Emission Theories and Relativity

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Abstract

The present paper makes a comparison between two different approaches for Relativity Theories. 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 resulting time dilation and length contraction, while the new approach considers it a speed problem where time and space are absolute variables. The result of the proposed approach is a theory where particles move according Galilei relativity, and speeds calculated with the Lorentz transformation equations are virtual speeds that allow the calculation of magnitudes like momentum, energy, Doppler effect, etc. which are not linear functions of the Galilean speeds.

1 Introduction.

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 origin that generates the constancy of light speed in all inertial frames.

The Standard Model postulates light speed c in vacuum and accepts time dilation and length contraction. It is not possible to measure time dilation or length contraction directly. All experiments where time dilation or length contraction is measured are indirect measurements and where the experimental results are justified with time

dilation or length contraction, independent of the real physical causes that led to the measured data.

The proposed 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.

The proposed 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 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.

Fig 1 shows how bursts of Fundamental Particles (FPs) with opposed angular mo-

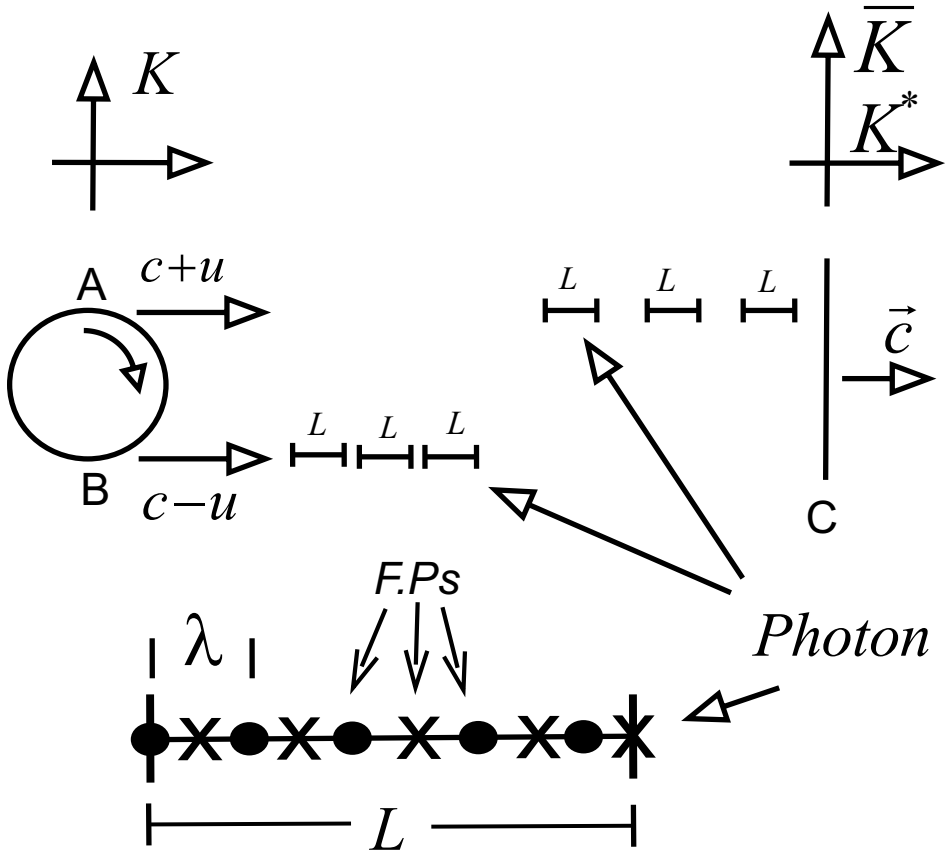

Figure 1: Emission Theory.

menta (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.

2.2 Energy of Fundamental Particles.

The emission time of photons from **isolated** atoms is approximately $\tau = 10^{-8}\ s$ what gives a length for the train of waves 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 (see Fig. **??**, Fig **??** and Fig. **??**), that the photon is composed of a train of FPs with alternated opposed angular momenta where the distance between two consecutive FPs is equal $\lambda_t/2$. The number of FPs that build the photon is therefore $N_{\mathbf{FP}} = L/(\lambda_t/2)$ and we get for the energy of one FP

The concept is shown in Fig. 2

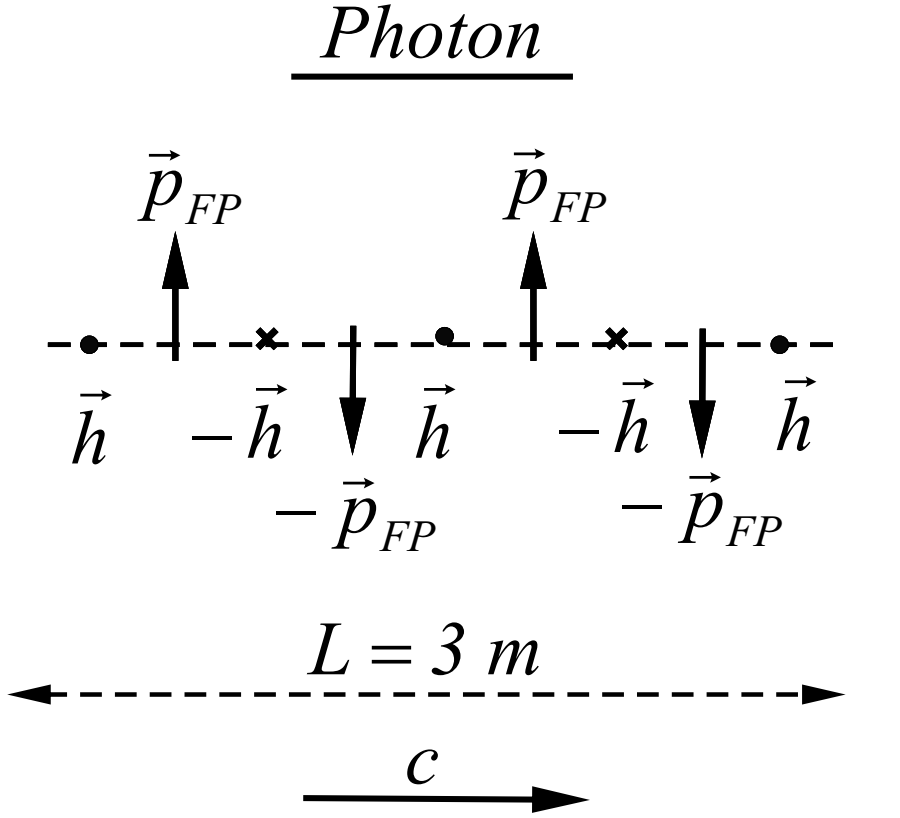

Figure 2: Photon as sequence of opposed angular momenta

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

and for the angular frequency of the angular momentum h

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

Finally we get

$$\nu_t = N_{\mathbf{FP}}\ \nu_{\mathbf{FP}} = \ 5 \cdot 10^7\ N_{\mathbf{FP}}\ s^{-1} \qquad with \qquad N_{\mathbf{FP}} = \frac{c\ \tau}{\lambda_t/2} \tag{3}$$

Note: The frequency ν_t represents a linear frequency where the relation with the velocity v and the wavelength λ_t is given by $v = \lambda_t\ \nu_t$. The frequency $\nu_{\mathbf{FP}}$ represents the angular frequency of the angular momentum h.

The momentum generated by a pair of FPs with opposed angular momenta is

$$p_{\mathbf{FP}} = \frac{2\ E_{\mathbf{FP}}}{c} = 2.20866 \cdot 10^{-34}\ kg\ m\ s^{-1} \tag{4}$$

Note: Isolated FPs have only angular momenta, they have no linear momenta and therefore cannot generate a force through the change of linear momenta . Linear momentum is generated only out of pairs of FPs with opposed angular momentum as defined in sec. **??**. It makes no sense to define a dynamic mass for FPs because they have no linear inertia, which is a product of the energy stored in FPs with opposed angular momenta. FPs that meet in space interact changing the orientation of their angular momenta but conserving each its energy $E_{FP} = 3.313 \cdot 10^{-26}\ J$.

The number N_{FP_o} of FPs of an resting BSP (electron or positron) is

$$N_{FP_o} = \frac{E_o}{E_{FP}} = 2.4746 \cdot 10^{12} \tag{5}$$

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. 3

2.3 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.

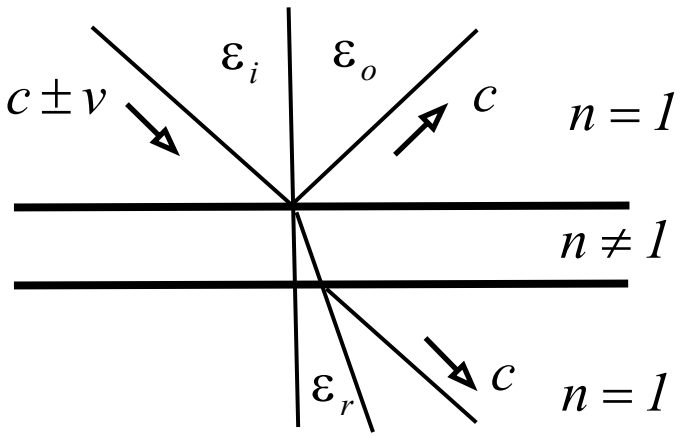

Figure 3: Light speed at reflections and refractions

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. 4.

$$x^2 + y^2 + z^2 + (ic_o\, t)^2 = \bar{x}^2 + \bar{y}^2 + \bar{z}^2 + (ic_o\, \bar{t})^2 \tag{6}$$

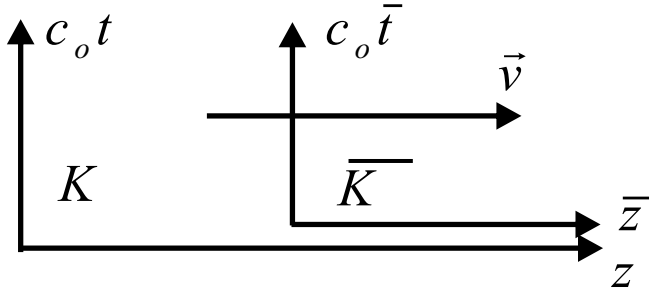

Figure 4: Transformation frames for **space and time** variables

For distances between two points eq. (6) writes now

$$(\Delta x)^2 + (\Delta y)^2 + (\Delta z)^2 + (ic_o\, \Delta t)^2 = (\Delta \bar{x})^2 + (\Delta \bar{y})^2 + (\Delta \bar{z})^2 + (ic_o\, \Delta \bar{t})^2 \tag{7}$$

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. (7) through

the **absolute time** $(\Delta t)^2$ and introducing the forth speed v_c.

$$v_x^2 + v_y^2 + v_z^2 + (iv_c)^2 = \bar{v}_x^2 + \bar{v}_y^2 + \bar{v}_z^2 + (i\bar{v}_c)^2 \tag{8}$$

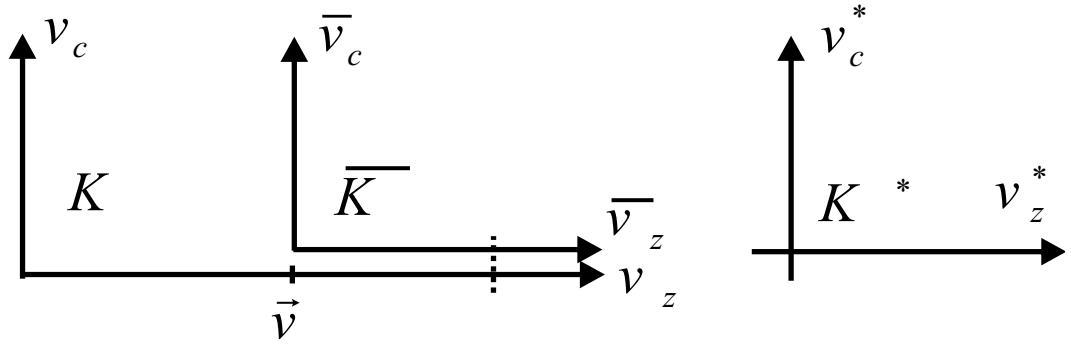

Figure 5: Transformation frames for **speed** variables

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

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

Frame $\bar{K}$ is a virtual frame that gives the virtual speeds $\bar{v}_i$ that allow the calculation of the moment, energy, acceleration and current density of particles with rest mass, which are not linear functions of the real Galilei speeds $v_z \pm v$ of the particles.

According to the approach "Emission & Regeneration" Unified Field Theory [10] from the author, electromagnetic waves (rest mass zero) 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 5 the instruments are placed in the frame K^* which is linked rigidly to the *virtual* frame $\bar{K}$, and electromagnetic waves that move with $v_z = c_o$ in the frame K move withe the real speed $\bar{v}_r = c_o - v$ in the frame $\bar{K}$.

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** between the relative moving frames.

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 frames:

$$\begin{aligned} K &\to \bar{K} & \qquad \bar{K} &\to K^* \\ \lambda &= \bar{\lambda} & \qquad \bar{f} &= f^* \end{aligned}$$

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.

Momentum and acceleration

$$p_z^* = m\,\frac{-v}{\sqrt{1-v^2/c_o^2}} \qquad\qquad a_z^* = \frac{a_z}{\sqrt{1-v^2/c_o^2}} \tag{9}$$

Energy

$$E^* = \frac{E_o}{\sqrt{1-v^2/c_o^2}} \tag{10}$$

Energy density current

$$J_E^* = \bar{J}_E = \bar{\rho}_E\, v_r = \frac{N}{dV}\, m\, c_o^2\, (v_z \pm v)\gamma = \frac{J_{E_z} \pm \rho_E\, v}{\sqrt{1-v^2/c_o^2}} \tag{11}$$

with

$$J_{E_z} = \frac{N}{dV}\, m\, c_o^2\, v_z \qquad and \qquad \rho_E = \frac{N}{dV}\, m\, c_o^2 \tag{12}$$

where J_{E_z} is the energy density current and ρ_E the energy density, both in the frame K. The number N of particles, the volume dV and the particle density are equal in all frames (no length contraction).

Doppler effect

$$\frac{f}{f^*} = \frac{\sqrt{1+v/c_o}}{\sqrt{1-v/c_o}} \qquad\qquad \frac{\lambda}{\lambda^*} = \frac{\sqrt{1-v/c_o}}{\sqrt{1+v/c_o}} \tag{13}$$

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.

2.4 Transformation steps for photons from emitter to receiver.

Electromagnetic signals (photons) have to pass an interface at the receiver until a measurement can be made. The interface is an optical lense, a mirror or an antenna. The signals undergo two transformations when travelling from the emitter to the receiver. The first transformation occurs before the interface and the second behind the interface.

The concept is shown in Fig.6

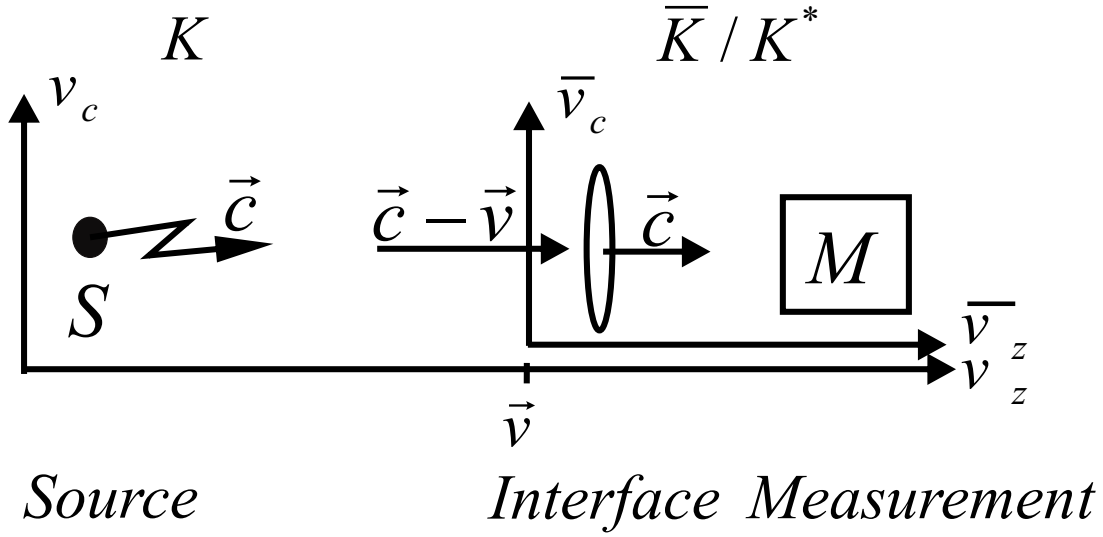

Figure 6: Transformation at measuring equipment's interface

If we assume that the emitter's signal in the K frame is

$$c = \lambda\, f \tag{14}$$

the signal befor the interface of the receiver in the $\bar{K}$ frame is

$$\bar{f} = f\,\frac{\sqrt{c+v}}{\sqrt{c-v}} \qquad and \qquad \bar{\lambda} = \lambda \qquad and \qquad \bar{v_z} = c \pm v \tag{15}$$

At the output of the interface we get the signal in the K^* frame that is finally processed by the receiver.

$$f^* = f\,\frac{\sqrt{c+v}}{\sqrt{c-v}} \qquad and \qquad \lambda^* = \lambda\,\frac{\sqrt{c-v}}{\sqrt{c+v}} \qquad and \qquad v_z^* = c \tag{16}$$

At the first transformation the wavelength doesn't transform (absolute space) and at the second transformation the frequency (absolute time).

The speed before the interface $\bar{v_z}= c \pm v$ is the galilean speed which changes to $v_z^* = c$, the speed of light, before the processing in the receiver. This explains why always c is measured in all relative moving frames.

2.5 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 Relativity 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

$$F_T = F_G + F_R = \left[\frac{G}{d^2} + \frac{R}{d}\right] M_1 M_2 \tag{17}$$

with

$$G = 6.6726 \cdot 10^{-11} \ \frac{m^3}{kg\ s^2} \qquad and \qquad R = 2.5551 \cdot 10^{-32}\ v_2 = R(v_2)\ \frac{m^2}{kg\ s^2} \tag{18}$$

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. 7 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 $d = 25 \cdot 10^{19}\ m$.

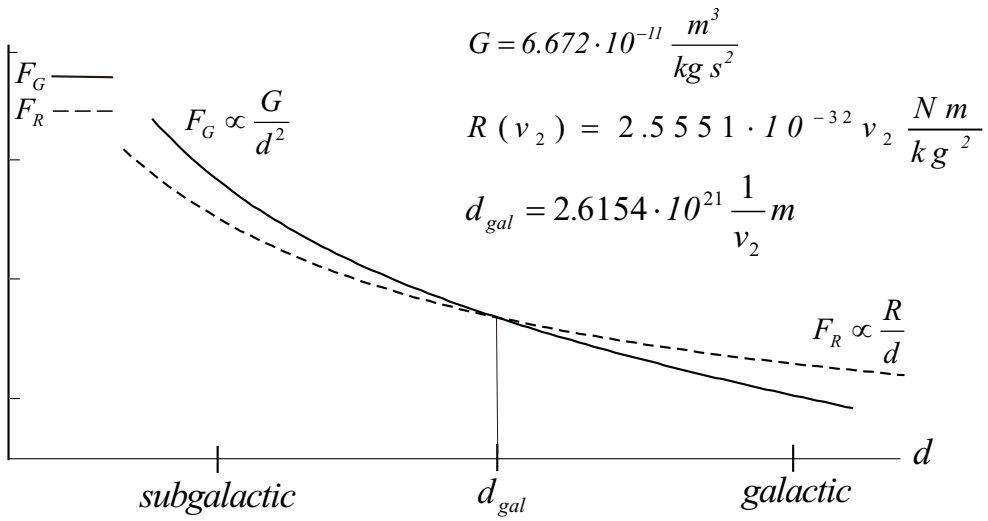

Figure 7: Gravitation forces at sub-galactic and galactic distances.

3 Characteristics of the two approaches for Relativity.

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 Units, time and clocks.

To make physical interactions comparable, units (meter, kilogram, second, ampere, kelvin, mole and candela) must be equal in all frames.

Time dilation and length contraction is equivalent to say that time unit (second) contract and length unit (meter) dilate, in other words, that units are not equal in all frames violating fundamental principles of theoretical and experimental physics.

Theories that are flawed present contradictions and paradoxes what is the case of Special Relativity.

Time can only be defined relative to one physical clock in the universe to which all other physical clocks must be synchronized. .

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 fictious entities (particle wave, gluons, gravitons, dark matter, dark energy, time dilation, length contraction, Higgs particle, Quarks, Axions, etc.) and helpmates (duality principle, equivalent principle, uncertainty principle, violation of energy conservation, etc.) taking care that the theory is as consistent and free of paradoxes as possible. The concept is shown in Fig. 8. These improvements were integrated to the existing model trying to modify it as less as possible what led, 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 fictious entities.

Fig. 8 is an organigram where the main steps of the integration of fictious entities to the SM are shown. All experiments where the previously defined fictious entities are indirectly detected (point 7. of Fig. 8) are not a confirmation of the existence of the fictious entities (point 8. of Fig. 8), they are simply the confirmation that the model was made consistent with the fictious entities (point 3. of Fig. 8).

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

In the case of the increase of the life time of moving muons the increase is because of the interactions between the FPs of the muons with the FPs of the matter that constitute the real frame relative to which the muons move. To explain it with time dilation only avoids that scientists search for the real physical origin of the increase of the life time.

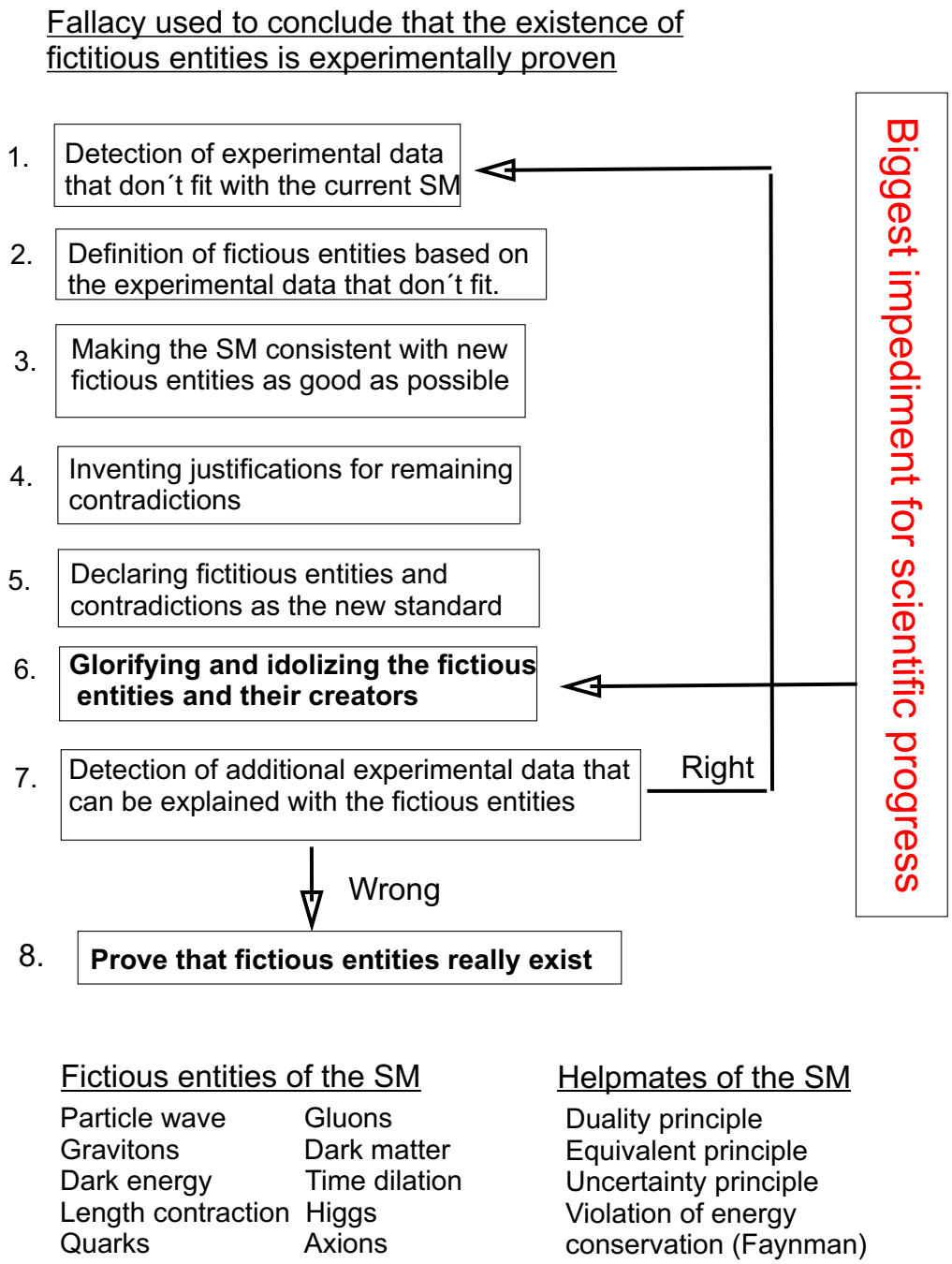

Figure 8: Fallacy used to conclude that fictious entities really exist

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 arises is how to decide for one of these theories .

The primordial objective of a physical theory or a scientific model is to allow cal-

culations 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 fictious entities (particle wave, gluons, gravitons, dark matter, dark energy, time dilation, length contraction, Higgs particle, etc.)
- needs the less number of helpmates (duality principle, equivalent principle, uncertainty principle, violation of energy conservation (Faynman), etc.)
- is consistent with the less number of paradoxes and 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.

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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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