True Relativity

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Abstract

There are some unresolved paradoxes 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 Morely experiment there is simple addition 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 charges in the conductor. And if the magnet is moving then there is same force involved i.e. Lorentz force. 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 principal is not very extraordinary. No matter how much you can curve spacetime it will not result in acceleration.

Key Words: *Special Relativity, Twin Paradox, General Relativity, Speed of Light*

1. 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. [1] It 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 has two postulates: All the laws of nature have the same form for observers in any frame of reference, whether accelerated or not. In the vicinity of any point, a gravitational field is equivalent to an accelerated frame of reference in gravity-free space (the principle of equivalence). [1] Equivalence principal is not very extraordinary. No matter how much you can curve spacetime it will not result in acceleration.

2. Galilean Invariance

Galilean invariance is deep symmetry of the universe. [2] 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 $v_{room} - v_{ball}$.. And from rear end, the speed of ball will be $v_{room} + v_{ball}$. 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. See fig. 1.
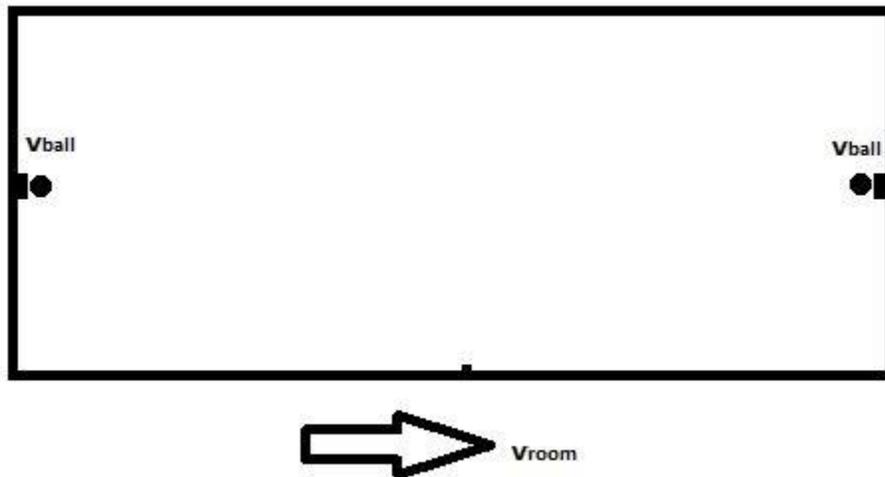

Fig. 1 Room moving to right with veocity v

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 $v_{room} - c$. And light from rear end is not $v_{room} + c$. 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. [3] See fig. 2. You can never compensate this difference no matter what you do including relativistic doppler effect. So this discrepancy can never be resolved if we assume speed of light does not depend upon the speed of source.
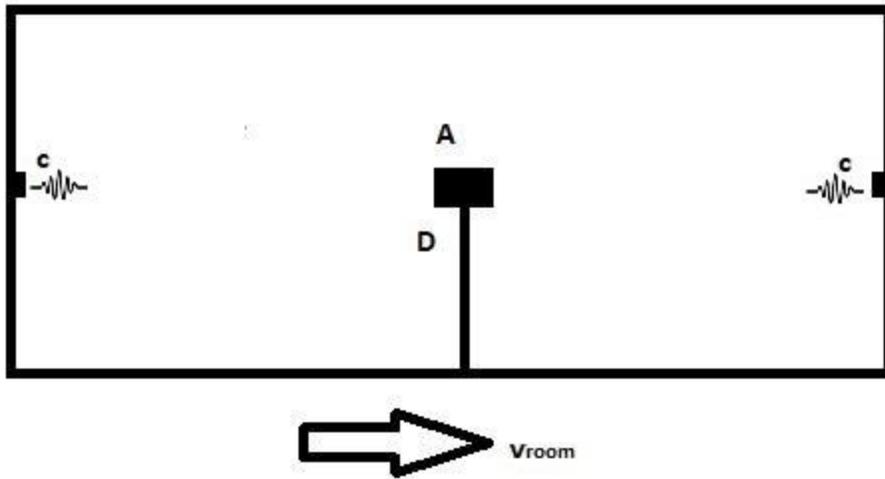
Fig. 2 Room moving with velocity v to the right and a detector

Now consider there is light source in the middle of room. And photons are emitting from it and hits the roof 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 tangential 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 tangential. No 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 O_1 in space and it emits a light beam towards another observer O_2. O_3 observer is seeing that light is getting to O_2 and O_2 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 O_2 even then speed of light cannot be 'c'. [4] See fig. 3.

Fig 3. O2 is moving towards O1 with velocity v

3. Relative Motion

Only relative motion is observable; there is no absolute standard of rest. But one really uniquely changes its position in space.

4. Michelson Morely Experiment

In Michelson Morely 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. So no fringe shift was observed. [5] See fig. 4.
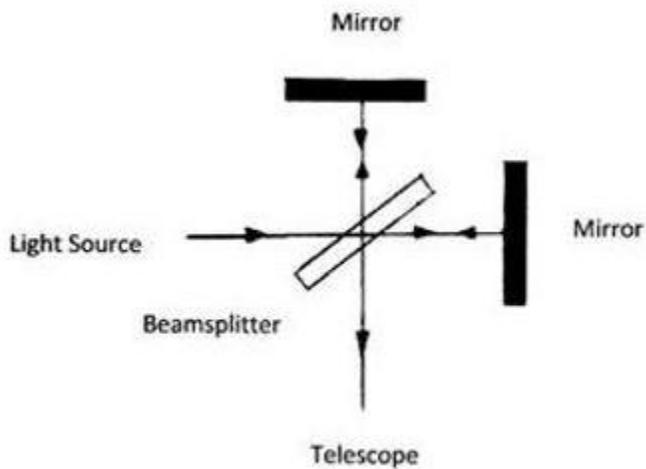

Fig 4. Michelson-Morley apparatus

5. Moving Magnet and Conductor Problem

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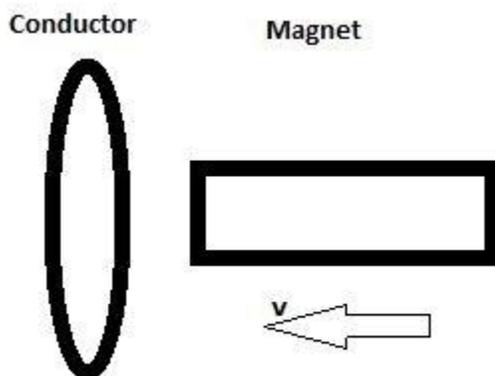

Fig.5 Magnet moving towards conductor

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. And if the magnet is moving then there is same force involved i.e. Lorentz force. See fig. 5.

Consider a thought experiment. Consider a room is moving at a velocity. We have a magnet on a stand. Because it is moving its magnetic flux will change. 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. You have a charged rod. If the rod is moving. There emerge in vicinity of rod a magnetic field. It will effect nearby compass. But this never happens. Take daily life example. Earth is moving but the charged rod never deflects the nearby compass. 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.
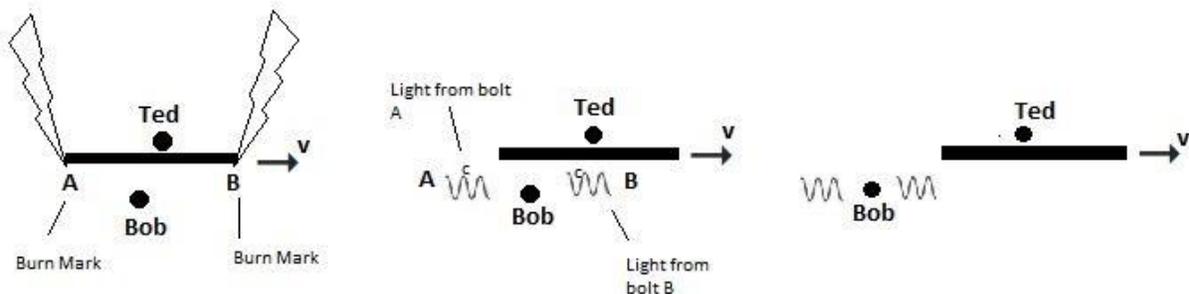
6. Simultaneity is Absolute

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

See fig.6. See this thought experiment is fallacious. Because it is relating to apparent time is taken by light. 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 fig. 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 fixed time and this archer hits at the target midway. And O_1 is watching it. Now consider O_2 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 archer

hits the target and in other it misses it. There is out of synchronization situation here. So I concluded simultaneity is absolute.
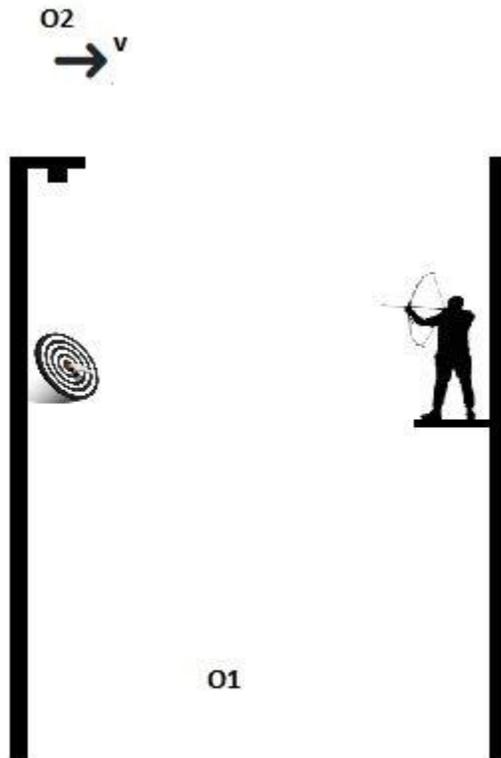

Fig.7 An archer is throwing an arrow on target

7. Consequences of Special Relativity:

Time Dilation

$t' = t \times ĉ$

$ĉ = \frac{1}{2} v^2/c^2$

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

Mass Increase

Only inertial mass increases.

$m' = m \times ĉ$

$ĉ = \frac{1}{2} v^2/c^2$

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

Length Contraction

Length contraction is not there. There are many unresolved paradoxes such as train tunnel paradox. [2] Let's think about a scale. A car is moving along it. As cars time slow 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.

Time Dilation and Mass Increases

Both are proportional.

Relativistic Kinetic Energy

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 = 3×10^8 m/s: $m' = 0.5$ kg	K.E. $= 4.5 \times 10^{16}$ J	$E = 4.5 \times 10^{16}$ J
At velocity v = 6×10^8 m/s: $m' = 2$ kg	K.E. $= 1.8 \times 10^{17}$ J	$E = 1.8 \times 10^{17}$ J

Energy Mass Equivalence

This relation $E = mc^2$ hold true. [7]

8. 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.

9. Twin Paradox

Imagine two rooms are flying apart. And they are looking towards each other. From O_1 he is still and other is moving and from observer O_2 point of view he is moving. Then in both reference frames time should be slow down. This creates the famous twin paradox. [2] 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. And we cannot use this information to determine which is in absolute motion.

10. Gravitational Force, Electric force and Other Forces Remain Same

Electric force, gravitational force and other forces remains same as charge and gravitational mass remain same. Only inertial mass increases that is why time slows down.

11. Doppler Shift

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.

12. Particle Approaching Speed of Light

Particles are approaching close to speed of light in particle accelerator and their mass is not increasing considerably. It is said that as particle approaches close to speed of light. Its relativistic mass 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 speed then how can it move the object beyond it. In my point of view close to speed of light, there is ineffectiveness of 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.
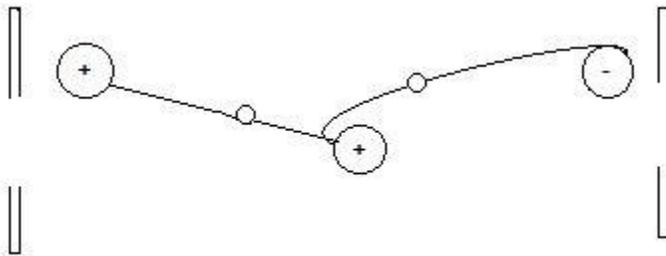

Fig.8 Proton beween two plates of opposite charges in accelerator

13. Flaws in General Relativity

Equivalence principal is not very extraordinary. No matter how much you can curve spacetime it will not result in acceleration. [8]

14. 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.

15. Time Dilation and Mass Increase in Gravity

In gravity inertial mass increases and thus time is dilated.

And the formula for time dilation is: $t' = t \times GM/Rc^2$. Here t' is dilated time and t is proper time with respect to infinity.

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

16. Do Accelerating Charged Particles Radiate Under the Influence of Gravity?

No accelerating or decelerating particles do not produce electromagnetic radiation unless they move in electric field.

17. Nature of Light

Photon is just like other particles. Photon have rest mass just like other particles. If it has not 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.

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.

References

1. Serway, R.A., J.W. Jewett, and V. Peroomian, *Physics for scientists and engineers*. Vol. 2. 2000: Saunders college publishing Philadelphia.
2. Mould, R.A., *Basic relativity*. 2001: Springer Science & Business Media.
3. Britannica, *Galilean transformations*, in *Encyclopedia Britannica*, O. edition, Editor. 2023, Encyclopedia Britannica Inc. .
4. Britannica, E., *Lorentz transformations*. 2023.
5. Michelson, A.A. and E.W. Morley, *On the relative motion of the Earth and the luminiferous ether.* American journal of science, 1887. **3**(203): p. 333–345.
6. Einstein, A., *On the electrodynamics of moving bodies.* 1905.
7. Einstein, A., *Does the inertia of a body depend upon its energy-content.* Annalen der physik, 1905. **18**(13): p. 639–641.
8. Einstein, A., *The foundation of the general theory of relativity.* Annalen Phys, 1916. **49**(7): p. 769–822.