

# Weakest Point of Special Relativity

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## Abstract:

The theory of special relativity has extraordinary and amazing inferences; therefore the consistency of its technical essence gets more significance. In this study, the primary mentality of the special relativity is re-examined with the help of present and advanced methodology moreover its postulates are questioned on the universal scale. A defect caused by locality and neglected factors were detected. Reforming postulates offers a potential for new expansions in terms of light kinematics and cosmological analyses.

**Key words:** Light kinematics, Postulate restoration, Cosmological analysis, Age of universe, Pseudo science

## Introduction:

There is a great deal of discourse, anecdote and text admitting how difficult to understand the theory of special relativity (SR). In the current publications, its technical essence is briefly passed on and its implications are foamed. As if, it is preferred to ignore its technical essence, for example the general attitude towards mathematics or algebra. In fact, first original scientific paper of the theory can be quite vague and difficult for the majority to comprehend; imaginary light from an imaginary light source on a moving object is analysed. In most texts, the subject is mentioned as "light"; but, the word of "light" includes/reminds the meaning of continuous light or a photon flow. When the logic is enforced, it may lead us to prefer memorising or self-deception/rationalization instead of understanding/comprehending the essence. The precision of the methodology requires considering a unique/identified photon (Another important detail is the directing the photon by a perforated plate filter).

On the other hand, over the past 115 years, methodology and scientific perspectives have been developed and the ability of defining the events closer to natural reality and the ability of solving some complexities has increased (at least a methodological rule can be generated from a deep academic examination of the event that led to "big picture" and "relational integrity"). In addition to single-photon application, the awareness of reforming of postulates on universal scale and project systematic is emerging (in pursuant of personal ability); the postulates are generated in local conditions/events (and they are formed by becoming an opinion of repetitive perceptions); therefore, they may not be appropriate to use directly for universal events.

## The learning and questioning the root of theory

Probably, Einstein had an opinion that his theory could not be easily understood and therefore he published a book which he described for high school students (1916) [1]. It will be useful to repeat and examine Einstein's mentality through the narrative in this book. Its high implications make it very important to understand and internalize the essence of the theory on the grade of necessary and sufficiently. We may not see its flaw without understanding its technical mentality.

**Einstein's simplified statement** (Figure 1):

Definitions:

K : Absolute (Reference) system

K' : Moving (relative) system (linearly in the + x direction with fixed v speed)

P<sub>1</sub>: Identified single photon

Flow of events:

At the moment T<sub>0</sub>, K' system and photon P<sub>1</sub> start to move from point O.

At the moment T<sub>1</sub>, the centre of K' reaches to point A and the photon P<sub>1</sub> reaches to the point B.

The coordinates of photon P<sub>1</sub>:

According to the K system : (x; t)

According to the system K' : (x'; t')

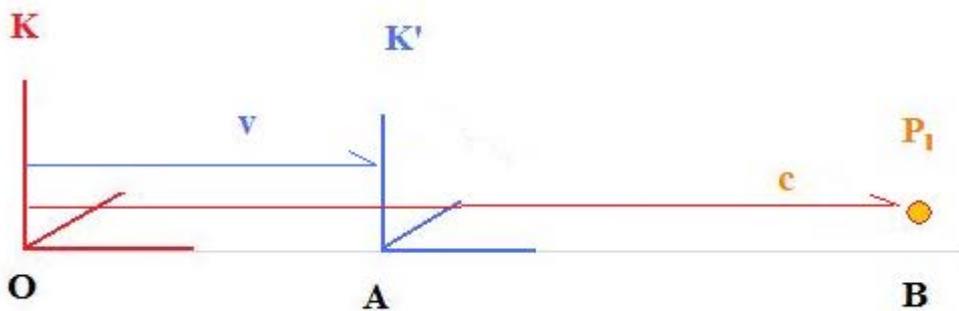


Figure 1- Coordinates of a photon according to different Cartesian systems

The coordinates of an object relative to any system are a routine/usual method of definition. Other/any points or systems can also be selected as reference systems. So far everything is customary, normal or classic in physics.

The stage where Special Relativity theory comes into play:

Einstein says, "When a person in the K system measures the speed of light, he will find the value ' c ' ;

$$x / t = OB / t = c \tag{a}$$

Similarly, when the person in the relative K' system measures the speed of light, he finds the value c again; so

$$x' / t' = AB / t' = c \tag{b}$$

In order to achieve this equation (b), both the AB distance and the time t' should take the values that the result will be ' c ', when they are divided. After that, it was solved with math or algebra and determined as Lorentz transformation equations.

In the original text of the theory, a fictive light source is allegorized on an object which it has uniform motion, and a photon goes away with the value 'c' from this light source/object (SR says that the distance between object/source and photon continuously increases with the value 'c' of speed).

There are two important points to consider in this account of the theory:

1- The uniqueness of the photon (due to its existence): The defined photon, which we use as a subject, is unique in the universe, its existence and instant position is unique. Everyone agrees, including Einstein, Lorentz, Poincaré, etc.

2- The person in K' system is not aware that he is moving with v speed. How the Earth travels - in its orbit around the sun - by a speed of ~ 108 000 km/h and we are not aware of this motion; The K' system should be considered similarly. Einstein had used the set of Peron (for K system), train (for K' system) sampling for easy explanation; the train is windowless, vibrationless and quiet; it is essential to indicate from the beginning.

The identified photon travels/scans the OB distance in the time t (the K reference system must be considered to be an absolute stationary space); and the relation of  $x / t = c$  is a natural and unproblematic result.

To have  $x' / t' = c$  in the relative system K', the photon must take the AB distance in less time than t because the AB distance is shorter than OB. But it is not enough to reduce the numerical value of times. In order to obtain the result c in the division process, it is necessary to increase the numerical value of distance too. Slowing of the tempo of time (the growth of the unit of second: time dilation) to ensure that the time is reduced in numbers; to increase the numerical value of distance, unit of meter must be shorter (Fitzgerald contraction). The Lorentz transform equations change these units of dimensions<sup>1</sup>.

**Key point of SR mentality**

SR has extraordinary inferences. Therefore we must carefully examine its technical essence and we have to be sure for first and every step. There are some points against the logic and causality in the mentality of SR that has been adopted so far: these are generally tolerated by "subjective reasoning" (rationalization). Weakest point of SR can be explained easily:

When we remember again what was happening: At the moment  $T_0$ , K' and the photon of  $P_1$  set off from point O, after a period of time, at the moment  $T_1$ , the K' system reached to the point A; also, the photon  $P_1$  has reached to the point B.

We can see everything clearly from outside the K system.

But the theory SR says that: The person in the K' system perceives himself as immobile and uses the c value he finds when he measures the speed of light (he says "there is experimental evidence; I measured it"). In other words, if he measures the way of photon on the moment  $T_1$  (which will be the AB), he will think that the AB distance should be travelled by the speed c in a time between  $T_1 - T_0$ . It will have to bend  $x'$  and  $t'$  to achieve this ( $x' / t' = c$  equation). Theory SR considers and analyses the photo of  $T_1$  instant; K' experimenter ignores the movement of OA way, because he is not aware his own motion on universal scale. But the outsiders (K system person) perceive the incident clearly; they cannot use a method like self-deception, they have no such luxury.

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<sup>1</sup> Lorentz equations are purely math products; physics formula process had not been applied.

Due to our ability to look from outside the K system, we can see clearly what is going on: Photon P<sub>1</sub> has actually passed all points of the OB way in the T<sub>1</sub> - T<sub>0</sub> period; there is no abnormality.

The person in the K' system attempts to interpret an illusion (he thinks that the AB way is taken by c speed instead of OB way). If he is not aware that the view from the internal and actually relative system to the whole / event will may be caused wrong perceptions (such as "The Sun is rotating around the world"), probably his conclusions will also be wrong. To give a reference frame role to an object (which is in local and actually relative motion) causes wrong perceiving and decision. We had learned this due to Copernicus and Galilei.

The essence of the event: The perception of the relative system (K') experimenter is wrong. Why can we continue to analyse this as if it were real, while those in the K system and the outer consecutive system also comprehend this mistake? Answer: "I find the c value when I measure the speed of light in the train. When the person in the K system also measures the speed of the same photon, he will find 'c' again. Then the relative velocity of the light is c according to all systems".

Is there another option? Yes it is possible and SR had not discerned this option: We can measure just the universal speed of light by present experiment (mirrored double path, uninterrupted light etc.); we cannot measure local relative speed and other kinds of relative speeds. The measurements for every direction give the same value; this reality is a powerful evidence for this option.

There are similar some examples for first approaches in science history. Phlogiston theory had got lost its reputation when the oxidation factor was discovered. Copernicus and Galilei had terminated an illusion about the dogma of "the sun turns around the Earth". They presented a new alternative explanation although dogmatic paradigm. Similarly, our measuring experiment can measure the universal speed of light, according to outmost/external frame (outer space). But the theory SR used the measured value as "exact relative" value because of mechanical habitually and after that generated some high inferences.

Initial or root pre-acceptance (postulate) causing special relativity theory and subsequent foamings: To label each measured speed as "genuine relative" to the current local environment (Whereas, an alternative definition was possible: "hypothetical relative"). This attitude is a stigma resulting from our local experience in mechanics. Since this theoretical misconception is at the postulate level, it reduces the inferences and verification experiments to the ad-hoc level.

Whereas the person in K' or Lorentz, Einstein and others, wherever they are measuring; in fact, if they knew that they could measure the speed of light only and always universal value (that is, according to the space), they would not be exposed to this wrong perception. It is interesting to ignore this option even when the evidence<sup>2</sup> is available. Another flaw for SR is to ignore the types of relativity; There are varieties such as "exact relativity", "hypothetical relativity" and "momentary relativity" [2]. "Which one of them applies to light?" This may be questioned; but, relativity types never considered in SR, they has not been studied; a process such as choosing the appropriate one for light has not been applied.

When Copernicus / Galilei said, "The world actually rotates around the sun, but we misinterpret the view that caused by the world's turning around its axis", the paradigm of period excluded and judged them. Humanity could not perceive a technical complexity. SR has also similar complexity.

Humanity could not comprehend the complexity of SR and preferred to admire for brilliant inferences of SR. But the measured light velocity value is actually the relative value according to the outer space. This has experimental evidence: measurements give the same result in every direction. Consequently, due to its special conditions (round-trip, double-track and continuous photon current, etc.), our light velocity measurement cannot measure the local relative speed according to the experimental environment or source, but its universal speed is relative value according to the outer space.

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<sup>2</sup> Isotropic results.

Einstein and others also expected the result to be  $c \pm v$  at the start of the measurement; that is, in the accompaniment of the ethereal mentality - they intended to measure the relative speed of the light according to the source, but when they detected the result always in  $c$ , they used it with the same intention: as the escaping speed from the source. This is the weakest point of the theory.

However, there are other options that have a natural example in the world: after the player shots to the ball in the football game, he moves to his new strategic position; the speed of the ball -for the next moments- is no longer according to the player; is relative to the ground. That is, it is a relative value to the common reference frame. In this setup, if the player is considered instead of light source, ball as the photon, and the ground as outer space, we will reach the judgment that is consistent for light kinematics. When we flashed the photo flash, we can no longer claim that the distance between the camera and the photon pack will varies with  $c$ . After flashing the camera (the dead photo flash) may moves freely in any direction. There is a similar situation in the relationship between Voyager and the World (Discussion 7).

### **Postulate reformation for universal scale:**

Postulates are opinions that were inured to the repeated perceptions and they are used as axiom-like root reference. The following steps of analysis is dependent on hard discipline; but, postulates are the work of local conditions, and as if they are exempted of questioning even for the phenomena of universe-scale physics. For example, a speed value obtained in the velocity measurement in the mechanical field is directly labelled as "exact relative" according to the local environment and is used in this sense without questioning. We can see a similar attitude in measuring the speed of light. In fact, initially the  $c \pm v$  value was expected due to effect of the aether mentality, and the resulting  $c$  value was defined as the speed of a photon that the speed of moving away directly from its source. The special theory of relativity also used the speed of light in this meaning (exact relative: in terms of content and meaning of essence).

In general, experiments have a preliminary intention, and the results of the experiments are generally interpreted for this initial intention. When an experiment is designed, it should be considered which hypotheses else are supported by this experiment. If we intended to measure the velocity of light relative to the outermost reference system as the initial aim, we would define the result -by the same traditional attitude- as universal velocity of light. And the fact that the measurements were independent from the direction (isotropic) supports this decision. It is highly probable that this is the truth. So wherever we measure it, we can only measure the universal velocity by the current measuring apparatus (with mirrored double paths and continuous photon current) on the universe scale; not the escaping speed from its source.

The special theory of relativity claims that the same photon is moving away from each one of the sequential reference systems (train, world, Milky Way, local cluster, super cluster, universe, and all-encompassing frame: "space"). In fact, this claim is contrary to our mechanical habits and causality. However, more accurate definition / interpretation is possible for this experimental result<sup>3</sup>: Light velocity measurement method can only measure the relative speed of light according to universal scale (outer space). This method of measurement cannot measure the local relative speed of the photon according to its source. At this point, it may be useful to remember how does work the measurement method that is only light-specific and mirrored double path, uninterrupted photons. On the other hand, the fact that it gives the same result in every direction is a strong proof that velocity can be measured according to the outer space. When we measure the speed of the ball in football, we cannot insist that it is the escaping speed from the player for every seconds of the flowing time. After throwing, the player can go to his new position; for the next moments the ball's speed is not "exact relative" according to the player. The speed of ball is a relative value according to the ground. This analogy is a good example for requirement of co-reference frame for all actors. We have to consider the

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<sup>3</sup> SR never investigated this option and it is justified about its interlocutors would behave the same.

measured speed of photon (and source's speed) is a relative according to a common reference frame (it will be outer space or LCS<sup>4</sup>).

If the observers in K and K' coordinate systems can distinguish that they can measure just universal value of light's speed, they will have no problems in physical flow. If the experimenter in the K' system can consider the big picture, he will not have any problems and will not need to play with the dimensional units. He may even produce new experiments / inferences (discussion 5).

### Discussion:

- 1- The value of light's velocity (  $c$  ) is a relative speed according to outmost reference frame (LCS). The speed  $v$  (of local place, a train or source) is belonging to a most internal frame.  $c$  and  $v$  are never used in a same formula; the speed value of the train must be adapted according to the reference frame of light's velocity:  $V_u$ .
- 2- SR allows to accept the same value of light's relative velocity according to every sequential frames; Earth, Solar system, galaxy, ....., Universe, outer space. Its argument is "Physics rules are the same in everywhere". This argument is valid; but at that form: "The present measuring experiment gives the same value '  $c$  ' on everywhere". Because this specific experiment can measure just universal speed of light; not local relative speed according to its source. We must can distinguish the serious difference of meaning (nuance) between those phrases "it is measured" and "it always moves away with the speed  $c$  from its source"
- 3- The special theory of relativity wants the uniform motion of the K' system as an initial requirement. This condition is the Galilean relativity principle and applies to the relativity of objects that have mass. When we release a pebble freely in a train travelling at constant speed and linearly, its path is a vertical line that combines the point where the pebble falls and the tips of our fingers; because the pebble has a horizontal initial velocity value which is transferred from the train due to its mass. But since there is no measurable mass of light, there is no horizontal speed transmitted to the photon from the speed of the train or its source. We have not an argument for applying the Galilei relativity principle to a moving body for inertial frame role; however, uniform motion of the source may solely simplify the analysis.
- 4- Every points of path OB are scanned by the photon itself along the time  $T_1 - T_0$ . However, since the experimenter in the K' system is unaware of his own motion, he is mistaken to determine this distance as AB at the time of  $T_1$ . When the detection is incorrect, it is natural that the analysis and the result will be also incorrect. While the photon travels to +  $x$  direction and if its source or K' system goes to the direction  $-x$  (which is naturally possible), the photon only scans every points of the way OB. We cannot claim that the photon travelled the way DO or DB. (figure 2). If we insist for SR, we find

$$t'_{(\text{opposite direction})} > t'_{(\text{same direction})}$$

that if we simultaneously consider both option, the clock of K' system cannot indicate these different times.

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<sup>4</sup> LCS: Light Coordinate System



Figure 2. If the source goes to the direction - x

- 5- SR restricts the thought by isolating the light / photon with its source and analysing their motions only with the method of relativity. If we can isolate a single photon in an experiment on the Earth and if we can detect  $T_0$  and  $T_1$  moments precisely (L: distance between light source and photon receptor):

$$(T_1 - T_0) \cdot c - L = V_U \cdot (T_1 - T_0) \quad (c)$$

We may use this equation (c). If the motion of the world is parallel to the photon and in the same direction, the photon's arrival point will be translated a little due to the  $V_U$  speed of the world according to the LCS and the travelled length by the photon will be different than L.

- 6- The most effective defending against this study which reveals the inaccuracy of SR's first postulate, may be to address player-ball analogy in space conditions: when the football player and ball are isolated in space conditions; we have to consider Newton's third law (For every action, there is an equal and opposite reaction). If the player throws a ball, while the ball goes to a direction, the player also gets a motion at opposite direction (in proportion of his and the ball's masses) and if the method of relativity is considered; -that is, assuming the player as inertial frame - the distance between the ball and the player changes with the ball's speed. In essence, exact/genuine relativity is realized. This is true; this explanation may convince some people. But, we have to distinguish the essence of event: the action-reaction principle is valid between masses and applying a force is mentioned. Neither the source nor the photon does not push the other. Photon never need to apply a power for its motion. Also the source never apply a force to the photon. When the photon is released, it travels on the bed of the electromagnetic cycle by energy. The role of the source is to release the photon; it has not any contribution for photon's motion. Since there is no measurable mass of light, the effect is not subject to the action-reaction principle. If a relative speed is defined for light/photon, this is the value according to space or LCS. The source can be freely transferred to the new position just like the footballer after releasing the photon. At the releasing moment, the source just has passed over the releasing point of the photon that is marked at LCS.
- 7- SR insistently uses the "exact relativity" type; that is, (claiming that the distance between the photon and the source always increases with the speed of c) SR imposes an imperative that the source always follows the photon. There is never an event like this in nature; contrariwise, our camera can go freely to anywhere after the flashing. Another example: when the Earth travels in the opposite direction in its orbit around the sun, the relative speed of Voyager 1 or 2 according to the Earth transfers to type of "hypothetical relative" instead of "exact relative" (Earth's speed on its orbit is  $\sim 30$  km/sec; Voyager's speed according to the Sun is  $\sim 15$  km/sec), when the relationship of motion between Voyager and the world are isolated (when the big picture is ignored), the state of approaching the world can be realized.

## Principles of LCS method about light kinematics (instead of SR)

In astronomy and cosmology, the primary origin of information/data and processing factor is "light" that arrived to us from celestial objects. Accurate determination of the motion properties of light is important. The special theory of relativity fulfilled its function as a first approach, and thanks to it for a new step (LCS method) forward was created. This new approach [2] allows cosmological analysis and helps to elaborately determine the age of the universe [3]:

- 1-The motion of the photon and the light source are analysed in a common frame.
- 2-This frame is most external reference system: outer space or LCS.
- 3-The velocity of the light is the value '  $c$  ' according to LCS.
- 4-The speed of celestial object/light source must be adapted according to LCS:  $V_U$
- 5-The starting point of the photon is marked in the space/LCS.
- 6-A photon arrives to eye of an observer with the value  $c$  of light's speed (Figure 3)
- 7-A cosmological analysis must be treated between biggest formations in universe (super clusters).
- 8-The Earth will be considered at the centre of Virgo for using observational data.

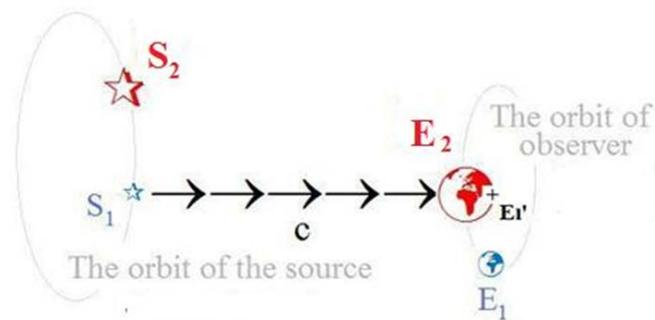


Figure 3 The light arrives to observer by the velocity  $c$

The space or LCS is not tangible; nature doesn't care this status/difficulty. However, a sheet of paper is functional for theoretical analyses.

## Conclusion

The main mistake of special relativity theory is to give a reference role to a local object. When the candidates for reference frame are evaluated according to their coverage capacity - how the sun is superior and more inclusive than the earth - the light (or light coordinate system: LCS) is far superior to the light source or a moving body due to its universal qualities.

In the extension of this basic misconception, accepting every speed in the definition of "exact relativity" and perceiving the photon-source relationship in the context of the car- road relationship is the weakest point of the special relativity theory. However, there is relationship between the two cars on the same road; these cars do not apply force to each other, in summary, this setup may be called as "hypothetical relativity". The relationship between a light source and a photon is in the definition of "hypothetical relativity". After the

photon is released, the source can move freely in other directions; the distance between the photon and the source changes with the speed  $c \pm V_U$ , but the current measuring device always gives the value  $c$ .

Considering the whole picture or conception of connective integrity makes it necessary to revise some of the theories that we adopted as an idol. The perceiving ability from the outside of the absolute  $K$  system allows us to clearly see what is happening: Photon travelled the  $OB$  path by the speed  $c$  at time  $T_1 - T_0$ . This is all. The constraints, misperceptions and interpretations of the person in  $K'$  will not care for natural reality and science in essence.

Light kinematics are subjected to at least eight basic factors [2]; If some of them are neglected, some different hypotheses with fantasy implications, such as the special theory of relativity, can be produced (e.g. the burning event cannot be accurately defined regardless of oxidation).

There are those who consider the special theory of relativity as a first approach for universal physics. However, this study indicates that the mentality of locality is still effective in the theory  $SR$ . Unfortunately, the postulates are generated from the nearby local conditions. It is necessary to reform the postulates on the universal scale and with the project discipline for light kinematics and cosmological analyses.

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