Dynamic wave geometry concept

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Abstract

The initial idea that made me think about this new concept was that the wave nature of light must be the reason why no entity in this universe can exceed this propagation speed, but only if all other "particles" are waves as well. Assuming this was true it meant that all the effects described by relativity must be related to this wave nature of light and matter. If these effects can be explained that way, then the only option is that what we use as clocks don't measure the true time. We can define time as absolute and think that clocks don't measure the absolute time, but they have a tick rate that depends on the speed relative to the flat absolute space. The idea is a natural interpretation of what happens in the very popular thought experiment of Einstein's relativistic train. If the light beam is a light clock, it becomes clear that the trajectory of the light beam is the only thing that makes the tick rate change. The idea is that the same thing happens with all the clocks we use. This model assumes, by definition that space doesn't have a variable geometry and takes the other possibility, hence, complex particles inner geometry changes what *we measure* as time and space.

The strong point of this concept is that it predicts a particle / wave construct model that perfectly matches the behaviour of internal OAM light beams. Analysing these waves, in this context, leads to a proper development of the concept.

1. Introduction

Before Special Relativity it was thought space and time were absolute and we also measured them as absolute. Based on this, units of time and space were defined. Once Special Relativity (SR) was accepted by the mainstream, these definitions remained the same but they were not absolute anymore. Instead, speed of light became absolute which apparently made things work surprisingly well and equations had a remarkable symmetry. Moreover, since the idea of an Aether was not necessary anymore, only the speed of light could remain absolute and constant in every reference frame. This points to the idea of a space that has a dynamic structure and it is real. However, we can mathematically, define an absolute space and time and speed of light will be observer dependent in an absolute frame of reference. A medium for waves like the electromagnetic waves to propagate is no longer necessary in this context but the concept doesn't exclude it.

When time was viewed as absolute, clocks were made and thought to measure this time (absolute). Clocks accuracy improved over time, but they kept measuring the same thing, and that is relative time. We though clocks were measuring absolute time,

but we can also say they were measuring the relative time.

2. Space geometry

For this concept to work, we will define a **flat space geometry**. This flat geometry space-time cannot be changed (since it is defined as flat). We will define an absolute reference frame with an origin for x, y and z axes of a Euclidean space. For simplicity, we will refer to this frame with flat space as the **alpha frame** *(AF).* *AF* will use alpha meters and time. This *AF* can be real if we can prove the electromagnetic waves need a medium to propagate, only the origins are arbitrarily chosen. Otherwise, empty space is an absolute void and flat geometry is the way to tell that the structure of space and time does not change.

We can see the space as an *electromagnetic-superfluid* with permittivity and permeability properties that enables the propagation of electromagnetic field. This way, in the AF, the fluid is at rest. However, the present concept, fundamentally, doesn't support the idea of motion relative to a space, other than **in a mathematical form**. We **can define this motion mathematically** (as in chapter 3), using the Euclidean space and a constant time flow, but this motion is never real. Instead, it strongly suggests, that nothing really moves and only values of fields propagate at a constant speed, as waves.

3. Time and space definition

If we **define** *alpha time* as absolute, we can see that our clocks will not be able to measure measure alpha time. Their tick rate will indicate *alpha speed of the clock.*

An object like an atom, for example, that is stationary in AF will have the highest oscillating frequency compared to the frequency in any other reference frame we choose. In other words, **a clock at rest in AF will have zero time dilation factor**. Any other reference frame we choose will have clocks at rest at a lower tick rate.

Another property of absolute time is that along the time axis the total amount of information in the universe should be conserved. On any other dimension that doesn't happen. This is the essence of time and it is how true time should be defined.

4. Defining Alpha dimensions

In the **alpha reference frame** we will define alpha time and alpha length and relative alpha speed of light (observer dependent):
$$x_\alpha, \ t_\alpha, \ c_{r\alpha}$$
$c_{r\alpha}$ is a relative speed of light seen in *AF*, as the difference between *c* and object speed in *AF*.

In any other reference frame, *c* will be measured will not vary because

those frames use clocks that have variable tick rates in *AF*.

Figure 1, represents 2 regions of space viewed from *alpha frame.*
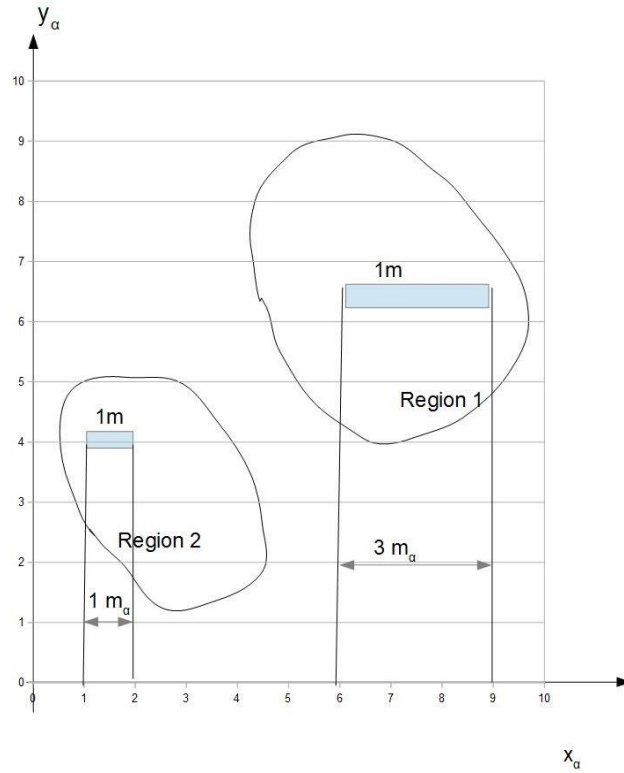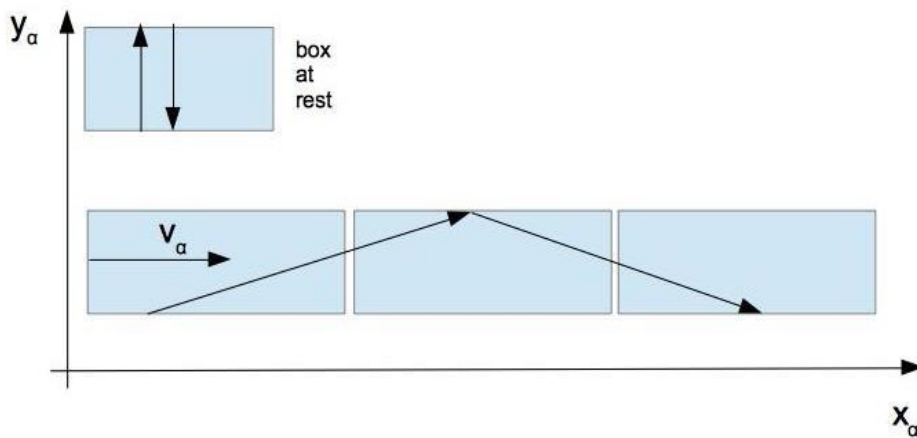

Fig. 1. Alpha frame 2 space

Fig. 2. Simple SR diagram for AF the arrows represent flashes of light travelling from the floor to the ceiling and back. Notice that the box needs to expand on x axis to explain the experimental evidence. This is further explained in chapter 7.

5. From SR to Alpha Space-time

Figure 2, looks like a basic **SR** diagram. An observer at rest in the *AF* (obviously, it works for any reference frame we choose), will measure light as constant no matter how fast the box is moving. If trying to measure the speed of light (two way) in the moving box you get the same value for c. SR conclusion is that something must be happening with time in the moving box and that is time dilation. However, there is another possibility that can answer more questions. We assumed that clocks measure time as absolute, then **SR** demonstrated time was relative. When we define time as absolute the new idea is since our clocks we use don't measure time anymore their tick rate depend on speed. In other words, they don't measure *alpha time*, but relative time. A clock in the moving box (fig. 2), is in fact the light clock. The light clock will complete a cycle in a longer time viewed for *AF*. The tick rate is reduced by Lorentz factor γ. Any other clock we used would do the same thing. It is as if time dilates but the true alpha time doesn't change. If we think of the problem this way, we will be able to explain the mechanics contained in this paper. For the idea to work we need to take into account a length extension (not contraction) as shown in chapter 10.

6. The illusion of Matter

If the mechanism of clocks (which applies to the most accurate atomic clocks available), holds to any clock, it implies the unification of all the fields we know, including gravitational into a single fundamental field. This points to the idea that, everything in the universe is only made only of waves in the electromagnetic field. Nicola Tesla philosophically says "Everything is light" and it confirms my hypothesis. The waves corresponding to this field interfere in such a manner that they create structures like particles we identify as matter and also all effects we consider forces. In figure 2, I've used a light flash as a clock. It is clear that the particle geometry matters. If we take for example quarks that are supposed to consist of different matter, *despite all the evidence, no one has actually seen a bare quark. Instead, we observe clusters of known particles with ½ spin origin* [7]. The spin indicates a complex geometry particle that is a superposition of waves propagating, following a helical trajectory and not a straight line.

According to this concept s**pace doesn't have a variable geometry (the term is usually curved geometry). Waves helical geometry changes what we measure as time and space**. An ½ spin particle moving faster, changes its geometry and its wavelength changes (basically the same way the oscillation frequency we use as a reference in atomic clocks, should change). When travelling faster the geometry of a ½ spin wave, assumed as a particle, changes and makes it complete the cycles in a longer time. Careful studies must be carried to confirm the geometry. At rest the wave

orbits around its centre. The analogy with the OAM light beams works very well. The internal local beams of an OAM |m| =1 light beam, are never at rest in AF, only the wavefront can be at rest at an instant of time. Following this concept, a particle has a wavelength that is equal to the step length of the helical surface. *It is interesting that if we look at an OAM beam, the helical surfaces are 2d objects not 3d.* The entropy of a system is proportional to the surface of the volume that engulfs the system, hence it might be a connection between these facts. This wavelength experiences Doppler effect. Hence the moving particle will be measured with higher frequency / lower wavelength. However, the Doppler effect is a different aspect. This has only to do with what a wave detector reads. The Doppler effect is only an illusion. When you move toward pulses a detector reads an increase frequency. If a ½ spin particle is accelerated, then the wavelength increases but surprisingly the frequency increases as well. That is because the wave-front speed also increases. In this case, f=v/λ and not c / λ.

To summarise, it is the helical mode geometry (this refers to any ½ spin particle that has "rest mass") that gives the *illusion* of changing the geometry of spacetime.

7. A classical model for a photon and a particle for the purpose of explaining this concept

For this concept, to make an analogy with the particles in The Standard Model, I will define the term particle, in a classical way, ignoring the quantum behaviour. I will study the behaviour of this particle in a flat space Euclidean space ignoring Lorentz transformations. What is also important to note is that, since we cannot use Lorentz transformations and Minkowski spacetime concept, gravity will be considered as a consequence of a gravitational field rather than a space-time curvature. In my other paper [1], I have presented a hypothesis that shows gravity as a consequence of electromagnetic interference, but that statement needs to be considered very carefully.

For in this concept, I will define a photon is a classical electromagnetic wave as a packet of a **fixed number of oscillations** (Fig. 1), and an initial fixed amplitude. I will refer to this classical model as a *pulse photon (P photon)*. I will also consider the arrangement of classical local momentum vectors to describe a spin 1 (*P photon*) and spin ½ for a helical mode |m| = *1*. For the latter, I will use the name *omega particle (Ω particle)*.

Since the helical mode is *m=0*, the wave-front velocity is constant (c) and it is equal to the propagation speed of light in a vacuum, therefore we can define the velocity of the *P photon* as *c*. For the *helical mode 1*, the velocity of the wavefront will be defined as the velocity of the Ω *particle*. When calculating the frequency of the particle we need to be careful, as the frequency seen by a stationary observer will be f = v/λ, therefore the velocity of the wavefront will have a critical significance.
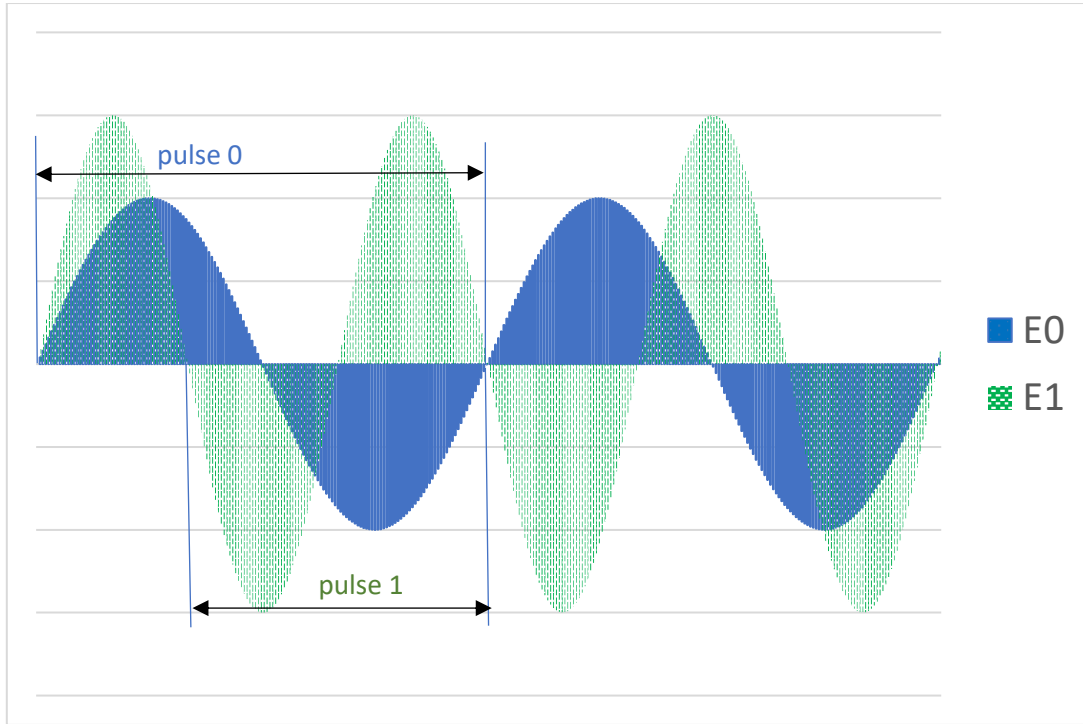
Fig.3. A representation of a classical wave packet, helical mode m=0, on a spatial x axis having linear polarization. Only the electric field is depicted here. The energy of the whole packet (pulse) E_1 is equal to E_0. (Integrating the two sinewaves over a single wavelength gives the same value).

When sending a pulse in the direction of a gravitational field, it is known that the frequency of the wave increases. However, there is no reason for the number of oscillations to increase. According to General Relativity the frequency of a photon should increase, hence, when we use $E_\gamma = hf_\gamma$ formula for the energy of a photon, the energy should increase when falling in a gravity well. In the figure 3, the *pulse 0* and *pulse 1* are *P photons* defined here. These pulses have equal energies for different wavelengths which is possible in this classical framework. However, we can see that the amplitude to the electric field depicted here must be higher for the lower wavelength *P photon*. But, we know that when travelling down a gravity well, the energy of photon increases. Therefore, I will make the assumption that the energy of a *P photon* will increase along with the wavelength decrease, as we know from experiments. This way the amplitude of a *P photon* should increase even more. It is clear that this classical photon model looks very different from the quantum mechanical model.

A more careful analysis of the structure, tells us that when we scan across the whole helical structure of the particle and choose a section plane perpendicular to the direction of travel, the **local wavefront** velocity will obviously vary across the helical structure. Therefore, as a whole, the Ω particle never has a definite velocity like a

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simple object, but since here is defined as the velocity of the front end (wave front) of the particle, we can use it as a reference. Even if the wavefront at an instant of time stops, the structure of the particle will continue to propagate following it. In the next chapter, I will show the equations that leads to this result.

8. The wave equation of the *P photon*

To model this photon, we will use absolute space and time. I will simplify the model by imagining we are taking a snapshot of it at an instant of time. This way the function will not depend on time, but on x axis. The length of the *P photon* is given by a number l multiplied by the wavelength. For most examples this number will be 1, therefore, the *P photon* will be a single spatial oscillation. The wave function is ξ (x). The electric field and magnetic field vary along the x axis as follows:

$$E(x) = \sqrt{2}\bar{E}\cos\left(\frac{2\pi x}{\lambda}\right) \qquad (2)$$

$$B(x) = \sqrt{2}\bar{B}\cos\left(\frac{2\pi x}{\lambda}\right) \qquad (3)$$

The potential energy density of the photon is:

$$u = \frac{1}{2}\varepsilon E^2 + \frac{1}{2\mu}B^2 \qquad (4)$$

$$u(x) = \varepsilon\ \bar{E}^2\cos^2\frac{2\pi x}{\lambda} + \frac{1}{\mu}\bar{B}^2\cos^2\frac{2\pi x}{\lambda} \qquad (5)$$

The wave function can be written as a complex number to show the 90-degree angle between the E and B field.

$$\xi(x) = \sqrt{\varepsilon}\cos\left(\frac{2\pi x}{\lambda}\right)(\bar{E} + ic\bar{B}), \qquad (6)$$

$$\xi(x) = \cos\left(\frac{2\pi x}{\lambda}\right)\left(\varepsilon\bar{E} + i\frac{1}{\mu}\bar{H}\right) \qquad (7)$$

Where ε and μ are the permittivity and permeability of free space, and $\bar{E} = \frac{E_{max}}{\sqrt{2}}$, $\bar{B} = \frac{B_{max}}{\sqrt{2}}$, $\bar{H} = \frac{\bar{B}}{\mu}$ the mean values of these fields.

The energy density function can now be written as: $u(x) = |\xi(x)|^2$ and for a radius r of the beam the total energy will be:

$$U = \pi r^2 \int_0^{\lambda} u(x)\,dx = \pi r^2 \int_0^{\lambda} |\xi(x)|^2\,dx = \pi r^2 \int_0^{\lambda} \varepsilon\,\cos^2\left(\frac{2\pi x}{\lambda}\right)(\bar{E}^2 + c^2 \bar{B}^2)\,dx$$

$$U = \pi r^2 \int_0^{\lambda} \cos^2\left(\frac{2\pi x}{\lambda}\right)\left(\varepsilon \bar{E}^2 + \frac{1}{\mu}\bar{B}^2\right)dx$$

$$U = \frac{\lambda}{2}\pi r^2 \left(\varepsilon \bar{E}^2 + \frac{1}{\mu}\bar{B}^2\right) \tag{8}$$

The wave function does not depend on time since is represents a snapshot of the energy function of x coordinate.

We can imagine this function translating in time on the x axis at a constant velocity c to have the whole picture of the wave. The equation (8) uses the potential energy of E and B fields but this represents the total energy of the wave.

Using this classical framework, we can discuss about the mass of this P photon. The mass will be proportional to the energy and it is $m = \frac{U}{c^2}$. We can normalize the energy equation to express zero rest mass. However, the real meaning of the mass will be altered, since energy and mass are associated with the excitations in the E and B field. The introduction of the rest mass concept changes the picture we have about energy.

If the energy is proportional to with λ, then if λ reduces, the energy reduces. To allow for the conservation of energy, the amplitude of the wave must increase. The modified energy is $U_m = \frac{U}{\lambda}$.

If we assume the Plank _Einstein equation is correct then $U_m = \frac{U}{\lambda^2}$

But in this case the conservation of energy doesn't hold, therefore the energy equation becames:

$$U_m = \frac{1}{2}\pi r^2 \left(\varepsilon \bar{E}^2 + \frac{1}{\mu}\bar{B}^2\right) \tag{9}$$

However, when descending in a gravity well, the wave gains energy but we know that the frequency also increases. We need to compensate again the function to match this frequency increase. Therefore, the term $\varepsilon \bar{E}^2 + \frac{1}{\mu}\bar{B}^2$ must be proportional to $1/\lambda$.

The final equation is:

$$U = \frac{1}{2}\pi r^2 \left(\varepsilon \bar{E_r}^2 \frac{1}{f(\lambda)} + \frac{1}{\mu}\bar{B_r}^2 \frac{1}{f(\lambda)}\right)$$

$$E^2 = E^2{}_r \frac{1}{f(\lambda)}$$

$$B^2 = B^2{}_r \frac{1}{f(\lambda)}$$

where $f(\lambda)$ is a function that returns a value directly proportional to λ. For example, it

can be $f(\lambda) = \lambda$.

If we go back to the wave equation, we get:

$$\xi(x) = cos\left(\frac{2\pi x}{\lambda}\right)\left(\varepsilon\overline{E_r}\frac{1}{\sqrt{f(\lambda)}} + i\frac{1}{\mu}\overline{H_r}\frac{1}{\sqrt{f(\lambda)}}\right)$$

If you fire a single photon from H_1 down to H_0 in a gravity well, if the amplitude of a radio wave increases, then in the case if photons you should detect more photons at the bottom. However, a single photon will not divide nor by QM neither classically, therefore as a single pulse this higher amplitude wave should be able to knock out an electron from a stronger bond exactly like a higher frequency photon does.
In conclusion, this photon should behave like a higher frequency photon but will QM be able to explain the amplitude increase?

To create a non-zero rest mass particle (*Ω particle*) derived from this model, we can modify the Euclidean space where *x* axis is a straight line, so that *x axis* becomes a helical axis. By changing the helicity angle of the axis the wavefront velocity (*v*) changes. A θ =0-degree angle corresponds to *v=0* and a θ of almost *90 degree* angle to almost |v|=c. A perfect 90 angle is impossible if we keep the helicity of this space. v=c for the function is only allowed in the Euclidean space. This explains the speed limit c. To match the structure of OAM beams, the wavelength needs to be adjusted so that at a certain θ angle it corresponds to 1 rotation of the helix.
Making an analogy with the current theories model, a fermion is a 1/2 spin particle is the Ω particle always in the modified helical space and a photon (OAM m=0) is the P photon.
At 0-degree the velocity is *v=0* but the energy of the particle will not be zero, therefore the mass of a 1/2 fermion cannot be zero and a fermion can never reach *c*.

9. The Ω particle explains zero versus non-zero rest mass /energy of particles

Usually, photons as electromagnetic waves (OAM mode 0), travel in a straight line always (in an isolated system – no gravity). All other particles are waves that describe circular or spiral patterns, thus the lead wave speed is reduced. Fig. 3. Mass or energy are a question of frequency and total length (or helical surface, for OAM mode 1) of the wave like radiation (photons) does.
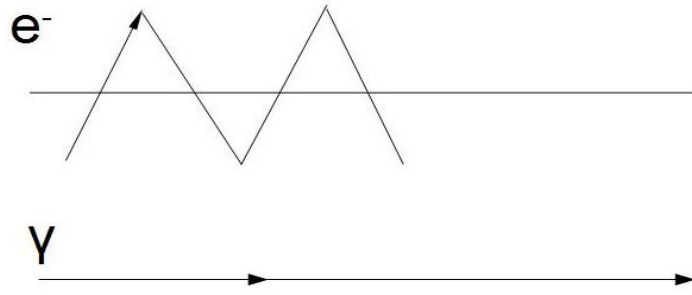
Fig.4. An example of a hypothetical

Electron vs. a Photon

The electron energy wave goes on a different trajectory because of the interference between fields just like OAM photons do. In AF the trajectory it can form a helix (Fig.4) but viewed from a moving reference frame the trajectory can be seen differently.

Here is a an explanation made by De Broglie after his findings:

"*Thus to describe the properties of matter as well as those of light, waves and corpuscles have to be referred to at one and the same time. The electron can no longer be conceived as a single, small granule of electricity; it must be associated with a wave and this wave is no myth; its wavelength can be measured and its interferences predicted. It has thus been possible to predict a whole group of phenomena without their actually having been discovered. And it is on this concept of the duality of waves and corpuscles in Nature, expressed in a more or less abstract form, that the whole recent development of theoretical physics has been founded and that all future development of this science will apparently have to be founded.*" [2].
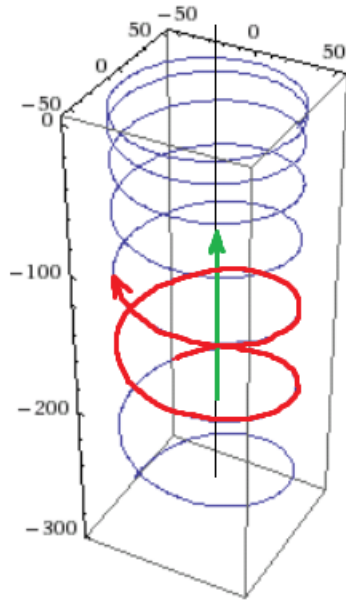
Fig. 5.. A wave-front of a ½ spin Ω particle decelerating in a constant gravitational field. The blue plot represents a local beam momentum trajectory. The red arrow is the particle. The plot is on an 3d space. Time dimension is not depicted here.

For other particles we know from The Standard Model, helical mode |m| =1 must exist in order to experience these effects.

Particles like electrons at rest can also be viewed as circles or loops. The internal beams still propagate at c. That is how they can have rest mass / energy.

The same effect can be applied to more complex entities like atoms, since they are composed of elements like electrons and quarks and the waves they are made of have the c velocity local beams following spiral trajectories. The clue that all particles travel as if following these trajectories, is the OAM |m| =1 spin photons. In my paper, ***Slowing down OAM light beams using a gravitational field* [17],** I have shown that OAM |m| =1 photons behave, under gravity, like a ½ spin uncharged particle (fig.4).

Defining a particle model and analysing consequences

Using the properties of OAM photons, I will use the definition of the Ω *particle* defined as a ½ spin noncharged particle as identical to an *OAM mode 1 P photon.* I have defined an *OAM mode |m| =1 P photon* as pulse containing a constant integer number of wavelengths. The definition of an Ω *noncharged particle* is now identical to a OAM mode 1 *P photon* defined here. In other words, a OAM |m| =1 *P photon* is an Ω photon.

Looking at the particle model explained here, the idea of kinetic energy doesn't have the same importance as in classical theories like newtonian mechanics. That is because particles are waves similar to the *P photon* and the *Ω particle,* not point particles, hence the energy of the wave has a single form and it is neither kinetic nor potential. The particle size in *AF* should be thought in terms of the unrolled length of the spiral. We can see that the energy of the particle in alpha frame depends on speed of the wavefront because looking at the *P photon*, when you reduce the wavelength of the particle, the amplitude of the wave increases.

The mass of the particle is equivalent to its energy. This means that using this model, mass doesn't change either therefore, mass unit is redundant. The relativistic mass formula is $|m| = m_0\,\gamma$. Combined with the model described in fig.4, this means, for a particle to get more mass / energy, it needs an additional amplitude. If you give energy to an electron it increases its frequency but the wavelength, surprisingly, due to its helicity, increases as well as shown in **Slowing down OAM light beams using a gravitational field** [17]. The spiral length should remain unchanged. This will be useful for a better description of the photoelectric effect.

The absolute mass/energy for a fixed helical length (multiple of wavelength), would be :

$E_\alpha = E_e\,n,$ where $n = x_\alpha / \lambda_\alpha$ *is the number of oscillations of the electron wave.*

x_α *is a helical length (length dimension is in AF)*
λ_α *is the wavelength of the electron in AF*
E_e *is the energy within a single oscillation*
$m_\alpha = E_\alpha / c^2$

Notice that m_a is thought to be the absolute total mass of an electron. The oscillation has the same frequency as the internal deBroglie frequency of the electron. This mass is invariant and also the energy is invariant.
A clock at rest in the moving reference frame will also be influenced by the relative speed.
The equation for Doppler shift for a source travelling towards the observer at rest in AF is:

$$f = \frac{c}{c - v_a} f_a \qquad (10)$$

f is the frequency perceived and f_α is the absolute frequency.
If the observer is moving the equation (corresponding to a moving observer) should be corrected with the Lorentz factor.
For redshift, in the classical Doppler effect, the same thing happens, the frequency of the source is not modified, but the recessional motion causes the illusion of a lower frequency.

If we look at a proton, the constituents (quarks and electrons) obey the same rule. The mass of an electron is generated by the wave energy. For example, an orbiting

photon like hypothetical Ω *particle* can have a huge "mass" at rest, that means, when the wavefront has infinitesimal velocity.

Gravitational effect cannot hold the proton together though. Strong nuclear force must be an interference effect between quarks. The interference creates an appearance of a stronger force. (These statements however remain to be proved). The proton mass is not composed of its constituents' rest mass. As an analogy, string theory also treats particles as vibrating strings.

Mass doesn't seem to have a meaning as an intrinsic property of a wave other than energy. We can measure mass through gravity force or inertia, but can a body have mass without exerting any gravity force? Two parallel photons do not interact gravitationally. If we can understand how light waves interfere with other waves, creating a trajectory deviation we call gravity, then we can understand what gravity is. I consider it a simple interference between fields because an OAM |m| =1 light beam spirals as if attracted by a force in the middle of the spiral. However, in this case we know that fundamentally, there is no such a force.

A black hole is an object that behaves like a particle. It is possible to simulate a black hole made entirely of light waves. If BH were tiny as atoms (not particles) we would think of them as new atoms with rest mass. The centre of the BH would be the particle position. Simply because they are big, they can capture all sorts of particles and extreme amounts of energy.

Energetically if we compare a photon and the hypothetical particle, when you push energy into a photon, it increases its frequency. The H particle will do the same as the wavefront accelerates. The speed limit for the H particle is obviously c.

The frequency of the Ω particle is given by the equation:

$$f = \frac{c}{D^\Upsilon} \tag{11}$$

D is the diameter of the outer side of the helical momentum surface of the particle, Υ is the Lorentz factor in absolute space and time. The equation is explained by using the helical model, Fig 4.

10. Discussion on Gravitational effects generated by particles

Looking at what happens to an uncharged particle while moving, the idea of curved spacetime doesn't hold anymore. It is known that the gravitational field effect has a unique property. It is always attractive.

Analysing the studies made on gravitational effects and experimental data available, we can realise that the gravitational effects cannot simply be attributed to a simple gravitational field around the matter. The spacetime concept is a step forward form newtonian gravity, but it seems to me it cannot explain all the effect that appear

in the real world.

For understanding gravity, in this context, I will use the term particle which will describe a pulse beam that propagates **either in a straight line or in a helical mode |m| =1** and **not spheres or point like entities (singularity is not accepted in this context).**

The gravitational effect, I think, is best described by selecting two beams of light and watch how the gravity between them is generated. That is because this alpha space concept treats matter as helical mode 1 beam pulses. Understanding how gravity works for ligh is crucial. The original paper that presents such an experiment is **Tolman, R.C., Ehrenfest, P., and Podolsky, B. Phys. Rev. (1931) 37, 602.** The idea was studied in the paper "Gravitational interaction for light-like motion in classical and quantum theory" Nikolai V. Mitskievich. **The study concludes that two pencils of light moving in parallel will not experience any gravitational effect**. If they travel antiparallel the experience a gravitational effect, but it is twice as big as it would be by judging the relativistic masses (using a quasinewtonian model).

Using the ideas expressed in this paper, we can analyse a case of two hypothetical particles, as in figure 6. The arrows represent the local momentum.
In the case of the anti-parallel wave beams the gravitational effect should be maximum. For the H particles, it is clear that the gravitational effect will be smaller. For simplification instead of a helical mode, I have used a squared pattern to express the local momentum, but the gravitational total effect should be the same. We can see that in the case of H particles, only **half** of the local momentum lines travel anti-parallel. Those are the vertical lines. This explains the effects seen in Tolman experiment.
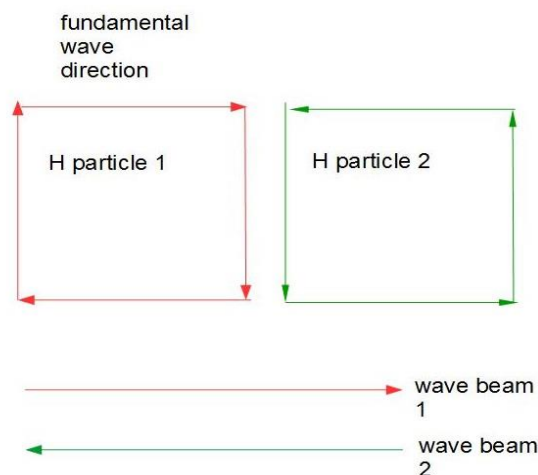

Fig.6. This diagram represents two hypothetical

particles at rest (only the front wave briefly reaches

zero velocity) in the AF and two wave beams of the

An interesting fact that can be seen looking at this diagram is that a gravitational effect can be produced within the particle itself as long as the absolute speed in AF is not comparable to c (the effect should be reduced at 'relativistic' speeds). The magnitude of the gravitational effect is twice as big as it is between the H particles.

The most important idea is that in order to understand gravity, **we need to understand how gravitational effects occur between photons** only. Then we can extrapolate it to all particles.

Another important thing to note is that the local momentum trajectory is produced only through electromagnetic interference, although it might look like the trajectory is deviated by a force towards the centre of the helix. It is clear that there is no real force but only an illusion. By understanding the propagation of these waves, I can conclude that gravity must be also a consequence of fields interference. According to this concept, the gravitational field doesn't exist and gravity is not curved spacetime either. Also, there are no forces needed to explain interactions between entities (wave structures).

11. Equations for transition between the AF and a reference frame

Since by definition clocks we use don't measure absolute time means in *AF* a normal second, cannot be compared to *alpha seconds*. In other words, *alpha time* is not measured in seconds but in a different unit of measurement we can call *alpha second.*

We will consider an example where a particle has a speed of v_Ω *[m_α / s_α]*.

For explaining the principles of conversion, we will use the Ω *particle* that has certain properties.
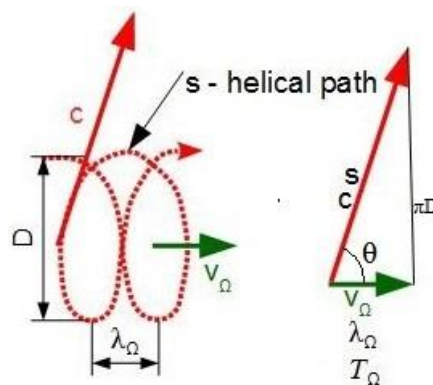

Fig.7. Unfolded helical path

For the *alpha second* definition, we will use the time for a free Ω *particle* to complete a **single oscillation** when stationary in *AF*. The helix radius will be of a radius of *1 m_α* in *alpha space*. Hence the definition of an *alpha meter* will be the radius of a Ω *particle*.

The wavelength of an Ω *particle* in *AF* will be defined as $\lambda_\Omega = 1\ m_\alpha$. Equation number 10 gives the frequency of a clock that uses the frequency of the particle to measure time. The radius is D/2, $D = 2\ m_\alpha$.

No matter how an observer is moving, this frequency will remain constant in *AF* as long at the particle wavelength remains constant, but it is seen differently by the observer.

To solve the equation associated with the helical path, we can unfold the path to a triangle. The hypotenuse is the helical length, the circumference is πD and it is the opposite side and the wavelength λ_Ω is the adjacent side. The triangle corresponds to the velocity triangle made of v_Ω, c and the radial component. We get:
$s^2 = \lambda_\Omega^2 + \pi D^2$, where s is the total helical path of the helix. Then, we can write:

$$\frac{v_\Omega}{c} = \frac{\lambda_\Omega}{s}$$

$$V_\Omega = \frac{c\lambda_\Omega}{\sqrt{\lambda_\Omega^2 + \pi^2 D^2}} \qquad [12]$$

The length of the particle in the travelling direction is $x_\Omega = \lambda_\Omega$.

An observer will see a moving particle, or extrapolating this, an object, in *AF*, increasing its size in the direction of travel. If the observer is moving in *AF*, it will see stationary objects smaller than they were or than they are in reality.

If the H particle has a length x_Ω at speed v_Ω and a length x_Ω' at speed v_Ω' the relation between them is the following:

$$x_\Omega' = x_\Omega \sqrt{\frac{1 - \frac{v_\Omega^2}{c^2}}{1 - \frac{v'^2_\Omega}{c^2}}} \qquad (13)$$

The equation shows that with increasing speed the length in the absolute space-time (*AF)* is increasing and **not contracting as SR says.**

If the oscillation period of the Ω particle (also measured the oscillation period of a clock in case of an atomic clock) is T_Ω at v_Ω and a period of T_Ω' at a speed v_Ω' the relation between them in the following equation:

$$T_\Omega' = T_\Omega \frac{v_\Omega}{v_\Omega'} \frac{\lambda'_\Omega}{\lambda_\Omega} = T_\Omega \frac{v_\Omega}{v_\Omega'} \frac{x'_\Omega}{x_\Omega} = T_\Omega = T_\Omega \frac{v_\Omega}{v_\Omega'} \sqrt{\frac{1 - \frac{v_\Omega^2}{c^2}}{1 - \frac{v'^2_\Omega}{c^2}}} \qquad (14)$$

As speed in *AF* increases the time for a fundamental wave within a particle to complete an oscillation increases. That is what we take as the tick rate of the clock or tick rate of a clock. This shows that time itself, as defined, does not change.
We can define:

$$\gamma_v = \frac{1}{\sqrt{1 - \dfrac{v^2}{c^2}}}$$

as a factor that depends on v_n. The relation 13 can be written now as:

$$x'_\Omega = x_\Omega \frac{\gamma_{v\prime}}{\gamma_v}$$

$$T_\Omega{}' = T_\Omega \frac{v_\Omega}{v_\Omega{}'} \frac{\gamma_{v\prime}}{\gamma_v}$$

However, in SR, we define a frame where an object is at rest, then this object is accelerated until it reaches a velocity *v*. The new length contraction factor only uses this velocity. I our case it would be the difference between *v* and *v'*, but $\frac{\gamma_{v\prime}}{\gamma_v} \neq \Upsilon_{v\prime - v}$.

If an observer is at velocity *v* in *AF*, and then accelerates to *v'*, according to **SR** it will see an object that travels at *v,* shorter, using the factor $\Upsilon_{v\prime - v}$.

12. Two-way speed of light

For this concept to work speed of light needs to be constant only when we measure the total time between a point A and a point B and back. The speed from A to B will not be equal to the speed from B to A in a particular reference frame we chose to measure it. However, in AF, it is always constant.

It is interesting to see what we should actually measure if one way speed of light could be measured.

Consider a box within the measurement of the speed of light is done. A light beam is sent from a source to a mirror and then it comes back. If we ignore the length extension I've mentioned in chapter 11, we get

$$c_{m_F} = (c - v)\gamma \tag{15}$$

$$c_{m_F} = (c + v)\gamma \tag{16}$$

where c_{mF} is the speed measured forward and c_{mR} is the speed measured when the light returns from the mirror. γ is the Lorentz factor.

$$c_{m_F} = (c - v)\gamma = \frac{d'}{t_F} = \frac{d\gamma}{t_F} \tag{17}$$

$$\frac{d}{t_F} = c - v = c^r_{m_F} \tag{18}$$

However, the box will increase in size by Lorentz factor, flowing the rule in the particle mode, which says that particles get elongated in the direction of motion. Therefore, we get:

c^r_{mF} is the real measurement after length correction.
Hence the real measurements should show:
$$c^r_{mF} = c\text{-}v \quad \text{and} \quad c^r_{mR} = c\text{+}v$$

These seems to confirm the conclusions of Stephan J.G in his paper, ***GPS and the One-Way Speed of Light*** although the experimental results haven't been accepted by the mainstream.

The DGW concept is supported by the evidence we have about the speed of light as a constant when measured both ways just like relativity. However, the only experiment claiming to have achieved the correct measurement for the one-way speed of light supports this concept and indicate the same results.

Reginald T. Cahill in his paper, One Way Speed of Light Measurements Without Clock Synchronisation, concludes:

"The absence of the Fresnel drag in RF coaxial cables enables 1st order in v/c measurements of the anisotropy of the speed of light. "[13]

13. Paradoxes in SR and GR

General Relativity limits the particle speed justifying that to accelerate a particle to c you need infinite energy and sometimes people ask what would happen if you exceed this limit. Some even think, that would mean going back in time. My model seems more natural, because it is easier to predict the consequences. Exceeding c is clearly impossible and also there is no reason to think of going back in time.

Because in AF time is absolute, there are no issues with the moment *"now"*. What is *now* here it is *now* everywhere in AF. The popular twin paradox is not a matter of time any more. The twin that returns younger than his brother does that because the particles he is made of, experience slower cycles.

Time travelling is not possible here because it is in contradiction to the way alpha time is defined.

This theory allows the possibility of taking a snapshot of the universe (a single line through the space axis) and containing all the information in the universe. Thus, the next frame can be generated. However, quantum effects, could prevent knowing the hypothetical "next" frame and an infinity of possible next frame can exist, the one that follows is not known until it happens. If we imagine a random number RN that is either 1 or 2 and an event E that can generate two possible outcomes O1 and O2, then

these outcomes are equally valid. Which one follows, is impossible to know. This means the universe will certainly generate only one of these outcomes. The generation of a random outcome is subject of controversy.

We can imagine the following experiment. Two circles of equal radius approaching each other from opposite directions. The path they describe is a straight line and the circles move so as the centres of the both circles are on the line. After they collide, we assume they will bounce in opposite directions. The question is if the trajectory of both circles will not follow the same line, how can we predict which side of the line they will go? No matter how much we zoom in we will always see continuous lines and not points. But the circles are made of points and spaces between points that are also infinitesimal. This is a sort of a mechanical RN generator.

14. Black Holes Dynamics Hypothesis

First of all, this model does not allow any singularity neither point particles.

It is very likely that strong / weak forces to have a fundamentally electromagnetic origin. In that case, it is a single shell of the BH, comprising all sorts particles orbiting at near c (elongated helical trajectories). Most of these particles are turned into various extreme high frequency EM waves (photon geometry). This is the optimum way to compress energy. This way the shell becomes very thin and gravitational effect is maximum.

The gravity produced is the same gravity planets produce, but different structure bodies produce different effects on close objects trajectories.

What differs from a planet in case of the BH are the "relativistic" and a stronger frame dragging effects.

I think it is important to take into account "relativistic" increase in "masses". The phenomenon that can also be explained by relativity (however, only if using infinitesimal mass particles instead of photons) is that photons moving in parallel do not attract but those travelling anti-parallel do. This has been studied in the experiment conducted by Tolman [5] . In case of other particles, a similar thing happens. If moving parallel the gravity does not increase.

All particles approaching the black hole horizon are accelerated by extreme frame dragging at near c, on the outer shell and begin to orbit along with the orbiting radiation.

Most probably the greatest amount of gravity is produced by the relativistic motion of electro-magnetic waves while orbiting and not by their value of rest mass.

There is not reason for any particles inside the black hole. All particles and photons are concentrated on the shell that corresponds to what is called event horizon in General Relativity.

Fast jets and fireworks

According to this model, scenarios about polar jets can be easily accepted. It is possible that high frequency radiation including, spin ½ particles, are ejected though the poles, due to high values and high fluctuations of electromagnetic fields produced by the spinning electromagnetic waves ans spin ½ particles.

According to data available, BH are relatively stable, but especially during

collisions with massive objects, part of the particles is destabilized and can escape the BH.


15. Electromagnetic waves vector summation

For explaining the electromagnetic interference I will use the *H.G. Schantz's* paper as a reference. He manages to explain this in the most elegant and logical way which reveals a perfect energy / information conservation principle.

Dirac concluded in his paper, that two photons can never interfere with each other (P.A.M. Dirac, *The Principles of Quantum Mechanics*, 4th ed. (revised), 1967, p. 9.).

" I believe Dirac was wrong.

Interference is defined with respect to the electric field. But when two photons interfere, a very interesting thing happens. Electric energy transforms to magnetic energy, but conservation of total energy holds. The figure below illustrates how this works for constructive interference (left) and destructive interference (right).
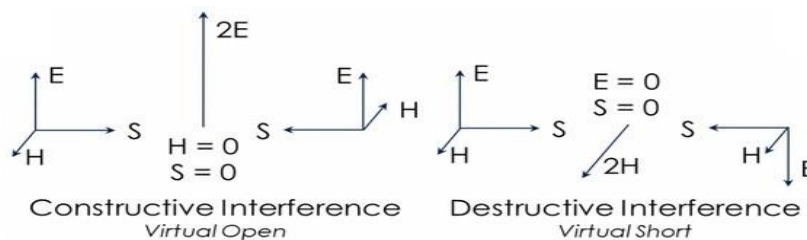
In "destructive interference," magnetic fields (H) add while electric fields (E) cancel. In "constructive" interference, electric fields add while magnetic fields cancel. Energy is always conserved, merely transitioning between the electric and magnetic forms. The "S" is showing the Poynting vector, the local flux of EM energy, given by S = E x H.

The truly fascinating aspect of this is that when one field or the other goes to zero, the energy comes to a rest, even though the waves keep propagating through each other. Some of the energy is exchanged between the two, so some of the forward propagating energy becomes backwards propagating energy and vice versa.

I discuss this at greater length in a blog post, "Dirac's Big Mistake: What EM Tells us About QM."

So in summary, in a destructive interference, energy is conserved because the cancelled E-Field generates an enhanced H-Field and the "missing" electric energy transforms to magnetic energy.

You'll find Princeton physics professor Kirk McDonald offers an excellent analysis here, as well: "Does Destructive Interference Destroy Energy?"[12]

If this explanation for waves interference hold, then it can explain how it is possible to create apparent charges using electromagnetic waves only.

16. The electro-magnetic medium

If you can explain the electromagnetic waves propagation without using a medium, then waves propagate in an absolute frame of reference. However, if the medium is necessary to provide this propagation, then I can say that this medium needs to have constant permittivity and permeability. These properties define the speed of light. There is no definite motion of this medium. Even if it had, it wouldn't have had absolutely any effect on the propagation of waves.

17. Time definition aspects

In his paper, ***Time Invariance of the Fundamental Phisical Constants***, *the author Mugur B. Răuţ concludes:*
This paper shows that the variation of certain fundamental constants is practically impossible in a physical time frame of reference. We can have as many time frames of reference we want but when we transform them all into physical time frames of reference, with time as a measure of movement, physical equations retain their form and meaning and values of certain physical quantities and fundamental constants are the same. Therefore the question of variation of certain fundamental constants is only possible for those frames of reference other than physical time. [14]

I've defined space and time as absolute, so that they can become frame independent. This way, the absolute time is not physical. By proposing a special particle geometry, I have shown that causally is constant in absolute time and space, although the **measured** time and lengths vary from frame to frame. This way there is no contradiction between my model and the ideas expressed in the M. Raut's paper.

18. A classical hypothesis on the photoelectric effect

The ideas in this chapter are speculations only. However, according to the P *photon* model, when analysing the behaviour of photons and interactions with atoms and electron, we get different results. That is because the power delivered to the atom seems to be important but also the total energy of the photon. In the double slit experiments, in terms of Quantum Mechanics (QM), it is often said that the measurement collapses the wave-function or more exactly, the measurement destroys

the interference. However, we can also think, that is not the measurement that destroys the interference (except for some experiments). The delayed choice quantum eraser can be used as a proof. People developed the DCQE (Delayed Choice Quantum Eraser) experiment, where there is no measurement involved at the slits, but they went forward with QM believing that even simply watching the results destroys the interference. If QM is all correct concerning this aspect, this seems a rational conclusion. However, I think it is not the case. The theory probably makes wrong assumption. Apparently, the detectors cannot detect a photon, if the energy that reaches the detector is by a certain degree less than the work-function. QM says, that there is a significant probability of detection when the wave passes through both slits to have a photo-electron release on either detector A or B. That could be wrong. The probability could be **almost** zero. Unless the other part of the wave hits the orbiting electron that still holds the energy from the previous electromagnetic wave in a very short time, the atom will not release the electron.

The following explanations relies on an assumption that an electron bound to an atom can acquire some energy if hit by a photon.

Let's suppose we have a photon with energy E_Y. After it passes the slits we assume we obtain two waves of E_{YL} and E_{YR}. Say, the energy required for an atom in the ground state to release an electron is E_{e^-} (this is the work-function) . If a wave with energy E_{YL} hits the atom on the x screen detector, it will energise the electron, but the atom will not release the photoelectron yet. Since the energised electron state does not correspond to a stable electron orbital, it will quickly lose energy. However, if the wave E_{YR} comes quickly enough and in phase, there will still be enough energy left in the excited atom and $E_R+E_L>E_{e^-}$. Hence the electron will be released.

Notice, that the energy of a photon when it was just been released will always exceed the work-function (will always have more energy than E_{e^-}) otherwise the frequency of the wave is not enough to trigger a photo-electron release.
We can, then say that this mechanism should work at any frequency of the photon. More exactly, a wave of any frequency could trigger an electron release, because photons can add up energies to the electron until it gets released. It is clear that it doesn't since the experiments show that the frequency matters. However, we can then make the assumption that for a photon to interfere with an electron, it needs also a minimum frequency. It is possible to explain how this happens. A low frequency wave interferes with an electron attached to an atom as well, just like a high frequency does. However an energised electron, looses energy quicker than the low frequency wave is able to provide the energy for releasing an electron.

Supposing we have a Hydrogen atom. We can write:

$E_A(t)=E_{A0}+E_Y - P_A*t$
where, E_{A0} is the energy of the atom when the electron is a stable configuration, ground state.

t is measured in absolute seconds, according to this concept. All symbols for time denote absolute time

$E(t)$ is the energy stored in the orbiting electron, which is a function of time.

E_A is the energy received from an electromagnetic wave.

P_A I.s the radiation power of the electron in the energised unstable state.

$E_\gamma = P_\gamma \ t_A$

t_A is the emission time of an electromagnetic wave.

E_γ is the energy produced by an electromagnetic wave.

We can also write:

$E_\gamma(t) = P_\gamma \ t$

P_γ - power produced by an electromagnetic wave

Since this model is classical, this power depends on the frequency only:

$P_\gamma = k\upsilon$

k is a constant and υ is the frequency of the wave.

We can now write:

$E_\gamma(t) = k\upsilon \ t$

To produce a photo-electron, the energy E_A needs to reach E_{e-}

$E_A(t) = E_{A0} + k\upsilon \ t - P_A t$

In conclusion, to produce photo-electron, the electromagnetic wave must have a frequency that satisfies the following inequality:

$$\nu \geq \frac{P_A}{k} \qquad (20)$$

These equations need to be viewed in an absolute time. Applying relativistic equations to them will generate wrong results in certain situations, because the relativistic effect is generated automatically by the wave behaviour of all particles.

Supposing we have a hydrogen atom. There is another option for this mechanism or more precisely the energy release mathematical function (not the work function) can be more accurately described. The energised electron loses energy until it reaches the stable state. This depends on the temperature of the system. It can do that is a continuous mode. However, it is more likely that it loses energy by releasing a single oscillation, like when accelerating a charge (this case a single movement – positive acceleration and then negative acceleration to stop the motion). This is only an analogy since the electrons do not possess point charges but the charge is evenly spread out throughout the entire wave structure.

If the electron creates a **single pulse** as it settles to the stable state (which depends on temperature/background radiation) then **photons are single wavelength electromagnetic waves having an amplitude corresponding to the energy difference between states.**

For the electron to be energised, a short pulse (small wavelength) can deliver

the energy quicker than a long wavelength pulse. A minimum amplitude is also required but since the emissions of photons are at fixed amplitudes the energy of a photon *apparently* doesn't depend of amplitude. This is not correct, because if you split the wave, the energies left in each half may reduce below the workfunction. When you increase the intensity of a beam, it doesn't mean the amplitude of the waves increases instead, the number of pulse emissions in a given time increases. However, if there is a constructive interference, of two waves (usually originated from the same photon emission, like in the double slit experiment) then this pulse can exceed the work function and trigger a photoelectron release. This has been observed experimentally and it is called TPA. (https://en.m.wikipedia.org/wiki/Two-photon_absorption).
This demonstrates photons behave like classical waves from this point of view and not as QM says. The *virtual state* in the TPA concept is real.

It is interesting that in the ground state corresponding to 0 K temperature, the atoms behave differently. For example, if we have few atoms they start to behave like a single one.

In a normal environment the electron seems to be permanently energised by the background radiation and regularly emits EM waves to try to go to ground state.
It is clear that a world without this background radiation (which in fact dictates the temperature) would be completely different.

In the case of an atom, the electron is literally orbiting the atom, but not as a point charge particle. This interpretation is flawed. It is a continuous orbiting wave around the nucleus describing certain patterns (probably a ring) depending of the energy level.
The lowest level is the ground state which happens below the temperature of 10K. Above 10K, when two atoms share an electron, they share this wave that surrounds both nuclei.

Based on this mechanism for the photoelectric effect we can analyse the double slit experiment.

I suspect that if we use special detectors based on atoms that emit photoelectrons at half the work-function(for example 2eV instead of 4eV) of the original detectors, we can detect the photons that cause the interference pattern without destroying it.

In the Delayed Choice Quantum Eraser experiment by Kim et. al, we can replace d1 and d2 with the special detectors. If the d4 or d3 get a detection, the special d1 and d2 detectors should be triggered simultaneously as well. This should confirm that the electromagnetic pulse was split when passed through the slits.

As I said at the beginning of the explanation, I assumed that an electron bound to an atom can acquire some energy if hit by a photon. The consequences that result from this assumption lead to the conclusion that the assumption could be wrong. Therefore, just like the behaviour of photons in a gravitational field, it is possible that electrons do not acquire any energy. An electron bound to atom, could be either in a helical mode or not. If it is in a helical mode if accelerated, the wavefrons

My suggestion is that instead of using energy packets to model the photon – electron interactions, we can analyse the waves also by their power delivery in a dynamical way because a higher frequency wave can deliver more power. A classical wave **power output** depends on frequency unlike the total energy that depends also on the length of the wave. Therefore, in the case of an atom it is probably important how quickly the energy is delivered and how quickly the energy is lost by decay.

19. The connection between the speed limit and wave propagation

You can imagine the universe as an inert homogeneous medium (liquid), frictionless, lake and matter / energy as waves. Imagine waves propagating at a constant speed, in a single direction, not radially in all directions. Particles would travel in variable zig-zag patterns and light beams of helical mode m = 0, would travel straight. My concept allows a hypothetical observer that can "watch" the lake from above and describe what it sees. That is the absolute observer and it can define an absolute frame where it is at rest. Clocks rates depend now on the distance between the peaks of the zig-zags and not on the wavelengths. A hypothetical observer from above can have a clear picture of the lake, but an observer made of waves itself will find difficult to visualise it. Even the observer above the lake can have trouble finding a frame where the medium (the liquid in this case) is at rest because there are no floating objects, but having the whole picture you can have an idea of what is your speed relative to the medium. There are already experiments that claim to have found the aether drift. The one-way speed of light experiment is also a proof that there is an absolute frame which must be the frame in which the medium is at rest. Just like relativity says about things that don't have a definite state of motion, here, the medium doesn't have a definite state of motion and even if it had it would have no effect.

Viewing the world from above becomes the general case.

The propagation of light is constant relative to the medium. This medium does all this weird apparent "time dilation".

Sound waves cannot exceed the speed of sound just like light cannot exceed the speed of light. This is not a coincidence. The wave behaviour of light is responsible for the speed limit.

The ½ spin particle model described in this concept, works in accordance with this explanation.

20. Gravity as a consequence of electromagnetic filed interference hypothesis

In chapter 15 I have shown how the energy conservation mechanism works for the electric and magnetic field vectors. The cross product of the electric field over the magnetic field yields the Poynting vector which gives the propagation direction

vector. Cancelling the E field, energy doubles the energy H field energy. If we introduce a third filed as the gravitational it could disturb this equilibrium. Therefore, it is possible that gravity is a simple consequence of the electric and magnetic fields interference. Since this concept says the world is made of this EM field and the propagation of their values in the direction of the Poynting vector, all forces we experience become consequences of these interferences, including electromagnetic forces, inertia and gravity. If two beams of light appear to attract each other or a beam seems to be attracted by a massive body, in reality, electromagnetic interference could be responsible for an apparent change in the propagation direction.

A very interesting and powerful example that can support this idea are OAM beams of light. If we look at a beam of light carrying internal OAM with helical mode $|m| > 1$ then we can see that the superposition of waves can make the local momentum to follow a spiral rather than travelling in a straight line creating the illusion of a force that points to the centre of the spiral.

21. **The connection between the helical modes of light beams and the particle model predicted by this concept**

In chapter 7, I have shown how a particle that has rest mass / energy, propagates.

If we look at an OAM helical mode $m = 0$ beam of light, the propagation speed of the wave front is maximum and it is equal to the speed given by the permittivity and permeability of the medium. In this case the Poynting vector follows a straight line. This corresponds to an integer spin particle like normal photons $(m=0)$.

For a beam of light of internal OAM helical mode $|m| = 1$ or greater there is experimental evidence that the wave-front speed is reduced [reference 16]. Because of electromagnetic waves interferences the local momentum, instead of following a straight trajectory, it follows a helical one. The vector speed is still the same, c. However, the front wave velocity is slower.

22. **How gravity slows down time**

According to General Relativity, it is the Gravitational Potential that influences a clock frequency. This is equivalent to measuring two clock rates that are placed one at the front and one towards the rear at a certain distance, in a moving vehicle. If the distance is the same and the proper acceleration is the same as the g given by the gravitational field, either being in an accelerating vehicle or in the gravitational field, the two clocks will behave absolutely the same way. This is the called the *equivalence principle.* I will now use this concept to explain why do we get these effects. To show how this happens using the mechanism provided by this concept, we can use the Ω particle concept described in chapter 7. If the particle is at a distance *H1* from a massive object M as it travels towards it, it has λ_1 wavelength equal to the step length of the helical path. After it gets closer and reaches a distance H0 from M

the energy becomes higher. The same thing happens if you accelerate a particle using a different method (other than gravity) – its energy becomes higher. Because the wavefront velocity increases, the wavelength of the beam (and hence the pitch helix) increases, $\lambda_0 > \lambda_1$. Since the wave front travels now at a higher velocity, I have shown that the **frequency increases** (the frequency measured by a stationary observer). A higher frequency means that the energy and the **amplitude** of the wave is higher.

This paper assumes that, instead of a dilation of time itself, when moving faster in an absolute flat space, only the clock frequencies reduce and the defined absolute time rate does not. If we look at the Ω particle model described in this paper, we can build a clock that indicates time by measuring the frequency of the H particle using a frequency detector. When both the particle and the detector are at rest in AF, the frequency is greater than when they both move in the same direction. If the particles travel at a velocity v towards the detector, then, I have shown that the frequency increases (Eq.2). $f_v > f_0$.

$$f_v = \frac{c}{D\gamma} \tag{21}$$

where, f_v is the frequency detected when the source in moving towards the detector at speed v which appears in the gamma factor.

The interesting part is to see what frequency is a detector, that moves in the same direction and at the same speed with the particle, is going to measure. In this case, in the reference frame where the detector is at rest, the oscillator (the source) is also at rest. That is what happens when we measure time using an atomic clock: both the detector and the atom that is measured, are moving at the same speed, being in the same frame of reference. Because the velocity difference between the wavefront and the detector is zero, the detector will only see an increase in wavelength. Therefore, the clock rate will be reduced by the following formula:

$$t_v = t_0\gamma \tag{22}$$

We now need to go into further investigation of the gravitational influence on clock rates. For this purpose, I will use the Ω particle model to construct a simplified atom model which I will call, Ω atom. This atom consists of a neutral nucleus that has a certain mass which makes the Ω particle orbit around it. Real atoms rely on charge to do this but the model of an electron is more complicated as the helical structures can reach even 200 units of oscillations per helical revolution.

We can look at figure 1 to see what happens to an Ω *atom* in a gravitational field. from *H1* to *H0*.
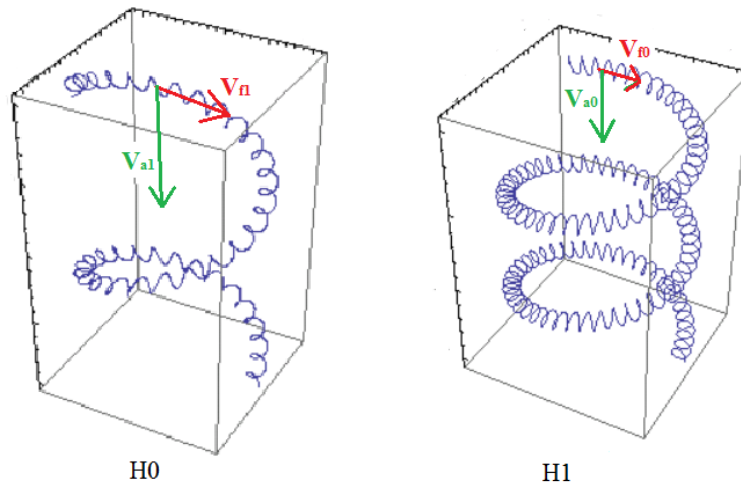
<center>H0   H1</center>

Fig.8. An Ω atom descending in a gravity well (a constant gravitational field), confined on a circular trajectory. The gravitational field is pointing downward. In the left side the atom is at a lower height D0 and in the right side the atom is at the initial position D1

The *wave 1* on the left side, is lower in the gravitational field. Velocities V_{a1} and V_{a2} are the velocities of the atoms. V_{f1} and V_{f0} are the wave-front velocities of the Ω particles. V_{f1} and V_{f0} are the vertical components of V_{a1} and V_{a0} (note that for comparison, in the picture the green vectors lengths are longer, but these lengths, here do not signify the vector strength, but the colour red signifies a stronger vector, therefore always $|Va1| < |Vf1|$ and $|Va1| < |Vf1|$).
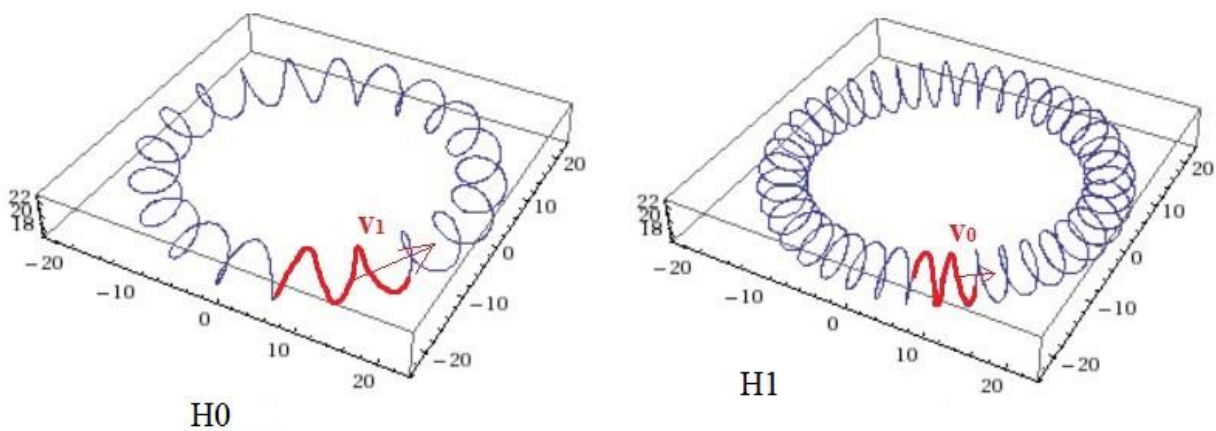

Fig. 9. Two Ω atoms at rest. The atom on the left is at a lower

<center>28</center>

In figure 15, we have represented an Ω atom at "rest". The wave-front speed of the atom at *H0* is higher than the wave-front of the atom at *H1*. However, the wavelength λ_{a1} of the atom *at H0* is greater than the wavelength λ_{a1} of the *atom at H1*. We measure the frequency f_1 of the atom at *H1,* using a detector. This detector should incorporate an oscillator that oscillates the same way as the Ω atom. This oscillator will have a wavelength λ_{o1} at the altitude H1. When both the atom and the detector get to a lower altitude H0, the λ_o and λ_a will increase by the same factor and hence it will show the same value. However, if we use two counters that count the number of oscillations (like a clock does), in a certain amount of time, the counter at the higher altitude H1, will obviously read a higher value than the counter at H0.

This simple to understand mechanism clearly explains why clocks at different altitudes measure time differently.

23. Charged particles

In this paper, I have studied the behaviour of charged particles models deducted from an OAM |m|=1 photon model.

"Electron vortices are unusual quantum states that have only recently been predicted [10] and produced in transmission electron microscopy (TEM) experiments [11,12].Electron vortex beams have the same geometrical properties as their optical counterparts, being characterized by an exp(ilφ) angular dependence related to lℏ units of OAM, but they also produce features that have no analogue in optics. In particular the circulation of charge in an electron vortex beam gives rise to an arbitrarily large orbital magnetic moment (figure 2), distinct from the magnetic moment due to spin [10, 13]. Hence electron vortices can couple to electronic degrees of freedom through dipole selection rules forbidden to optical vortices [14]. Given the analogies (and differences) between optical and electron vortices, the question arises: do electron vortex waves undergo something analogous to an optical Faraday effect? Here we show that there is indeed a Faraday rotation (compare figure 1(b)) arising through Zeeman interaction from propagation parallel to a uniform, external magnetic field (i.e. in a geometry where there is no Lorentz force)."[1]

24. The origin of OAM beams

Here is a good classical description of the phenomenon
The optical Faraday effect and its generalization for electron waves
Michael Faraday reported in 1845 that the polarization of light can be affected by magnetic fields, an effect that now bears his name. Since then, the Faraday effect has found numerous metrological and research applications, including the ultra-sensitive detection of magnetic fields, [1, 2], or of fields generated by electron plasmas in interstellar space and the ionosphere [3, 4]. Faraday noted that the polarization

direction of light is rotated after passing through 'heavy glass' exposed to a longitudinal magnetic field. We now understand that the Faraday effect arises from the different speed of propagation of right and left handed circularly polarized light through an optically active medium. The associated difference in accumulated phase between the circular components of linearly polarized light results in a rotation of the polarization direction, shown in figure 1(a). One of the intriguing properties of light is that it can carry angular momentum: a spin contribution associated with circular polarization (±$\bar{h}$), but also orbital angular momentum (OAM) [5, 6]. While circular polarization describes a rotation of the electric field vector upon propagation, the OAM is a feature of 'twisted' light beams. The OAM can take on arbitrary multiples of $\bar{h}$ depending on how tightly wound the phase fronts are. These so-called 'vortex beams' have a rotational intensity pattern and are associated with a phase dependence exp(ilφ), where l is a non-zero integer and φ the azimuthal angle. Strictly speaking, Faraday rotation is not a relevant concept for optical OAM. The reason is that there is no intrinsic mechanism in a gyromagnetic medium to produce the required OAM state dependent dispersion, because selection rules forbid coupling of the OAM to the atomic electron degrees of freedom. This is consistent with results from a recent experiment in which no rotation was observed for a superposition of right and left handed OAM states (a Hermite–Gauss mode) propagating through cholesteric liquid crystals [7]. We note that a relative phase shift between right and left handed OAM components will appear as a rotation of the intensity pattern [8]. Such phase shifts can be induced by spinning the medium through which the light propagates, inducing a 'mechanical' Faraday rotation, as demonstrated recently in a slow light medium [9]. [18]

Internal OAM appears when a paraxial light beam is in a "helical mode". Helical modes of the electromagnetic field are characterized by a wavefront that is shaped as a helix, with an optical vortex in the center, at the beam axis [10]. The helical modes are characterized by an integer number m, positive or negative.

25. Field Equations

The geometry of Ω particles (these are similar to OAM light beams) shows that the apparent motion is in fact propagation of values of the fields and not the kind of motion that appears in the Newtonian mechanics, driven by inertia. I have explained the source of inertia as derived from the wave nature of all particles. Therefore, a point charge that can move from one place to another is not possible because it will propagate at the speed of light. Maxwell equations say that magnetic monopoles do not exist, and indeed there haven't been discovered yet. However, electric monopoles are not allowed either by the wave nature of particles, because these monopoles would have to travel at subluminal speed which is not allowed for a point entity. The only option that I see is that, within the helical structure of an electron, the magnetic field cancels and only the electric field (which doubles) remains present. To model the electromagnetic field equations, we can only use the modified symmetrical Maxwell equations for a region with no charges.

$$\nabla \cdot \mathbf{E} = 0 \quad \nabla \times \mathbf{E} = -\frac{1}{c}\left(\frac{\partial \mathbf{B}}{\partial t}\right) \tag{23}$$

$$\nabla \cdot \mathbf{B} = 0 \quad \nabla \times \mathbf{B} = \frac{1}{c}\left(\frac{\partial \mathbf{E}}{\partial t}\right) \tag{24}$$

$$\frac{1}{c^2}\frac{\partial^2 \mathbf{E}}{\partial t^2} - \nabla^2 \mathbf{E} = 0 \tag{25}$$

$$\frac{1}{c^2}\frac{\partial^2 \mathbf{B}}{\partial t^2} - \nabla^2 \mathbf{B} = 0 \tag{26}$$

Conclusions:

The paper shows that the propagation of values (waves) of electromagnetic field happens at the same constant speed in absolute space and time as defined. The concept predicts that the particles geometry are similar to the light helical modes. Light waves of helical mode $|m| = 0$, travel straight and thus the forward speed is c. Waves associated to particles with ½ spin travel in a helix / spiral and thus the front-wave speed is reduced, but the internal field propagation is at the same constant speed c. Thus, c limit becomes obvious for non zero rest mass particles. The c limit of light is the natural propagation speed of EM waves and it is not a really a limit, but the speed the propagation it always happens. It feels natural for fields to travel at a certain speed rather than at an infinite speed. Infinite speed would be unimaginable and a universe like that wouldn't work. The value $2.999 \cdot 10^8$ m/s is because the conventions we use when defining dimensions. This constant is dictated by the permittivity an permeability properties of the vacuum. The only important thing is that is constant and non infinite.

The reason why c is not variable is because the propagation environment and propagation mechanics don't change. There seems to be no reason for the vacuum properties to change. The fundamental waves that compose other particles propagate the same way. In other words, there is a single fundamental speed in the universe. Speeds below c, are apparent. If you send a light beam through a channel with mirrors like a optic-fibre, it goes in a zigzag pattern and it reaches the observer slower but the wave poynting vector has travelled the same speed. The apparent speed is lower. Otherwise, you would say only c is constant and other particles travel at various speeds. According to this concept, that is not the case.

Analysing this concept, one could say that these mechanisms I have presented are the result of Relativity. My opinion is that relativistic effects like reduced frequencies of clocks are the result of the mechanics I have presented in this paper. Before creating this concept, I was expecting that Relativity will explain the wave behaviour of particles and the connection to the speed limit, but apparently it is the wave behaviour responsible for generating the relativistic effects.

GR limits the particle speed justifying that to accelerate a particle to c, you need infinite energy and sometimes people ask what would happen if you exceed this

limit. Some even think that would mean going back in time. My model seems more natural. Exceeding c is clearly impossible and also there is no reason to think of going back in time.

Usually theories start from simple concepts. If the concept is wrong, then mathematics can't do anything to fix it, unless you accept the mathematical predictions are irrational. Mathematics can be used to further develop the theory and to make sophisticated predictions. My opinion is, both Quantum Mechanics and General Relativity theories, at some point make irrational predictions.

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