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True Relativity

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Abstract

There are some unresolved paradoxes and inconsistencies in special relativity and general relativity. This paper is an attempt to fix them all. I presented the true version of relativity. And it is shown conclusively that speed of light cannot be same with respect to source or observer. Simultaneity is absolute. Galilean invariance is indeed deep symmetry of the universe. And it applies on the speed of light too. In Michelson and Morley experiment there is simple addition and subtraction of velocities with respect to source and mirror so that is why there is no fringe shift when apparatus moves with a certain velocity. In moving conductor and magnet problem, in both cases same phenomenon is involved. If the conductor is moving there is Lorentz force on the moving charges in the conductor. And if the magnet is moving then there is same force involved i.e. Lorentz force on charges. Maxwell's equations cannot be used to determine that the speed of light is constant for all inertial frames. I conceived that the flaw is not in Galilean invariance but in Maxwell's electrodynamics. 3 × 10^8 m/s is not the speed limit of the universe. When a galaxy goes away it gives red shift. It is because of photons or light slows down. There is simple addition and subtraction of velocities. Light behaves just like other particles. Speed of light is not constant. Time dilates and inertial mass increases as an object moves. In gravity there is increase in time dilation and increase in inertial mass. Equivalence principle is not very extraordinary. No matter how much you curve spacetime it will not result in acceleration. The idea of spacetime curvature seems unrealistic and fictitious.

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Introduction

Special relativity postulate that laws of physics must be the same in all inertial reference frames. And the speed of light in a vacuum is the same in all inertial reference frames regardless of the motion of the observer or source. The second postulate is wrong. In upcoming different scenarios there is effort to figure it out. Speed of light depends upon the velocity of source and observer. Einstein's general theory of relativity is built upon two fundamental principles. First, the laws of physics maintain the same form for all observers, regardless of how they are moving even if their motion is accelerated. Second, a gravitational field can be locally replaced by an equivalent description that uses an accelerated reference frame in an otherwise gravity-free region. This idea, known as the equivalence principle, asserts that gravity and acceleration are indistinguishable in a small enough region of space. Equivalence principle is not very extraordinary. No matter how much you curve spacetime it will not result in acceleration. The idea of spacetime curvature seems unrealistic and fictitious [1].

Galilean Invariance

Galilean invariance is deep symmetry of the universe. Take an example we are moving in a room. We cannot make any experiment to let us know that we are moving. Not with smoke and tennis balls and even electromagnetism. You can never design an experiment or measurement which will tell you that you are moving. Take an example of tennis balls in a room. They collide at mid-point of room. They are fired from two opposite walls of room at velocity of 5 m/s. And front side the ball speed will be room speed vroom - vball.. And from rear end, the speed of ball will be vroom + vball. And now they will again collide at mid-point of room exactly like in rest room on earth. So, we can never make an experiment in room moving with velocity 'v' to let us know that we are moving [2]. See figure. 1

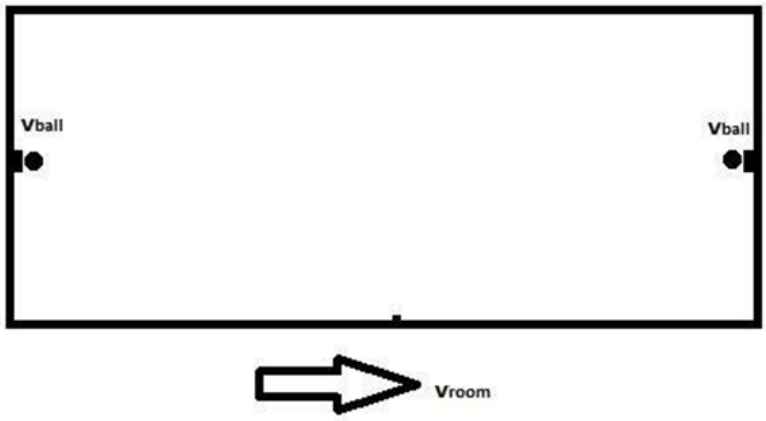

Fig. 1 Room moving to right with veocity v

Now consider light beams instead of balls. You are in a room moving with velocity. If both beams are moving at same speed c. As it is said that light speed is independent of source speed. So light beam from front end will hit earlier because there is no vroom – c. And light from rear end is not vroom + c. So the light from rear end will hit the detector later than light from front. So, in this way we will know that we are moving. And this opposes Galilean invariance. See figure. 2. Moreover, this discrepancy cannot be compensated for by invoking the relativistic Doppler effect, time dilation, length contraction, or relativity of simultaneity. Therefore, if one assumes that the speed of light is entirely independent of the source motion, the difference in arrival times cannot be eliminated within this framework [3].

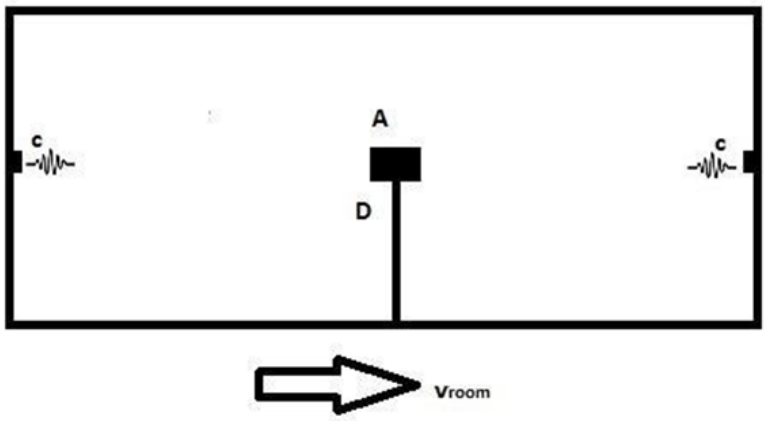

Fig. 2 Room moving with velocity v to the right and a detector

Now consider there is light source in the middle of room. And photons are emitting from it and hits the ceiling of room. As now room is moving to the right. If we assume that light beam does not depends on the source speed then path of light will be slanted and if we have sensor in the room, it will tell deflection and we will know that we are moving. If light does not depend upon the velocity of emitter and getting no momentum then its path should be slanted. Every piece of matter even light must possess the same velocity as it leaves the body.

From two observer point of view light cannot have speed 'c'. Imagine there is an observer O1 in space and it emits a light beam towards another observer O2. O3 observer is seeing that light is getting to O2 and O2 is moving towards it. In this case the speed of light must be v + c and not c. Light speed cannot be 'c' relative to source and observer. It defies common sense. If we incorporate Lorentz transformation for length contraction and time dilation for O2 even then speed of light cannot be 'c'. How can one beam possibly have the same speed for both observers? [4]. See fig. 3.

Fig 3. O2 is moving towards O1 with velocity v

Relative Motion

Only relative motion is observable; there is no absolute standard of rest or motion. But one really uniquely changes its position or displace in space. So, there is absolute motion. Although no physical experiment can detect it [1].

Michelson Morley Experiment

In Michelson Morley experiment there is simply the addition of velocities and subtraction and so there is no fringe shift at all. Light beam that goes horizontal gets a push from light source and beam speed is 'c + v' and after reflection from mirror its speed is 'c - v' as the apparatus moves with a velocity with Earth. So, no fringe shift was observed [5]. See figure. 4.

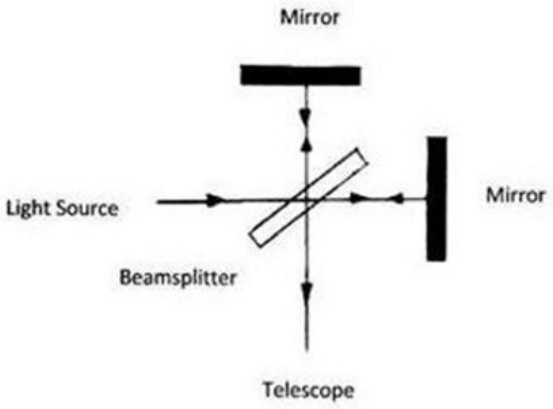

Fig 4. Michelson-Morley apparatus

Moving Magnet and Conductor Problem

In 1905 paper, Einstein mentioned the famous thought experiment. The same phenomenon seems to have two different explanations depending on the frame of reference of the observer [6].

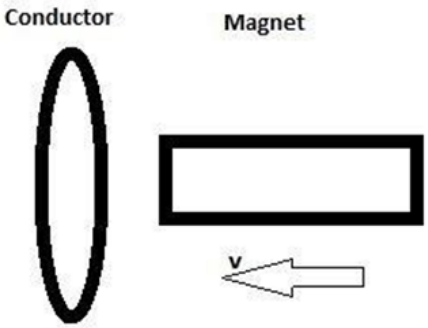

Fig.5 Magnet moving towards conductor

This is fallacious. In both cases the same force is involved. If the conductor is moving there is Lorentz force on the charges in the conductor. In this case, the charges in the conductor move through a static magnetic field of the magnet. And if the magnet is moving then there is same force involved i.e. Lorentz force $F_B = q(v \times B)$ and not an induced electric field in the conductor by the changing magnetic flux according to Faraday's law. See figure. 5.

Consider a thought experiment. Consider a room is moving at a velocity relative to an outside observer. You are in that room. We have a magnet on a stand in that moving room. Because it is moving its magnetic flux will change relative to outside observer. So, it is established that changing magnetic flux will produce changing electric flux. So, it will produce an electric field. Now imagine we have a hanging charged leaf. By newly creating electric field it will be effected. But if it happens it will let you know that room is moving so it is in absolute motion. It is violation of Galilean invariance. So, I concluded that established theory that changing magnetic flux produces changing electric flux is wrong.

Consider another thought experiment. You are in a room and it is moving with a velocity and an outside observer is watching. You have a charged rod. If the rod is moving. There emerge in vicinity of rod a magnetic field relative to outside observer. It will affect nearby compass. But this never happens. Take daily life example. Earth is moving but the charged rod never deflects the nearby compass although magnetic field produces

is extremely weak. So, if it does then we will know that we are moving. So, it counters Galilean invariance which is indeed deep symmetry. And so, I concluded the charged particles when move produces no magnetic field around it unless they move in an electric field. Maxwell's equations cannot be used to determine that the speed of light is constant for all inertial frames. I conceived that the flaw is not in Galilean invariance but in Maxwell's electrodynamics.

Simultaneity is Absolute

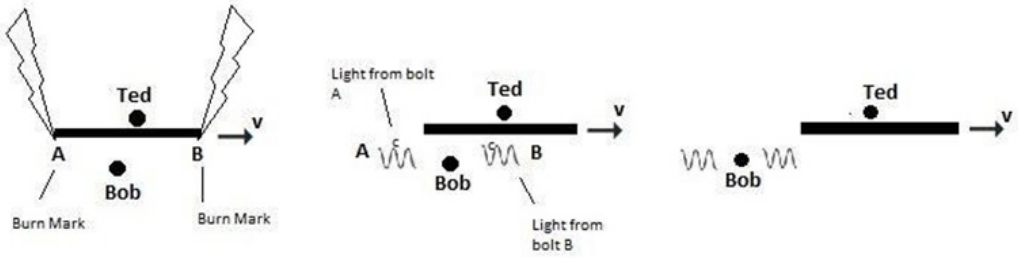

Fig.6 An experiment to study simultaneity. Ted is moving to the right with velocity v.

See figure.6. See this thought experiment is fallacious which is presented in text books to prove simultaneity is not absolute. Because it is relating to apparent time taken by light. Moreover, in the above thought experiment as Ted moves to the right with velocity 'v' we are adding v to speed of light and from rear end we are subtracting velocity 'v' from speed of light. By principles of relativity speed of light must be c for all observers [1].

See figure. 7. Consider a thought experiment. There are two buildings. On building one there is target and on building two archer is standing midway. He fires at a fixed time and this arrow hits at the target midway after free fall of target from above at a fixed time. The target unplugs from above at a fixed time. It is event 1. And arrow release at a fixed time is event 2. And O1 is watching it. Now consider O2 is coming from left side with a certain velocity. For him target falls down first and archer fires his arrow lately. In one scenario the arrow hits the target and in other it misses it. There is out of synchronization situation here. So, I concluded simultaneity is absolute.

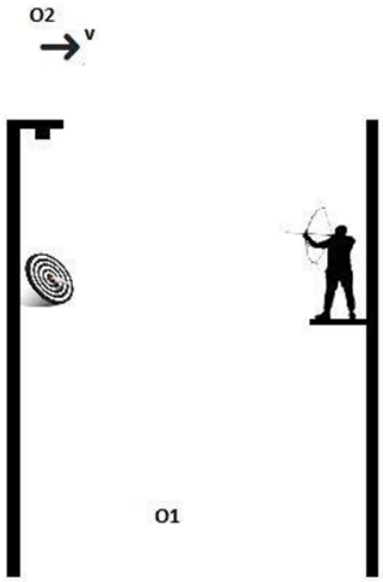

Fig.7 An archer is throwing an arrow on target

Consequences of True Relativity

Time Dilation

$$t' = t \times (1 + \hat{c})$$
$$\hat{c} = \tfrac{1}{2} v^2/c^2 \qquad (1)$$

Here t proper time. v is object velocity. c is speed of light. ĉ is a factor.

Mass Increase

Only inertial mass or relativistic mass increases. The amount of matter stays the same; only inertia increase.

$$m' = m \times (1 + \hat{c})$$
$$\hat{c} = \tfrac{1}{2} v^2/c^2 \qquad (2)$$

Here m is proper mass. v is object velocity. c is the speed of light. ĉ is a factor.

Length Contraction

Length contraction is not there. There are many unresolved paradoxes such as train tunnel paradox. Current solutions to the length contraction paradoxes are wrong. Let's think about a scale. A car is moving along it. As car's time slows down. The observer looks outside and sees the reading. The scale will recede past with speed. But its length will not be contracted apparently or in real. So, I concluded that space is absolute [2].

Time Dilation and Mass Increases

Both are proportional. Inertial mass increases with motion and time dilates.

Relativistic Kinetic Energy

When an object moves it gains kinetic energy that energy appears as increased inertial mass or relativistic mass. And if the high velocity object emits a photon, then this photon's inertial mass will also be higher.

Relativistic kinetic energy value is same to classical kinetic energy at various velocities. See table 1:

Table 1

Mass Increment $m' = m \times \frac{1}{2} v^2/c^2$	**Kinetic Energy** $K.E. = \frac{1}{2} mv^2$	**Energy Conversion** $E = mc^2$
At velocity v = 100 m/s: $m' = 5.5 \times 10^{-14}$ kg	K.E. = $\frac{1}{2} \times 1 \times (100)^2$ K.E. = 5000 J	$E = 5.5 \times 10^{-14} \times (3 \times 10^8)^2$ E = 5000 J
At velocity $v = 3 \times 10^8$ m/s: m' = 0.5 kg	K.E. = 4.5×10^{16} J	E = 4.5×10^{16} J
At velocity $v = 6 \times 10^8$ m/s: m' = 2 kg	K.E. = 1.8×10^{17} J	E = 1.8×10^{17} J

Energy Mass Equivalence

This relation $E = mc^2$ holds true. Inertia of an object depends upon its energy contents [7].

Speed Limit of the Universe

3×10^8 is not the speed limit of the universe. At this speed photon emits from a body at rest. There is no speed limit of the universe. If an object is moving with a certain velocity and to increase its speed further another object has to speed up and give it push. In this way energy is spent. If we spend all the energy of the universe then objects move to a certain speed. So, speed limit of universe could be potentially 9×10^{16} m/s.

Twin Paradox

Imagine two rooms are flying apart. And they are looking towards each other. From O1 he is still and other is moving and from observer O2 point of view other is moving. Then in both reference frames time should be slow down. This creates the famous twin paradox. In real only in one frame time slows down. I conceived the room which is uniquely changing its position in space its time will slow down. And other frame of reference time will speed up relative to other frame of reference. So, in the room in which time slows down the person looks outside and see the outer world and see time is running fast so he will know that he is in absolute motion. But inside closed room he can never arrange any experiment to let him know he is moving. Moreover, current solutions to twin paradox are wrong [2].

Gravitational Force, Electric force and other Forces Remain Same

Electric force, gravitational force and other forces remain same as charge and gravitational mass remain same. Only inertial mass increases that is why time slows down. Time is intrinsically linked to matter motion in space. So, there must me a physical causality for the time slowdown. The idea of spacetime is not quite evident. Although the electric force, gravitational force, and other fundamental interactions remain unchanged—since charge and gravitational mass are constant the inertial mass of a body increases at high velocities. This increase in inertial mass affects the dynamical behavior of matter and leads to a reduction in the rate at which physical processes occur, which is interpreted as time dilation. In this view, time is intrinsically connected to the motion and behavior of matter in space; therefore, a physical causality must underlie the observed slowdown of time. The conventional concept of spacetime, while widely accepted, does not always present an intuitively evident explanation for this physical mechanism. Moreover, time can be a consequence of fundamental forces of nature. And it moves in one direction due to these fundamental forces of nature.

Doppler Shift

When a galaxy goes away it gives red shift. It is because of photons or light slows down. There are a simple addition and subtraction of velocities. So, the slow light photons have lesser energy that perceives as red light. So, in my point of view wavelength and frequency remains same but speed of light beam slows down.

Particle Approaching Speed of Light

Particles are approaching close to speed of light in particle accelerator and their mass is not increasing significantly. It is said that as particle approaches to speed of light its relativistic mass becomes infinite as gamma factor becomes infinite. It is not only unintuitive but fallacious because if we give whole energy of the universe to it even then it will not exceed speed of light? Light itself moves at a speed when emits from a body at rest then how can it move the object beyond it? If light possesses relativistic mass, then according to relativistic reasoning, its mass should also become infinite when moving at speed c due to the influence of spacetime geometry. In relativity, it is established that as an object moves, its inertia increases, and its kinetic energy manifests as an increase in inertial mass. However, the physical mechanism underlying this increase remains unclear. If there is no physical barrier and space and time remain the same at high speeds, why does the object's speed not increase significantly, while its inertial mass or energy grows dramatically at near speed of light? The explanation that this occurs solely due to spacetime geometry is not entirely satisfying. Is there any field with which objects interact at high velocity and gain inertial mass? Object gains inertial mass as it moves but according to factor $\hat{c} = \frac{1}{2} v^2/c^2$ as I described in section 7.

And now there is a question why particles in particle accelerator do not exceed light speed? In my point of view close to speed of light, there is ineffectiveness of electromagnetic force mediator photons to transfer force because proton is moving close to speed of light. As photon emits from proton it has lower speed than c. For like charges, the exchange of virtual photons occurs along a nearly linear trajectory, representing direct repulsive interaction. In contrast, for unlike charges, the photons follow a curved trajectory emerging from behind the moving particle.

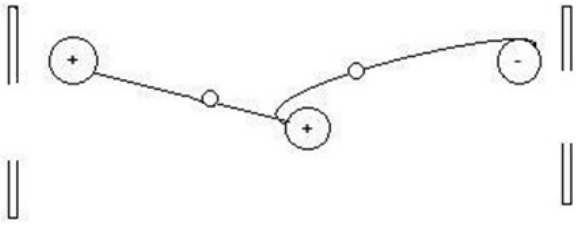

Fig.8 Proton beween two plates of opposite charges in accelerator

Flaws in General Relativity

Equivalence principle of Einstein asserts that gravity and acceleration are indistinguishable in a small enough region of space. [8] Equivalence principal is not very extraordinary. No matter how much you curve space-time it will not result in acceleration. The idea of spacetime curvature seems unrealistic and fictitious. The concept of spacetime curvature, as introduced in General Relativity, treats space as a dynamic, deformable medium influenced by mass-energy. However, in the present interpretation, such curvature is considered a mathematical abstraction rather than a physical reality. Space, by its nature, is not a substance but a condition of emptiness—a framework that allows the existence and motion of matter. Hence, attributing physical curvature to "nothingness" appears conceptually inconsistent. Instead of interpreting gravitational or electromagnetic phenomena as manifestations of curved space, they may be better understood as field interactions occurring within flat, non-material space.

Why Gravitational and Inertial Masses Are Equal?

Imagine one and three particles in space above earth as shown in figure 9. Because every particle attracts other particle in the universe with a force. Every particle of Earth attracts these one and three particle objects so as gravitational mass increases inertial mass also increases. In this framework, as a particle's gravitational mass effectively increases due to cumulative gravitational interactions, its inertial mass correspondingly increases. This correlation provides an intuitive explanation for why all objects fall with the same acceleration in a gravitational field, regardless of their size or composition.

Fig. 9 One and three particles objects in space above Earth

Gravity

Gravity is a force and indeed it is mediated by gravitons. Graviton is the smallest and lightest particle in the universe. And gravity also effects the photons. Because photon has mass.

Time Dilation and Mass Increase in Gravity

In gravity inertial mass increases and thus time is dilated.

And the formula for time dilation is: $t' = t \times GM/Rc^2$. (3)

Here t' is dilated time and t is proper time with respect to infinity.

And the inertial mass increment formula is $m' = m \times GM/Rc^2$. (4)

Gravity effects energy so it must affect mass. Inertial mass increases in gravity.

So, it can explain galaxy flat rotation curves. Stars far away from the center move just as fast as inner stars because stars far away have lesser inertial mass than inner stars and as force decreases so speed remain same. And it may explain dark energy too.

Do Accelerating Charged Particles Radiate Under the Influence of Gravity?

No accelerating or decelerating particles do not produce electromagnetic radiation under the influence of gravity. They radiate when they accelerate or decelerate in an electric field.

Nature of Light

Photon is just like other particles. Photon have rest mass just like other particles though it is extremely tiny. If it has zero mass then its speed should be infinity. Photon can transfer momentum like billiard balls. Its speed depends upon the velocity of source and observer. In blue light photons are closer. This is high frequency and thus its wavelength shorter. And in red light photons are comparatively far and thus it has relatively lower frequency and longer wavelength. Red light beam is longer in length than blue light beam. See figure 10. Each small sphere represents a single photon. And it emits from a body or antenna at 'c'. But if antenna moves to right with velocity 'v' then photon's speed will be c + v not 'c'.

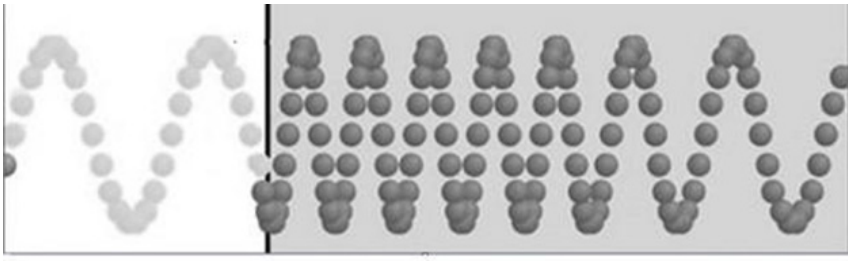

Fig. 10 Photons in red and blue light wave

Conclusion

Light behaves just like other particles. Speed of light is not constant. It depends upon the velocity of source and observer. There is no speed limit of the universe. Time dilates and inertial mass increases as an object moves. In gravity there is increase in time dilation and increase in inertial mass.

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