Special Relativity with absolute time and space and without paradoxes

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(This paper is an extract of [10] listed in section Bibliography.)

Abstract

The present paper makes a comparison between two different approaches for Special Relativity. One is the approach made by Einstein at the beginning of the 20th century which postulates that light moves with light speed c independent of its emitting source. The proposed approach postulates that light moves with light speed c relative to its emitting source, which also includes the reflecting and refracting surfaces. Einstein interpreted the constancy of light speed in all inertial frames as a time and space problem, while the new approach considers it a speed problem. The result is a SR without time dilation and length contraction and consequently without paradoxes.

1 Introduction.

The present paper presents first a short introduction to the proposed "SR with absolute time and length" and analyzes in what follows the differences to Einstein's approach. After an enumeration of the main characteristics of the two theories a criterion is proposed to decide which theory could be the better theory.

When Einstein developed his Special and General Relativity at the beginning of the 20th century it was impossible to think about light that moves with speeds different than light speed c in vacuum. Speed c was the maximum possible speed. With this fact in mind Einstein saw no other way to adapt equations to match equal speed c in relative moving inertial frames than making time relative. This approach required that length also became relative because the problem is intrinsically a speed problem, in other words, the quotient between length and time. Einstein's approach makes abstraction of the physical cause that results in the constancy of light speed in all inertial frames, justifying it with time delay and length contraction.

The Standard Model postulates light speed c in vacuum and accepts time delay and length contraction. All experiments where time delay is apparently measured are

indirect measurements and where the experimental results are justified with time delay or length contraction, independent of the real physical cause that let to the measured data.

Special Relativity without time and length distortions is based on a theory called "Emission & Regeneration" UFT [10]. The theory is based on an approach where subatomic particles such as electrons and positrons are modeled as focal points in space where continuously fundamental particles (FPs) are emitted and absorbed, fundamental particles where the energy of the electron or positron is stored as rotations defining longitudinal and transversal angular momenta (fields). Interaction laws between angular momenta of fundamental particles are postulated in that way, that the basic laws of physics (Coulomb, Ampere, Lorentz, Maxwell, Gravitation, bending of particles and interference of photons, Bragg, etc.) can be derived from the postulates. This methodology makes sure, that the approach is in accordance with the basic laws of physics, in other words, with well proven experimental data.

The "Emission & Regeneration" UFT postulates that light is emitted with light speed relative to the emitting source and that light is absorbed by optical lenses and electric antennas of the measuring instruments and subsequently emitted relative to them with light speed, explaining the constancy of light speed in all inertial frames.

Special Relativity derived in the frame of the "E & R" UFT has absolute time and absolute space resulting in a theory without paradoxes.

2 "Emission & Regeneration UFT.

2.1 Emission Theory.

The assumption of our standard model that light moves with light speed c independent of the emitting source induces the existence of an absolute reference frame or ether, but at the same time the model is not compatible with such absolute frames.

The objections made by Willem de Sitter in 1913 about Emission Theories based on a star in a double star system, is based on a representation of light as a continuous wave and not as bursts of sequences of FPs with opposed transversal angular momenta with equal length L . The concept is shown in Fig 1.

In the quantized representation photons with speeds $c + v$ and $c - v$ arrive simultaneously at the measuring equipment placed at C showing the two Doppler spectral lines corresponding to the red and blue shifts in accordance with Kepler's laws of motion. No bizarre effects, as predicted by Willem de Sitter, are seen because photons of equal length L and λ with speeds $c + v$ and $c - v$ are detected independently by the measuring instrument giving well defined lines corresponding to the Doppler effect.

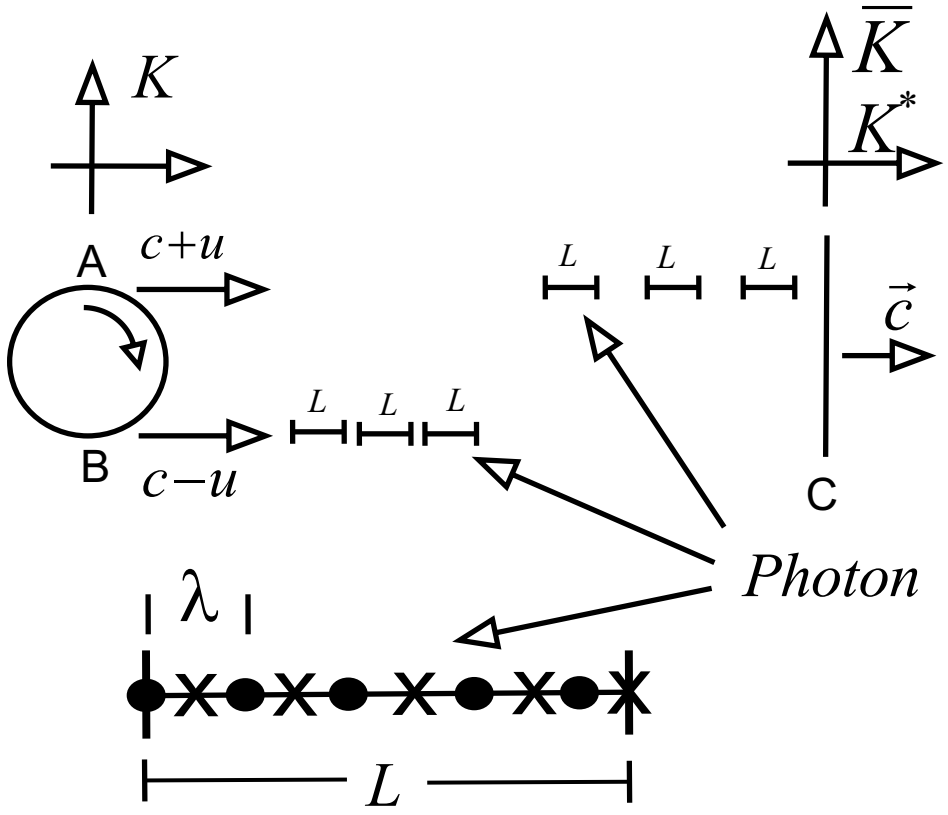

Figure 1: Emission Theory.

Fig 1 shows how bursts of Fundamental Particles (FPs) with opposed angular momenta (photons) emitted with light speed c by a star in a double star system, travel from frame K to frames $\bar{K}$ and K^* with speeds $c+u$ from A and $c-u$ from B. When they arrive at the measuring instruments at C, the transformations to the frames $\bar{K}$ and K^* take place and the photons are emitted with the speed of light c relative to these frames explaining the constancy of the light speed in inertial frames.

The emission time of photons from **isolated** atoms is approximately $\tau = 10^{-8}\ s$ what gives a length for the wave train of $L = c\ \tau = 3\ m$. The total energy of the emitted photon is $E_t = h\ \nu_t$ and the wavelength is $\lambda_t = c/\nu_t$. We have defined that the photon is composed of a train of FPs with alternated angular momenta where the distance between two consecutive FPs is equal $\lambda_t/2$. The number of FPs that build the photon is therefore $L/(\lambda_t/2)$ and we get for the energy of one FP

$$E_{FP} = \frac{E_t\ \lambda_t}{2\ L} = \frac{h}{2\ \tau} = 3.313 \cdot 10^{-26}\ J = 2.068 \cdot 10^{-7}\ eV \tag{1}$$

and for the angular frequency of the angular momentum h

$$\nu_{FP} = \frac{E_{FP}}{h} = \frac{1}{2\,\tau} = 5 \cdot 10^7\ s^{-1} \tag{2}$$

The "Emission & Regeneration" UFT is based on a quantized physical description of nature postulating that

- photons are emitted with light speed c relative to their source
- photons emitted with c in one frame that moves with the speed v relative to a second frame, arrive to the second frame with speed $c \pm v$.
- photons with speed $c \pm v$ are reflected with c relative to the reflecting surface
- photons refracted into a medium with $n = 1$ move with speed c independent of the speed they had in the first medium with $n \neq 1$.

The concept is shown in Fig. 2

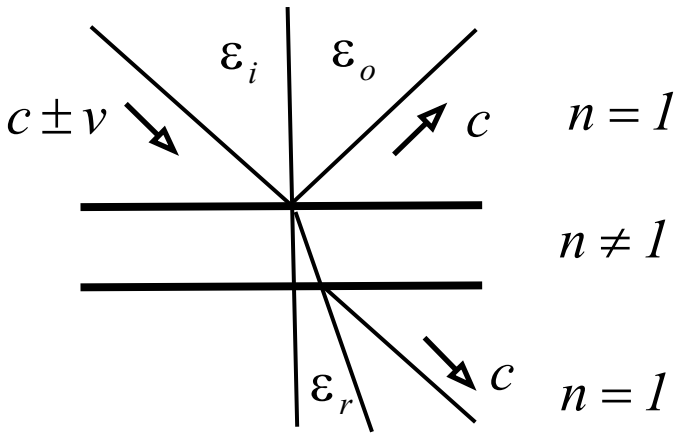

Figure 2: Light speed at reflections and refractions

2.2 Special Relativity based on absolute time and space.

Space and time are variables of our physical world that are intrinsically linked together. Laws that are mathematically described as independent of time, like the Coulomb and gravitation laws, are the result of repetitive actions of the *time variations* of linear momenta [10].

To arrive to the transformation equations Einstein made abstraction of the physical interactions that make that light speed is the same in all inertial frames. The transformation rules show time dilation and length contraction.

The Lorenz transformation applied on speed variables, as shown in the proposed approach, is formulated with absolute time and space for all frames and takes account of the physical cause for the constancy of light speed in all inertial frames.

To show the difference between Einstein's approach and the proposed one, we start with the formulation of the general Lorentz equation with space and time variables as shown in Fig. 3.

$$x^2 + y^2 + z^2 + (ic_o\, t)^2 = \bar{x}^2 + \bar{y}^2 + \bar{z}^2 + (ic_o\, \bar{t})^2 \tag{3}$$

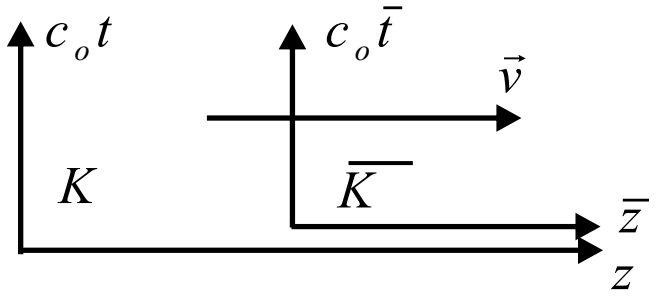

Figure 3: Transformation frames for **space and time** variables

For distances between two points eq. (3) writes now

$$(\Delta x)^2 + (\Delta y)^2 + (\Delta z)^2 + (ic_o\, \Delta t)^2 = (\Delta \bar{x})^2 + (\Delta \bar{y})^2 + (\Delta \bar{z})^2 + (ic_o\, \Delta \bar{t})^2 \tag{4}$$

The fact of equal light speed in all inertial frames is basically a speed problem and not a space or time problem. Therefor, in the proposed approach, the Lorentz equation is formulated with speed variables and absolut time and space dividing eq. (4) through the **absolute time** $(\Delta t)^2$ and introducing the forth speed v_c.

$$v_x^2 + v_y^2 + v_z^2 + (iv_c)^2 = \bar{v}_x^2 + \bar{v}_y^2 + \bar{v}_z^2 + (i\bar{v}_c)^2 \tag{5}$$

For the special Lorentz transformation with speed variables we get the following transformation rules between the frames K and $\bar{K}$:

a)	$\bar{v}_x = v_x$	$v_x = \bar{v}_x$
b)	$\bar{v}_y = v_y$	$v_y = \bar{v}_y$
c)	$\bar{v}_z = \dfrac{v_z - v}{\sqrt{1 - v^2/v_c^2}}$	$v_z = \dfrac{\bar{v}_z + v}{\sqrt{1 - v^2/\bar{v}_c^2}}$

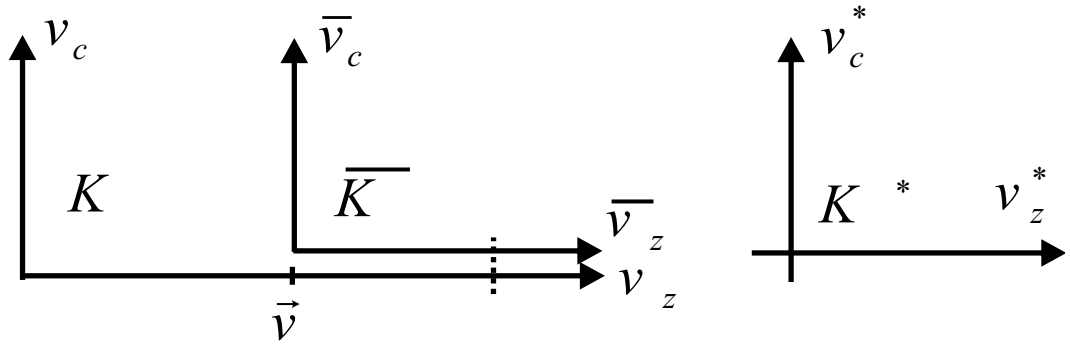

Figure 4: Transformation frames for **speed** variables

$$\text{d)} \qquad \bar{v}_c = \frac{v_c - \frac{v}{v_c}\, v_z}{\sqrt{1 - v^2/v_c^2}} \qquad\qquad v_c = \frac{\bar{v}_c + \frac{v}{\bar{v}_c}\, \bar{v}_z}{\sqrt{1 - v^2/\bar{v}_c^2}}$$

According to the approach "Emission & Regeneration" Unified Field Theory [10] from the author, electromagnetic waves that arrive from moving frames with speeds different than light speed to measuring instruments like optical lenses or electric antennas, are absorbed by their atoms and subsequently emitted with light speed c_o in their own frames. To take account of the behaviour of light in measuring instruments an additional transformation is necessary.

In Fig 4 the instruments are placed in the frame K^* which is linked rigidly to the *virtual* frame $\bar{K}$ and electromagnetic waves arrive from the frame K with the speed $\bar{v}_z$ in the *virtual* frame $\bar{K}$. The potentiality of the virtual frame $\bar{K}$ consists in that electromagnetic waves can move with all possible speeds in that frame. The frequencies of electromagnetic waves that pass from the virtual frame $\bar{K}$ to the frame K^* are invariant resulting the following transformation rules between the two frames:

$$\text{e)} \quad v_x^* = \bar{v}_x \qquad \text{f)} \quad v_y^* = \bar{v}_y$$
$$\text{g)} \quad v_z^* = \bar{v}_z \qquad \text{h)} \quad f_z^* = \bar{f}_z$$

The link between the frames K and $\bar{K}$ is given by the wavelengths $\lambda = \bar{\lambda}$ which are invariant because there is **no length contraction**.

The links between the frames are:

$$K \to \bar{K} \qquad\qquad \bar{K} \to K^*$$
$$\lambda = \bar{\lambda} \qquad\qquad \bar{f} = f^*$$

As shown in [10] all relativistic equations derived with Einstein's approach are also derived with the "E & R" approach, except the relativistic addition of speeds and the transversal Doppler effect.

Note: All information about events in frame K are passed to the frames $\bar{K}$ and K^* exclusively through the electromagnetic fields E and B that come from frame K. Therefore all transformations between the frames must be described as transformations of these fields, what is achieved through the invariance of the Maxwell wave equations.

2.3 Gravitation.

SR was used by Einstein to explain the gravitation mechanism introducing the equivalence principle between inertial and gravitational masses. The result was General Relativity that explains gravitation with the curvature of space, which is simply the product of time and length distortions.

Introducing a SR without time and length distortions requires the introduction of a new mechanism for gravitation that replaces GR.

The "E & R" UFT approach explains gravitation as the result of the reintegration of migrated electrons and positrons to their nuclei. The equivalence principle is not required because only the inertial mass exists.

Gravitation has two components, one due to the longitudinal reintegration and one due to the transversal reintegration of electrons and positrons to their nuclei. The longitudinal component is invers proportional to the square distance and gives the known Newton gravitation law, while the transversal component is invers proportional to the distance giving the Ampere gravitation law.

The total gravitation force with its two components is

$$F_T = F_G + F_R = \left[\frac{G}{d^2} + \frac{R}{d}\right] M_1 \, M_2 \tag{6}$$

with

$$G = 6.6726 \cdot 10^{-11} \; \frac{m^3}{kg \; s^2} \qquad and \qquad R = 2.5551 \cdot 10^{-32} \; v_2 = R(v_2) \; \frac{m^2}{kg \; s^2} \tag{7}$$

For sub-galactic distances the induced force F_G is predominant, while for galactic distances the Ampere force F_R predominates.

The Ampere component is influenced by the relative speed between masses (Hafele-Keating Effect, Precession of the Perihelion) and explains the flattening of the galaxie's speed curve and acceleration of the expansion of the universe without the need to introduce dark matter and dark energy respectively.

The concept is shown in Fig. 5 where d_{gal} and R were calculated for the Sun with $v_2 = v_{orb} = 220 \; km/s$ and $M_2 = M_\odot = 2 \cdot 10^{30} \; kg$ and a distance to the core of the Milky Way of $d = 25 \cdot 10^{19} \; m$.

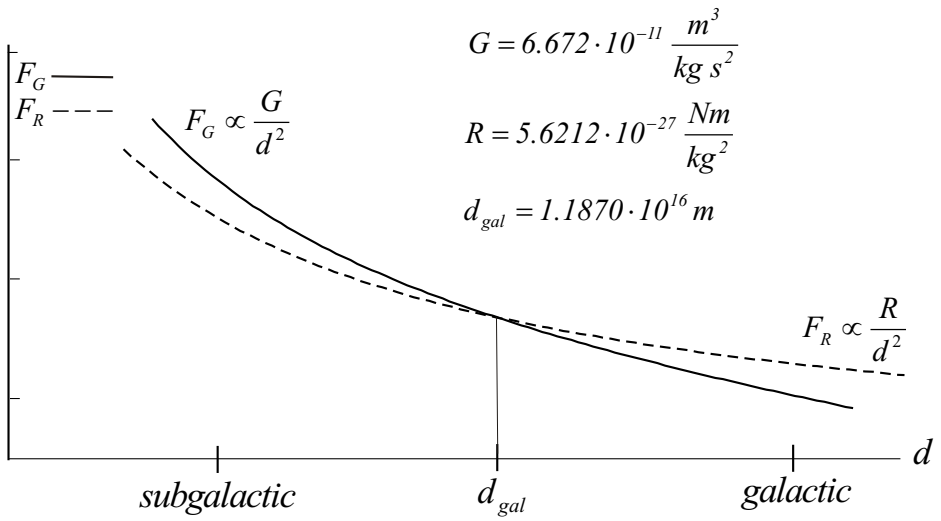

Figure 5: Gravitation forces at sub-galactic and galactic distances.

3 Characteristics of the two approaches for SR.

3.1 Time and length.

SR from our Standard Model (SM) explains the constancy of the light speed in all inertial frames with time dilation and length contraction making abstraction of what really happens with light when it moves between inertial frames. The result is, that scientists justify experimental data with time dilation and length contraction and don't realize that these are only helpmates that stand for interactions between the light and the measuring instruments.

3.2 Difference between time and clocks.

To make physical interactions comparable the definition of an absolute time is indispensable. The Terrestrial Time (TT) is a modern astronomical time standard defined by the International Astronomical Union

Clocks build by man are physical devises whose stability of oscillations are influenced by many factors like, temperature, pressure, humidity, electromagnetic fields, vibrations, gravitation, relative speed to other masses, probability, etc. That makes it difficult to compare times recorded with different clocks.

3.3 Paradoxes and incompatibilities.

The most evident sign that a theory is flawed are paradoxes (contradictions). The list of paradoxes due to SR of our SM is considerable. All paradoxes are build on time dilation and space contraction.

In the frame of our Standard Model (SM) the results of the Sagnac experiment are not compatible with Special Relativity and easily explained with non relativistic equations, but still assuming that light moves with light speed independent of its source. The Sagnac experiment analyzed in the frame of the "E & R" UFT shows no incompatibilities with the proposed approach.

3.4 Interpretation of Data in a theoretical frame.

A theory like our Standard Model was improved over time to match with experimental data introducing helpmates (new concepts, mathematical constructions, analogies, new particles, dark objects and energies, etc.) taking care that the theory is as consistent and free of paradoxes as possible. These improvements were integrated to the existing model trying to modify it as less as possible what let, with the time, to a model that resembles a monumental patchwork. To return to a mathematical consistent theory without paradoxes (contradictions) a completely new approach is required that starts from the basic picture we have from a particle. "E & R" UFT is such an approach representing particles as focal points in space of rays of FPs. This representation contains from the start the possibility to describe interactions between particles through their FPs, interactions that the SM with its particle representation attempts to explain with helpmates like strings, etc.

All experiments where time dilation or length contraction is apparently measured are indirect measurements and where the experimental results are justified with time dilation or length contraction, which are only helpmates that stand for interactions between light and the measuring instruments.

4 Characteristics of a good theory.

The present work is not only limited to show the pragmatic approach of SR and GR by Einstein and its consequences, it presents also an alternative theory where the interactions omitted by Einstein are considered. The question that now arises how to decide for one of these theories .

The primordial objective of a physical theory or a scientific model is to allow calculations that match with experimental data obtained with measurements. A second objective is to allow theoretical predictions that still must be corroborated through experimental data.

A good theory is a theory that

- describes mathematically the biggest number of physical interactions based on the fewest postulates.

- has mathematical descriptions that give calculated data that best match experimental data.
- needs the less number of helpmates (gluons, gravitons, analogies, time and length distortions, dark matter and energy, etc.)
- has the less paradoxes (contradictions)
- has the biggest potential to predict new interactions and particles.

5 Resume.

Einstein's approach to Special Relativity is an heuristic (pragmatic) approach ignoring the interactions light suffers when moving between inertial frames resulting in equal light speed in all frames. The proposed approach postulates that light is emitted with light speed relative to the emitting source and that light is absorbed by optical lenses and electric antennas of the measuring instruments and subsequently emitted relative to them with light speed, explaining the constancy of light speed in all inertial frames. The proposed approach has absolute time and space and is free of time dilation and length contraction With the proposed approach all relativistic equations derived with Einstein's approach can be derived, except the relativistic addition of speeds and the transversal Doppler effect. All experiments where time dilation or length contraction are apparently measured are indirect measurements, and where the experimental results are justified with time dilation or length contraction ignoring that they are only helpmates that stand for interactions between light and the measuring instruments.

Bibliography

Note: The present approach is based on the concept that fundamental particles are constantly emitted by electrons and positrons and constantly regenerate them. As the concept is not found in mainstream theory, no existing paper can be used as reference.

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