentz Transform that is limited to massless for a frame of mass or an object of mass in Special Relativity by using the same frame or object of mass moving hypothetically at the speed of light, what has been achieved in Special Relativity is in fact a distorted reality.

Lorentz Transform is not a real natural transform, it is an imaginary transform. Lorentz Transform is not applicable to objects of mass. Lorentz Transform was developed especially for the propagation of light or electromagnetic waves. On the other hand, Special relativity is exclusively for the motion of masses. It is not possible to replace the light with an object of mass moving at the speed of light as it is done in Special Relativity to adopt Lorentz Transform for objects of masses. Without such unrealistic adaptation of Lorentz Transform, there will not be Special Relativity. You cannot force a false momentum on massless light just because you want to make light relative. Despite the false claim that the light is involved in Special Relativity and the preposterous false claim that the light has a momentum, what is in Special Relativity that has a momentum at the speed of light is the same frame of mass moving hypothetically at the speed of light, not the light itself.

Lorentz Transform does not apply for light since it is not unique. Lorentz Transform exists only in human imagination, not in reality. Altered Lorentz Transform based Special Relativity is not a real natural mechanism, it is imaginary and hypothetical. Special Relativity is not a mechanism of nature. Just as it is with the Lorentz Transform, Special Relativity only exists in human imagination, never in the reality. What exists with regards to the motion dynamics is the Galileo Transform. Lorentz Transform is hypothetical, not real. Lorentz Transform does not exist in nature. Special Relativity is hypothetical, not real. Not a mechanism of nature.

Space does not move. Space cannot be a moving frame. There is no way to move space. External mechanical forces only act on objects of mass, not on space itself. External mechanical forces have no effect on light. Light has no momentum. If light had had a momentum, light cannot have a constant speed determined by the medium. If light has a momentum, we could stop light by applying equal and opposite momentum. Light cannot be brought to a halt by using equal and opposite momentum since light has no standstill existence. Light has no existence without propagation. If light has a momentum, we could be able to stop light, and hence it would no longer be light. Propagating waves do not have a momentum.

Special Relativity does not involve propagation of light. Special Relativity involves the frame or object of mass hypothetically moving at the speed of light and hence Special Relativity has a momentum at the speed of light. Momentum at the speed of light in Special Relativity is the momentum of the frame or object of mass hypothetically moving at the speed of light. A mass moving at the speed of light is not the same as the light propagating at the speed of light;

they are two completely orthogonal mechanisms that Special Relativity falsely and blindly considers the same.

Momentum of an object of mass hypothetically moving at the speed of light in Special Relativity cannot be used to impose an artificial momentum on light since they are not the same. Momentum of the frame or object of mass moving at the speed of light c in Special Relativity is not a momentum of light. LIGHT HAS NO MOMENTUM. Special Relativity is a result of a "TOTAL BLINDNESS TO THE REALITY." Blindness to reality in Special Relativity has altered the reality hypothetically.

Special Relativity is not what it is said to be. There are some who is blind to see what Special Relativity really is due to their religious blind faith on what Special Relativity is said to be by its founder. Followers of Special Relativity have created a religious cult around its founder to the extent that they fail to grasp the seriousness of its hidden mistakes. They preach what is in the text of Relativity as it is passed down from its creator, the prophet, as the final word of the nature without questioning, a new religion, a mean to waste life. Don't we already have enough barbaric religions for that?

XI. LIGHT HAS NO LORENTZ FIELD

For an electromagnetic field (**E**, **B**), the Lorentz Field **E**', on an inertial frame moving at velocity **v**, is given by $\mathbf{E}'=\mathbf{E}+\mathbf{v}\times\mathbf{B}$, where **E** is the electric field and **B** is the magnetic field. This is not a general relationship that applies to any field. The applicability of Lorentz field $\mathbf{E}'=\mathbf{E}+\mathbf{v}\times\mathbf{B}$ depends on the nature of the electromagnetic field since electromagnetic field can be either static or propagating. Propagating electromagnetic fields have no Lorentz field. Radiation has no Lorentz field. Lorentz field for static electromagnetic field of a source placed on a moving frame is just the Faraday field. There is no Lorentz field.

A moving frame cannot increase the energy of electromagnetic radiation. A moving frame cannot increase the strength of a radiating electromagnetic field since it is not possible to give a ride to a radiating electromagnetic field on a moving frame. You can give a ride to a source of electromagnetic radiation on a moving frame, but you cannot give a ride to electromagnetic radiation itself. Radiating electromagnetic field is not affected by a moving frame since electromagnetic waves are not relative. Massless are not relative. Propagation of waves is not relative. Even when a source of electromagnetic radiation is on a moving frame, the electromagnetic radiation is independent of the speed of the moving frame since electromagnetic waves are not relative [2].

a) Radiating Electromagnetic Field (**E**, **B**) Has No Lorentz Field $\mathbf{E}'=\mathbf{E}$

Light is not relative. Light propagates. Any entity that propagates does not take hitchhike on an inertial frame or any moving frame. Light or any radiating electromagnetic field is not associated with a mass. Light or any electromagnetic field is not anchored to a source, a mass. Any entity that is not associated with a mass is not relative. As a result, radiating electromagnetic fields or light does not have a Lorentz field. For a radiating electromagnetic field or light, $\mathbf{E}'=\mathbf{E}$, $\mathbf{E}'\neq\mathbf{E}+\mathbf{v}\times\mathbf{B}$, where **E**' is the relative electric field on the frame moving at speed v. This is also clear since the Lorentz Transform is not unique for propagation of light [2]. When Lorentz Transform is not unique, electromagnetic waves cannot be transformed on to a moving frame. As a result, Lorentz field does not exist for propagating electromagnetic waves or light. A source of an electromagnetic radiation field is relative, but the radiating electromagnetic field itself is not relative.

"*Light does not hitchhike. Propagating light cannot be given a free ride even when the source is placed on a moving frame since light is not anchored to the source. Light has no Lorentz field.*"

"A field that does not hitchhike has no Lorentz field."

Propagation of light or electromagnetic waves do not have a Lorentz field.
$\mathbf{E}'=\mathbf{E}, \mathbf{B}'=\mathbf{B}$
$\mathbf{E}'\neq\mathbf{E}+\mathbf{v}\times\mathbf{B}$
Electromagnetic field (**E**, **B**) is unaffected by the motion of a frame or an object of mass even when the source is on a moving frame.

In addition, if there exists a Lorentz field as it is suggested by the Special Relativity, the motion of a frame increases the energy of the propagating wave, which is realistically impossible. Motion of a frame cannot change the energy of light or propagating wave. Motion of a frame can increase the kinetic energy of the source of radiation if the source is not the frame, but motion of the frame cannot change the field strength of radiation electromagnetic waves emanating from the source. The strength of the electromagnetic radiation is independent of the motion of the source.

The field strength of electromagnetic radiation is independent of the motion of the source.

If the light is relative, then there will be a Lorentz field that changes the energy of light which is not possible and hence Lorentz field cannot exist. When Lorentz field has no existence, light cannot be relative. Lorentz field for propagation of light cannot have a

realistic existence. Electromagnetic waves cannot have a Lorentz field. Propagating waves cannot have a Lorentz force. Electromagnetic radiation cannot have a Lorentz field.

"*Lorentz Transform is hypothetical, not real*. *Not a Transform of Nature*."

b) **Only a Static Electromagnetic Field** (**E**, **B**) **Has a Lorentz Field E'=E+vxB**

Static electromagnetic field has no independent existence without a source, a mass. Static magnetic field is always associated with a source, which has a mass. As a result, by placing the source associated with the static electromagnetic field on an inertial frame, static electromagnetic field can be given a free ride. The Lorentz field **E'** for a static electromagnetic field (**E**, **B**) is given by **E'=E+vxB**. The mass associated with a static electromagnetic field does hitch hike generating a Lorentz field.

"*Static electromagnetic field hitchhikes. Static electromagnetic field can be given a free ride by placing the source on a moving frame since the static electromagnetic field is anchored to the source*."

"*A field that hitchhikes generates a Lorentz field.*"

Light does not hitchhike. Radiating electromagnetic waves cannot be given a free ride even by placing the source on a moving frame since radiation is not anchored to a source, a mass. Electromagnetic waves do not have a Lorentz Field. Static electromagnetic fields, however, do hitchhike. Static electromagnetic fields can be given a free ride on a moving frame by placing the source on a frame since static electromagnetic fields is anchored to the source, a mass. For a static electromagnetic field, Lorentz field is just the Faradays field. Lorentz field has no existence. Lorentz Transform and Lorentz fields are human crafted hypothetical prophesies that have no real existence.

"*There is no such field called Lorentz Field*."

Lorentz Transform is the mother of all the ills in Modern Physics.

XII. ABSOLUTE MOTION AND RELATIVE MOTION

There cannot be a relative motion without an absolute motion. There is no relative speed without an absolute speed. Speed of a propagation of wave is always the absolute speed. It is the motion of an object of mass that can be relative to the motion of another object of mass. Motion of two masses is relative. Waves are not relative. A wave does not propagate relative to masses or observers. Motion of an object of mass and the propagation of massless light cannot be relative. There is no relativity unless masses are involved. There is no momentum without a mass. There is no relative motion without a momentum. Light has no momentum. If light has a momentum, light cannot have a constant speed under gravity. Light is not affected by gravity.

Propagation of waves can neither be relative to the motion of a mass nor relative to the propagation of another wave. Waves are not relative. If you can stop it, it is relative. If you cannot stop it, it is not relative. Light cannot be stopped since light has no existence without propagation. Light is not relative [2].

"*A wave cannot be stopped since a wave has no existence without propagation. A propagating wave is not relative*. When the propagation of light is not relative, the speed of light cannot be relative."

Light propagates in empty space. Light does not propagate relative to a medium, or relative to a frame or an object of mass. Massless cannot be relative. What is relative in Special Relativity is not light itself, it is the frame or the object of mass hypothetically moving at the speed of light that is relative in Special Relativity. A mass moving hypothetically at the speed of light is not light. Special Relativity has nothing to do with the propagation of light. Special Relativity only involves a frame moving hypothetically at the speed of light c, nothing more.

Propagation of light is absolute. Propagation of electromagnetic waves is absolute. Light propagates relative to the space, empty space. If there happens to be a medium in the space, the speed of light and the direction of light are determined by the properties of the medium. In the absence of a medium, light takes a straight path and propagate at the speed of the empty space. Propagation of light does not require a hypothetical and mysterious aether, a nonsense. There is no aether. There is no aether wind. So-called aether wind is just blowing hot air, nothing more.

Definition: Absolute Motion [3]

Motion of an object of mass with respect to the propagation of light is the absolute motion.

How to determine if a frame or an object of mass is in absolute motion or not, and if it is in absolute motion, how to determine the absolute velocity of the frame or an object of mass on absolute motion from within the frame or object is given in [3].

Definition: Relative Motion

Motion of an object of mass relative to another object of mass is the relative motion.

Corollary:

Light does not propagate relative to a frame or an object of mass. There is no propagation of light relative to a frame in motion. Propagation of light is absolute.

Waves do not move, they propagate. Masses do not propagate, they move. Irrespective of the size, masses are not Waves. Motion and propagation are two different mechanisms. Motion and propagation cannot be unified under one frame since they are completely different mechanisms.

Special Relativity does not bring motion of masses and propagation of light under a unified framework. Special Relativity only brings a motion of a mass and the same mass moving hypothetically at the speed of light together. Even though both light and objects of mass travel, they travel by mechanisms that are orthogonal. Light waves travel by propagation while masses travel by motion.

In reference [3], there is a typographical error in the definition of the absolute motion. The definition of absolute motion appears as the motion of a mass with respect to "speed of light". It is not the speed of light absolute motion is with respect to; it is the "propagation of light" it must be with respect to. The corrected definition is given above.

It is not just the relative speed of an object of mass that is bounded by the speed of light, the absolute speed of an object of mass must also be bounded by the speed of light. This fact was disregarded in Special Relativity. An observer in any inertial frame can obtain the absolute speed of the frame from within using a beam of light since light is not relative. The claim by both Newton and Einstein that the absolute motion cannot be obtained from within an inertial frame is incorrect. Absolute motion of an object of mass exists and it can be determined within an inertial frame [3].

"*Propagation of light is NOT involved in Special Relativity*. Only the speed of light, the constant c is involved."

Light does not propagate relative to objects of mass. Light is NOT Relative. Motion of a mass and Propagation of light are mutually orthogonal and cannot be unified realistically.

XIII. **CONSPECTUS**

The intension of Special Relativity was to make the propagation of light to be relative on a moving frame of mass. Instead, what Special Relativity ended up achieving unintentionally was forcing of the same frame of mass moving hypothetically at speed of light to be the reference in Special Relativity leaving behind a rest energy equal to the kinetic energy of the same frame of mass moving at constant speed of light from the very start.

In Special Relativity, the intention was to define the relative time or the proper time of a moving frame with reference to the propagation of light, but the relative time or proper time of a frame in Special Relativity is not defined with reference to the propagation of light. Instead, in the hindsight, proper time in Special Relativity is defined with reference to the same frame moving hypothetically at the constant speed of light from the start.

In Special Relativity, what is being referred to as light is not the light itself, it is the same frame of mass moving hypothetically at the speed of light that is being unintentionally and falsely referred to as light, a catastrophic mishap, reality altering mistake that turned physics into spooky voodoo-physics. Special Relativity has nothing to do with propagation of light.

Lorentz Transform requires frame or object to move at constant speed from the very start. When the frame of mass is assumed to be moving hypothetically at the speed of light from the very start as the reference, the reference kinetic energy of the frame of mass will be hypothetically present even when the actual momentum of the frame is zero. This is what led to the meaningless hypothetical rest kinetic energy, $E=mc^2$ even when the momentum of the frame is zero.

In Special Relativity, the hypothetical rest energy $E=mc^2$ is forced onto a frame of mass by assumption; $E=mc^2$ does not appear in Special Relativity as a reality, it appears simply because of the implicit choosing of the frame of mass m moving hypothetically at the speed of light from the start as a reference in place of light in the Lorentz Transform. Propagation of light to the Lorentz Transform is the motion of the same frame of mass at the speed of light to the Special Relativity. A mass cannot have a real kinetic energy at rest, that is the reality, $E\neq mc^2$.

Propagation of light for the Lorentz Transform is the motion of the same frame or object of mass at the speed of light for the Special Relativity.

The intension of Special Relativity was to treat both the motion of a mass and the propagation of light on a same frame. However, what it ended up doing was to treat the motion of a frame of mass and the hypothetical motion of the same frame of mass at the speed of light as a speed-limiting boundary case in a single framework. It does not matter how hard one intends to bring together motion of a frame of mass together with the propagation of light, what one in effect ends up doing is bringing together motion of a frame of mass and the hypothetical motion of the same frame of mass at constant speed of light, which is unavoidable; that is what is happening in the Special Relativity in a nutshell. Motion dynamics of a mass and the propagation mechanics of light cannot be unified under a single framework since the motion of a mass and propagation of light are orthogonal.

What is Special Relativity proclaiming to be

happening in Special Relativity is not what is exactly happening in Special Relativity. Despite the claims in Special Relativity, it is not possible to bring together the motion of an object of mass and the propagation of light under a unified motion dynamic framework since the motion and propagation are two completely different process. Any effort to do that, in effect, ends up not bringing the light itself but forcing the same frame or the object of mass to move hypothetically at the speed of light instead. This frame of mass moving hypothetically at the speed of light is being misinterpreted in Special Relativity as light having an artificial momentum.

Propagation of light is not involved in the Special Relativity. It is only the same frame of mass or the object of mass moving at the speed of light that is involved in the Special Relativity, nothing else.

There is no way to impose on a frame of mass that it is the propagation of light that is under consideration, not the same frame of mass moving hypothetically at the constant speed of light. There is no way to make sure it is the propagation of light that is the reference in proper time, not the same frame hypothetically moving at the speed of light. This is the biggest dilemma in Special Relativity. This is where Special relativity and its conclusions fails.

Mass-energy relationship in Special Relativity defies any logic; it is mathematically and conceptually incorrect. It is also improper. The main mistake in the mass-energy relationship stems from the definition of the rate of change of the general momentum in Special Relativity and the derivation of the kinetic energy of a frame of mass at constant speed withing the Lorentz Transform. Special Relativity properly and correctly defines the general momentum or relative momentum with respect to the proper time τ. However, in Special Relativity, the rate of change of general momentum is incorrectly and improperly defined with respect to frame dependent time t, which led to the improper mass-energy relationship,

$E^2=(mc^2)^2+(pc)^2$.

It is this incorrectly derived, improper mass-energy relationship that has created havoc and an energy mayhem in Modern Physics. The factor 1/2 is missing from the kinetic energy of an object of mass m in the improper mass-energy relationship in Special Relativity due to the improper choice of the rate of change of general momentum with respect to time t instead of with reference to proper time τ.

If the rate of change of general momentum had been properly defined with respect to the frame independent proper time τ, the resulting mass-energy relationship in Special Relativity would have been,

$E=p^2/2m+(1/2)mc^2$,

where, p is the general or relative momentum.

This relationship still contains kinetic energy term even when the speed of the frame or object is zero, which appears as illogical rest kinetic energy. This rest energy term is exactly the kinetic energy of the frame of mass m if the frame is moving at the speed of light c, which is contradictory since no mass can reach the speed of light in Special Relativity. Even when the momentum is zero, the appearance of a constant kinetic energy term in the mass-energy relationship is a result of the negligence of another important fact, a limitation of Lorentz Transform, in the derivation of the mass-energy relationship in Special Relativity.

One important fact is missing in the above improper derivations of mass-energy relationships in Special Relativity. The fact is that the general momentum or relative momentum in Special relativity is a constant and hence the true energy is simply the kinetic energy due to the general momentum of the frame of mass moving at constant speed v,

$E=(1/2)\gamma^2mv^2$.

where γ is the Lorenz factor, which is a constant, for a frame or object moving at constant speed v.

Lorentz Transform is applicable only for moving frames or objects at constant speed. For Lorentz Transform to apply, the frame or object must have a constant speed from the starting time t=0 to any time t. Lorentz Transform is not applicable for accelerating frames or objects. Lorentz Transform is only applicable for waves and massless hypothetical frames moving at constant speed since both can have a constant speed from the start without acceleration. No frame of mass or object of mass can have a constant speed from the start and hence Lorentz Transform is not applicable to masses.

It is only for a frame or object of mass moving at constant speed from the very beginning t=0 onward that the Maxwell's equations for the propagation of light can be transformed onto a moving frame using the Lorentz Transform. It is only for frames or objects moving at constant speed from the starting time t=0 that the Lorentz factor $\gamma=(1-v^2/c^2)^{1/2}$ is valid. The same Lorentz factor γ derived for an inertial frame or object of mass m moving at constant speed v from t=0 is not applicable if the frame or the object starts at rest v=0 at t=0 and must accelerate to reach the constant speed v. Maxwell's equations for propagation of light cannot be transformed onto accelerating frames. Special Relativity does not apply for accelerating frames.

Special Relativity correctly defines the general momentum or relative momentum as the mass times the rate of change of position with respect to the frame independent proper time τ. However, Special Relativity failed to define the rate of change of the general or relative momentum, which is the force, in a similar manner with respect to the proper time τ although it should have. In Special Relativity, the definition of the rate of change of general momentum with respect to the frame dependent time t is incorrect. When the general momentum is p, the definition of force F as $F=\partial p/\partial t=m\partial^2x/\partial t\partial\tau$ is incorrect. The correct definition should have been $F=\partial p/\partial\tau= m\partial^2x/\partial^2\tau$.

If the general momentum is defined as mass m times the general speed v_g, where $p=mv_g$ $v_g=v/(1-v^2/c^2)^{1/2}$, v_g is rate of change of position with respect to

the frame independent proper time τ for a frame of mass m moving at speed v, then the rate of change of the general momentum, which is the force F, must also be defined with respect to the frame independent proper time τ, $F=\partial p/\partial\tau$. The force must also be defined as the rate of change of general momentum with respect to the proper time τ for the frame of mass m moving at speed v, $F=m\partial^2x/\partial^2\tau$, where $\tau=(1-v^2/c^2)^{1/2}t$. In addition, the general speed and proper time pair (v_g,τ) is related to speed and time pair (v,t) by the relationship, $v_g\tau=vt$.

It is this incorrect definition of the rate of change of general momentum, which is the force F, with respect to the frame dependent time t, instead of the frame independent proper time τ, that led to the wrong mass-energy relationship $E^2=(mc^2)^2+(pc)^2$ in Special Relativity. It is the misinterpretation of this incorrect mass-energy relationship $E^2=(mc^2)^2+(pc)^2$ in isolation without the general momentum relationship $p=\gamma mv$ that led to the meaningless concept of massless momentum. If the mass-energy relationship had been paired with its foundational general momentum relationship in its interpretation, there would not be a massless momentum.

We cannot disregard the fact that there is no mass-energy relationship without the general momentum relationship. If the mass m=0, then there is no mass-energy relationship to begin with. So, how can one have a massless momentum in mass-energy relationship when mass m=0. The fact in Special Relativity is that the mass-energy relationship is improper and incorrect, $E^2\neq(mc^2)^2+(pc)^2$. The evaluation of the mass-energy relationship in isolation without its foundational general momentum relationship, $p=\gamma mv$, has led to invalid conclusions in Special Relativity.

For Lorentz Transform and Special Relativity to hold correct, the frame or object must have the same constant speed v from the starting time t=0. There cannot be an acceleration from the rest v=0 at time t=0 to constant speed v in the Lorentz Transform. Lorentz factor γ is not for accelerating frames or speeds that are incremental. As a result, the rate of change of general momentum, which is the force F, is zero, F=0. Lorentz factor $\gamma=(1-v^2/c^2)^{1/2}$ does not apply for accelerating frames or object of mass even at the beginning if it must accelerate to reach the constant speed. Lorentz factor $\gamma=(1-v^2/c^2)^{1/2}$ is not an instantaneous value with respect to incremental speeds. Lorentz factor γ for a given inertial frame moving at constant speed v is a constant from the very start, time t=0, to any time t, and hence $\partial\gamma/\partial t=0$ and $\partial\gamma/\partial\tau=0$.

The general momentum or relative momentum is not an instantaneous momentum. General momentum $p=\gamma mv$ for a given inertial frame or object moving at constant speed v is also a constant from the start time t=0 to any time t. The derivative of general momentum p with respect to both frame dependent time t and with respect to the frame independent proper time τ are zero, $\partial p/\partial t=0$ and $\partial p/\partial\tau=0$. As a result, the derivation of mass-energy relationship using the kinetic energy as the work done for the frame or object of mass m to reach the speed v, $\int Fdx$, in Special Relativity is incorrect. The Kinetic Energy $KE\neq(\gamma-1)mc^2$. The total energy of the frame or object of mass m moving at constant speed $E\neq\gamma mc^2$. Famous mass-energy relationship in Special Relativity, which is the core of the Special Relativity, is improper and incorrect, $E^2\neq(mc^2)^2+(pc)^2$.

Both +E and -E satisfy the mass-energy relationship $E^2=(mc^2)^2+(pc)^2$ and hence the negative energy is a result of this improper and incorrect mass-energy relationship in Special Relativity. Mass-energy relationship in Special Relativity is improper and incorrect, $E^2\neq(mc^2)^2+(pc)^2$, and hence the negative energy has no existence. When the mass-energy relationship in Special Relativity is improper and incorrect, the foundation of the Modern Physics is also improper and incorrect.

When mass-energy relationship in Special Relativity is incorrect, $E^2\neq(mc^2)^2+(pc)^2$, there is no rest energy, $E\neq mc^2$. The total energy is the kinetic energy of the inertial frame or object of mass m due to the general momentum, $E=p^2/2m$, which is the same as $E=(1/2)\gamma^2mv^2$, where $p=\gamma mv$, p is the general momentum or relative momentum. A mass cannot have kinetic energy unless it is moving and hence there is no rest energy, $E\neq mc^2$. When mass is at stand still, p=0 and hence E=0. A mass at stand-still cannot have kinetic energy. There is no rest kinetic energy. In addition, when the mass m=0, the momentum p=0 and E=0. There is no massless momentum. When mass is zero, there is no mass. When there is no mass, there is no mass-energy relationship to obtain a massless momentum from. Without a mass, mass-energy relationship has no existence in Special Relativity. Without a mass, Special Relativity has no existence.

There is no massless momentum.
There is no rest kinetic energy.

Even with improper and incorrect mass-energy relationship is Special Relativity, $E^2=(mc^2)^2+(pc)^2$, where $p=\gamma mv$, when mass m=0, the momentum is zero, p=0. As a result, both mc^2 and pc terms in the mass-energy relationship in Special Relativity will be zero when m=0 and hence E=0 when m=0. There is no energy when mass m=0. There is no momentum in Special Relativity when m=0. There is no massless kinetic energy in Special Relativity. The blind claim in Special Relativity that there is a momentum when m=0 is invalid, incorrect, and defies the logic or mathematics.

It is surprising how the necessity for mathematical and logical correctness has been overlooked in Special Relativity to introduce an imaginary hypothetical concept of massless momentum that has

been the driving factor in the twentieth century physics. When m=0, we have p=0 and E=0, which indicates clearly that the widely accepted relationships E=pc and p=E/c in Modern Physics are incorrect, E≠pc and p≠E/c. When E≠pc and p≠E/c, Quantum Mechanics ceases to exist.

There is no massless momentum. There is no massless kinetic energy. Electromagnetic energy is not kinetic energy. Electromagnetic energy is not involved in Special Relativity since light is not involved in Special Relativity. All that is involved in Special Relativity is the speed of light, the constant. What is involved in the Special Relativity is the frame of mass moving hypothetically at the speed of light, not the light itself. Mass-energy relationship in Special Relativity does not involve electromagnetic energy. Any conclusion that had been made using the mass-energy relationship alone without the collaboration of the general momentum relationship will be incorrect and invalid since mass-energy relationship cannot stand alone without its foundational general or relative momentum relationship. Mass-energy relationship in Special Relativity has no existence without the general momentum. When m=0, the momentum p=0 and E=0.

Since $E^2\neq(mc^2)^2+(pc)^2$, when m=0, the energy E≠pc and p≠E/c. There are no massless particles. There is no kinetic energy without a motion of a mass. There is no massless momentum. When mass-energy relationship in Special Relativity is improper and incorrect, $E^2\neq(mc^2)^2+(pc)^2$, all the conclusions based on the improper and incorrect mass-energy relationship in Special Relativity are invalid.

Massless kinetic energy is an oxymoron.
Mass-energy relationship has no existence without a mass.
There is no Special Relativity without a mass.

In Special Relativity, if the rate of change of general momentum p, which is the force F, had been properly defined with respect to the proper time τ of the frame or the object of mass m moving at constant speed v, the proper mass-energy relationship would have been quite different. With the proper definition of F, the proper mass-energy relationship would have been $E=p^2/2m+(1/2)mc^2$ or $E=(1/2)\gamma^2mv^2+(1/2)mc^2$, where, the general momentum $p=\gamma mv$. When mass m of the object is zero, m=0, the general momentum is also zero, p=0. As a result, the energy E=0 when m=0. There is no massless momentum. There is no massless kinetic energy. When p=0 or v=0, the so-called rest energy would have been more sensible $E=(1/2)mc^2$, not $E=mc^2$. The fact is that $E\neq mc^2$ for p=0 when the mass-energy relationship is derived properly and correctly because general momentum p is a constant and hence the rate of change of general momentum is nil, the force F=0, within the Lorentz Transform in Special Relativity.

However, since the assumption that the general momentum is the instantaneous general momentum in the derivation of proper mass-energy relationship $E=p^2/2m+(1/2)mc^2$ as well as the improper mass-energy relationship $E^2\neq(mc^2)^2+(pc)^2$ in Special Relativity is incorrect, both energy relationships do not hold true. In the absence of those relationships, there would be no rest energy. There is no motionless kinetic energy. A mass does not have a kinetic energy unless it is in motion. A mass cannot have improper kinetic energy $E=mc^2$ or proper kinetic energy $E=(1/2)mc^2$ without the mass moving at the speed of light. The appearance of the rest kinetic energy in Special Relativity is solely a result of the disregard of the fact that the rate of change of general momentum or the force F is zero in the Lorentz Transform and Special Relativity. If the mass-energy relationship had been correctly derived by considering that the force F must be zero, F=0, in the Lorentz Transform, there would not be a rest energy in Special Relativity.

Since the general momentum $p=\gamma mv$ is a constant from the start time t=0 to any time t in Lorentz Transform, the rate of change of general momentum is zero irrespective of it is taken with respect to time t or proper time τ, $\partial p/\partial t=0$ and $\partial p/\partial\tau=0$. When the rate of change general momentum is zero, the force F is zero, F=0, and hence the mass-energy relationship in Special Relativity is improper, illogical, incorrect, and meaningless.

The TRUE ENERGY E or the frame independent energy of an inertial frame or object of mass m moving at constant speed v is simply the general kinetic energy resulted from the general momentum. The true energy E of an inertial frame or object of mass m moving at constant speed v is given by $E=p^2/2m$, where the general momentum $p=\gamma mv$. The true energy E can also be written as $E=(1/2)\gamma^2mv^2$. When m=0, the energy E=0. When p=0, the energy E=0. There is no rest energy. There is no massless momentum. There is no massless kinetic energy.

The Rest Energy E for p=0 in Special Relativity:
$E=mc^2$ (IMPROPER and INCORRECT)
$E=(1/2)mc^2$ (PROPER but NOT TRUE)
E=0 (PROPER and TRUE)

Important Points in Special Relativity:

1. Mass of an object is frame independent.
2. The proper time $\tau=(1-v^2/c^2)^{1/2}t$ is well known in Special Relativity as frame independent.
3. The motion dynamics of an inertial frame of mass m moving at constant speed in Special Relativity must be with respect to the proper time τ.
4. Motion dynamics of an inertial frame or object of mass m moving at constant speed v must be properly defined using the general speed

of the frame $v_g=\gamma v$.

5. The motion dynamics of an inertial frame or object of mass m moving at constant speed v must be properly defined using the general momentum $p=mv_g$.
6. The rate of change of general momentum, which is the force F, must be properly defined with respect to proper time, $F=\partial p/\partial\tau$, which is also same as $F=\gamma^2 ma$, where acceleration of the frame or object $a=\partial v/\partial t$.
7. In the case of Special Relativity and Lorentz Transform a=0, γ=constant, p=constant, and F=0.
8. The true proper energy E of an inertial frame or object of mass m moving at speed v in Special Relativity is the kinetic energy of the object of mass m due to the general momentum p and given by, $E=p^2/2m$, where $p=mv_g$, $v_g=\gamma v$ or $p=\gamma mv$, which is also the same as $E=(1/2)\gamma^2 mv^2$.
9. For an inertial frame or an object moving at constant speed, any time varying quantity must be defined with respect to frame independent proper time τ to maintain an agreement between observers.
10. In Special Relativity, proper time τ based on Lorentz factor γ holds only for objects moving at constant speed v from the start at time t=0 to any time t.
11. For Lorentz Transform and Special Relativity, $\partial p/\partial t=0$ and $\partial p/\partial\tau=0$, $\partial\gamma/\partial t=0$ and $\partial\gamma/\partial\tau=0$, where $p=\gamma mv$.
12. Lorentz factor γ is no longer hold true for frames or objects that must accelerate to reach the constant speed v from the rest v=0 at t=0.
13. Instantaneous increment of v is not possible when v must be a constant from the start at t=0 to any time t. It is the disregarding of this fact that led to a wrong mass-energy relationship in Special Relativity.

Lorentz Transform that is the foundation of Special relativity is NOT UNIQUE. There are infinite number of Lorentz Transforms that are equally valid for any given frame moving at constant speed. There are infinitely many Lorentz factors γ^n, n=1,2,3, … that are equally valid. Proper time τ is frame independent only for n=1. As a result, the proper time is no longer frame independent unless all the observers have an agreement that n=1, which is not possible. Since there cannot be an agreement on the value of n between observers, the proper time τ is no longer proper, no longer unique. This prevents the proper time τ being frame independent. There are no frame independent quantities in Special Relativity except the mass of an object. Mass of an object is frame independent. Since the square of the proper time defines the spacetime, spacetime ceases to exist when the proper time is not unique. Spacetime function $\tau^2\neq t^2-x^2/c^2$ unless all the observers have an agreement that n=1 since Lorentz Transform is not unique.

Maxwell's equations cannot be transformed uniquely onto a moving frame using Lorentz Transform since Lorentz Transform is not unique. Maxwell's equations cannot be transformed to accelerating frames including circular orbits at constant speed. Maxwell's equations and propagation of light are not relative. Light does not propagate relative to moving frames or objects. If light is relative, light must propagate relative to frames moving at constant speed as well as relative to accelerating frames. Since Maxwell's equations cannot be transformed onto either inertial frames or accelerating frames, light is not relative and Special Relativity and Lorentz Transform do no hold true.

Lorentz Transform was developed for the propagation of waves under a hypothetical massless frame moving at constant speed v. The frame in Lorentz Transform refers to just the space itself. Since a hypothetical frame of massless space cannot have a real motion, Lorentz Transform itself has no real existence. Lorentz Transform is completely hypothetical. It is only the masses that move. Massless waves cannot move, waves propagate. Masses do not propagate. Motion of masses and propagation of massless cannot be unified under a frame of mass using Lorentz Transform. Lorentz Transform cannot be applied for the motion of masses.

Proper time is NOT PROPER since
Lorentz Transform is NOT UNIQUE

The main idea grounded on Special Relativity that the light is relative is fundamentally incorrect [2]. Time is not relative. Mass is not relative. Relative motion cannot change time, dimensions, and mass of an object. Relative motion cannot change the physical characteristics of an object. Special relativity is fundamentally incorrect. Ubiquitous rest energy of an object appeared in the improperly defined and incorrectly derived mass-energy relationship in Special Relativity as the kinetic energy of the mass moving at the speed of light from the start at t=0 is incorrect since no mass can start at a constant speed, as well as no mass can reach the speed of light, $E\neq mc^2$. No rest mass can start to move at constant speed. Any mass at rest must have to go through an accelerating phase to reach the constant speed in which Special Relativity and Lorentz Transform do not apply. Kinetic energy of a frame of mass m cannot be obtained speed-incrementally integrating differential work done, $\int Fdx$, to reach speed v from rest v=0 withing the Lorentz Transform.

Since the light is not relative, it is possible to determine the speed of an inertial frame from within an inertial frame [3]. Similarly, it is also possible to distinguish if you are inside a linearly accelerating

cabin or inside a cabin at rest on a gravitational object using a beam of light since light is not relative [2,3]. A beam of light orthogonal to the gravitational field inside a cabin at rest on a gravitational object take a straight path while a beam of light orthogonal to the direction of motion in the accelerating cabin takes a parabolic downward curved path. A vertical beam of light from the bottom of a cabin in a horizontally moving train at constant speed takes an angular path relative to the moving train while the same beam takes a vertical path if the train is at stand still. The speed of an inertial frame determination from within the frame is possible because light is not relative. Light does not travel relative to moving objects. The invalid assumption that the light is relative is the foundational mistake in Special Relativity and General Relativity.

Ubiquitous diagram in Special Relativity showing a vertical beam of light from the bottom of a moving train as a vertical straight line relative to the train is a mistaken belief, a mistake in Special Relativity. What is hidden in this picture is the unstated conjecture that light is relative. Light is not relative. A vertical beam of light from a bottom of a moving train takes an angular path relative to the train.

Light does not hitchhike. Light cannot be given a free ride on a moving frame even the source is on a moving frame. Propagating light has an independent existence outside the source. Light is not anchored by the source unlike a static electromagnetic field. Light does not generate a Lorentz field. Electromagnetic radiation is not subjected to a Lorentz field when the radiation is on a moving frame. There is no Lorentz field as such. Propagating electromagnetic fields do not generate Lorentz fields. If propagating light generates a Lorentz field, the energy of light will increase on a moving frame, which is not possible. No moving frame can increase the energy of light or electromagnetic radiation.

Electromagnetic field of light or radiation field is not frame dependent, cannot be frame dependent. This is an indication that the Lorentz field cannot exist. If Lorentz field cannot exist, Lorentz Transform has no existence. If Lorentz Transform has no existence, light cannot be relative. Since the Lorentz Transform is not unique, Lorentz Transform and Lorentz fields have no existence.

It is only the static electromagnetic fields that generates a Lorentz field, which is just the Faraday field, no difference. Static electromagnetic fields have no independent existence without the source, a mass. As a result, static electromagnetic fields can be given a free ride on an inertial frame by placing the source on the frame. Static electromagnetic field is relative since it is anchored to a source, a mass. A field that is relative generates a Lorentz field. It is only a static field that can generate a Lorentz field or Faraday field if the source is on the moving frame.

Light is not relative. Any entity that is not relative does not generate a Lorentz field. Propagating waves do not generate Lorentz fields. The fact that a radiating electromagnetic wave do not generate Lorentz field is clear since the Lorentz Transform is not unique. When the Lorentz Transform is not unique, it is obvious that light is not relative.

Propagation of light exists in the empty space, not relative to an object of mass or hypothetical medium of aether. Propagation of light does not require a material medium. The only effect of a material medium on the propagation of light is on the speed of light, not on the propagation. The speed of light changes with the medium. The existence of propagation of light does not depend on a material medium. No hypothetical medium of aether is required for the propagation of light. The so-called aether wind that has been much talked about with regards to the Michelson and Morley experiment is just hot air, blowing hot air, nothing more. Aether is hypothetical, mythical, unnecessary, and has no physical existence, pure nonsense, nonscience.

Space and time are mutually independent. Time is not relative. It is the mechanism of a clock that is relative, not the time itself. When light is not relative, light cannot have a momentum. Massless entities have no momentum. When light has no momentum, light cannot be particles. There are no light particles or photons. It is the misinterpretation of the improper mass-energy relationship in Special Relativity in isolation without the general momentum relationship that led to the concept of massless momentum or light particles, photons. When that mistake is corrected in the mass-energy relationship in Special Relativity, massless particles have no existence either physically or conceptually. Special Relativity is a fundamentally flawed theory that has been justified by the misinterpretation of experiments. It is a theory that should have not seen the light of the day.

"*Light itself is never involved is Special Relativity. It is only the speed of light c that is involved. What is involved in Special Relativity is a frame or an object of mass m moving at constant speed v and the same frame or object of mass m hypothetically moving at the speed of light c. In Special Relativity, time is assumed to be speed dependent except when the object reaches the speed of light. Special Relativity is designed so that the time is speed independent when the object reaches the speed of light. Despite recurrent claims in Special Relativity, propagation of light is never involved in Special Relativity.*"

"Light is not relative [2], it is the frame of mass m moving hypothetically at the speed of light that is relative in Special Relativity."

Light is not affected by gravity. Gravity has no effect on massless. Gravity is not affected by light. Light has no effect on gravity. Light and gravity are mutually independent [3].

Although light is unaffected by gravity, a mass

moving at the speed of light is affected by gravity. What is moving at the speed of light in the Special Relativity is affected by gravity since it is a frame of mass that is moving at the speed of light in Special Relativity, not the light itself. Special Relativity does not involve light itself in any manner. Special Relativity only involves the constant speed of light. What Special Relativity involve with is a frame of mass hypothetically moving at the speed of light as a reference. Special Relativity mistakenly interpret a frame of mass moving at the speed of light as light itself. It is this misinterpretation of a mass moving at the speed of light as the light itself that led to the wrong conclusion in Special Relativity that the gravity affects light. Gravity has no effect on light in any manner.

Although the gravity has no direct effect on light, gravity can have an indirect effect on light in the presence of a material medium. In the presence of a medium, gravity creates a density gradient in the medium. A density gradient in the medium in turn alters the path of light. The diffraction of light near the sun is an indication that there is a material medium surrounding the sun. Similarly, although the light has no direct effect on the gravitational force between masses, light can generate a secondary effect on the gravitational force between two masses in the presence of a medium. In the presence of a medium, light can generate a density variation in the medium, which in turn affect the overall gravitational force between masses. A density variation in the medium can alter the gravitational force between objects [3].

"*All the ills in the Modern Physics are the results of the use of unrealistic non-unique mythical Lorentz Transform, and the unintentional misrepresentation of the frame of mass moving hypothetically at the speed of light in Special Relativity as the propagation of light itself. Despite the many invalid claims that the propagation of light is the foundation of Special Relativity, the* propagation of *light is never the foundation of Special Relativity. It is a frame of mass hypothetically moving at the speed of the light that is the foundation of the Special Relativity."*

"Motion and Propagation are two completely different mechanisms that cannot be unified under a single transform. Any attempt to bring the motion and propagation under a unified framework will lead to an altered reality as it is apparent in Special Relativity."

Hypothetical Lorentz Transform, which is inconsistent and always at odd with the reality, is the genesis of the mayhem in Modern Physics. Lorentz Transform was first introduced for massless frames and massless light. Since the speed of light is a constant determined by the medium, Special Relativity speculated that the speed of light must also be the same constant relative to a frame of moving mass and tried to bring the motions of masses and the propagation of light under a unified framework using the Lorentz Transform.

However, motion of a mass and propagation of light are two different processes that have no common mechanism of operation except that they both seem to travel, although that travelling is in completely different mechanisms. Motion is direct travelling due to the energy conservation, where momentum is involved. Propagation is indirect travelling due to the mutual transfer of electric energy to magnetic energy and vice versa, where no mass or momentum is involved. The only possibility is to bring speed of light, not the light itself, into the motion dynamics of a mass using the Lorentz Transform with a frame of mass together with the same frame of mass moving hypothetically at the speed of light in place of the light itself. It is not possible to bring the propagation of massless light itself together with the motion of masses using the Lorentz Transform.

So, Special Relativity substitutes a frame of mass moving at the speed of light in place of light in the Lorentz Transform. This is the origin of unreality because the motion of a mass at the speed of light is not a substitute for the propagation of light since a mass moving at the speed of light has a momentum while light has no momentum. In addition, massless entities cannot be relative. Only the moving objects of masses can be relative. Propagating waves cannot be relative. Using a frame of mass moving at the speed of light and hoping and praying it to be propagation of light in Special Relativity is not science.

The expectation in Special Relativity that massless light to be relative is not real. If an entity is relative, that entity must be able to be brought to a standstill. If there is an entity with a momentum, that entity must be able to be brought to a complete halt by applying an equal and opposite momentum. Any entity that cannot be brought to a complete halt by applying an equal and opposite momentum cannot be relative [3]. Light cannot be brought to a complete halt since light has no existence without propagation. Light cannot be relative. Massless do not move. It is only the masses that undergo motion. Masses move. Massless light propagates. Propagation and motion are not the same and cannot be brought under a unified frame without altering the reality. Propagation of light plays no role in the motion of a neutral object of mass and vice versa.

> Using a frame of mass moving at the speed of light and hoping and praying for it to be propagation of light is what is being done in Special Relativity.

Although the intension of Special Relativity was to bring the motion of masses and the propagation of light under a unified framework, Special Relativity could only manage to bring a motion of mass and the hypothetical motion of the same mass at the speed of

light under unified framework, never the propagation of light itself. Motion of a mass and the propagation of light are orthogonal processes and cannot be brought under a unified framework.

Contrary to many invalid claims in Special Relativity, propagation of light is nowhere to be seen in the Special Relativity. Propagation of light is present in the original Lorentz Transform designed for a massless frame and massless light. There is no momentum involvement in the Lorentz Transform that was originally used for transforming Maxwell's equations for propagation of light on to a massless moving frame, which itself is nonexistent and hypothetical. Special Relativity applied only for masses. Propagation of light is not present in Special Relativity, where Lorentz Transform was extended for motion of masses with a motion of frame of mass in place of the massless frame and the same frame of mass moving hypothetically at the speed of light in place of light itself.

Lorentz Transform is exclusively for massless. Special Relativity is exclusively for masses. Using a frame of mass moving hypothetically at the speed of light c in place of light in the Lorentz transform together with the frame moving at speed v in Special Relativity, and claiming it is the propagation of light itself and a frame of mass moving at speed of v that are used in Special Relativity is simply a mega-deception at inception, a disgraceful act, it is not physics, it is not science.

A Challenge to Special Relativity Priests:

If you want to claim that the propagation of light is the foundation of Special Relativity, show that it is not a mass moving at the speed of light that is involved in Special Relativity.

No one can because no massless entity can be relative. No massless entity can be a part of Special Relativity. No massless entity possesses a momentum. Any travelling entity with momentum cannot propagate, it moves. Any travelling entity without momentum cannot move, it propagates. Masses move. Waves propagate. Motion and Propagation are mutually orthogonal mechanisms. Motion and Propagation cannot be unified under LaGrange and Action. Motion and Propagation cannot be unified under Special Relativity.

"*Momentum does not propagate. Momentum-less does not move*."

XIV. **CONCLUSIONS**

Special Relativity does not involve propagation of light in any manner. Special Relativity only involves the speed of light c, nothing more. What is in Special relativity is a frame of mass moving at speed v and the same frame of mass moving hypothetically at the speed of light c.

A mass moving hypothetically at speed c, which is the speed of light, cannot be considered the light itself. Founders and believers of Special Relativity have been calling and representing a mass moving at speed c falsely as light itself without a proof all along from the very beginning, from the inception of Special Relativity. Proclaiming and representing a mass moving at speed c as the light does not turn a mass into light itself. The use the constant c, which is the speed of light, in Special Relativity does not bring the propagation of light onto a frame of mass in Special Relativity.

It is not possible to prove what is travelling at speed c, which is the speed of light, in Special Relativity is light itself and not an object of mass. There is no Relativity without motion of masses. Massless are not relative. Any entity without a mass cannot be relative. Any entity that cannot possess a momentum cannot be relative. Any entity that cannot have a standstill existence cannot possess a momentum and hence cannot be relative.

There is no way to incorporate propagation of waves into Relativity since Relativity only applies for the motion of masses. Nothing that cannot be brought to a complete halt by applying a momentum cannot be relative. Propagation of light cannot be brought to a halt by any mean since light has no existence without propagation. Propagation of light cannot be a part of Relativity or Special Relativity.

Relativity is exclusively for motion of masses. There is no relativity without two masses in motion. A mass and a beam of light are not relative. Light and Light are not relative. Two beams of light are not relative. Relativity is not applicable to the propagation of massless waves. Relativity is not applicable to propagation of light. Propagation of light is not relative.

There is no motion without a momentum. Propagation of light has no momentum. Propagation is not motion. Unlike a motion of mass where motion is also in the direction of motion, the motion (variation) in propagation is orthogonal to the direction of propagation. Motion and propagation are orthogonal mechanisms that have no common ground for unification.

LaGrange and Action are strictly limited to the description of motion dynamics of masses. There is no LaGrange and Action without a mass and a momentum. LaGrange and Action are only applicable for motion of masses. LaGrange and Action are not applicable and meaningless for massless. There is no LaGrange and Action for propagation of waves. LaGrange and Action cannot describe propagation of light.

If you force a hypothetical momentum on light just for the purpose of describing the LaGrange and Action for light, you are in effect no longer dealing with light. Instead, you are dealing with a mass moving at the speed of light. You have unintentionally replaced light with a motion of mass at the speed of light and there is no propagation of light is involved. This is the sad dilemma in Special Relativity.

Any effort to unify motion of a mass and propagation will in effect ends up bringing together a motion of a mass and the same mass hypothetically moving at speed c, which is the speed of light. There is no momentum without a mass. Propagation of light does not have a momentum. There is no momentum without a mass in motion, to claim otherwise is simply scientifically uncivilized. The false claim in Modern Physics that E=pc is mathematically uncivilized. False expression E=pc ignores the fact that both p=0 and E=0 when m=0, E≠pc, where E is the kinetic energy and p is the momentum.

Lorentz Transform only deals with hypothetical massless frames and propagation of massless light. As soon as you introduce a frame of mass moving at speed v in place of the massless frame in Lorentz Transform as in the case of Special Relativity, you are in effect also replacing the propagation of light in the Lorentz Transform with a mass moving at the speed of light, which is unavoidable.

You cannot unify the propagation of light and the motion of a mass on a single framework to make them rooted in LaGrange and Action, impossible. Despite the false and blind claims in physics textbooks how beautifully Special Relativity has unified the motion of masses and the propagation of light under LaGrange an Action, Special Relativity does not unify the motion of masses and the propagation of light in any manner. Bringing together motion of a mass and the same mass hypothetically moving at the speed of light c does not unify the motion and propagation.

"*Bringing c into Special Relativity does not bring propagation of light into Special Relativity*."

The mass-energy relationship in Special Relativity is improper and incorrect. Proper and true mass-energy relationship indicates that there is no negative energy E≥0; there is no rest energy or motionless kinetic energy, $E \neq mc^2$, E=0 for p=0; there is no massless momentum, E≠pc, E=0 and p=0 for m=0 in Special Relativity. There are no wave particles. There are no particle waves. As a result, there is no wave-particle duality, without which Quantum Mechanics have no existence. When propagation of light cannot be described by LaGrange and E≠pc, Quantum Mechanics has no foundation to stand.

Mass-energy relationship has no existence without a mass. There is no massless kinetic energy. Special Relativity has no existence without a mass. Propagation of massless light has no place in Special Relativity. Motion of a mass and propagation of light cannot be unified. Propagation of light and motion of a mass are incongruent, incompatible.

If a Lorentz field exists, it leads to an increase in the light energy, which is impossible. A moving frame cannot change the radiation energy or light energy since electromagnetic radiation waves are not relative. Lorentz field cannot exist, $\mathbf{E}' \neq \mathbf{E} + \mathbf{v} \times \mathbf{B}$, $\mathbf{E}' = \mathbf{E}$, $\mathbf{B}' = \mathbf{B}$. Lorentz Transform itself has no existence since Lorentz Transform is not unique.

For Lorentz Transform to exist, Lorentz field must exist. Lorentz field cannot exist since its existence leads to an increase of the electromagnetic radiation energy, which is not possible. No motion of a frame of mass can increase the radiation energy. You cannot increase the light energy by giving light a train ride. You cannot increase the brightness of a flashlight by running with it. No motion of a frame can increase the radiation energy even if the source is on a moving frame of mass. Electromagnetic fields are not relative.

Maxwell's equations for propagation of light cannot be transformed on to a moving frame since Lorentz Transform is not unique. Proper time is not frame independent. Spacetime has no existence when proper time is not unique. Spacetime is a fantasy, not reality. Gravitational waves are a fantasy, not reality. Unlike an electromagnetic field, a gravitational field has no mechanism for propagation. Gravitational field is static, not a wave.

Lorentz Transform is hypothetical, not real. Lorentz Transform is the mother of all the ills in the Modern Physics. Modern Physics must and will collapse itself on the fallacy of the Lorentz Transform.

Time is not relative. Mass is not relative. Light is not relative. Relative speed cannot alter the time, mass, and the dimension of an object of mass. Gravity has no effect on light and vice versa. There is no dark matter or dark energy. Special Relativity is invalid both mathematically, conceptually, and logically. Special Relativity, Quantum Mechanics, and Twentieth Century Physics in general would have been disappeared from the face of earth by now if it is not for the institutions (chapels) where they are treated as a religion by a few devoted blind-believers (priests). Religious believes have no place in science.

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