Emission Theories and Relativity

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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 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 that particles move according Galilei relativity multiplied with the relativistic gamma factor.

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 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

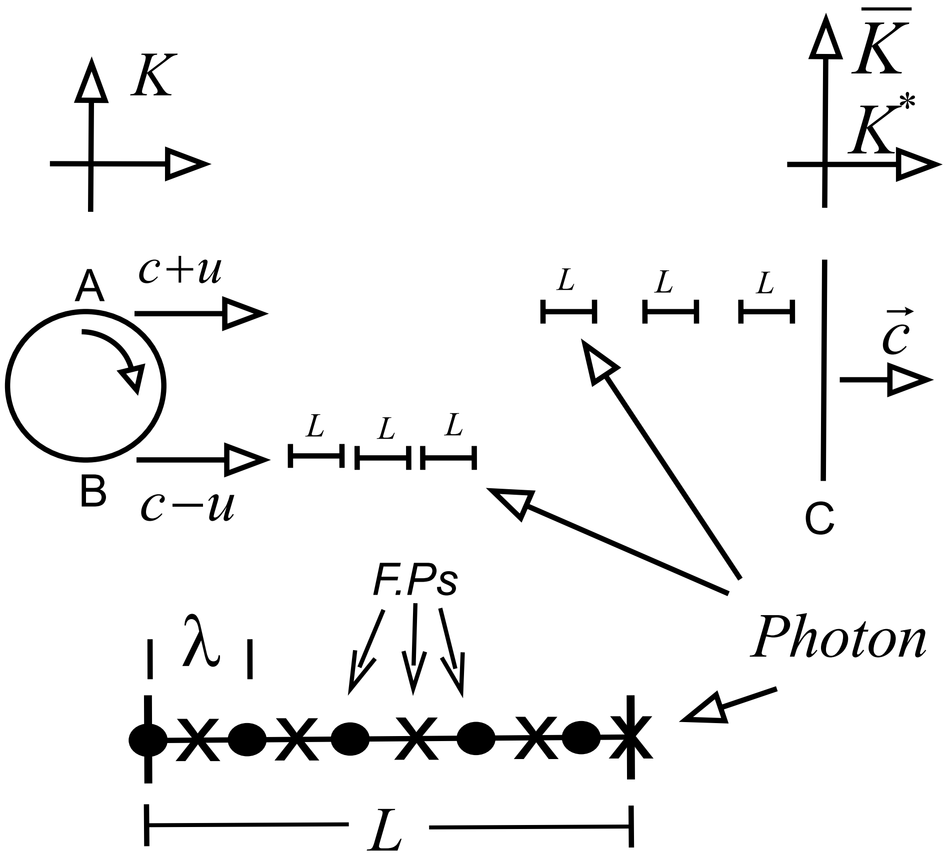

Figure 1: Emission Theory.

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.

3 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 $\lambda_t = c/\nu_t$. In 10 the photon is defined as composed of a train of FPs with alternated opposed potential 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

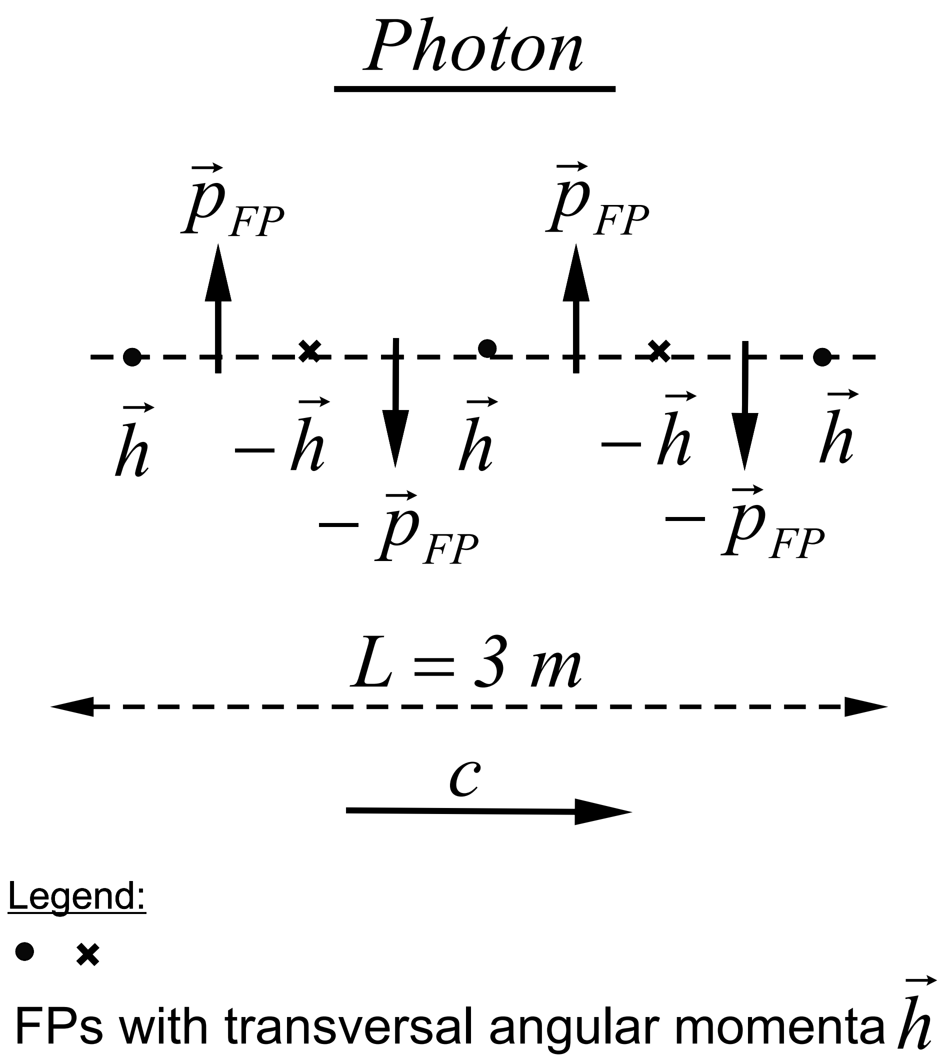

Figure 2: Photon as sequence of opposed angular momenta

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

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. 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

The concept is shown in Fig. 3

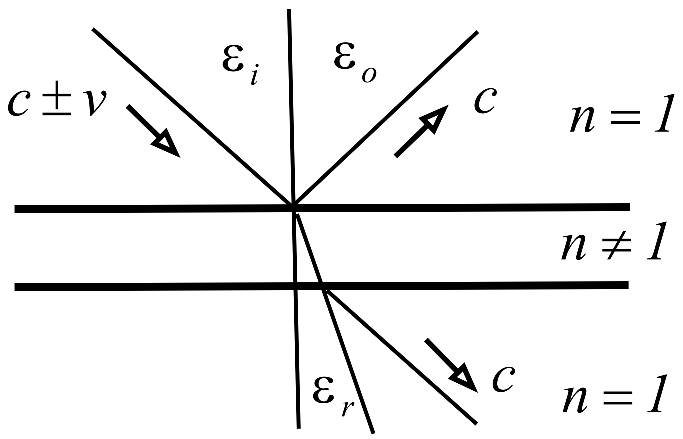

Figure 3: Light speed at reflections and refractions

- 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 $n \neq 1$.

4 Relativity based on absolute time and space.

4.1 Lorenz transformation based on speed variables.

The general Lorentz Transformation (LT) in orthogonal coordinates is described by the following equation and conditions for the coefficients [**??**]:

$$\sum_{i=1}^{4}(\theta^i)^2 = \sum_{i=1}^{4}(\bar{\theta}^i)^2 \qquad \sum_{i=1}^{4} \bar{a}^i_k \bar{a}^i_l = \delta_{kl} \qquad \sum_{i=1}^{4} \bar{a}^k_i \bar{a}^l_i = \delta^{kl} \tag{6}$$

with

$$\bar{\Theta}^i = \bar{a}^i_k \Theta^k \ + \ \bar{b}^i \tag{7}$$

The transformation represents a relative displacement $\bar{b}^i$ and a rotation of the frames and conserves the distances $\Delta\Theta$ between two points in the frames.

Before we introduce the LT based on speed variables we have a look at Einstein's formulation of the Lorentz equation with space-time variables as shown in Fig. 4.

$$x^2 + y^2 + z^2 + (ic_o\, t)^2 = \bar{x}^2 + \bar{y}^2 + \bar{z}^2 + (ic_o\, \bar{t})^2 \tag{8}$$

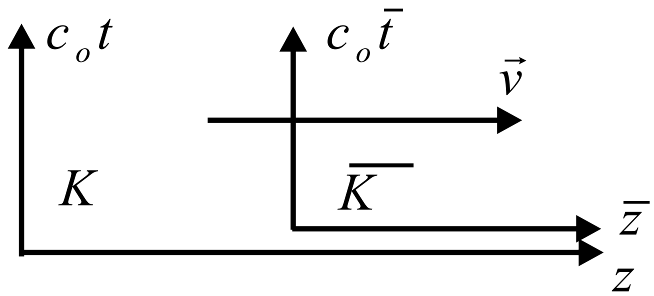

Figure 4: Transformation frames for **space-time** variables

For distances between two points eq. (8) writes now

$$(\Delta x)^2 + (\Delta y)^2 + (\Delta z)^2 + (ic_o\, \Delta t)^2 = (\Delta \bar{x})^2 + (\Delta \bar{y})^2 + (\Delta \bar{z})^2 + (ic_o\, \Delta \bar{t})^2 \tag{9}$$

The fact of equal light speed in all inertial frames is basically a speed problem and not a space-time problem. Therefor, in the proposed approach, the Lorentz equation is formulated with speed variables and absolut time and space. Dividing eq. (9) through the **absolute time** $(\Delta t)^2$ and introducing the forth speed v_c we have

$$v_x^2 + v_y^2 + v_z^2 + (iv_c)^2 = \bar{v}_x^2 + \bar{v}_y^2 + \bar{v}_z^2 + (i\bar{v}_c)^2 \tag{10}$$

The concept is shown in Fig. 5.

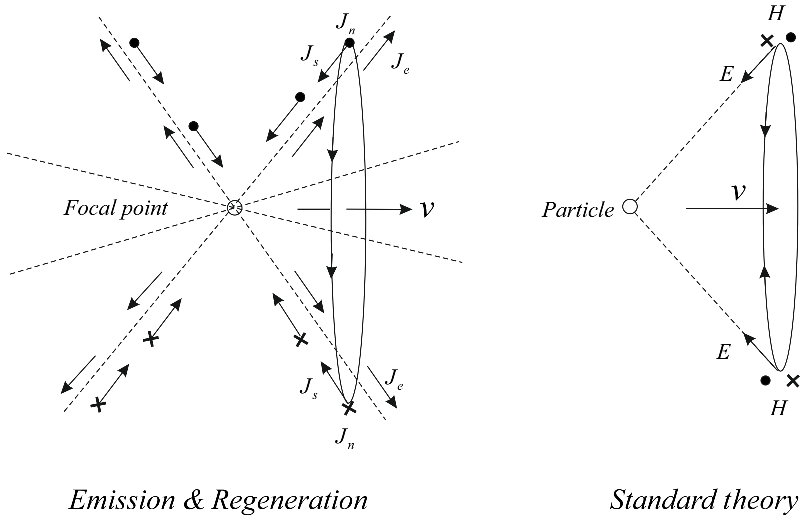

Figure 5: Particle as focal point in space

The forth speed v_c introduced is the speed of Fundamental Particles (FPs) that move radially through a focus in space, according to a new representation of basic subatomic particles like the electron or positron, as defined in the approach "Emission & Regeneration" Unified Field Theory [10] from the author. Fig. 5.

The FPs store the energy of the subatomic particles as rotations defining longitudinal and transversal angular momenta. The speed v_c is independent of the speeds v_x, v_y and v_z, forming together a four dimensional speed frame.

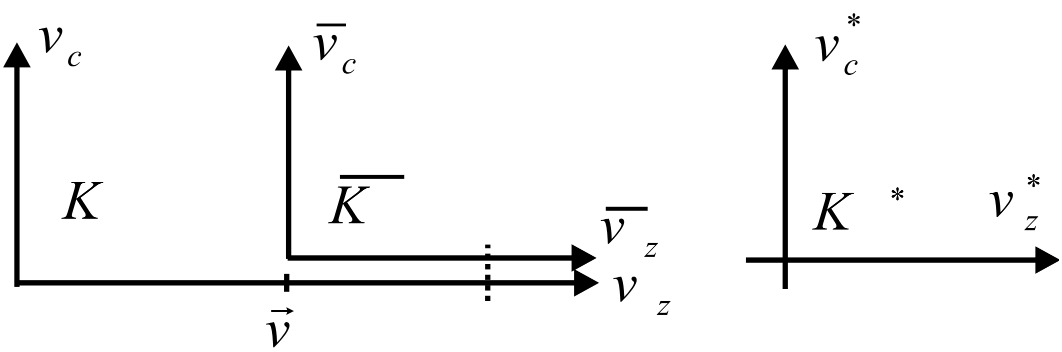

Figure 6: Transformation frames for **speed** variables

For the Lorentz transformation with speed variables Fig. 6 we get the following transformation rules between the source frame K and the virtual frame $\bar{K}$:

a)	$\bar{v}_x = v_x$	$v_x = \bar{v}_x$
b)	$\bar{v}_y = v_y$	$v_y = \bar{v}_y$
c)	$\bar{v}_z = (v_z - v)\,\gamma_v$	$v_z = (\bar{v}_z + v)\,\gamma_v$
d)	$\bar{v}_c = (v_c - \frac{v}{v_c}\,v_z)\,\gamma_v$	$v_c = (\bar{v}_c + \frac{v}{\bar{v}_c}\,\bar{v}_z)\,\gamma_v$

with $\gamma_v = [1 - v^2/v_c^2]^{-1/2}$

4.2 Transformations for momentum and energy of a particle.

For $v_z = 0$ and $v_c = c$, where c is the light speed, we get

a)	$\bar{v}_x = v_x$	b)	$\bar{v}_y = v_y$
c)	$\bar{v}_z = -v\,\gamma_v$	d)	$\bar{v}_c = c\,\gamma_v$

We see that for $v_z = 0$ the transformed speeds $\bar{v}_z$ and $\bar{v}_c$ are not linear functions of the relative speed v because

$$\gamma_v = \left(1 - \frac{v^2}{v_c^2}\right)^{-1/2} = 1 + \frac{1}{2}\,\frac{v^2}{v_c^2} + \frac{1 \cdot 3}{2 \cdot 4}\,\left(\frac{v^2}{v_c^2}\right)^2 + \frac{1 \cdot 3 \cdot 5}{2 \cdot 4 \cdot 6}\,\left(\frac{v^2}{v_c^2}\right)^3 + \cdots \qquad (11)$$

The case $v_z = 0$ is the case of a particle placed at the origin of the frame K. The momentum and the energy of the particle in the frame $\bar{K}$ are given by

$$\bar{p} = m\,\bar{v}_z = -m\,v\gamma_v \qquad \bar{E} = mc\,\bar{v}_c = mc\,c\gamma_v = \sqrt{E_o^2 + E_p^2} \qquad (12)$$

$$E_o = mc^2 \qquad \textit{and} \qquad E_p = mc\bar{v}_z = mc\,v\gamma_v \qquad (13)$$

As the speed v_z in the frame K is parallel to the relative speed v between the frames, the momentum and the energy of a particle moving with v in the frame K and a relative speed v_z between the frames must give the same values. That we obtain multiplying the transformed speeds $\bar{v}_i$ with γ_{v_z}

$$\gamma_{v_z} = \left[1 - v_z^2/v_c^2\right]^{-1/2} \qquad (14)$$

We get for the general case with $v_z \neq 0$ the momentum and the energy in the frame $\bar{K}$

$$\bar{p} = m\ \bar{v}_z \gamma_{v_z} = m\ (v_z - v)\gamma_v \gamma_{v_z} \qquad \bar{E} = mc\ \bar{v}_c \gamma_{v_z} = mc\ (v_c - \frac{v}{v_c} v_z)\gamma_v \gamma_{v_z} \tag{15}$$

Note: The frame $\bar{K}$ is a *virtual* frame because the speeds calculated with the Lorentz transformation equations for this frame are virtual speeds and not the real Galilean speeds of the particles, which are $\bar{v}_{r_z} = v_z \pm v$. The frame $\bar{K}$ gives the virtual velocities that allow the calculation of the values of the momentum and energy, which are not linear functions of the real Galilean speed $\bar{v}_{r_z}$.

For the distances between the frames K and $\bar{K}$ the Galilean relativity is valid.

$$\Delta \bar{z} = z_o \pm v\ \Delta t \qquad with \qquad \Delta \bar{t} = \Delta t \quad for\ all\ speeds \quad v \tag{16}$$

If we start counting time when the origin of all frames coincide so that it is

$$z = \bar{z} = z^* = 0 \qquad for \qquad t = 0 \tag{17}$$

we get for the different types of measurements

Measurement	**K**	$\bar{\mathbf{K}}$	$\overset{*}{\mathbf{K}}$
ideal	$z = z_o$	$\bar{z} = z_o \pm v\ t$	$z^* = z_o \pm v\ t$
non destructive	$z = z_o$	$\bar{z} = z_o \pm v\ t$	$z^* \approx z_o \pm v\ t$
destructive	$z = z_o$	$\bar{z} = z_o \pm v\ t$	$z^* = z_o \pm v\ t_{meas}$

where t_{meas} is the time the destructive measurement took place at the instrument placed in K^*.

As time and space are absolute variables it is

$$\Delta t = \Delta \bar{t} = \Delta t^* \qquad \Delta z = \Delta \bar{z} = \Delta z^* \tag{18}$$

Note: The Lorentz transformation equations a),b) and c) are independent equations with the variables v_x, v_y and v_z; there is no cross-talking between them. Not so equation d) where $\bar{v}_c$ is a function of v_c and v_z. The speed v_z is modifying $\bar{v}_c$.

4.3 Transformations for electromagnetic waves at measuring instruments .

According to the approach "Emission & Regeneration" Unified Field Theory [10] from the author, measuring instruments are composed of an interface and the signal comparing part. Interfaces are optical lenses, mirrors or electric antennas.

The concept is shown in Fig.7

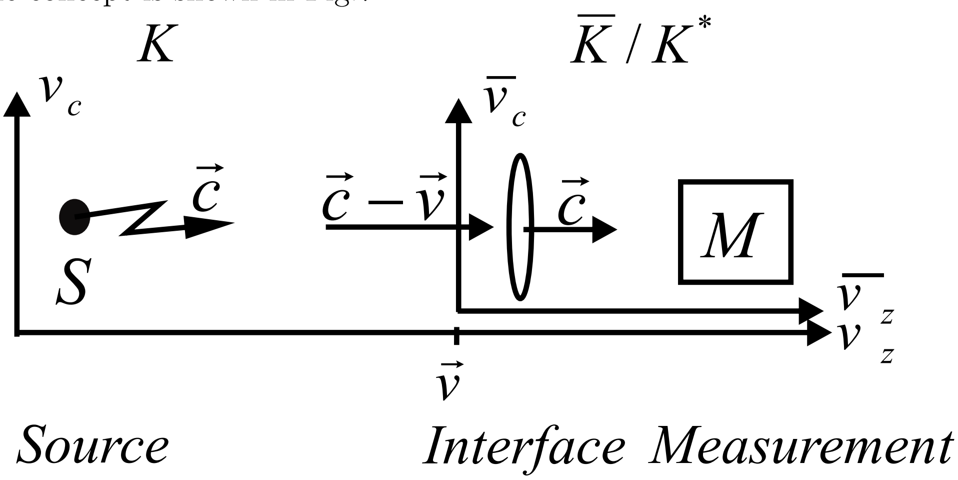

Figure 7: Transformation at measuring equipment's interface

Electromagnetic waves that are emitted with the speed c_o from its source, arrive to a relative moving frame of the measuring instrument with speeds different than light speed, are first absorbed by the atoms of the interface and than emitted with light speed c_o to the signal comparing part .

To take account of the behaviour of light in measuring instruments an additional transformation is necessary.

In Fig 7 the instruments are placed in the frame K^* which is linked rigidly to the *virtual* frame $\bar{K}$. Electromagnetic waves from the source frame K move with the real speed $\bar{v}_{r_z} = c_o \pm v$ in the *virtual* frame $\bar{K}$. The real velocity $\bar{v}_{r_z}$ can take values that are bigger than the light speed c_o.

The links between the frames for an electromagnetic wave that moves with c_o in the frame K are:

	K	$\bar{\mathbf{K}}$	$\overset{*}{\mathbf{K}}$
e)	λ_z	$\bar{\lambda} = \lambda_z$	
f)	$v_z = c_o$	$\bar{v}_{r_z} = c_o \pm v$	$v_z^* = c_o$
g)	$f_z = c_o/\lambda_z$	$\bar{f}_{r_z} = \bar{v}_{r_z}/\lambda_z$	
h)		$\bar{f}_z = \bar{f}_{r_z}\ \gamma$	$f_z^* = \bar{f}_z$
i)	$E = h\ f_z$	$\bar{E} = h\ \bar{f}_z$	$E_z^* = h\ f_z^*$

e) shows the link between the frames K and $\bar{K}$. The wavelengths $\lambda_z = \bar{\lambda}_z$ because there is **no length contraction**.
f) shows the real Galilean speed $\bar{v}_{r_z}$ in frame $\bar{K}$.
g) shows the real frequency $\bar{f}_{r_z}$ in the frame $\bar{K}$.
h) shows the virtual frequency $\bar{f}_z$ in the frame $\bar{K}$ and the link to the frequency f^* of the frame K^*.
i) shows the equation for the energy of a photon for each frame.

Note: Also for electromagnetic waves the frame $\bar{K}$ gives the virtual velocity that allows the calculation of the values of the momentum, energy and frequency, which are not linear functions of the real speed $\bar{v}_{r_z}$.

For electromagnetic waves we have the following real speeds for the different types of measurements:

Measurement	**K**	$\bar{\mathbf{K}}$	$\overset{*}{\mathbf{K}}$	**Refraction**
ideal	$v_z = c_o$	$\bar{v}_{r_z} = c_o \pm v$	$v_z^* = c_o$	$n = 1$
non destructive	$v_z = c_o$	$\bar{v}_{r_z} = c_o \pm v$	$v_z^* < c_o$	$n > 1$
destructive	$v_z = c_o$	$\bar{v}_{r_z} = c_o \pm v$	$v_z^* = 0$	$n \Rightarrow \infty$

with n the optical refraction index $n = c_o/v_z^*$.

4.4 Equations for particles with rest mass $m \neq 0$.

Following, equations for physical magnitudes are derived for particles with rest mass $m \neq 0$ that are measured in an inertial frame that moves with constant speed v. For this case the transformation equations a), b), c) and d) from K to $\bar{K}$ are used. The transfomation from $\bar{K}$ to K^* is the **unit** transformation, because of conservations of momentum and energy between rigid linked frames.

4.4.1 Linear momentum.

To calculate the linear momentum in the virtual frame $\bar{K}$ of a particle moving in the source frame K with v_z and $v_x = v_y = 0$ we use the equation c) of sec 4.1, with $v_c = c_o$. The speed $v_c = c_o$ describes the speed of the Fundamental Particles (FP) [10] emitted continuously by electrons and positrons and which continuously regenerate them, also when they are in rest in the frame K ($v_x = v_y = v_z = 0$). From (15) we define

$$\bar{v}_z' = (v_z - v)\gamma_{v_z}\gamma_v \tag{19}$$

The linear momentum $\bar{p}_z$ we get multiplying $\bar{v}_z^{'}$ with the rest mass m of the particle.

$$\bar{p}_z = m\,\bar{v}_z^{'} = m\,(v_z - v)\gamma_{v_z}\gamma_v = p_z^* \tag{20}$$

Because of momentum conservation the momentum we measure in K^* is equal to the momentum calculated for $\bar{K}$, expressed mathematically $p_z^* = \bar{p}_z$.

Eq. (20) is the same equation as derived with special relativity.

Note: The rest mass is simply a proportionality factor which is not a function of the speed and is invariant for all frames.

4.4.2 Acceleration.

To calculate the acceleration in the virtual frame $\bar{K}$ we start with

$$\bar{a}_z = \frac{d\bar{v}_z^{'}}{dt} \qquad with \qquad \bar{v}_z^{'} = \bar{v}_z\,\gamma_{v_z} = (v_z - v)\gamma_v\gamma_{v_z} \tag{21}$$

what gives for $v_z(t)$ and $\gamma_{v_z}(t)$

$$\bar{a}_z = \frac{d\bar{v}_z^{'}}{dt} = \frac{d\bar{v}_z}{dt}\gamma_{v_z} + \bar{v}_z\frac{d\gamma_{v_z}}{dt} = \frac{dv_z}{dt}\,\gamma_{v_z}\gamma_v + (v_z - v)\gamma_v\,\frac{d}{dt}\gamma_{v_z} \tag{22}$$

From momentum conservation $p_z^* = \bar{p}_z$ we have that

$$\bar{a}_z = a_z^* \tag{23}$$

4.4.3 Energy.

To calculate the energy in the virtual frame $\bar{K}$ for a particle that moves with v_z in the frame K we use the equation $d)$ of sec 4.1, with $v_c = c_o$. The equation $d)$ is used because it gives the speeds of the FPs where the energy of the subatomic particles is stored.

$$\bar{v}_c = \frac{v_c - \dfrac{v}{v_c}\,v_z}{\sqrt{1 - v^2/v_c^2}} = (v_c - \frac{v}{v_c}\,v_z)\gamma = \bar{v}_{r_c}\,\gamma \tag{24}$$

To get the energy in the frame $\bar{K}$ we multiply $\bar{v}_c$ with $mc\gamma_{v_z}$. See also eq. (15). We get

$$\bar{E} = mc\,\bar{v}_c\gamma_{v_z} = mc\,(v_c - \frac{v}{v_c}v_z)\gamma_v\gamma_{v_z} \tag{25}$$

Eq. (25) is the same equation as derived with special relativity.

With $v_z = 0$ we get

$$\bar{E} = \frac{m\,c_o^2}{\sqrt{1 - v^2/c_o^2}} = \sqrt{E_o^2 \;+\; \bar{E}_p^2} \tag{26}$$

with

$$\bar{E}_p = m\,|\bar{v}_z|\,c_o = |\bar{p}_z|\,c_o \qquad \bar{v}_z = v_z\,\gamma_{v_z} \qquad E_o = m\,c_o^2 \tag{27}$$

To calculate the energy $\bar{E}_p = m\;\bar{v}_z\;c_o$ we must calculate $\bar{v}_z$ as explained in sec. 4.4.1 with $v_z = 0$.

The energy E_o is part of the energy in the frame $\bar{K}$ and invariant, because if we make $v = 0$ we get E_o as the rest energy of the particle in the frame K.

Because of energy conservation between frames without speed difference the energy E^* in the frame K^* is equal to the energy $\bar{E}$ in the frame $\bar{K}$.

4.5 Equations for particles with rest mass $m = 0$.

In this section the equations for electromagnetic waves observed from an inertial frame that moves with the relative speed v are derived. A comparison between the proposed approach and the Standard Model is made.

4.5.1 Relativistic Doppler effect.

The speed $v_c = c_o$ describes the speed of the Fundamental Particles (FP) [10] emitted continuously by electrons and positrons and which continuously regenerate them, also when they are in rest in frame K ($v_x = v_y = v_z = 0$). In the case of the photon no emission and regeneration exist.

The photon can be seen as a particle formed by only two parallel rays of FPs. The first ray carries FPs with opposed transversal angular momenta of equal orientation and the second ray carries FPs with transversal angular momenta opposed to the first ray. At each ray FPs exist only along the length L of the photon.

The concept is shown in Fig. 8

To calculate the energy of a photon in the virtual frame $\bar{K}$ that moves with $v_z = c_o$ in the frame K we use the same equation $d)$ of sec 4.1 used for particles with $m \neq 0$, with $v_z = c_o$ and $v_c = c_o$. We use equation $d)$ because the energy is stored in FPs. We get

$$\bar{v}_c = \frac{v_c - \dfrac{v}{v_c}\,v_z}{\sqrt{1 - v^2/v_c^2}} = (c_o - v)\gamma_v \tag{28}$$

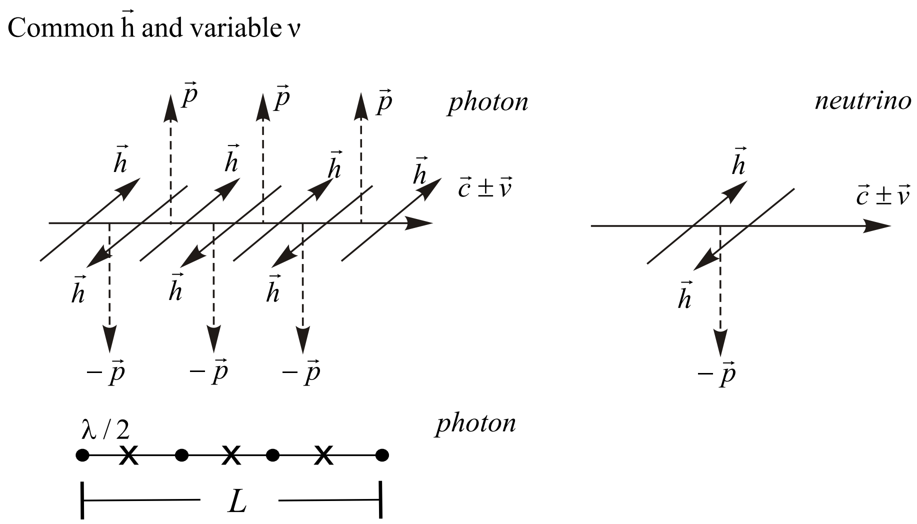

Figure 8: Photon and neutrino

Note: As the energy of a photon is a function of the frequency, the energy in the frame $\bar{K}$ is not afected by the non linear factor γ_z.

The momentum of a photon in the frame K is $p_c = E_{ph}/c_o = h\ f/c_o$ which we multiply with $\bar{v}_c$ to get the energy of the photon in the frame $\bar{K}$. The transformation of the energy between the frames $\bar{K}$ and K^* is $E^* = \bar{E}$ and we get:

For the measuring instrument moving away from the source

$$\bar{E} = p_c\ \bar{v}_c = \frac{E_{ph}}{c_o}\ (c_o - v)\ \gamma_v = E_{ph}\ \frac{\sqrt{c_o - v}}{\sqrt{c_o + v}} = E^* = h\ f^* \tag{29}$$

With $E_{ph} = h\ f$ we get the well known equation for the relativistic Doppler effect

$$f^* = f\ \frac{\sqrt{c_o - v}}{\sqrt{c_o + v}} \qquad or \qquad \frac{f}{f^*} = \frac{\sqrt{1 + v/c_o}}{\sqrt{1 - v/c_o}} \tag{30}$$

and with $c_o = \lambda\ f$ and $c_o = \lambda^*\ f^*$ we get the other well known equation for the relativistic Doppler effect

$$\frac{\lambda}{\lambda^*} = \frac{\sqrt{1 - v/c_o}}{\sqrt{1 + v/c_o}} \tag{31}$$

Eq. (30) is the same equation as derived with special relativity.

Note: No transversal relativistic Doppler effect exists.

Note: The real frequency $\bar{f}_{r_z}$ in the frame $\bar{K}$ is given by the Galilean speed $\bar{v}_{r_z} = c_o \pm v$ divided by the wavelength $\bar{\lambda} = \lambda$. The energy of a photon in the frame $\bar{K}$ is given by the equation $\bar{E}_{ph} = h\ \bar{f}_z$ where $\bar{f}_z = \bar{f}_{r_z}\ \gamma$, with $\bar{f}_{r_z} = (c_o \pm v)/\lambda_z$ the real frequency of particles in the frame $\bar{K}$.

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.

4.6 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.9

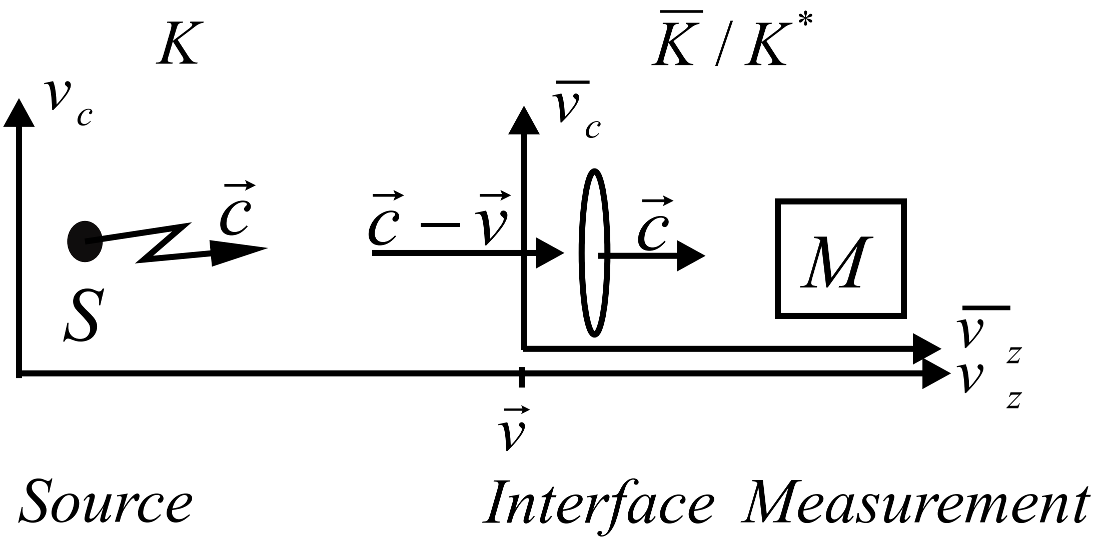

Figure 9: Transformation at measuring equipment's interface

If we assume that the emitters signal in the K frame is

$$c = \lambda\ f \tag{32}$$

the signal befor the interface of the receiver in the $\bar{K}$ frame is;
for the measuring instrument moving away from the source

$$\bar{f} = f\ \frac{\sqrt{c-v}}{\sqrt{c+v}} \qquad and \qquad \bar{\lambda} = \lambda \qquad and \qquad \bar{v}_z = c - v \tag{33}$$

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

$$f^* = f \, \frac{\sqrt{c-v}}{\sqrt{c+v}} \qquad and \qquad \lambda^* = \lambda \, \frac{\sqrt{c+v}}{\sqrt{c-v}} \qquad and \qquad v_z^* = c \tag{34}$$

At the first transformation the wavelength $\lambda = \bar{\lambda}$ doesn't transform (absolute space) and at the second transformation the frequency $\bar{f} = f^*$ (absolute time).

The speed before the interface $c \pm v$ 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.

4.7 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

$$F_T = F_G + F_R = \left[\frac{G}{d^2} + \frac{R}{d} \right] \; M_1 \; M_2 \tag{35}$$

with

$$G = 6.6726 \cdot 10^{-11} \; \frac{m^3}{kg \; s^2} \qquad and \qquad R = 2.5551 \cdot 10^{-32} \; v_2 = R(v_2) \; \frac{m^2}{kg \; s^2} \tag{36}$$

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

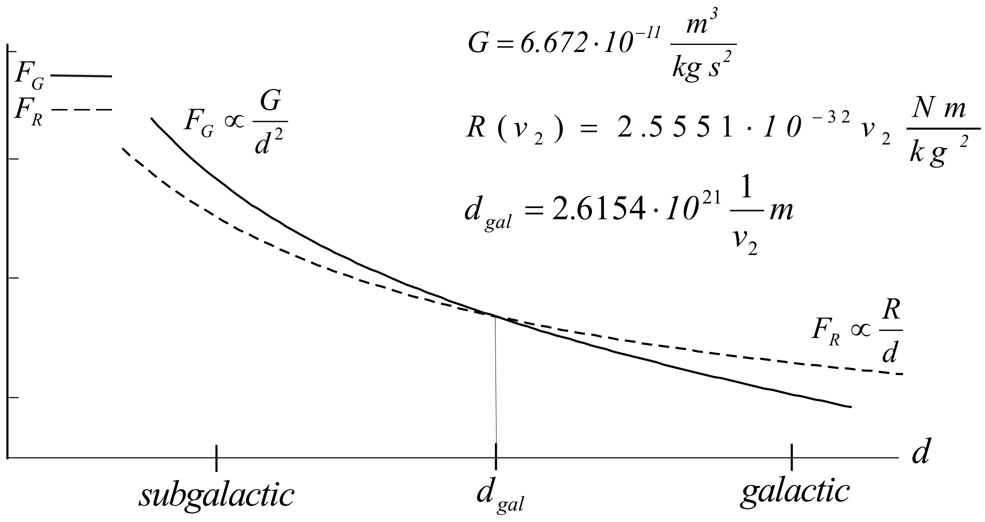

Figure 10: Gravitation forces at sub-galactic and galactic distances.

5 Characteristics of the two approaches for Relativity.

5.1 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.

5.2 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.

5.3 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.

5.4 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. 11. 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. 11 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. 11) are not a confirmation of the existence of the fictious entities (point 8. of Fig. 11), they are simply the confirmation that the model was made consistent with the fictious entities (point 3. of Fig. 11).

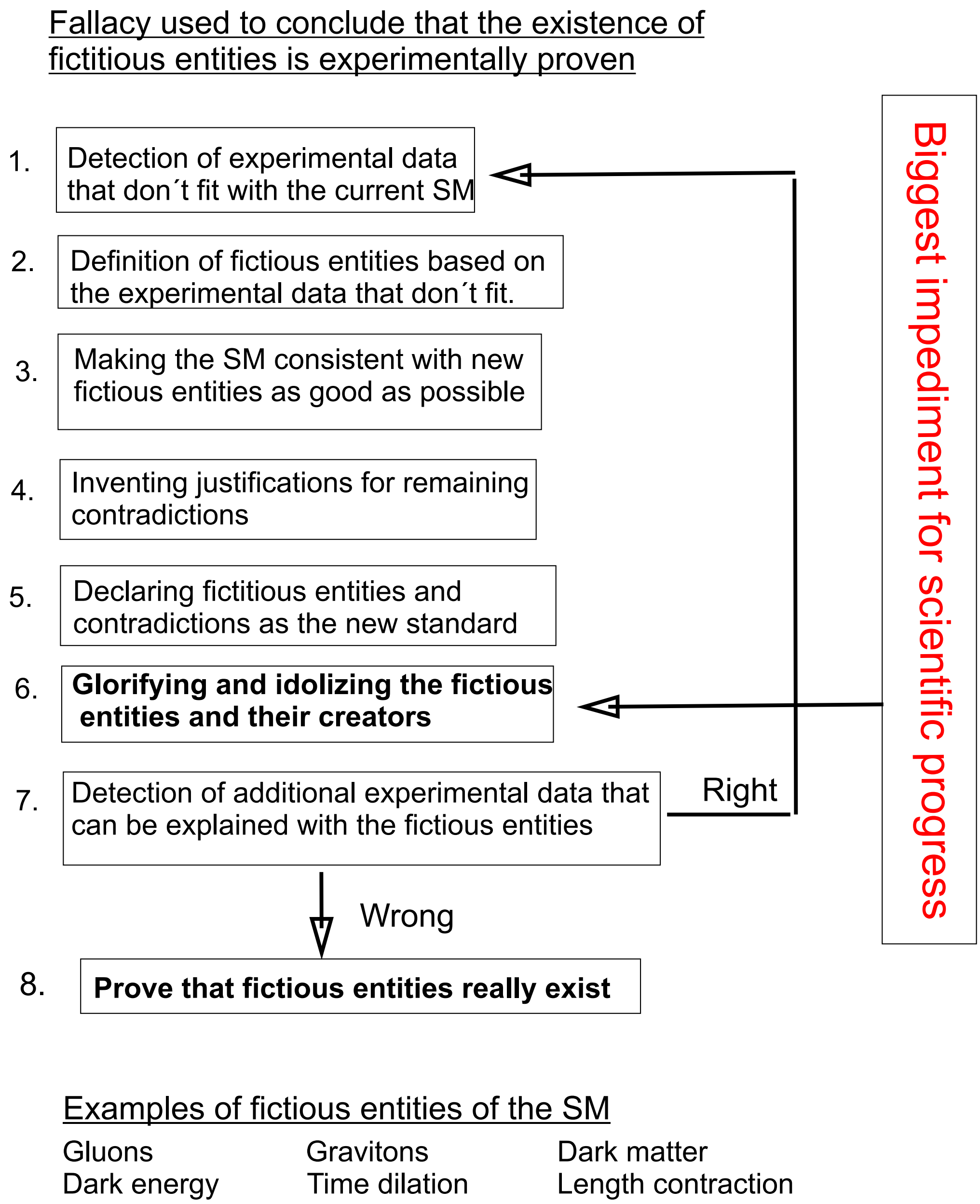

Figure 11: Fallacy used to conclude that fictious entities really exist

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.

6 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 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 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.

7 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 why always light speed is measured in all inertial frames. The proposed approach has absolute time and space and is free of paradoxes. The result of the proposed approach is Galilei relativity multiplied with the relativistic gamma factor.

All experiments where time dilation or length contraction are apparently measured are indirect measurements made in the frame of **special relativity** which was made consistent.

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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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