

## Methodological Defects in Relativity Theories

and

## Primary Principles of Light Kinematics

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**Abstract:** Special Theory of Relativity has been developed using by several excessive reductions/isolations and General Theory is presented instead of a superposing step. This study reconsiders and revises the relativity concept and light kinematics based on arguments presented herein.

**Résumé:** Théorie de la relativité restreinte a été développé à l'aide de plusieurs réductions / isolements excessives et Théorie générale est présentée à la place d'une étape de superposition. Cette étude examine et révisé le concept de la relativité et de la cinématique de lumière sur la base des arguments présentés ici.

**Keywords:** light kinematics; cosmological analyses; reduction method; kinds of relativity; methodology; mental references; ad-hoc; Popper

### I. INTRODUCTION

The human mind has been formatted by the dynamics of survival in accordance with the “requirement + sufficient” concept of nature. Humans also use this capacity of their minds for science and philosophy. Thus, certain rules, methods and disciplines are required to overcome linear/shallow thinking and enable us to define/analyze the complexity of nature. It is likely that we need to improve this methodology, particularly with regard to “managing mental references”.

We humans generally encounter difficulties when analyzing some new events and universal problems that are at border of our knowledge reserve based on our locality.

Although events in Nature possess multiple dimensions and are based on many factors, the human mind can use linear thinking to analyze them. Toward this end we use a routine reduction/isolation method, in which one or a few main factors are considered and conditions are simplified. After such analysis, the superposing step is required. Universal conditions are unfamiliar to humans, such that we may exaggerate the reduction method for some problems and so we may get some wrong conclusions. If we neglect certain primary factors and the superposing step, these mistakes can persist for hundreds of years.

Throughout history, there are the examples of such human distraction and mistakes, for instance, once believing that the earth was the centre of the universe, believing in the existence of phlogiston, etc. It is possible to perceive relativity theories as “living examples”.

## II. THEORETICAL ANALYSIS

The special theory of relativity (STR/SR) includes some facilitator reductions or isolations for the analyzing of light’s motion. For example, STR stipulates a uniform motion for the role of inert reference body in accordance with Galilean principle of relativity<sup>1</sup>.

The original STR text claims that fictive light (which is emitted by a fictive source onto a moving body) always moves away from its source with a speed of ‘c’ (this definition is an emphasis of relativity exactly). The moving body (which has uniform motion) is considered to be a reference/inertial frame for the relative velocity of light; the local place (as the reference frame for the speed of the moving body) is considered indirectly [1].

STR had to use some excessive reductions/isolations while analyzing the motion of light:

- 1- In STR, the motion of light is analyzed in only one direction (+ x apses); thus, the source and its light travel in the same direction. This analysis is a first approach and includes excessive reductions, because light or source can also travel in other directions. Each one of these directions requires different time dilation ratios because of STR mentality; but when other directions are considered in same analysis, different tempos are impossible for a clock simultaneously.

STR analyzes parallel light based on the properties of a moving body or light source that, this is an excessive facilitator reduction. STR mentions only the perpendicular direction and declares this position “ineffective” because of vectorial projection. Whereas, all of light’s directions are effective and unfortunately, the resulting identical analyses do not lead to the inferences -time dilation- of STR (Figure 1).

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<sup>1</sup> A body can be used as an inertial frame if it travels linearly at a fixed speed (uniform motion).

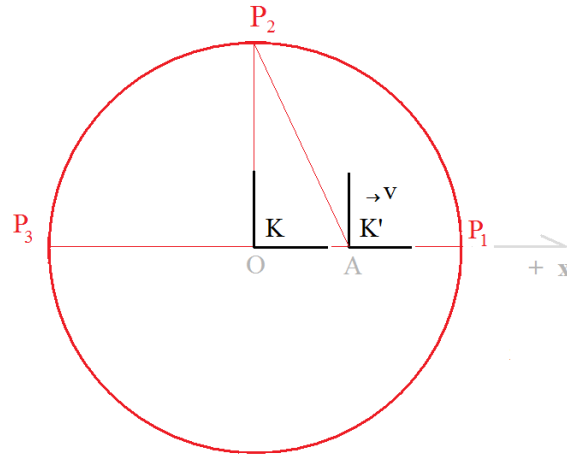


Figure 1- The identical analyses of light on other directions

The frames K and K' are on the beginning point O at the moment T. The photons of a light (like flashing) are emitted on the moment T. These photons will form a spherical surface on the moment T'. The source or moving body (the centre of K') passes over the point A on the moment T'. STR and Lorentz take a photo on the moment T' and analyze new position (this is another facilitator attitude). Results give always the value 'c' for the velocities the photons P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>,...P<sub>i</sub> according to points K and K'. Already the aim of STR was this result.

But, there is a serious result which may be overlooked: While the velocity of light is fixed, time tempo must proceed more quickly for the point P<sub>3</sub> [whereas, time tempo would be slower (time dilation) according to STR]<sup>2</sup>. Thus, time contracts rather than dilate, even if a unit of length is shortened by the Lorentz equation. The condition of K'P<sub>i</sub> > R requires that time contracts (the tempo accelerates).

A clock (which is taken place in K' frame) never work by these different tempos simultaneity.

- 2- The Cartesian coordinate system also facilitates analyses; it is another example of STR-based excessive reduction. Intrinsically, the increasing/decreasing speed of the distance between the independent actors (SDA) is the basis for definition of a velocity; in Lorentz's analysis, the travelling way of the light is considered as the distance between the photon and the centre of K' system. This way is K'P<sub>2</sub> (Fig. 1) for the perpendicular photon in accordance with Lorentz mentality (this way was K'P<sub>1</sub> for parallel photon) and the opinion of "ineffectiveness" is not mentioned; the projection argument is not valid. It would be time tempo changing for the perpendicular direction. The all ways K'P<sub>i</sub> must be traveled by the speed 'c' in accordance with STR/Lorentz/relativity mentality; but, their ratios of time dilation/contraction will be different values. It means: this result is contradictory to

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<sup>2</sup> When the parameter is applied with negative sign (- c) in Lorentz equation; the result [ t' (P<sub>3</sub>) > t' (P<sub>1</sub>)] indicates clearly. Similarly, will get (- v) for inverse option.

causality. This result is never possible for a clock or a moving body simultaneously. It is impossible for notional/abstract concept of time too.

- 3- Universe is not consisted the local place and the moving body. Solar system, Milky Way galaxy, Local group, super cluster, entire of universe ... and outer space are mentioned as hierarchical and consecutive reference frames. The speed of the moving body is different values according to every one of these reference frames. Hence, every one of them requires different values of time dilation and different ratios of length contraction according to STR mentality (even, when we suppose that the uniform motion status is kept). These results are never possible for any place simultaneously; we already do not observe/feel similar events for our living area.
- 4- Karl R. Popper advises to reconsider by using the factors at “ $d + 1$ ” number, when some negative signals emerge on the inferences of analysis. This advice or requirement indicates “the concept of excessive reduction” for the analyzing with “ $d$ ” number factors [2]. To consider the relativity of fix velocity of light according to its source (or a moving body) as a primary factor for space-time illusion is an excessive reduction or a wrong choice. Because the first and main reason (which must first come to mind) is the finite/limited value of light’s velocity. We can never see anything simultaneously.
- 5- When the light’s motion is mentioned, first operation must be the defining a unique or an identified photon as a test object. STR did not emphasize this requirement. Continuous light can be reason of confusing.

### III. TYPES OF RELATIVITY

1. Genuine relativity: In this regard, we must remember the essence of the concept of simple relativity. A car obtains its speed by applying power to the road surface via friction, such that the numerical value of its speed is relative to the road. Thus, the road is the reference frame (or comparing/inertial object) for the speed of the car. The car obtains its speed via its frictional pushing against the road or in actuality, the mass under the road. The road or mass of the Earth beneath it, has an active (but indirect) role in the motion and speed of the car. In other words, the speed of the moving body is relative to the mass of the reference frame. At the time of motion, the car’s speed remains relative to the road. The distance between the car and its starting point can be determined by this relative value of its speed.
2. Nominal/supposed relativity: Think about two cars moving on the same road. When we give the reference role to one of them (we suppose that it is immobile), the speed of other car (vectorial total of their speeds) can be defined as “nominal relative”. This car does not obtain this value of its speed due to other car. In this regard, the nominal relative value of a particular speed is the titular / notional / artificial / comparative value. The increasing/decreasing speed of the distance between these two cars can be defined by coding for the “nominal relative” speed of each car.

3. Momentary/temporary relativity: If a player throws a ball, what is the reference frame of the ball's speed? The player is the reason for the ball's motion, as the player supplies the power. Therefore, we can say that "the ball moves away from the player at the speed at which was thrown" or "the ball's speed has a value that is relative to the player". However, this holds only if the player does not leave the point from which (s)he threw the ball. Naturally the player has freedom to move after throwing the ball. At any given moment of flowing time, the distance between the player and the ball will differ from the " $v.t$ " value, because the player can travel in any direction [even if (s)he maintains uniform motion]. However, the relativity-based computation is valid with regard to the throwing point (which can be marked on the ground); thus, the main reference frame regarding the relativity of the ball's speed is the mass of the ground. The player determines the quality of reference frame only at the throwing moment; at subsequent moments the distance between the player and the ball cannot be determined merely by the throwing speed. Likewise, the relativity of the ball's speed is valid only with regard to the point (marked on the ground) at which the ball was thrown. Thus, the ground is the co-reference frame for the motions of the player and the ball.

Which type of relativity pertains to the relationship between light and its source/moving body? SR theory considers "the relativity concept" according to its first meaning (genuine relativity). Based on SR theory "the distance between a photon and its source always increases with the value of speed  $c$ ". We must, therefore, discuss "what contribution the source makes to the velocity of light?" or whether "the source makes any such contribution at all". The source never applies a power akin to pushing or throwing. In addition, the light does not apply such power to the source or moving body or its place/ground<sup>3</sup>. The light's velocity results from electro-magnetic cycles in space. The value of light's velocity can be defined based on the concept of "genuine relativity", which considers only the space involved. I prefer to call this major reference frame "Light coordinate system (LCS)". If we suppose that the source throws the photons, then the relationship between the light and its source (or moving body) is defined by momentary relativity by-which the light instantly transfers to the LCS. In this case, the LCS is the co-reference frame for the motions of the light and the other actors (source, observer, everything). The values of all parameters involved must be determined based on a co-reference frame, which is the LCS for light kinematics.

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<sup>3</sup> The velocity of light is the highest value in the universe; nevertheless, it does not accelerate to obtain this high value. This quality of light incorporates the concept of independence and superiority. In actuality, light has uniform motion in accordance with the Galilean principle of relativity. When considered in this way, the light or its comparison frame (LCS) is the most competent reference system for light kinematics.

#### IV. PRIMARY PRINCIPLES of LIGHT KINEMATICS

- 1- The velocity of light is genuine relative only to space (or the LCS). The LCS / light coordinate system is the most external frame and has the highest inclusion capacity.
- 2- The point (at which a numbered/defined photon is emitting) is marked on the LCS. The source passes from the emitting point at the emitting moment, as demonstrated by the lake surface experiment (Figure 2) [3]: An experimentalist drops a pebble to water while he runs, this pebble causes a circle wave. In this analogy, the surface of the lake represents the LCS, the circle wave represents the light, and the experimentalist represents the light source or the moving body. At the subsequent moments of flowing time, the distance between the experimentalist and a point on the circle wave cannot be determined by the speed of circle wave's expansion, even if the experimentalist exhibit uniform motion. In this analogy, the surface of the lake is the co-reference frame (and it is LCS for light kinematics).

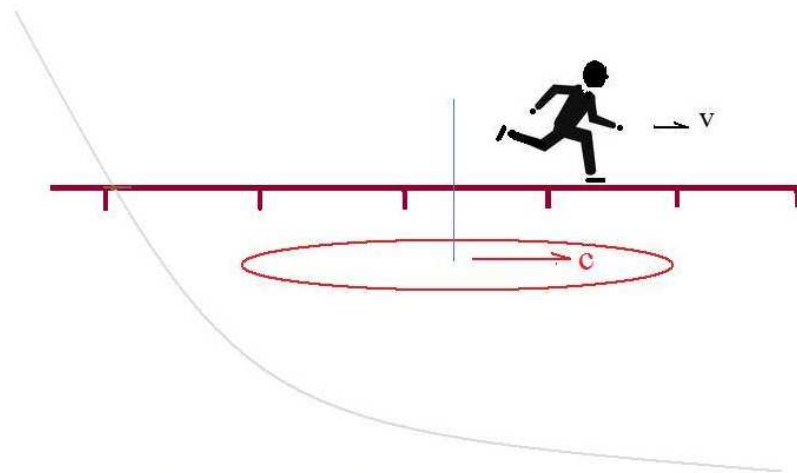


Figure 2 The analogy for light's motion

- 3- If we want to analyze the relationship between the light and any other entity (moving body, observer, source, etc.), we must use the values determined according to the LCS for the other actors' speeds or parameters in all of operations/analyses.
- 4- The upper limit of genuine relative speeds is ' c ' for all things (and light).
- 5- The upper limit of the SDA (the increasing/decreasing Speed of the Distance between independent Actors, including between a photon and other test objects) is ' 2.c ' .
- 6- The observer is an actor of analyzing because of requirement of tracing the event due to visual perception. But this requirement can confuse sometimes. Because observing capacity/ability is limited by the velocity of light. The starting point of photons (which are emitted on the moment  $T_1$ ) is marked on LCS (Point  $S_1$ ); these photons arrive to observer's eyes on the moment  $T_2$  (while he was on the point  $E_2$  of LCS). Always  $S_1E_2 = (T_2 - T_1) \cdot c$  (Figure: 3) [3].

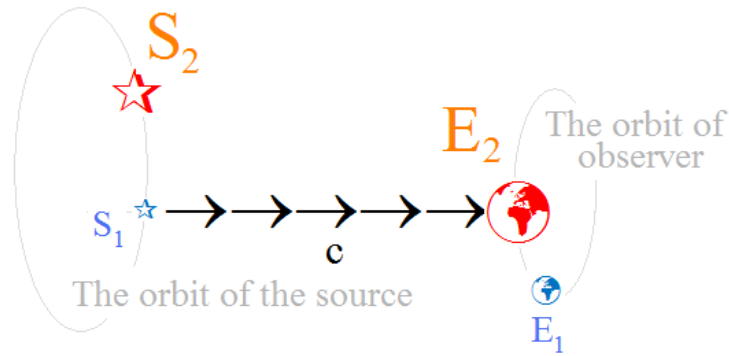


Figure 3 The light arrives to observer by the velocity  $c$

- 7- The observer's velocity is also based on a universal scale, and the value of projective SDA can be larger than  $c$  [between the observer (that is, at point  $E_1$  at the moment  $T_1$ ) and the photon (which begins to travel from point  $S_1$  at the moment  $T_1$ )]. However, the image (that is carried by the light) of the observing object's events always arrives to the observer at the velocity ' $c$ '; even under the conditions considered herein ( $SDA > c$ ) [Figure 3]. If the distance (between the observer and the object being observed) decreases, the observer perceives flowing images of the object at a faster tempo compared to the natural speed of life. If the distance (between the observer and the object being observed) increases, the observer perceives images of the object at a slower tempo compared to the natural speed of life. These faster and slower motions are visual images observed via a film; therefore these visual inferences must not be confused with the inferences of STR. STR claims that time dilation is effective upon the metabolic life of moving bodies.

#### IV. DISCUSSION

It is my opinion, Einstein would disagree with our arguments and probably he would said that: "But, we measure the velocity of light by the value ' $c$ ' according to its source, train, perron; in other words, light moves away from its source, train, perron, everything\* at a velocity of ' $c$ ' every second. This experiment is force major evidence for STR mentality (\*everything; because, the rules of physics are the same throughout the universe).

To this, I would answer as follows:

- 1- Inevitably, we experimentalists are in the local place and we may have settled/ingrained habits and opinions related to the mechanics we employ. In addition, all measured speeds are relative value to their positions in local place, so we naturally consider them as local relative values. But -therefore-, we must perceive, distinguish, consider and discuss other options. And perhaps, we must yield precedence to one of these options that has minimum potential of mysticism or enthusiasm.
- 2- We humans usually have the proclivity to interpret and label the results of our experiments in accordance with our beginning intentions; we may usually match



them directly. Based on SR theory, the measured velocity of light is its speed relative to its source or a moving body, and the concept of genuine relativity is considered as a primary (**but hidden**) postulate. Similarly, if we would intend to measure the velocity of light relative to outer space (LCS), the result would be called/labeled “the universal velocity of light” instead of local relative speed, and this interpretation would be correct.

- 3- The measuring device (continuous photons, double mirror path, etc.) is specific only to light. Therefore, results cannot be labeled directly like the routine local speed measurements of mechanics. This specific system determines relative velocity to outer space instead of local frames. The isotropic quality of the results of these measurements is powerful evidence in support of the universal velocity of light.
- 4- This paper confirms that “the rules of physics are the same throughout the universe” which means that, using this particular measuring experiment, “the velocity of light will be measured as ‘c’ in every instance and everywhere. The phrase “will be measured” is more significant and well directed definition than the alternative “will be moved away from its source by ‘c’ ”, as I believe that we cannot make the leap of meaning from the first phrase to the second.

STR never considered a different type of relativity beyond “genuine relativity”, we can understand this, due to his formula  $[W = (v + w) / (1 + vw/c^2)]$  ; If  $w = c$ ,  $\rightarrow W = c$  ]. This formula requires that the upper limit of all type of speeds is ‘c’. Indeed, this limit is valid with regard to the genuine relativity concept we discuss herein. However, the upper limit of other types of relativity is ‘2c’. The distance between two moving cars on the same road (as two moving objects on a rigid strip) must be determined under conditions where each object obtains its speed independently. In this regard, the upper limit of its own speed of every object relative to the rigid strip (or road/Earth/reference frame) is the value ‘c’; whereat the value of SDA can be bigger than c. The diameter of a light sphere increases at the velocity of ‘2c’ (its radius increases at a velocity of ‘c’); and in CERN, the collision speeds (like SDA) can exceed ‘c’.

In fact, Einstein had confirmed a defect of STR by claiming that the perpendicular light is ineffective. Because, even if it is correct, different tempos are not possible for a clock on the K’ system

When we consider the entirety of universe, the velocity of light is again determined to be relative to most external reference frame (LCS). Importantly, STR permits this deduction. On the other hand, to analyze light kinematics we must use the universal values of the parameters for other actors (observer, source, moving body, etc.) in accordance with scientific integrity. However,  $V_{(universal)} \neq v_{(local)}$  . Reciprocity is not provided. In this situation, we do well to consider the bigger/biggest reference frame.

STR is limited to the uniform motion of a moving body in accordance with the Galilean principle of relativity. This uniform motion can be considered solely with regard to local speeds. These local speeds do not infer uniform motion when considered on the universal scale (because of the chain of sequential reference systems and the vectorial components of orbital motions). The General Theory of Relativity (GTR) has aspired to extend the inferences of STR to all natural motions, and GTR has advanced our understanding of the relationship between acceleration and gravity.



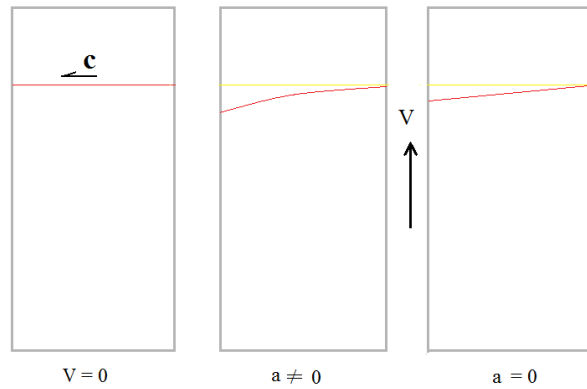


Fig. 4. The path of horizontal light in an elevator cabinet

We can never see anything simultaneously because of the limited/finite value of light's velocity. This limitation is a primary factor affecting our analyses of light kinematics. But, STR considers a different reason (the relativity of light's fixed velocity to everything) as a primary factor. Similarly, GTR claims that the light's path is bent in an accelerated elevator cabinet. Einstein had said in his book that "It is easily be shown that the path of the same ray of light is no longer a straight line when we consider it with reference to the accelerated chest (reference-body K')" [4], whereas, this assumption is only 4 D geometrical requirement or a visual/formal<sup>4</sup> event; because when also the cabinet has fixed speed (**acceleration = 0**) similarly inclined (but linear) path is realized instead of curvilinear path by the same GTR mentality (Figure 4). The primary reason for the bending of light should be the force of gravity; today we perceive this gravitational force as predominant factor in the operation of the gravitational lens. Thus, GTR does not realize its aim of superposing.

## V. CONCLUSIONS

Special Theory of Relativity contains a hidden postulate that every measured speed is relative to a local frame or the reason/object behind the motion. The origin of this hidden postulate is mechanics, that is; the world of materials/masses/locality. Essentially, light is a type of energy and contains major and specific qualities as well as universality; we must be more carefully or more sensible when analyzing the relationship of a body and light.

The primary postulate of STR is that **the speed of light has the same value in any inertial frame**. This postulate must be revised to include the concept that "the velocity of light is measured by the same value 'c' on everywhere", because the present measuring system can only measure the universal value of light's velocity, as opposed to its local and relative speed.

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<sup>4</sup> 4D Geometrical requirement: The cabinet also moves, while a photon travels the distance between two walls; and this photon arrives to an asymmetric point on the opposite wall according to its emitting point. GTR claims the gravity or acceleration for the reason of this event; whereas if the value of acceleration is zero ( $a = 0$ ), the same result will be realized; light's path will be an inclined/diagonal way for this uniform motion without effect of acceleration.

The first reason-object of a motion may not be essential reference frame for the object's relative speed value. A source emits a photon; an experimentalist causes a circle wave to appear on the water and a player throws a ball, but some the resulting speeds may be relative to different reference frames (outer space, the surface of the water, the ground, etc.) instead of their first reference frame. The nature allows these events.

SR theory does not permit for cosmological analysis because of the reason that the simultaneity cannot provided for cosmic objects' data. However, the concept of LCS presents a possibility for cosmological analysis [5].

Until Galileo we humans supposed and believed the Earth to be a major reference frame and the Sun to be a relative object; in actuality, the opposite is true. Sometimes we may assign local and nearby/at hand objects (light source, moving body, the earth, observer, etc. that they actually have relative roles) for the role of reference frame. We must not make the same mistake with regard to light kinematics.

Einstein presented to us precious inferences as  $E = mc^2$  (that the energy is essence of everthing) and Bose-Einstein density (that is clue for the beginning of the life and mental activities). These are splendid inferences for humanity. If it would not be STR step, probably we could not improve the LCS concept; therefore we do not deny the contribution of STR.

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<sup>5</sup> In Eng.: "Pseudo Science" Under the protection of Mysticism.