(First version 2005)
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Abstract

The model describes *radiation* as a wavelike disturbance in the distribution of aetherinos of the aether. When this radiation affects a "free" electron, the electron acquires a final speed v_L *relative to the emitter* that is proportional to the frequency of the radiation. Furthermore:
* The final speed v_L does not depend on the intensity of the radiation.
* The radiated recoiling electron reemits a secondary radiation that has the features (frequency function of the observation angle) observed in the Compton experiment.

To account for the fact that the number of ejected electrons is proportional to the intensity of the radiation it is assumed that: (1) the ejection only succeeds at those epochs and locations in which the rate between the strength of the coexisting aether fluctuation and the nominal intensity of the radiation is smaller than some threshold value, (2) the probability that the aether of some specific location suffers, during a specific time interval, a fluctuation above a given strength decreases with such strength.

Non photonic description of the radiation in the Compton effect.

Let the laboratory (lab) be the reference frame of description. Suppose that there is, at rest in the lab, an emitter E of electromagnetic radiation of frequency ν_1 and suppose that the radiation reaches the 'free' electrons of the target T. For simplicity, suppose that the target electrons are initially at rest in the lab.
Evaluations have been done modelling the radiation by an aether disturbance consistent with the model. These "Aether Compton Evaluations (ACE)", that will be presented below, show that a radiated target electron suffers an oscillating force (and therefore an oscillating acceleration) along the direction E-T that "quickly" stabilizes the movement of the electron into a state in which its instantaneous velocity oscillates but in which its time-average velocity v_L away from the source remains constant. The evaluations show that the time-average velocity v_L relative to the emitter at which the target electron stabilizes:
1) is independent of the intensity of the radiation, 2) is independent of the initial velocity of the target electron, and 3) grossly speaking, is independent of the duration and phase of the emitted radiation.
For consistency with the description of the Compton effect, the model should also predict that such average velocity v_L acquired by the electrons increases approximately[(1)] proportionally to the frequency ν_1 of the radiation in the lab reference frame. This goal can also be achieved with the introduction of further, more controversial, suppositions about the specific characteristics of the emitted radiation.
[(1)] Note: As Compton already mentioned in its 1923' paper, the frequencies of the secondary radiation along the different directions observed in his experiment are coincident with the frequencies that, according to the Doppler effect (in a classic, non photonic, model of radiation), the radiated electron would reemit when moving away from the source at a speed v_L related with the primary frequency ν_1 by:

[1] $$v_L = c\,(\lambda_C / \lambda_1)/(1+\lambda_C / \lambda_1) = \lambda_C\, \nu_1/(1+\lambda_C / \lambda_1)$$

where

$\lambda_C = h/(m\,c)$ is the, so called, *Compton wavelength of the electron*.

$\lambda_1 = c/\nu_1$ is the wavelength of the radiation emitted by the source E.

It is evident that v_L reduces to $v_L = \lambda_C\,\nu_1$ when $\lambda_C << \lambda_1$

The following graphic, done with Wolfram's Mathematica software, gives an idea of the evolution, according to the model, of the speed of the target electron for two different intensities of radiation. The horizontal axis represents the time elapsed in arbitrary units. The vertical axis represents the speed of the electron along the direction E-T (Emitter-Target electron) in units of c.

In this simulation, the values of the parameters of the model characterizing the emitted radiation have been adjusted ad hoc to predict a stabilizing average speed of the target electron of approximately v_L = 0.034c That is the value of v_L that the electron must acquire to describe (according to this model) the effect of a radiation of wavelength $\lambda_1 = 29.26\ \lambda_C$ where λ_C is the "Compton wavelength of the electron". Therefore λ_1 is approximately the same wavelength of the X rays that A. H. Compton used in his famous 1923 experiment. As explained below, it is possible to make "non photonic" assumptions about the nature of the emission process so that the model's predictions agree quantitatively with the results of the Compton scattering experiment.

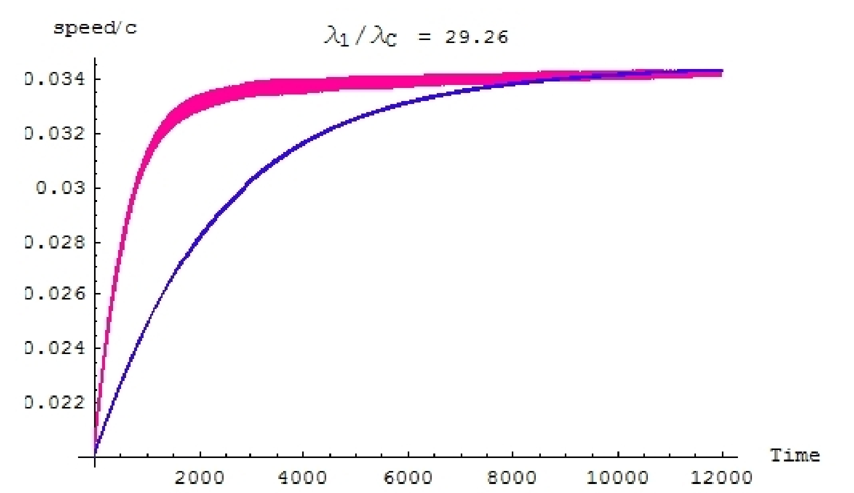


Fig [1] The red curve corresponds to an intensity of radiation 4 times that of the blue curve.

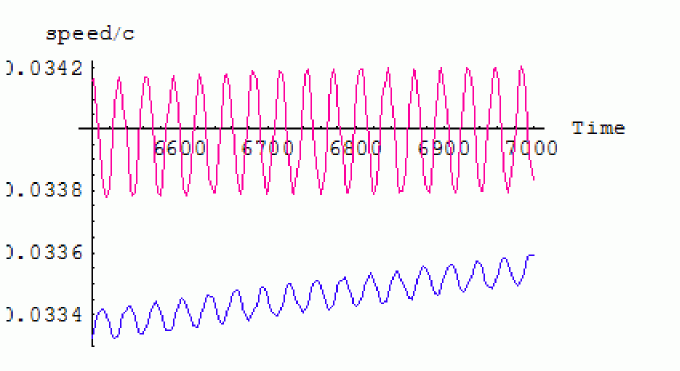


Fig [2] Detail of the above curves in which the oscillation of the speed of the target electron is manifest.

Notes:
- although the *average* velocity of a radiated free electron stabilizes at a constant value $\mathbf{v}_L$, its *instantaneous* velocity oscillates with an amplitude proportional to the intensity of the radiation.
- the "limit" velocity $\mathbf{v}_L$ (at which the target electron stabilizes) is a velocity along the direction E-T (emitter - target) and its component along that direction oscillates. It is therefore asserted that radiation exerts longitudinal forces on *free* electrons. (It does also exert, in most circumstances, transversal oscillating forces that are specially relevant when they act on bound (to matter) electrons. See Section 7).

It is interpreted that the ejected (recoiling) electrons, while moving away from the source at their stabilized average velocity component v_L, keep receiving the radiation from the source and are forced to oscillate at the frequency ν_2 at which they *perceive* the radiation.
According to the Assertion C of the model, an ordinary emitter of radiation emits the disturbance (carried by aetherinos) *at a plurality of speeds* but the disturbance (radiation) detected by an elementary detector, e.g. a free electron, has an effective speed c *relative to the elementary detector* and hence, in this case, a speed $c+v_L$ relative to the laboratory.
The frequency ν_2 is therefore the Doppler shifted frequency detected by a detector that moves away from the emitter at a speed v_L assuming that the emitter is at rest in a "medium" in which the speed of light is $c+v_L$ The classic formula of the Doppler effect for a "wave" of speed $c+v_L$ in the "medium" and for a detector receding with speed v_L may be applied to obtain ν_2:

[2] $$\nu_2 = \nu_1 \left(1 - \frac{v_L}{c+v_L}\right) = \nu_1 \frac{1}{1+v_L/c}$$

where ν_1 is the intrinsic frequency emitted by the emitter.

The same result is obtained assuming that the target electron (i.e. the detector) is at rest in a "medium" in which the speed of light is c and in which the emitter recedes away from the detector at a speed $-v_L$ The classic Doppler effect for this case gives again:

[3] $$\nu_2 = \nu_1 \frac{1}{1+v_L/c}$$

Note: as said above and shown in the "ACE" below, the velocity $\mathbf{v}_L$ along the direction E-T used in [2] is the *average* value of the instantaneous velocity of the target. After “a short time” of acceleration away from the source the instantaneous velocity of a radiated electron oscillates around v_L with a speed amplitude v_a and can be written as
$v[t] = v_L + v_a \mathrm{Sin}[2 \pi \nu_2 t]$

But in standard Compton experiments (with X rays and therefore high frequencies of emission together with moderate intensities) it will happen that, in the lab reference frame, $v_L >> v_a$ and therefore [2] is a valid approximation for the present purposes. (Note: the "ACE evaluations" show that, once the electron stabilizes at a constant average speed v_L, its instantaneous speed v[t] oscillates at the frequency ν_2 given in [2] *even if it were* $v_L < v_a$).
The scattered radiation received at different angles at the laboratory detectors can now be explained classically as the Doppler shifted radiation of the secondary emitters (i.e. the oscillating ejected electrons) of intrinsic frequency ν_2 that move in the lab with an average velocity $\mathbf{v}_L$. The Assertion C implies now that this *scattered radiation* has a speed c in the lab (since in a standard Compton

scattering experiment the detectors used to detect this secondary radiation are at rest in the lab; Remember that, in the model, the effective radiation has a speed c *relative to the material detectors*). The classic formula of the Doppler effect corresponding to an emitter (an ejected electron) that moves at a velocity $\mathbf{v}_L$ in a medium in which the disturbance propagates at speed c is:

[4] $$\nu_3 = \nu_2 \frac{1}{1 - \frac{v_L}{c} Cos\ \theta}$$

where ν_3 is the frequency of the scattered radiation detected in the lab by a detector placed at an angle θ .

Note: θ is the angle that the semi-direction T-D (graphite Target → radiation Detector) makes with the semi-direction of the velocity $\mathbf{v}_L$ of the new emitter (the ejected electrons). Notice also that the semi-direction of the velocity $\mathbf{v}_L$ acquired by the ejected electrons is, according to experiment (and according to the model), the semi-direction E-T (X ray Emitter → graphite Target).

Replacing ν_2 by its value given above:

[5] $$\nu_3 = \nu_1 \frac{1}{1+\frac{v_L}{c}} \frac{1}{1 - \frac{v_L}{c} Cos\ \theta}$$

that in terms of wavelengths $\lambda_1=c/\nu_1$ and $\lambda_3=c/\nu_3$ takes the form:

[6] $$\begin{aligned} \lambda_3 &= \lambda_1 \left(1+v_L/c\right)\left(1-v_L/c\ Cos\ \theta\right) = \\ &= \lambda_1 \left(1+v_L/c-v_L/c\ Cos\ \theta - v_L^2/c^2\ Cos\ \theta\right) \end{aligned}$$

and therefore *the wavelength shift* $\Delta\lambda \equiv \lambda_3 - \lambda_1$ of the scattered light

[7] $$\lambda_3-\lambda_1 = \Delta\lambda = \lambda_1 \frac{v_L}{c}\left(1 - Cos\ \theta - \frac{v_L}{c} Cos\ \theta\right)$$

With further ad hoc and more controversial suppositions about the radiation of the primary emitter, the model can predict that, in some limited range of frequencies, the stabilizing speed v_L is approximately proportional to the frequency ν_1 of the primary emitter, i.e.

[8] $$v_L = k\ \nu_1 = k\ c/\lambda_1$$

Note: In the mainstream “photon interpretation” of the Compton scattering, the conservation of momentum also predicts that, in a *head-on* collision between a photon and an electron at rest in which the scattered photon reverses its semi-direction, the electron must acquire a speed approximately proportional to the frequency of the incoming photon. (That applies in the ordinary case in which the scattered electron does no acquire a relativistic speed).

The model can adjust ad hoc the radiation parameters of the source to make the constant k numerically equal to $\lambda_C = h/(m\ c) = 0.00243$ nm, i.e. equal to the so called "Compton wavelength of the electron".

Replacing $k = \lambda_C$ in [8]:

[9] $$v_L = \lambda_C\, \nu_1 = \lambda_C\ c/\lambda_1$$

the model's prediction of the wavelength shift $\Delta\lambda \equiv \lambda_3 - \lambda_1$ *of the scattered light* would be:

$$[10] \qquad \Delta\lambda = \lambda_1 \frac{v_L}{c}\left(1 - Cos\,\theta - \frac{v_L}{c} Cos\,\theta\right) = \lambda_C\left(1 - Cos\,\theta - \frac{\lambda_C}{\lambda_1} Cos\,\theta\right)$$

that for radiations of not too big frequencies (in which $\lambda_1 >> \lambda_C$), can be approximated by:

$$[11] \qquad \lambda_3 - \lambda_1 = \Delta\lambda \simeq \lambda_C (1 - Cos\,\theta) \qquad \text{for } \lambda_1 >> \lambda_C$$

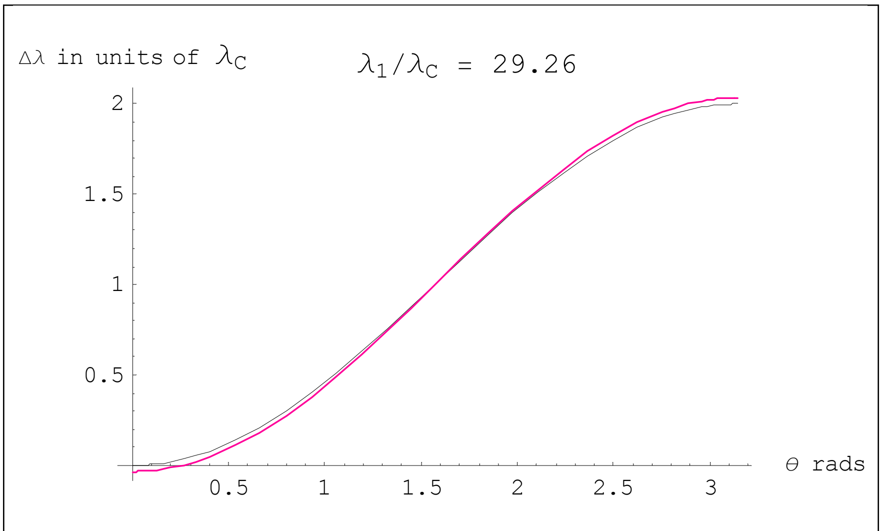
Some comments:

Remember that the Compton's scattering formula, accepted by mainstream physics, is also

$$[12] \qquad \Delta\lambda = \frac{h}{m\,c}(1 - Cos\,\theta) \equiv \lambda_C (1 - Cos\,\theta)$$

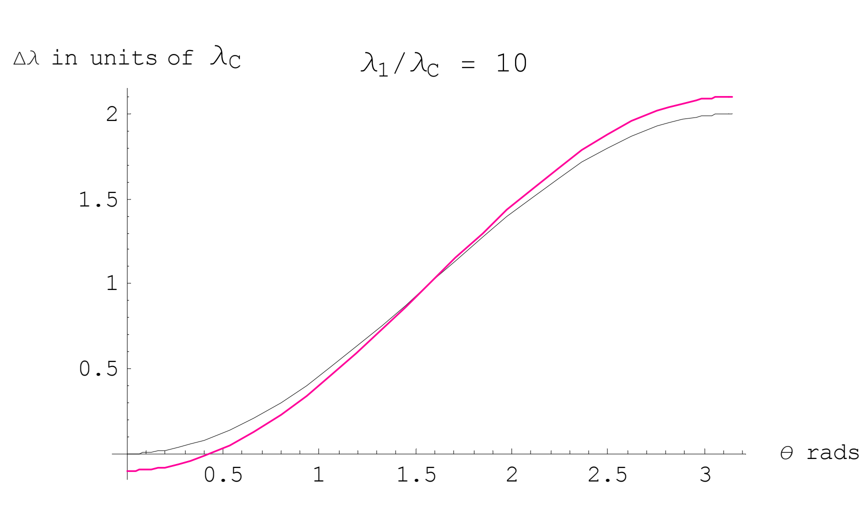
where *h* is Planck's constant, *m* is the mass of the electron and *c* is the speed of light.
The factor h /(m c) that has the dimension of length is, since Compton's experiment, called the "Compton wavelength of the electron" and denoted by λ_C.

Note: The simulations of the model obtain "good" approximations of the main experimental features of the Compton effect as long as λ_1 is "significantly" bigger than λ_C.
For example, A. H. Compton in his famous scattering experiment used X rays of wavelength λ_1=0.0711 nm to radiate his graphite target. Since the "Compton wavelength of the electron" is λ_C = 0.00243 nm (i.e. about 29.26 times smaller than λ_1) then, for λ_1=0.0711 nm and $\theta = \pi$, the model, see Eq[10], predicts $\Delta\lambda = \lambda_3 - \lambda_1$ = 0.00494 nm while the mainstream prediction is $\Delta\lambda_m = 2\,\lambda_C$ = 0.00486 nm
For λ_1/λ_C = 29.26 (like in the Compton experiment) and *other scattering angles*, the angular dependence of $\Delta\lambda$ predicted by [10] behaves in "good" agreement with the mainstream accepted formula [12]:



Fig[3] Comparison for $\lambda_1 = 29.26\,\lambda_C$ (like in Compton's experiment) of the wavelength shift $\Delta\lambda$ predicted by the model (red curve) with the mainstream Compton formula (black curve).

but for significantly smaller values of λ_1/λ_C the discrepancy becomes apparent as shows the following graphics for $\lambda_1/\lambda_C = 10$



Fig[4] Comparison for $\lambda_1/\lambda_C = 10$ of the wavelength shift $\Delta\lambda$ predicted by the model (red curve) with the mainstream Compton formula (black curve).

The model interprets that *radiation* is a periodic disturbance in the distribution of aetherinos of the aether caused by some periodic movement of particles with electric charge (whether negative particles, positive particles or both). The moving charges create an oscillating redistribution of the aetherinos that collide with them. This oscillation of the distribution of aetherinos emerging the emitter can be caused in different ways. For example:

(I) The net redistribution of aetherinos produced by the negative particles oscillates in intensity because there is an oscillating *number* of electrons in the "active" (non screened) part of the emitter while the number of protons remains there unchanged. This could be the case in the famous pioneer Hertz's spark gap.

(II) The redistribution of aetherinos emerging the emitter changes *directionally* in time in a periodic way. This can be understood assuming that (1) the electron (and the proton, and many other elementary particles) has an intrinsic anisotropic structure (e.g. with axial symmetry) that creates an intrinsically anisotropic redistribution of aetherinos and assuming that (2) the electrons perform periodic intrinsic rotations or oscillations[(*)]. For example suppose now that both the number of electrons and protons in the window of the emitter remains the same at all epochs. If the axes of the electrons and those of the protons remain randomly oriented, then no radiation will be emitted. But if for example the axes of a significant group of electrons rotate at a given frequency then an outside observer will notice that the net distribution of aetherinos emerging the emitter along his direction oscillates in time.
(*) Note: the term "oscillate" means here that they perform partial rotations in which they reverse their rotation vector before completing a full 2π angle, while when just saying "rotate" it is meant that they rotate bigger than 2π angles (with the same rotation vector).

(see more in the paper https://www.eterinica.net/radiations_en.pdf).

For the present purposes it suffices to suppose that the emitter produces along the direction of the observer an oscillating distribution of aetherinos that can be described by the addition of two contributing terms:

(1) An oscillating distribution of aetherinos produced (for example) by rotating electrons at the emitter.

(2) A non oscillating distribution due (for example) to an equal number of non-rotating protons of the emitter.

The net aetherinical force on the target electrons (for example on those of the graphite target of the Compton experiment) is therefore the sum of the two following forces:

F_{OSC} (force due to the oscillating distribution) + F_{NON} (force due to the non oscillating distribution).

--- Parenthesis: Description of the electric force by the model ---

The expression proposed by the model (see https://www.eterinica.net/redistribs_eterinicas_en.pdf) for the non-oscillating *redistribution* of aetherinos originated by a unit charge elementary particle can be expressed by

[14] $$r[v_R] = \sigma_S[v_R] \frac{\rho[v_R]}{2} \frac{v_R}{4\pi}$$

where $\sigma_S[v_R]$ is the cross section (averaged over all directions) of a unit charge to collisions with its switch-type aetherinos (i.e. those aetherinos that it *switches* into impulsion-type aetherinos) given by:

[15] $$\sigma_S[v_R] = a_S \, Exp[-b_S v_R^2]$$

where:

[16] $$\rho[v_R] = \frac{4 N_0}{\sqrt{\pi} V_M^3} v_R^2 \, Exp\left[-(v_R/V_M)^2\right]$$

is the canonical distribution of aetherino speeds in an undisturbed aether,

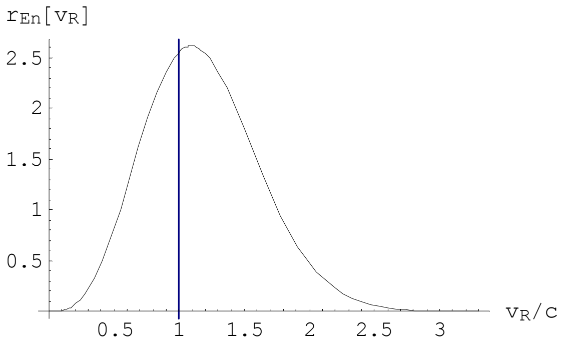
and where

v_R is the speed of the aetherinos relative to the redistributing charge.

V_M is a constant.

Therefore the redistribution of aetherinos created by a unit electric charge adopts the expression:

[17] $$r[v_R] = \frac{a_S N_0}{2\pi^{3/2} V_M^3} v_R^3 \, Exp\left[-(v_R/V_M)^2 - b_S v_R^2\right]$$



Fig[5]

In arbitrary units, average **redistribution** of n-type aetherinos originated by an electron at rest in the aether. See Eq[17].
(v_R is the speed of the aetherinos relative to the electron),
(taking a_S=1, b_S=1.255/c^2 , V_M=10^{10} c, N_0=10^{32}).

As said above, the model supposes that the elementary particles with charge have an intrinsic structure due to which the redistribution of aetherinos that they cause depends on the direction of the aetherinos relative to such structure. It is assumed that the intrinsic structure of most of the elementary particles with charge has an axial symmetry in which the axis of symmetry is being called the preferred redistribution axis (PRA) of the particle. It will be supposed that the switch cross section of a charged particle along a direction that makes an angle α with its PRA can be expressed by the following *directional cross section* expression:

[18] $$\sigma_{S\alpha}\left[v_R,\alpha\right] = a_S[\alpha]\ Exp\left[-b_S[\alpha]\ v_R^2\right]$$

where the parameters $a_S[\alpha]$ and $b_S[\alpha]$ depend on the angle α.
Note: an axial symmetry would imply that, for any angle α, $a_S[\pi-\alpha]=a_S[\pi+\alpha]=a_S[\alpha]$ and $b_S[\pi-\alpha]=b_S[\pi+\alpha]=b_S[\alpha]$

The switch cross section Eq[15] of the non-oscillating charges of the emitter would then simply be the average over all space directions of the directional cross section [18], i.e.

[19] $$\sigma_S\left[v_R\right] = \frac{1}{2}\int_0^{\pi} Sin[\alpha]\ \sigma_{S\alpha}\left[v_R,\alpha\right] d\alpha$$

and, according to the model $a_S[\alpha]$ and $b_S[\alpha]$ would be such that $\sigma_S[v_R]$ can be approximated by a function of the type

$\sigma_S\left[v_R\right] \simeq a_S\ Exp\left[-b_S\ v_R^2\right]$ with a_S an b_S constants.

---------- end of parenthesis ------------

NOTE 2: *Speed dependence of the forces of the model.*

The model predicts (e.g. see https://www.eterinica.net/redistribs_eterinicas_en.pdf) that the force exerted by a non oscillating electric charge q_1 on a target charge q_T that moves "frontally" along the straight line $q_1 \rightarrow q_T$ depends on the relative speed *u* of the target approximately as:

[20] $$F = F_0 \cdot \left(1-\frac{u^2}{c^2}\right)^{3/2}$$ for |u| << c

where F_0 (i.e. the force for u=0) is just the Coulomb force $F_0 = k_e\, q_1\, q_T/d^2$.

Note: The approximation [20] actually corresponds to the case in which (1) the charge source of the force has, in the direction of the target, a switch cross section of the type [15] with a parameter $b_S=1.255/c^2$ and in which (2) the charge target of the force has, in the direction of the source, an impulsion cross section $\sigma_I[v_R] \simeq a_I\, Exp[-b_I\, v_R^2]$ (the same type of function of Eq[15]) with a parameter $b_I=1.255/c^2$
By hypothesis of the model, the parameters b_S and b_I characterizing the *directional* cross sections of an elementary charged particle depend on the direction (relative to the inner structure of the particle) but when averaged, over all directions of space, their averages take those same values $b_S=1.255/c^2$ and $b_I=1.255/c^2$. Therefore Eq[20] can also be considered an approximation of the frontal force between two electric charges whose inner structures are randomly oriented in space.

The expression [20] is an approximation (valid for approximately |u|<c/2) of the force actually predicted by the model (whose plot can be seen in Fig[R-22] of the paper https://www.eterinica.net/redistribs_eterinicas_en.pdf). Such prediction of the force (exerted by an electric charge q_1 on a charged target q_T that moves "frontally" along $q_1 \rightarrow q_T$) relies mainly on (1) an hypothesis about the cross section of a unit charge to collisions with aetherinos in which these are redistributed, (2) an hypothesis about the cross section of a particle to collisions in which the aetherinos give impulse to such particle, (3) an hypothesis about the impulse (or more precisely about "the velocity change") suffered by a particle when collided by an aetherino,…

It can also be seen (evaluating the force between two charges in which the target moves frontally away from the source with a speed u) that if the "switch parameter" b_S of the source or the "impulsion parameter" b_I of the target (or both) are assigned values different from $b_S = b_I = 1.255/c^2$ then the force has no longer its maximum at u=0 but at some other speed u_E In this case, an approximation (for small u) of the frontal force between two charges will rather be of the type:

$$[21] \qquad F_E[u] = F_{0E} \cdot \left(1 - \frac{(u-u_E)^2}{c^2}\right)^{3/2} \quad \text{for } |u| \ll c$$

Forces acting on the target electrons in the Compton scattering experiment

The target electron suffering the radiation coming from the source can be considered to be acted by two opposite forces that will be called F_{NON} and F_{OSC}:

F_{NON}

Is the attraction force due to the protons of the source. It is supposed that, in ordinary emitters of radiation, the protons don't rotate and don't oscillate and keep their PRAs randomly aligned in space. Their aetherinical redistribution in the direction of the target corresponds therefore to the *average over all directions* redistribution (also called *isotropic* redistribution) that is characterized by a parameter $b_S=1.255/c^2$

Let q_1 be a *non oscillating* electric charge forming part of an emitter that is at rest in the aether and has remained so in the past. Suppose for example that the charge q_1 is implemented by N protons and that therefore $q_1 = N\, e^+$ (where e^+ is the charge of the proton).
Let q_T be a target electron that moves along the straight line $q_1 \rightarrow q_T$ with speed u.

It can be seen in the ACE simulations that when the target electron is under the influence of both the oscillating and the non oscillating redistributions of the emitter, this last non oscillating redistribution contributes with a force whose time averaged value $<F_{NON}>$ on the back and forth moving target can be approximated by:

$$[22] \qquad \langle F_{NON} \rangle = F_0 \cdot \left(1 - \frac{<u>^2}{c^2}\right)^{3/2} \qquad \text{for } |u| << c$$

where $<u>$ is the time average speed of the target electron and F_0 is again the Coulomb force that q_1 would exert on q_T if this latter were *at rest* at the same distance d.

In the simulations made to evaluate the behaviour of the target electron it is supposed that the net redistribution produced by the N *protons* of the emitter is simply given by:

$$[23] \qquad r_{NON} = N\ r_P = -\ N\ r_E$$

where r_E is the so called *isotropic redistribution* of the electron, i.e. the average redistribution per electron due to a large number of electrons whose redistribution axes are randomly oriented. The *isotropic redistribution* r_P *of the proton* (i.e. the average redistribution per proton due to a large number of non oscillating protons whose redistribution axes are randomly oriented) is by hypothesis equal to $-r_E$. The *isotropic redistribution* r_E of the electron is the one expressed in Eq[17] (and plotted in Fig[5]). This redistribution is characterized by a specific value of the constant b_S (plausibly $b_S=1.255/c^2$). As said above, the *force* exerted by this redistribution r_E on a target electron (that moves along the straight line joining the emitter and the target) is of the type of Eq[20].

Hence if the electron's isotropic redistribution of aetherinos of the n-type (those that are later able to give impulse to the target electron) is given by Eq[17], the proton's redistribution of aetherinos of the n-type is:

$$[24] \qquad r_P[v_R] = -\frac{a_S N_0}{2\pi^{3/2} V_M^3} v_R^3\ Exp\left[-(v_R/V_M)^2 - b_S v_R^2\right]$$

(i.e. the negative of that of the electron)

F_{OSC}

Consider now the presence in the emitter of an equal number n of "*oscillating*" *electrons* (i.e. whose intrinsic axes of redistribution oscillate or rotate with a given frequency ν_1).
F_{OSC} is the repulsion force suffered by the target electrons due to the oscillating electrons of the source. During the emission of radiation many of these electrons rotate (or oscillate) their PRA with some given frequency ν_1. Furthermore it is supposed that the disturbance departing the source in the directions of emission is strongly determined by the redistribution emerging from electrons whose PRA rotate in a limited set of planes (that make a limited set of angles with the direction of emission). In this scenario it is natural to suppose that the switch cross section of the rotating electrons in the direction of the target varies periodically between some extreme values $\sigma_S$min and $\sigma_S$max whose average parameter b_S is no longer $b_S=1.255/c^2$ but has some other value.

The consequence is that the net aetherinical redistribution emerging from these electrons (along the direction of the target electron) also oscillates. (As said above, it is assumed that an electron has some anisotropous structure, characterized by some axial symmetry, that produces an intrinsically non isotropic speed redistribution of the aetherinos colliding with them). As said above, such anisotropous redistribution of the electron can be written as:

[18] $$\sigma_{S\alpha}[v_R, \alpha] = a_S[\alpha]\ Exp\,[-b_S[\alpha]\ v_R^2]$$

An example "guess" to describe the oscillating redistribution emerging from these oscillating electrons *in the direction* α_t *of the target* is to suppose that the parameters $a_S[\alpha]$ and $b_S[\alpha]$ that characterize such redistribution oscillate in time according to:

[25] $$\begin{aligned} a_S[\alpha_t, t] &= (1 + k_a\ Sin[2\,\pi\,v_1\,t])\ a_{S\,OSC} \\ b_S[\alpha_t, t] &= (1 + k_b\ Sin[2\,\pi\,v_1\,t + \varphi])\ b_{S\,OSC} \end{aligned}$$

The simulations that have been done based on such guess show that adequate predictions are obtained when supposing that the constants a_{SOSC} and b_{SOSC} are such that $a_{SOSC} > a_S$ and $b_{SOSC} > b_S$ (where a_S and b_S are the parameters that characterize the isotropic redistribution).
It has also been found that the parameter $b_S[\alpha_t, t]$ does not need to oscillate to obtain adequate predictions of the Compton effect. Therefore, for simplicity, the simulations giving rise to the above Fig[1] were done supposing k_b=0. It was also supposed k_a=0.4, a_{SOSC}= 1.272 a_S, $b_{SOSC}=1.5/c^2$ and therefore:

[26] $$\begin{aligned} a_S[\alpha_t, t] &= 1.272\ (1 + 0.4\ Sin[2\,\pi\,v_1\,t]) \\ b_S[\alpha_t, t] &= 1.5/c^2 \end{aligned}$$

<u>Implications of changes in the values of the parameters</u> a_S and b_S.

When an electron (or a proton) rotates or oscillates with a constant frequency, its time averaged cross section and its corresponding time averaged redistribution along the directions of emission are by hypothesis different from the isotropous cross section and redistribution of the non-rotating randomly oriented proton. That is so because, in general, a radiating electron (or proton) rotates with a rotation vector perpendicular to its PRA and therefore the significant part of the emitted aetherinical disturbance (radiation) corresponds to those emerging along directions quasi perpendicular to the rotation vector. Those directions are only a subset of all the space directions relative to the electron and therefore has an average redistribution different from the average over all directions directional redistributions
The time averaged redistribution of an oscillating electron (or proton) along those directions of significant emission can be described by the same function, but with values of the parameters a_S and b_S different from those that describe the isotropous redistribution [17] (i.e. average over all directions) of a non rotating electron.

It can be seen that supposing that the parameters of the redistribution of a charged particle take, for example, the values a_{SOSC} = 1.272 and b_{SOSC} = $1.5/c^2$ (instead of a_S=1, $b_S=1.255/c^2$) the frontal force [20] that it exerts on a target charge moving at speed u suffers a small displacement of its maximum, a small change of curvature and a small change of strength. The consequence is that the time averaged *force* exerted on a target electron *of constant speed u* by an oscillating redistribution based on those modified parameters is now expressible by a function of the type:

$$[27] \qquad \langle F_v[u] \rangle = F_{0v} \cdot \left(1 - \frac{(u-u_v)^2}{c^2}\right)^{3/2} \qquad \text{for } |u| \ll c$$

and the time averaged force exerted by the oscillating redistribution of the source on a target electron *whose speed oscillates* around an average value $<u>$ is approximately:

$$[28] \qquad \langle F_{OSC} \rangle = F_{0v} \cdot \left(1 - \frac{(<u>-u_v)^2}{c^2}\right)^{3/2} \qquad \text{for } |u| \ll c$$

where F_{0v} and u_v depend on the frequency ν_1 of oscillation of the electrons of the emitter.
Note: $<F_{OSC}>$ and $<u>$ are time averages over a full period of oscillation.

Note:
When $\nu_1=0$ (i.e. no oscillation) it must be $F_{0v} = F_0$, $u_v=0$ so the force [28] becomes equal (though of opposite sign) to that due to a non oscillating group of protons.

The Aether Compton Evaluations (ACE) show that *the* oscillating redistribution *contributes* with a force F_{OSC} that oscillates with the Doppler shifted frequency $\nu_2 = \nu_1/(1+<u>/c)$. It has also been found in the ACE simulations that the phase of the instantaneous force F_{OSC} is greater than the phase of the speed u[t] of the target electron by an amount $\pi/2$.

According to this description, when the target electron is acted by *both* the oscillating distribution due to the electrons of the emitter and the non oscillating distribution due to an equal number of protons of the emitter, the average speed $<u>$ at which the target electron stabilizes (ceases to accelerate), which is being called v_L, is determined by the condition that the sum of the corresponding forces is zero:

$$[29] \qquad <F_{NON}> + <F_{OSC}> = 0$$

Example:

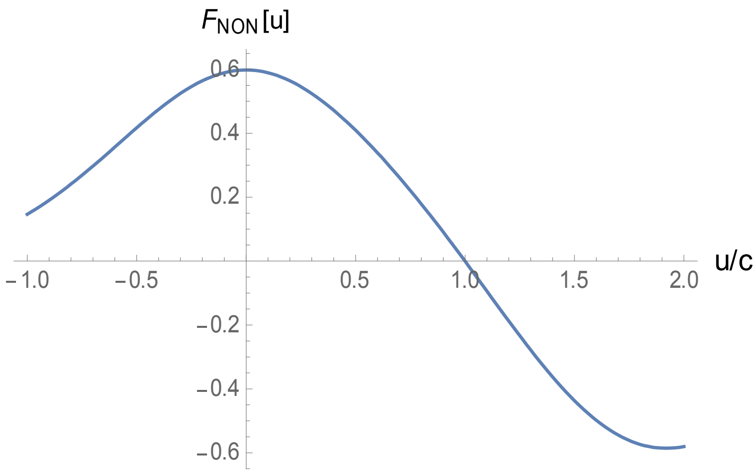
- Suppose that the redistribution r_E due to a *non oscillating electron* of the emitter is given by the above expression [17] with
 $a_S=1$, $b_S=1.255/c^2$, $V_M=10^{10}$ c, $N_0=10^{32}$,
 Suppose that the cross section of the electron (and hence of the target electrons) to collisions with *impulsion type aetherinos* of relative speed v_R is of the type:

$$[30] \qquad \sigma_I[v_R] \simeq a_I \; Exp\,[-b_I \, v_R^2]$$

with $a_I=1$, $b_I = 1.255/c^2$

 Suppose that the impulse given by an aetherino to an electron when it collides with it is of the type $\mathbf{i}_1 = h_1 \, \mathbf{v}_R$ where h_1 is a positive constant.

Taking for example c=1, h_1=1, the evaluations show that the force exerted by an electron of the emitter on a target electron that is at a distance, say, d=1 and moves towards/away from the first at a speed u is given (in arbitrary units) by the following plot:

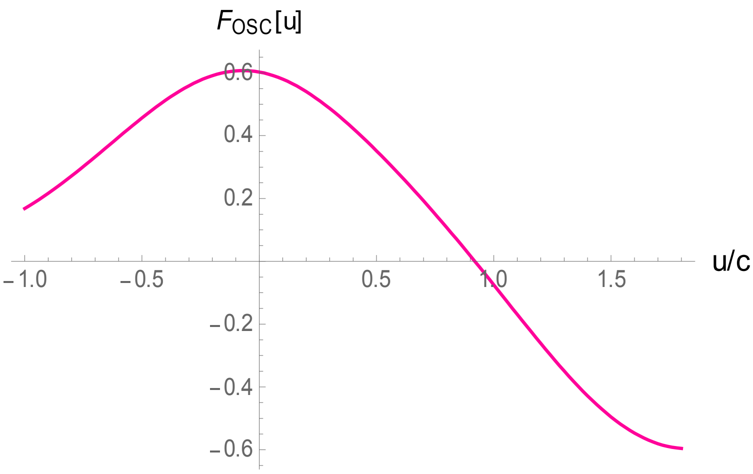


Force exerted by a *non oscillating* electron on a target electron that moves directly away from or towards the first at speed u
Fig[6]

The force exerted on a target electron by a non oscillating *proton* of the source will be just the negative of the force shown in Fig[6]

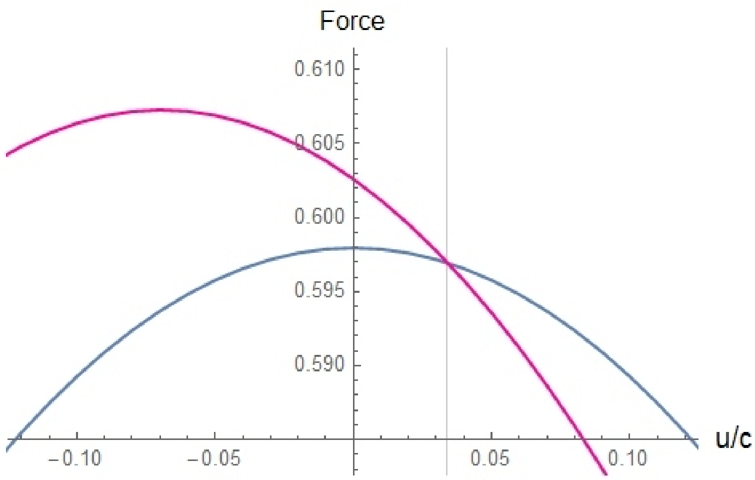
- Consider next an *oscillating electron* of the emitter whose time averaged redistribution in the direction of the target is, due to its oscillation, characterized by a redistribution of the type [17] but with a_S=1.272, b_S=1.5/c^2

Taking again c=1, h_1=1, it can then be calculated that the force exerted by such electron of the emitter on a target electron that is at a distance d=1 and moves towards/away from the first at a speed u is given (in arbitrary units) by the following plot:



Force exerted by an *oscillating* electron of the source on a target electron that moves directly away or towards the first at speed u
Fig[7]

And plotting both forces together it can be seen that the speed $u = v_L$ at which the curves intersect and hence for which the net force on the target electron $F_{NON}+F_{OSC} = 0$ (i.e. cancels) is approximately $v_L=0.034c$

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In red: force due to an oscillating electron
In blue: negative of the force due to a non oscillating
proton.
            Fig[8]
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Notice in this example that if the target electrons are initially at rest, Fig[8] shows that they will be repelled away from the emitter since, for $u< v_L$, the repulsion by the electrons of the emitter (red curve) is stronger than the attraction by the protons of the emitter (blue curve).
Note: when saying that a radiation force is of "repulsion" it is meant that the force suffered by the target electron tends to accelerate it along the semi-direction in which the wave-like disturbance travels and therefore along a semi-direction *away* from the emitter. Notice in Fig[8] that, with the values given in this example to the parameters of the emission, the condition $<F_{NON}> + <F_{OSC}> = 0$ is fulfilled for a "stabilizing" speed $v_L = 0.034c$ at which the two curves ($-F_{NON}$ and F_{OSC}) intersect. Fig[8] also shows that, if the target electron is initially moving away from the emitter at a speed *bigger* than v_L, the emitter will *attract* the target electron (slowing it down to the stabilizing speed v_L). The ACE simulations show that this behaviour of the target electron happens not only when the force due to the electrons varies like a simple Gaussian (the red curve of the above example) but also when it is actually a sinusoidal *oscillating force* whose time average is the mentioned Gaussian.

Further increases of the average parameters a_S and b_S characterizing the redistribution due to the oscillating electrons of the emitter predict higher stabilizing speeds v_L of the target electron. For example assuming that the parameters describing the (average) redistribution due to oscillating electrons of the emitter take the values $a_S=1.345$, $b_S=1.55/c^2$ the evaluations show that now the target electrons stabilize at a speed of (approximately) $v_L=0.065c$ (relative to the emitter).
The model has based the description of the Compton experiment on the supposition that the limiting speed v_L acquired by the target electron is directly proportional to the frequency ν_1 of the source (see Eq[9] $v_L = \lambda_C \nu_1$). The model is at this stage unable to justify quantitatively such relation but from a qualitative point of view it can argue as follows:

In some scenarios of generation of X-rays, an increase of the frequency of this radiation corresponds to an increase of the speed component of the electrons of the emitter in the direction of the observer. But, the bigger the speed component of an electron, the bigger is the solid angle (relative to the emitting electron) by which emerge the aetherinos that are able to collide with the target. Such bigger angle implies therefore a bigger strength parameter a_S of the redistribution created by the emitting electron in the direction of the target. On the other hand, a bigger angle in an anisotropous cross section (like the one of the emitting electron) implies a different value of the parameter b_S when averaged over such bigger solid angle.

Aether noise and light intensity.

Another feature of light that must be described by the model is the experimental fact that (in non saturated detectors) the number of photoelectrons ejected at the detector is proportional to the intensity of the incident light.

The mainstream photonic description has no problem explaining this since it assumes that the light intensity is proportional to the number of incident photons. It can thus easily explain that even a very weak light source is able to eject "full speed" photoelectrons. (The problem of the mainstream photonic description appears when it tries to describe, with that photon paradigm, the wave aspects of light).

But the model proposed in this work assumes that light is not made of localized photons but is instead a wave-like disturbance (of the speed distribution of the aetherinos of the aether). The description and the simulation of the Compton made above (and of the photoelectric effect) show that whatever its amplitude (and hence intensity) such wavelike disturbance ejects *in theory* any quasi-free electron that it encounters on its way. In other words, if the theory applied in the simulations assumes a *theoretically perfect* local aether, with no fluctuations (no noise) in its number-density of aetherinos, then the rate of electrons ejected at the detector would not depend on the intensity of the incident radiation but would only be limited by the characteristics of the detector (size, recovery time after each ejection, etc...)

Here are some hints of how this aether model can explain the increase in the number of "ejected" photoelectrons as the intensity of the incident light is increased:
The evaluations based on the model show that 'any' quasi-free *electron* standing on the way of a *radiation* of a given frequency acquires the same quantity of energy (i.e. the same final velocity) whatever the amplitude of the radiation. That is so because in the evaluations the radiation has been modelled by a "well defined" (non-random) mathematical function. But in practice an aether - implemented radiation is not a stable perfectly defined flow of aetherinos. The randomness of the aetherinical medium that sustains light introduces irregularities (noise) in the light wave. And in addition to those aetherinos coming from the emitter (that loosely speaking can be said that implement the wave) the target electron is also permanently exposed to the random collisions of many other aetherinos of the local aether that reach it from all other directions. In other words, the effect of radiation on matter
is always conditioned by the *"noise" of the aether*, i.e. 'by random aetherinical forces due to the statistical fluctuations in the speeds and number-density of the aetherinos of its local aether'. It can therefore be expected that in practice the behavior of a target particle acted by a given "nominal" force or radiation will depend on the aether noise present in the event. It will even happen that some expected events, like the acceleration and ejection of an electron in a photo-detector, will be *spoiled* in those cases in which the noise of the aether is *comparatively* high. That can be expected to happen in many zones of the wave and at many epochs when the applied nominal radiation is very weak. (Note: by "nominal" force or radiation it can here be understood the "average" value of the force or radiation that is applied in theory. Only such average value can be known in theory and in practice).

The 'aether noise' concept has yet to be defined in a more strict mathematical way but seems intuitive enough to continue the analysis of its consequences. For example, it seems physically reasonable to admit that in any given small region of space the aether *noise* presents the following kind of distribution:

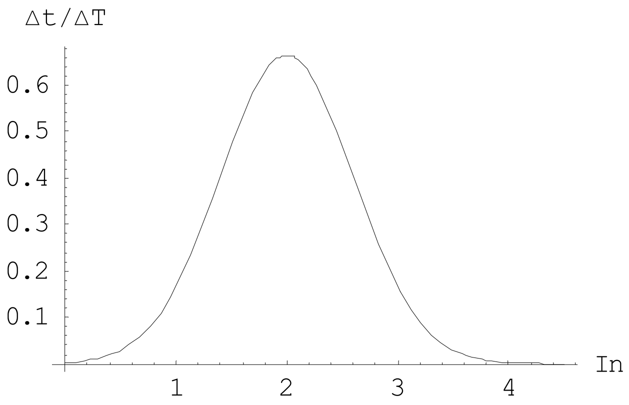

Fig [10]

where the horizontal axis represents the 'intensity' of the aether noise (in yet undefined units) and the vertical axis represents the fraction of time during which the local aether has the corresponding noise intensity in the given region. Fig[10] is just the plot of a Gaussian function that can be written as:

[31] $$\frac{\Delta t}{\Delta T} = \frac{1}{\sigma \sqrt{2 \pi}} e^{-\frac{(In - Inavg)^2}{2 \sigma^2}}$$

where I_n is the "aether noise intensity", I_{navg} is the average of the noise intensity, σ is a constant (equal to the standard deviation of the distribution), ΔT is the total (long) observation time interval , Δt is the sum of the time intervals (included in ΔT) during which the noise intensity is I_n .

(Note: the possibility that the aether noise manifests *itself* as radiation and furthermore that the Cosmic Background Microwave Radiation is just the manifestation of the aether noise and not of a Big Bang, will be considered in another paper).

From Eq[31] it is evident that the fraction of time during which the noise intensity is '**less'** than a given value I_n is just:

[32] $$L(I_n) = \int_0^{I_n} \frac{1}{\sigma \sqrt{2 \pi}} e^{-\frac{(In - Inavg)^2}{2 \sigma^2}} dI_n$$

which evidently always increases with I_n though in an asymptotic way (Fig 11):

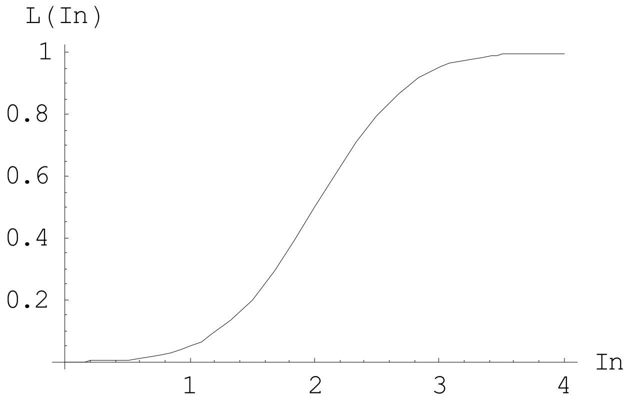

Fig [11]

According to the above assumption that ‘an aetherinical radiation only manifests itself when its intensity is higher than that of the aether noise that is simultaneously acting on the electron’ it can therefore be considered that Eq[32] once normalized, gives the probability that a radiation of intensity I_n is absorbed by a (non saturated) detector.

For a more complete description of the *absorption of light*, this noise threshold feature just explained has to be complemented with the well known wave feature according to which a *bound* electron exposed to radiation moves (oscillates) in such a way that it produces a secondary (out of phase) wave that interferes destructively with the incident one in the direction of advance of the first and subtracts intensity from it.

Summarizing: The aether model of this work describes *light* as an ‘angular spread’, ‘many flows’ disturbance of the aetherinos distribution that despite its dominant wave features is able to manifest some ‘apparently’ corpuscular properties when interacting with matter.

Warning: As said many times before, the EVE model does not claim to make at this stage quantitative precise predictions. The mathematical equations presented all along this work just pretend to give hints of how the paradigms of the model can be developed. The author does not consider himself in a position to make precise quantitative predictions that require a more specialized knowledge together with higher level mathematical skills. The intention of the work is only to draw the attention on the plausibility of new and simpler description paradigms in fundamental Physics.

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