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What is CPH Theory?

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Abstract

There are various theories in physics, but nature is unique. This is not nature's problem that we have various theories; nature obeys simple and unique law. We should improve our theories. Universal constancy of the speed of light undergoes the question whether the limit on the light speed originates from a natural event or not? According to pair production and decay, why photons move at constant speed, but we could change the speed of matter and antimatter? What is the unique characteristic of matter which is convertible to photons that move with constant speed c (speed of light)? What is the mechanism of increasing in the photon energy that causes increase in its frequency growth? So, in CPH theory (Creative particles of Higgs Theory), it has been attempted to scrutinize the interface between classical mechanics, relativity and quantum mechanics through a novel approach to the established physical events.

◙ **CPH Theory is based on the generalized light velocity from energy into mass.**

What is CPH Theory?

Emphasizing on these phenomena and presenting the relation between photon's energy and frequency, CPH Theory is to draw attention on the importance of constancy of speed in relation to the mass structure which will be scrutinized in reviewing relativistic Newton's second law.

The results of this point of view, many uncertainties and unanswered-questions in modern physics and cosmology, will be answered.

Introduction

Something that has been attractive in physics is behavior of light in different mediums and their interaction with other particles like electron. Doppler Effect, Photoelectric effect, Mossbauer Effect, curvature of space… all and all is analyzed without paying attention to Structure of the photon. Something that has been pain attention and accepted by physicists in is that photon (and electron) is a point-like and unstructured particle. Point-like particles are mathematical abstractions with zero size. However, even zero-size particles have an extended effect, due to the effect of the field surrounding them.

The only thing that has been investigated in astrophysics and astronomy is the Doppler Effect and red (or blue) shift of the gravitational. The efforts and attempts to recognize and explain the structure of photon is an inevitable necessity. Due to this reason, CPH theory has formed based on a definition from the structure of photon.

In recent decades, the structure of photon is discussed [1, 2 and 3]. In CPH Theory, description the structure of photon is based on the behavior of photons in the gravitational field, leading to a new a definition of the graviton too. In effect, gravitons behave as if they have electric and magnetic fields effects. These are referred to as negative color charge, positive color charge and magnetic color. From this, it can be shown that a photon is made of color charges and magnetic colors.

Rest mass

As we know, some particles such as photons are never seen at rest in any reference frame. So, there are two kinds of particles in physics;

1- Some particles like the photon move only with the speed of light c, in all inertial reference frames. Let's call these kinds of particles the NR-particles or Never at Rest condition particles.

2- Other particles like the electron always move with the speed $v < c$ in all inertial reference frames; they have rest mass, and could be called particles.

According to the above definition, photon and graviton are NR-particles, while electron and proton are particles.

What is CPH Theory?

Properties and speed of graviton

With regard to the exchange particles concept in the quantum electrodynamics theory and the existence of graviton, we will present a new definition of graviton. To define graviton, let's consider a photon that is falling in the gravitational field, and revert back to the behavior of a photon in the gravitational field. But when we define the graviton relative to the photon, it is necessary to explain the properties and behavior of photon in the gravitational field.

During the photon is falling in the gravitational field, its energy (mass) increases. According to $W = \Delta mc^2$, the force of gravity performs work on the photon, so the mass (energy) of the photon and its frequency increase from v to v' that given by;

$$v' = v(1 + \frac{GM}{rc^2}) \qquad (1)$$

Similarly, redshift has the opposite effect that given by;

$$v' = v(1 - \frac{GM}{rc^2}) \qquad (2)$$

G is the gravitational constant; M is the mass of the body, c is the velocity of light, r is the distance from the mass center of body.

Also force is described as energy per distance that shown by:

$$F = -\frac{dU}{dx} \qquad (3)$$

The energy of photon depends on its electric and magnetic fields. Therefore, one part of the work done by gravity converts to electrical energy and the other part converts to magnetic energy. The change of frequency of the photon in the gravitational field has been demonstrated by the Pound-Rebka experiment, the result confirmed the predictions of general relativity [4].

As a photon escapes from the gravitational field, its frequency shifts to red and its energy converts to gravitons. How can we describe this interaction between photons and gravitons on a sub-quantum scale such as in the structure of a photon?

In interaction between gravity and photon (blueshift), when gravity acts on photon and gravitons enter the structure of photon, gravitons do change the intensity of electric and magnetic fields which belong to photon. So, gravitons behave so that they are carrying the charge and magnetic fields effects in the structure of photon. When gravitons enter the structure of photon, the intensity of electric and magnetic fields increases, but photon has no electric effect. So, there should be two groups of gravitons one that behaves like electric field and the other one that neutralizes the electric effect of other group. So, a group of gravitons behaves like positive electric field and the other one behaves like negative electric field and they neutralize each other's electric effect. But they are moving, so a group of gravitons behave like magnetic field, and the intensity of two vertical electric and magnetic fields increases. So, gravitons are either color charge or color magnet. It is acceptable because when photon is falling in the gravitational field, the intensity of its electric and magnetic fields increase. So, a photon is made up of color charges and magnetic color that have linear speed equal c with photon motion and nonlinear speed in the structure of

photon, so, they move faster than light speed (Figure1). In the other word graviton moves faster than light speed [5].
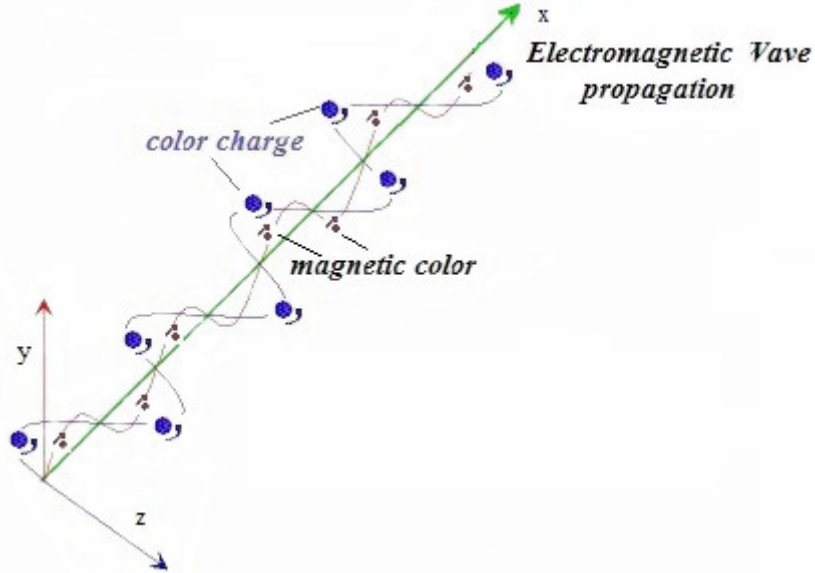

Fig1; paths of gravitons in photon structure, color charges and magnetic color have spin and curvature speed

It is important that we note the speed of graviton (also color charge and magnetic color) that is given with V_G and as explained before, its speed is faster than light speed, so $V_G > c$, that V_G is the total speed of linear and nonlinear of graviton or color charge and magnetic color. According to the above explanation and Figures (1) we can write;

$$V_{Gx} + V_{Gy} + V_{Gz} = V_G > c$$

And also note that as figure (1) shows we can write;

$$(V_{Gx} = c) + V_{Gy} + V_{Gz} = V_G > c \qquad (4)$$

Definition of graviton

A graviton is a NR-particle, with the constant NR mass m_G , that moves with the constant magnitude of speed of $|V_G| > |c|$ in any inertial reference frame, where c is the speed of light. According to the gravitational redshift, the NR mass of graviton is defined relative to a photon's NR mass by;

$$m_G < m = \frac{h\nu}{c^2} \quad \forall \nu \qquad (5)$$

And the relationship between energy and momentum for the NR mass of graviton given by;

$$\langle E_G \rangle = \langle |P_G| \rangle V_G = constant \qquad (6)$$

In all inertial reference frame and any condition

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Relation (6) shows that the energy (also mass) of graviton is constant, in any interaction between gravitons or with other particles. The space is full of gravitons. While the density of gravitons increases in space, the distance between them decreases, but they do not attach to each other, their paths change without decreasing (or increasing) the magnitude of V_G.

Graviton principle

Graviton is the most minuscule unit of energy with constant NR mass m_G that moves with a constant magnitude of speed so that $|V_G| > |c|$, in all inertial reference frames. Any interaction between graviton and other existing particles represents a moment of inertia **I** where the magnitude of V_G remains constant and never changes. Therefore;

$$\nabla V_G = 0 \text{ , in all inertial reference frame and any space} \qquad (7)$$

Based on the principle of graviton, a graviton carries two types of energy generated by its movement in inertial reference frame. One is transmission energy and the other one is non-transmission energy. In physics, we represent energy summation (both kinetic and potential) by a Hamiltonian equation and energy difference by a LaGrangian. Therefore, in the case of graviton, we use a Hamiltonian to describe the summation of energy generated by transmission energy T_G and non-transmission energy S_G as follows:

$$E_G = T_G + S_G = constant \qquad (8)$$

Since the speed and mass of graviton are constant, then $E_G = constant$. Graviton produces energy and energy produces matter and anti-matter. In fact, everything has been formed of graviton.

Sub quantum energy and Maxwell equation

When a photon falls in a gravitational field as Δr, the graviton's density in the vicinity of the photon electric field changes the value of ∂G_E, because the intensity of electric field changes as $\boldsymbol{E}_G$ (**E** is the electric field arising from graviton). In fact gravitons enter the structure of photon, and the intensity of electrical and magnetic fields which depends on photon increases. Two types of gravitons should enter the photon structure, so that they are able to increase the intensity of photon electric field without any charge effect. Thus the interaction between gravitons and photon, negative and positive $\boldsymbol{G}^-, \boldsymbol{G}^+$ gravitons (color-charges) are produced and enter the photon structure. The photon moves in the same direction as the increasing intensity of the gravitational field does, and the photon electric field is perpendicular to the photon movement direction that is compatible with the following equation:

$$\nabla \times \boldsymbol{E}_G = -\frac{\partial \boldsymbol{G}_E}{\partial t} \Leftrightarrow i(\boldsymbol{G}^+, \boldsymbol{G}^-) \qquad (9)$$

By changing the photon electric field, magnetic field also changes [6]. In this case also, the gravitons are converted into magnetic carrier particles G_m^+, G_m^- and enter the structure of photon that is given by;

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$$\nabla \times \boldsymbol{B}_G = \mu_0 \varepsilon_0 \frac{\partial \boldsymbol{E}_G}{\partial t} \Leftrightarrow j(\boldsymbol{G}_m^+, \boldsymbol{G}_m^-) \qquad (10)$$

Where $i, \, j$ are natural numbers, and proportion between $i \ and \ j$ should be consistent with equation (34 of [9]). According to the above relations, we can define energy and mass of graviton and photon in relation with each other.

Sub Quantum energy (SQE) and Dirac equation

To explain and define sub quantum energy, it is necessary to analyze the Dirac equation, we will have:

$$E^2 = (mc^2)^2 \rightarrow E = \pm mc^2 \qquad (11)$$

In general state, equation (11) does not accept any limitation for mass and energy regarding its value. Moreover, in limit of zero mass (zero rest mass of particles in quantum mechanics conceptions), Dirac equation was reduced to Weyl equation [7]. Weyl equation predicted the existence of fermions that their rest mass is zero [8], but they have spin $\frac{1}{2}$. Because here, the aim is to investigate and recognize the structure of photon. We reduce β matrix (of Dirac equation [9]) as follows and now we call it matrix A until after computations and necessary conclusions, we choose a special notion for it:

$$A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix} \qquad (12)$$

$$Amc^2 \rightarrow \begin{bmatrix} mc^2 & 0 \\ 0 & -mc^2 \end{bmatrix} \qquad (13)$$

According to relations (11 and 13) and in a special case that a photon collides with a heavy nucleus with at least energy $E = 1.022 \ MeV$, we can write:

$$E_+ = mc^2, \ E_- = -mc^2$$

That is called the process of pair production of electron and positron. Therefore, in general case, the relation (13) is reagent of energy for two fermions with spin $\frac{1}{2}$ that one of the possible case describes pair production of electron-positron. But occurring other cases is possible including photon with energy less than $E = 1.022 \ MeV$ is decayed to two fermions with spin $\frac{1}{2}$, that move with speed of light in which it is describer of Weyl fermions and they are called massless fermions or Weyl fermions (or particles with zero rest mass) [10 and 11].

According to Campton Effect and gravitational blue-shift, energy of a photon can decrease or increase without changing in its physical properties (except its energy and frequency). It means that whatever is increased to the energy of photon, it has the same total properties of photon (properties of electromagnetic energy). In other words, all photons have common physical properties except the value of energy that again it can be used the relation (13) for them. Therefore, at least electromagnetic energy can be defined as follows:

$$E_{minimum} = \frac{hc}{\lambda_{max}} \ , where \ E_{minimum} \ is \ detectable \qquad (14)$$

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According to relation (12), $E_{minimum}$ includes two parts that it can be written as follows:

$$AE_{minimum} \rightarrow \begin{bmatrix} +\frac{E_{minimum}}{2} & 0 \\ 0 & -\frac{E_{minimum}}{2} \end{bmatrix} \qquad (15)$$

In relation (15), the minus sign does not imply being negative of energy (or negative mass), as positron is not negative energy or mass in pair production. Signs $+,-$ in relation (15) show electromagnetic fields around a charged particle and carry the same type of electromagnetic energy that there exists around a charged particle. Therefore, the photon is formed of two types of positive and negative sub quantum energies that we show them by operators, right wedge $\triangleright$ for positive sub quantum energy and left wedge $\triangleleft$ that are defined as follows:

$$\text{Positive Sub Quantum Energy; } SQE^+: \triangleright = +\frac{E_{minimum}}{2} \qquad (16)$$

$$\text{Negative Sub Quantum Energy; } SQE^-: \triangleleft = -\frac{E_{minimum}}{2} \qquad (17)$$

It is obvious that spin of sub quantum energy (SQE) is equal to $\frac{1}{2}$. In general case, relation (13) can be written by using the definition of positive and negative sub quantum energies $\triangleright$, $\triangleleft$ in which k is a natural number and instead of A, we use γ that is sign or symbol of electromagnetic energy:

$$\gamma = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix} \qquad (18)$$

$$\gamma m c^2 \rightarrow \begin{bmatrix} k \triangleright & 0 \\ 0 & k \triangleleft \end{bmatrix} \qquad (19)$$

In relation (19), $k \triangleright$ is positive virtual photon γ^+, in which carries positive electric force and forms positive electric field and $k \triangleleft$ is negative virtual photon γ^- that carries negative electric force and forms negative electric field. Every real photon is formed of two virtual photons. Therefore, we will have:

$$\gamma^+ = k \triangleright, \ \gamma^- = k \triangleleft \rightarrow \gamma = \gamma^+ + \gamma^- \qquad (20)$$

As charged particles absorb or repulse each other and are ineffective on neutral particles, homonymous virtual photons repulse each other, non-homonymous virtual photons absorb each other and they form quantum energies and it causes two non-homonymous charged particles accelerate towards each other ([6] page 40). Assume that $2k$ positive and negative color-charges (kG^+, kG^-) enter the very small part of photon structure, proportional to the number of color-charges, the number of magnetic-colors are produced around the color-charges. Two opposite electric field are created in this space. Around each of the electric field a magnetic field is created by magnetic-colors. According to the sign of the electric fields, direction of magnetic fields are different, each magnetic field cover its color-charges and prevents them of escaping ([6] page 28). Each of the magnetic fields protects its electrical field and prevents them from collapsing. This mechanism is justifiable by Larmor radius (gyro radius or radius of the cyclotron) [12].

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Sub-Quantum Energy (SQE) Principle

One SQE is a very small energy with mass m_{SQE} that moves with speed $|V_{SQE}| > |c|$ relative to inertial reference frame and in every interaction between SQEs with other particles or fields the speed value of SQE remains constant; as in every physical condition we have;

$$\nabla V_{SQE} = 0 \text{ , in all inertial reference frames and any space} \qquad (21)$$

SQE principle (equation 21) shows that in every condition the mass, energy and the amount speed of SQE remains constant, and only the transmission speed V_{SQET} and energy E_{SQET} of SQE convert to its non-transmission speed V_{SQES} and energy E_{SQES} , and vice versa. Therefore, we have;

$$|V_{SQE}| = |V_{SQET}| + |V_{SQES}| = constant \qquad (22)$$

$$|E_{SQE}| = |E_{SQET}| + |E_{SQES}| = constant \qquad (23)$$

Speed of light principle

According to the principle of Special Relativity, the speed of light in vacuum is constant and it is equal to c for all inertia observers, and it is independent of the light source. How we can conclude this principle by using sub quantum energy principle? First, according to principle of SQE (which is also the result of the graviton principle) the amount of the linear speed of SQE depends to the interaction between SQEs and the other particles (or fields) in the medium. So, in a vacuum, photon (light) has not any interaction with other particles or fields outside of the photon structure, (assume gravitational effect of vacuum is negligible), thus, the linear speed of SQEs in the structure of photons are constant and equal to $V_{SQET} = c$. Also, the linear speed of virtual photons in a vacuum is the same amount of c. Let's in generally, show the speed of photons as v_{light}, it changes from one medium to another that in a vacuum is c, it means the speed of light in vacuum also is $v_{light} = c$. So that is called "speed of light principle" in CPH Theory which is given by:

$$\nabla v_{light} = 0 \qquad (24)$$

Thus, the linear speed of photon depends to medium conditions, the same as gravitons and sub quantum energy. But the total amount of transmission speed v_{lightT} and non-transmission speed v_{lightS} of photon is constant and it is equal to $|v_{light}|$, so that:

$$|v_{light}| = |v_{lightT}| + |v_{lightS}| = constant \qquad (25)$$

Relativistic mass

In classical mechanics, kinetic energy and momentum are expressed as;

$$E_k = \frac{1}{2}mv^2 , \quad p = mv$$

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Special relativity predicts that the speed of light is constant in all inertial frames of references. The relativistic energy–momentum relation gives with;

$$E^2 - (pc)^2 = (mc^2)^2 \qquad (26)$$

From which the relations for rest energy E_0, relativistic energy (rest + kinetic) E, kinetic energy, and momentum p of massive particles follow:

$$E_0 = mc^2 \,, \ E = \gamma mc^2 \,, \ p = \gamma mv \,, \text{where} \ \gamma = 1/\sqrt{1 - (v/c)^2} \qquad (27)$$

So relativistic energy and momentum significantly increase with speed, thus the speed of light cannot be reached by massive particles. In some relativity textbooks, the so called "relativistic mass" $m = \gamma m_0$ is used as well. However, this concept is considered disadvantageous by many authors; instead the expressions of relativistic energy and momentum should be used to express the velocity dependence in relativity, which provide the same experimental predictions.

First experiments capable of detecting such relations were conducted by Walter Aufmann, Alfred Bucherer and others between 1901 and 1915. In Boucherer experiment if we consider the initial mass of electron m_0 and the output electron, we have;

$$m = m_0 + m_E$$

There m_E is the gained mass of energy by electron in acceleration (exerting external force). We have:

$$E = nSQE \,, m_E = \frac{E}{c^2} = \frac{nSQE}{c^2} = nm_{SQE}$$

Thus;

$$m = m_0 + m_E = m_0 + nm_{SQE}$$

In reality is that in Boucherer experiment, an electron in acceleration gains energy and after exiting from the accelerator tunnel, because of collision with another particle or because of passing through a field that gives it negative acceleration, it loses the energy and in terms of mass it returns back to its former state. One could always use this experiment to prove relativity mass, but could not explain the real interaction between force and mass with relativistic mass.

Newton's second law and Sub Quantum Energy

Newton's second law in classical mechanics which the mass was given as constant value and it was defined as follows;

$$F = \frac{dP}{dt} = m\frac{dv}{dt} \qquad (28)$$

By considering relativity and the speed limit of light, in order to propose the speed limit, the relation (28) was modified. Thus the relativistic mass and the interaction between force and mass were presented as follows:

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$$F = \frac{dp}{dt} = \frac{d(mv)}{dt} = v\frac{dm}{dt} + m\frac{dv}{dt} \qquad (29)$$

Due to the relations (27 and 29), no force could extend/transmit the object/particle's speed faster than the speed of light. It would be acceptable that the external force action is limited, but the reason is not the mass variations rather as it accented above, the reason of the speed limit should be sought in the structure of matter. According to the definition of the photon and SQE, Newton's second law could be reconsidered.

By assuming an electron at moment t_1, with the mass m and the speed v_1 along an axis in the field (on an inertial frame in the gravitational or electrical field), under the force F and at the moment t_2, so its speed becomes v. Electron takes energy dE in the interval $dt = t_2 - t_1$. We have:

At the moment t_1;

$$p = mv_1$$

Within the time $dt = t_2 - t_1$, the electron gains energy as dE. At this time the electron momentum changes to the following value:

$$dE = np_{SQE}c = nm_{SQE}c^2$$

At the moment t_2 one could write:

$$mv_1 + nm_{SQE}c = (m + nm_{SQE})v$$

$$v = \frac{mv_1 + nm_{SQE}c}{m + nm_{SQE}} < c$$

Because of;

$$v_1 < c$$

$$v = \frac{mv_1 + nm_{SQE}c}{m + nm_{SQE}} < \frac{mc + nm_{SQE}c}{m + nm_{SQE}} = c \qquad (30)$$

As $v_1 < c$, so always $v < c$. Here one could correlate increased mass to the gain of energy in Newton's second law, i.e, so;

$$\frac{dm}{dt} = \frac{nm_{SQE}}{dt} = \frac{1}{c^2}\frac{dE}{dt}$$

And Newton's second law could be rewritten as below:

$$F = \pm\frac{v}{c^2}\frac{dE}{dt} + m\frac{dv}{dt} \qquad (31)$$

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The ± sign in relation (31) has been marked on the increasing and decreasing state of energy (collinear or non-collinear directional variations in force and speed). The relativistic mass uses in high energies just for showing the speed limit in quantum equations while for well-known subatomic particles always $v < c$, in this order, only the given energy by particles must be considered and there no need to use the relativistic mass relation. We can better understand and explain the physical phenomena by using Newton's second law as a relation (21). Through such a view of physical and astrophysical phenomena, the explanation of the universe would be more real. According to the Sub-Quantum Energy Principle the speed value of all subatomic particles would be always constant and external force could only convert the *SQE*'s linear motions to nonlinear motions and vice versa. The speed of the created particles is a function of the internal interaction and the mechanism of creation of subatomic particles, and the external forces that are exerted on them. Thus light speed is constant in vacuum but it changes in air or water and as soon as it enters vacuum it travels at former constant speed.

Moreover, concerning the speed of other subatomic particles, the reason behind the speed is a function of the internal interaction of the particles and the interaction among the *SQE*s within the structure of those particles.

New definition of Singularity

To derive his 1917 cosmological model, Einstein first studied the universe at large using the General Theory of Relativity he discovered that his equations predicted a universe which was either expanding or contracting and this was contradicted with the best astronomical observations at the time. He then modified his equations to satisfy the observations. This modification corresponds to the assumption that the whole universe is permeated with a constant pressure (which in his case balanced the expansion yielding a steady universe). This universal pressure is called the cosmological constant Λ (lambda) [14].

At almost exactly the same time, Friedmann carefully revised the Einstein's cosmological equations and he published his classic relativistic cosmology. In the paper of 1922, Friedmann found the solutions for expanding the universe models with closed spatial geometries, including those that expand to a maximum radius and then collapse to a singularity. Friedmann showed that there exist expanding solutions that are unbounded with hyperbolic geometry [15]. The differential equations that he derived were [16]:

$$\left[\left(\frac{1}{R}\frac{dR}{dt}\right)^2 - \frac{8}{3}\pi G\rho\right]R^2 = -kc^2 \qquad (32)$$

After Hubble discoveries on the universe's expansion, Friedmann's equation was as follows:

$$\left(H^2 - \frac{8}{3}\pi G\rho\right)R^2 = -kc^2 \qquad (33)$$

Where $H = \left(\frac{1}{R}\right)\frac{dR}{dt}$ is Hubble "constant", G is the gravitational constant , ρ is the universe mass density , c the speed of light and the parameter k is 0 , Euclidean Geometry or flat space, +1 ,

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elliptic space and -1, hyperbolic space. One can write $\rho = \rho_0(R_0/R)^3$, where ρ_0 and R_0 are the present day values of the density and radius of the universe.

In the 1990s, experimental observations showed that the expansion of the universe is accelerating and dark energy is tending to accelerate the expansion of the universe [17].

The Big Bang theory is an effort to explain what happened at the very beginning of our universe. According to the standard Big Bang theory, our universe sprang into existence as "singularity" around 13.7 billion years ago. What is a ''singularity'' and where does it come from? Well, to be honest, we don't know for sure. Singularities are zones which defy our current understanding of physics. They are thought to exist at the core of ''black holes.'' Black holes are areas of intense gravitational pressure. The pressure is thought to be so intense that finite matter is actually squished into infinite density (a mathematical concept which truly boggles the mind). These zones of infinite density are called ''singularities.'' Our universe is thought to have begun as an infinitesimally small, infinitely hot, infinitely dense, something - a singularity. Where did it come from? We don't know. Why did it appear? We don't know [18].

In CPH theory, regarding on review of relativistic Newton's second law, we have been attempted to enter to the sub-quantum space by crossing the border of quantum mechanics then to survey of counteracting Newton's second law and the universal gravitation law and finally we can be analyzed and investigated the results. In sub-quantum space, we passed across the black hole and reach the formation of the absolute black hole by specifying the limits of Newton's second law and gravitation law, then the singularity will be explained in the explosion of an absolute black hole. In this review we will be forced to change their attitude towards the singularity and the general conclusion in the singularity state is: ***volume will not be zero, density will be limited.***

According to equations (22) the amount speed V_{SQE} is constant, but the amounts of transmission speed V_{SQET} and non-transmission speed V_{SQES} are not constant, by decreasing the amount transmission speed of SQE is added to the amount non transmission speed and vice versa. Each of these values is maximum when another value is zero that is given by:

$$V_{SQET} \to V_{SQE} \Leftrightarrow V_{SQES} \to o \qquad (34)$$
$$V_{SQES} \to V_{SQE} \Leftrightarrow V_{SQET} \to o \qquad (35)$$

Thus, according to the direction of external force which was affected on a particle/object, the total non-transmission speeds rate is converted to the transmission speeds or to the inverse. Now we can define an absolute black hole. But before explanations, it is necessary to define two terms of sub quantum divergence and sub quantum converges;

*1- **Sub quantum Divergence:*** if a particle/object falls in the gravitational toward a massive body, and the linear speed of its $SQEs$ will be V_{SQET} , we say that the object has sub quantum divergence (Figure 2). There is $V_{SQE} = V_{SQET}$ in the sub quantum divergence. So;

Sub quantum Divergence; $V_{SQET} = V_{SQE} \Leftrightarrow V_{SQES} = o$ (36)

2- ***Sub quantum Convergence:*** if total transmission speeds $SQEs$ of a particle/object go to zero, $V_{SQET} \to 0$, we say that the object has sub quantum convergence (Figure 2).

There is $V_{SQES} \to V_{SQE}$ in the sub quantum convergence. So;

Sub quantum Convergence: $V_{SQES} \to V_{SQE} \Leftrightarrow V_{SQET} \to o$ (37)
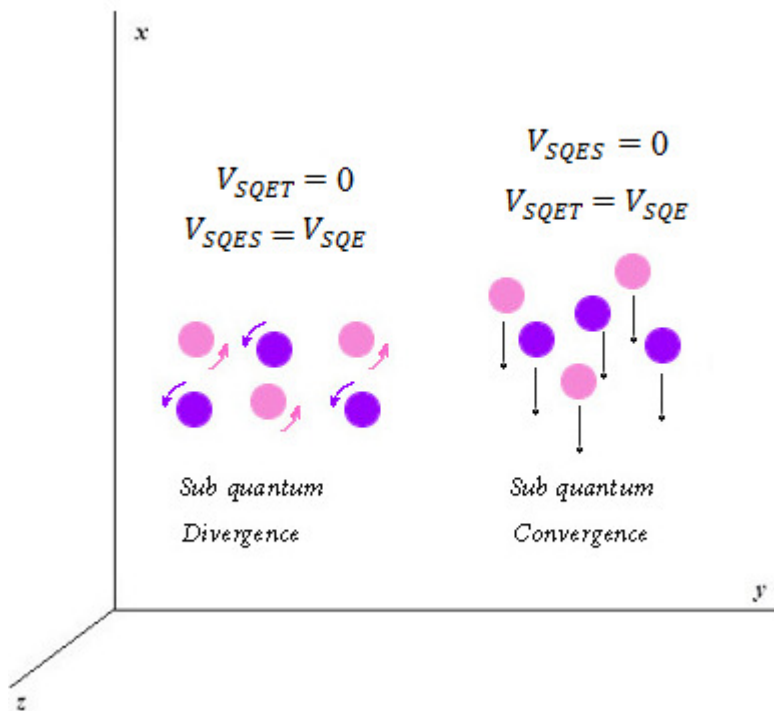

Fig2; Sub-quantum Divergence and Convergence

Definition of an absolute black hole: If a particle/object falls down into the absolute black hole, it will be involved in sub quantum divergence before reaching the surface of the absolute black hole.

Consider the absolute black hole swallowing more matter; its mass and thus its gravitational field intensity will be increase. By increasing the mass, volume is reducing, its constituent $SQEs$ is condensed and its transitional space will be limited.

Definition of Singularity: An absolute black hole with very high density under two followed conditions reaches the singularity state:

1) Its constituent $SQEs$ reach sub quantum convergence state i.e. $V_{SQES} \to V_{SQE}$. So the linear speed of everything on the surface of absolute black hole goes to zero, $V_{SQET} \to 0$

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2) Due to the gravitational pressure, the average distance between $SQEs$ of an absolute black hole goes to zero.

Once the non-transmission speed of $SQEs$ reach maximum, $V_{SQES} \rightarrow V_{SQE}$, the average distance between $SQEs$ goes to zero due to intensive collision.

They are scattered around and these chain scattering are spread everywhere inside the absolute black hole and therefore the singularity is occurred. The density is very high in the singularity state, but not infinite. In addition, the volume does not reach to zero, but the average the distance between $SQEs$ reach to zero. Given above descriptions can easily explain counteracting Newton's second law and gravity.

Given the above themes, there are three basic limitations: transmission speed, non-transmission speed and density that they are the reason of creation the observable universe and all physical phenomena existing in it.

Now, by using the equations (36 and 37), the Friedmann's equation (32) and then the Big Bang will be reviewed. Right side of the Friedman equation (32), has given for real space-time and is used for after the Big Bang, because k determined the geometrical properties of space-time and c is the speed of light in a vacuum is constant, but given that the speed of light is not constant in gravitational field and it is zero for surface and inside of an absolute black hole (equations 24 and 25), So if we want to solve the Friedmann's equation for absolute black hole, we must consider the speed of light to zero and the equation becomes as follows:

$$\left[\left(\frac{1}{R}\frac{dR}{dt} \right)^2 - \frac{8}{3}\pi G\rho \right] R^2 = o$$

Assuming $R \neq o$ (which is a reasonable assumption because the notion that, if the universe collapses, it will not vanish volume and it is not reasonable that universe was created of nothing), then we have:

$$\left(\frac{1}{R}\frac{dR}{dt} \right)^2 - \frac{8}{3}\pi G\rho = o \rightarrow \left(\frac{1}{R}\frac{dR}{dt} \right)^2 = \frac{8}{3}\pi G\rho$$

We take the square root of the above equation, so we have:

$$\frac{1}{R}\frac{dR}{dt} = \pm\sqrt{\frac{8}{3}\pi G\rho}$$

$$\frac{dR}{R} = \pm\sqrt{\frac{8}{3}\pi G\rho}\, dt$$

We take an integral from both sides of above equation:

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$$L_n R = \pm \sqrt{\frac{8}{3}\pi G \rho}\; t + C, \qquad C \text{ is integer constant}$$

$$R = e^{\pm\sqrt{\frac{8}{3}\pi G\rho}\; t + C} = e^{C} e^{\pm\sqrt{\frac{8}{3}\pi G\rho}\; t}$$

For $= 0$, the initial radius of the universe is obtained (at the moment of the Big Bang), we have;

$$R_o = e^{C}$$

For the negative mode, we have:

$$R = R_0 e^{-\sqrt{\frac{8}{3}\pi G\rho}\; t} = \frac{R_0}{e^{\sqrt{\frac{8}{3}\pi G\rho}\; t}}$$

The above means that the radius of the universe is shrinking over time and is not acceptable. For positive mode, we have:

$$R = R_0 e^{\sqrt{\frac{8}{3}\pi G\rho}\; t} \qquad (38)$$

Equation (38) is an exponential function that shows in the first moments after the explosion, expansion of the universe was very fast. In addition, because of the big bang, Newton's second law contrasts with the law of gravitational law, in this confrontation, Newton's second law, and the universal gravitational law is neutralized. In the early moments after the Big Bang the speed limit was not the speed of light c, because $SQEs$ collide with each other, everything, even the photons were decomposed and the speed limit could have one of two values SQE speed V_{SQE} or the speed of graviton V_G . So, we can write:

$$\left[\left(\frac{1}{R}\frac{dR}{dt}\right)^2 - \frac{8}{3}\pi G\rho\right] R^2 = -kV_{SQE}^2 \qquad (39)$$

Classical mechanics and relativity (special and general) describe the acceleration is an explanation of outward of phenomena regardless of the properties of sub quantum scales. It should be noted that the interaction between large objects (e.g. collision of two bodies) under the action of the quantum layer (in fact sub quantum layer) done. In sub quantum level, the amount of speed is constant, in any condition and any space, and in any interaction linear momentum changes to nonlinear momentum and vice versa. According to SQE, we are able to show there is not a zero volume with infinite density in singularity also before the Big Bang. So, regardless to reconsidering the relativistic Newton's second law, how can we resolve the dark energy problem?

Perhaps still in the aftershocks of the Big Bang to take over the universe. In addition, there is no proof for the existence, be limited to the observable universe, or owes its existence not earlier collapse.

Production of virtual photon

In particle physics, quantum field theories such as the Standard Model describe nature in terms of fields. Each field has a complementary description as the set of particles of a particular type. A force between two particles can be described either as the action of a force field generated by one particle on the other, or in terms of the exchange of virtual force carrier particles between them. The energy of a wave in a field (for example, electromagnetic waves in the electromagnetic field) is quantized, and the quantum excitations of the field can be interpreted as particles. In quantum electrodynamics (QED) a charged particle emits exchange force particles continuously. This process has no effect on the properties of a charged particle such as its mass and charge. How is it explainable? In theoretically a pure steady state spin current without charge current can induce an electric field ([6] page 63). If a charged particle as a generator has an output known as a virtual photon, what will be its input? Now let's explain the mechanism of electrodynamics fields around the electron and positron.
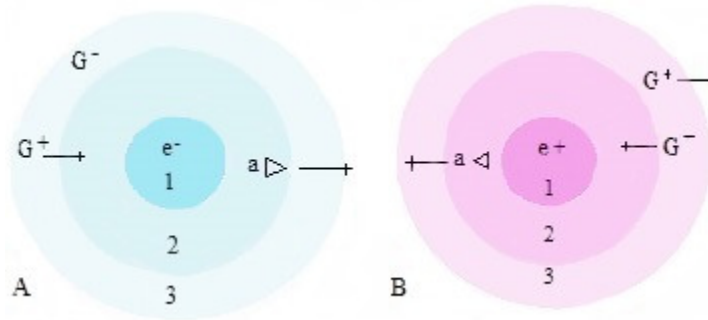
A.   Electron; Area3, G convert to G^- , G^+, then G^- moves to far and G^+ moves to area2
Area2: Spinning electron, magnetic field compacts G^+s and repels virtual positive photon that shown by $a \triangleright$

B.   Positron; Area3, G convert to G^- , G^+, then G^+ moves to far and G^- moves to area2
Area2: Spinning positron, magnetic field compacts G^-s and repels virtual negative photon that shown by $a \triangleleft$

Fig3; around charged particles

Look at the electron and positron. Electron is in the center of a spherical space (Figure 3-A). This rotational sphere-like (electron spinning) is in a look into gravitons. The electron has two opposite interactions on gravitons around itself, and converts them to G^- , G^+, so there is a lot of G^- , G^+ in area 3 (Figure 3-B) G^-s escape from electron's locality and G^+s move toward the electron and enter the area 2, near the magnetic field of electron spinning. Magnetic field (electron spinning) compresses positive gravitons G^+s and repels them.

Now we can define an operator for the production of positive electric force particle. Let's show this operator by $a \triangleleft$ per time that acts on the electron and produces positive electric force, it is given by;

$$\frac{d}{dt} \triangleleft s = a \triangleright \qquad (40)$$

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There, a is a natural number. Operator $\vartriangleleft s$ compresses G^+s and pushes them; a magnetic field which contains G^ms is formed up around G^+s set. According to the Larmor (cyclotron) radius can be prevented from scattering [19]. Each process in the laboratory is feasible, realistic and easier to occur in nature.

Operator $\vartriangleleft s$ shows a magnetic field which presses the positive gravitons G^+s around electron (spinning electron) and makes a virtual positive particle of electric force continuously that we show by γ^+. In general, a charged particle is a generator that its input is gravitons and its output is virtual exchange particles that form the electric field. So, for electron we can write;

$$\frac{d}{dt} \vartriangleleft s(G^+) = a \vartriangleright = \gamma^+ \qquad (41)$$

Same as electron, positron's behavior is like a generator, but spinning positron produces and emits negative virtual particles continuously. So;

$$\frac{d}{dt} \vartriangleright s(G^-) = a \vartriangleleft = \gamma^- \qquad (42)$$

When $a \vartriangleright = \gamma^+$ from the electron reaches to area2 around the positron, then it combines with $a \vartriangleleft = \gamma^-$ and they form a quantum energy, so that;

$$a \vartriangleright + a \vartriangleleft = \gamma^+ + \gamma^- = \gamma \qquad (43)$$

This quantum energy is transferred to the positron, and positron accelerates toward the electron.

Note: With the discovery of charged particles and electric fields, it was assumed that the charged particle and the surrounding fields are the same. Our examination shows that the electron produces positive virtual photon, emits and pushes the negative charges, because each negative charged particle behaves on the other, the same as electron and produces positive virtual particle. Likewise, positive charged particles such as positron, also provides a negative electric field that drives the positive virtual photon.

Virtual photon in Structure of photon

The attention inside the photon structure is very useful and important for understanding QCD phenomena. Equivalence relation of mass-energy conception is beyond converting matter into energy and vice versa. Because what is at the core of the interaction between quarks in the proton structure occurs is the logical result of interaction between the SQEs (or $\vartriangleright$, $\vartriangleleft$) in photon structure. When you convert energy into matter, the properties of interaction between SQEs are also transferred from the photon to particle–antiparticle and vice versa.

The amount of the positron mass is equivalent to energy $k \vartriangleright$. Now we will see that how the electrical properties of a number of $\vartriangleright$ (which are positive), stay together in the photon's space. This phenomenon is explainable by using Ampere's law. As the two wires carrying electrical flow due to magnetic flux around the wires, they attract or repel each other, the same charged particles (or particles carrying the same electric field) affected by their own magnetic fields, then they interact with each other. We assume that two same sub particles $\vartriangleright$ are in a position that the magnetic fields of these two particles cause them to attract each other (Figure 4-A). In this case, a

number of magnetic loops are formed around the sub particles ▷ and prevent them from being dispersed and a quantum positive particle is formed. But a photon is not formed of same sub particles ▷, there are equal numbers of ▷ and ◁ in the structure of photon (Figure 4-B). As two opposite charged particles interact with each other, these two particles also tend to combine together, but magnetic fields around $k ▷$ and $k ◁$ prevent them from this combination (figure 5-A).
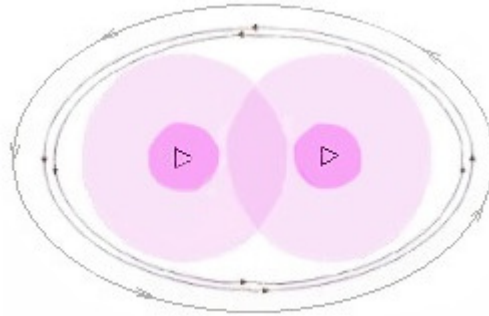
A. Magnetic field around two same *SQEs.*
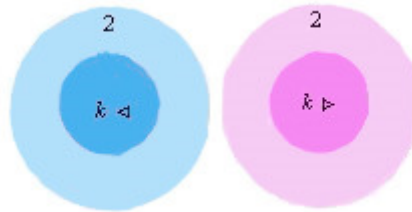
B. A photon is formed of $k ▷ + k ◁$, but magnetic fields around ▷ (s) and ◁ (s) prevent them from this combination

Fig4; Sets of *SQEs*

With this approach, let's look at pair production and decay which is given by;

$$kSQE^+ = k ▷ \rightarrow e^+ , \ \ kSQE^- = k ◁ \rightarrow e^-$$

For two photons (figure 2-B):

$$k ▷ + k ◁ = 2\gamma = \left(\frac{k}{2} ▷ + \frac{k}{2} ◁\right) + \left(\frac{k}{2} ▷ + \frac{k}{2} ◁\right)$$

For three photons:

$$k ▷ + k ◁ = 3\gamma = 3\left(\frac{k}{3} ▷ + \frac{k}{3} ◁\right)$$
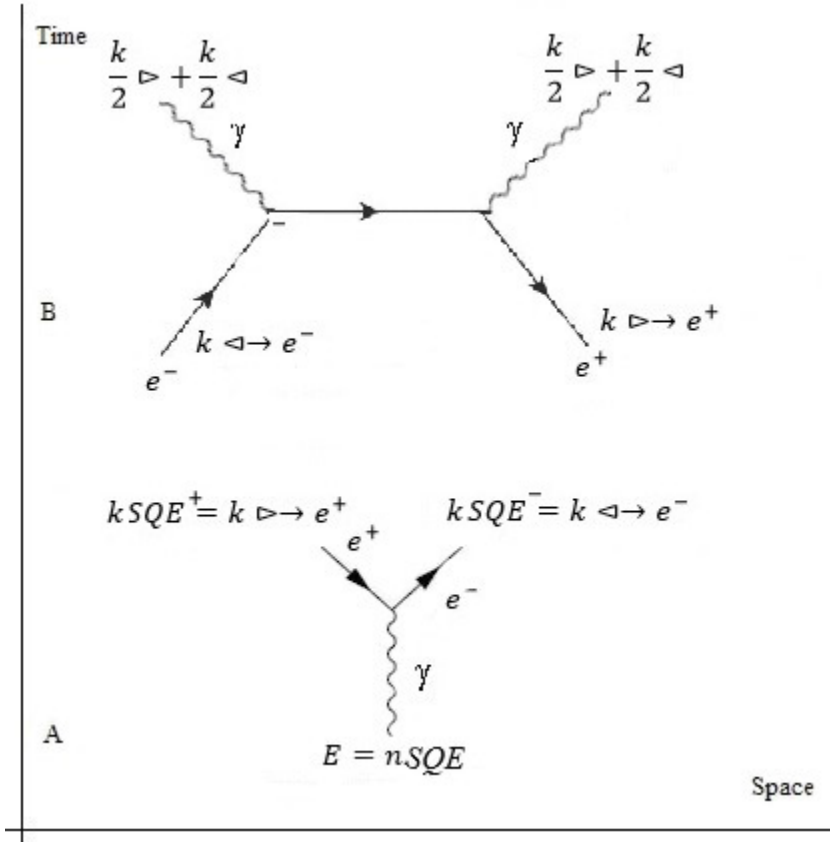
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Fig 5; pair production and decay by using negative and positive SQE

This approach to photon is a useful step to explain the real-photon processes and the quantum chromodynamic. In $p\bar{p} \rightarrow \gamma\gamma$ annihilation in QCD [20], compare decay of electron-positron and proton-antiproton using the SQEs;

$$p\bar{p} \rightarrow \gamma + \gamma$$

Charges of proton and anti-proton with positron and electron are equal. But the mass of proton is about eighty times greater than the sum of the rest masses of the quarks that make it up, while the gluons have zero rest mass. Quark's charge is given by;

$$u = \frac{2}{3}k \triangleright, d = \frac{1}{3}k \triangleleft \qquad\qquad \bar{u} = \frac{2}{3}k \triangleleft, \bar{d} = \frac{1}{3}k \triangleright$$

So relation (4) is given by;

$$p + \bar{p} = (uud + n_1 g) + (\bar{u}\bar{u}\bar{d} + n_2 g) \rightarrow \gamma + \gamma = n(\triangleright + \triangleleft)$$

Where, n_1 and n_2 are integer numbers and g is symbol of gluon.

Pairs in the decay of electron-positron and proton-antiproton (quarks, anti-quarks and gluons) are converted into energy. In high energy physics, input particles accelerate. As a result of this

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acceleration the number of *SQE*s increases and the heavier particles are produced with different properties. The reactions $e^-e^+ \to \pi^+\pi^-$ and $e^-e^+ \to \overline{N}N$ with $N = p$, N are studied in a non-perturbative quark model [21]. In relation $e^-e^+ \to \pi^+\pi^-$ two fermions convert into two bosons.

In all these processes there is a physical reality that must be considered. The fact is that in high energy physics, from energy, the particles with different physical properties are produced. Interaction between the *SQE*s or interactions between the collections of them together, in the photon structure create phenomena and its existence before spontaneous symmetry breaking. Physicists in high energy physics are trying to create conditions which have existed before spontaneous symmetry breaking. The same existing condition in the photon structure hasn't been considered enough yet, unfortunately.

Unification and *SQE*

In generally, since it appears that all known interactions between objects can be described with only negative and positive color charges. How two up quarks with positive charged do not repel each other? Let's show how two positive charged particles produce binding energy, in small distances. Suppose two positive charged particles A and B is at distance d from each other. There are three locations around each positive charged particle (figure 6).

In real space, every charged particle is plunging in a sea of gravitons. Location3 (figure 6) is full of gravitons that move with speed of $v > c$. When gravitons reach to location2, electric field (and magnetic field) of charged particle acts on them so that gravitons convert to positive and negative color charges. Positive charged particle repels positive color charges and absorbs negative color charges. Therefore, negative color charges enter into location1 (figure 6). In location1, negative color charges convert to negative virtual photon (see relations 41 and 42).
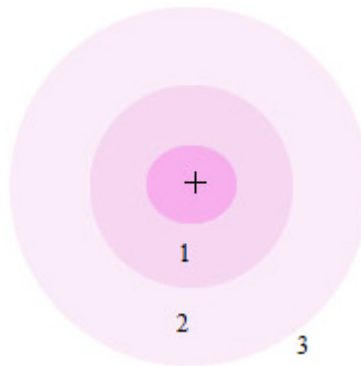

Fig6; Locations around each positive charged particle
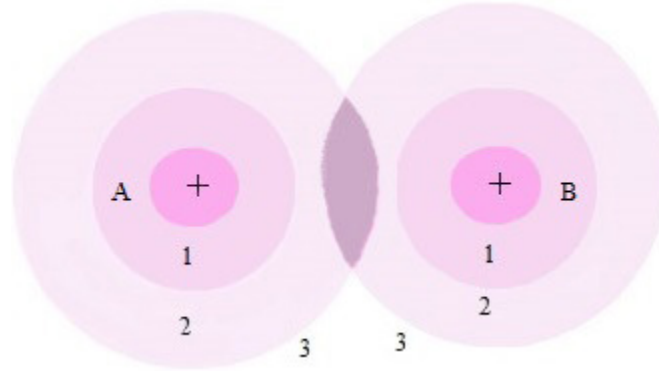
What is CPH Theory?

Fig7; interconnect two positive charged particles

In general, location3 is full of gravitons; location2 is full of negative and positive color charges, and positive charged particle generates negative virtual photon in location1. Now suppose two positive charged particles A^+ and B^+ are near each other that location2 interferes with each other (figure 7). Their direction movement is the opposite of A production. Therefore, in location2, positive color charges G^+ from A and negative color charges G^- from B, have the same direction movement that is toward the B particle. They combine and convert to electromagnetic energy and transfer to the particle B. The same action happens for positive color charges G^+ from B and negative color charges G^- from A; so, they form quantum energy that moves toward A. This shown as follows;

$$a \rhd + a \lhd = \gamma$$

These are energies form the binding energy between A and B. In a heavy nucleus, that contains a lot of protons, every quark interacts with each other and produces banding energy. Consider the center of stars, two hydrogen ions (protons) move toward each other, when their distance decreases, then locations2 of them interconnect and produce banding energy.

Minkowski formula and time

Our physical observations and experiences are limiting of the visible universe or spacetime laws. Because human being and their tools are formed up of spacetime being and obey of spacetime laws. In this paper, let's focus on speed and momentum of real and virtual photons, so we use light-like interval that given by; $c^2t^2 = r^2$ or $S^2 = 0$. World lines of NR-particles relative an inertial observer in (x, y, z, t) frame (by argue not directly) in Minkowski spacetime [22] can be written as follows:

$$\text{Real spacetime; } x^2 + y^2 + z^2 = c^2t^2 \qquad (44)$$

$$\text{Virtual spacetime; } x^2 + y^2 + z^2 = V_{SQE}^2 t^2 \qquad (45)$$

$$Non-obvious\ space: x^2 + y^2 + z^2 = V_G^2 t^2 \qquad (46)$$

Equation (44) shows photon world line is border of real spacetime, world line of other particles such as electron that moves with speed v<c, is given by;

$$Particles\ worldline;\ x^2 + y^2 + z^2 = v^2 t^2, v < c \qquad (47)$$

World line of other physical being such as virtual photon and graviton is outside of the real spacetime. In Equation (45) when $V_{SQE} = c$ virtual particles appear in real spacetime, it is detectible indirectly (in photon structure). When $V_{SQE} < c$ it is a part of quantum particles such as electron. Boundary between real spacetime and virtual spacetime is speed of light c. In gravitational blueshift and zero point energy; virtual photons leave in virtual spacetime and enter into the real spacetime. Also in gravitational blueshift gravitons of the first leave non-obvious space and enter into virtual spacetime, then leave virtual spacetime and in the second case leave virtual spacetime and enter into real spacetime and they can be a part of real spacetime being such as photon and electron.

According to $|V_G| > |V_{SQE}| > |c|$, every visible (detectable) physical being decay, also every virtual particles decay too. But graviton does not decay, in the other word; time does not pass of graviton; the reason is that graviton does not decay to other physical being. If graviton does not experience "time passing", so what means t parameter in the equation (46)? This equation is an assumption, for an inertial observer in real spacetime, it is not the only option, and the imaginary of Minkowski's formula is discussed [23]. If a graviton writes its world line equation, it maybe same as; $x^2 + y^2 + z^2 = 0$. By solving this equation in imaginary space we have;

$$x^2 = (-1)(y^2 + z^2) = i^2(y^2 + z^2) \qquad (48)$$

$$x = \pm i\sqrt{y^2 + z^2} \qquad (49)$$

Graviton's life is independent of time. It exists and moves in an imaginary space that for human being is not conceivable. Graviton carries information and moves so much faster than light speed. According to color charges and magnetic color G, G^-, G^+, G^m, in fact graviton is pure information that for a real observer it moves with infinite speed, remember quantum entanglement [24].

Thermodynamic basic-level state of a system and SQE

Every system emits heat energy; in fact a system works on itself continuously that is positive work on the environment. Let's name it the "Inherent power of system". So, every system has an inherent power that is greater than zero $P > 0$. If a system loses its inherent power, it is at basic-level state of thermodynamics. In other words, a system would be at inherent power, if its inherent power would be zero $P = 0$ (figure 8).
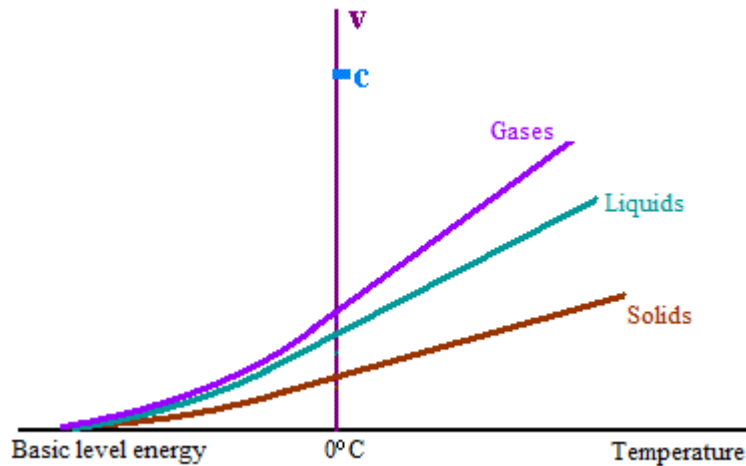
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Fig 8; Velocity and temperature of systems

When a system is at basic-level energy, its charged particles are not able to work on each other, so the system does not emit heat energy. When a system is at basic-level energy, then its temperature is absolute zero. Suppose a system is at basic-level energy, it contains n *SQE*s that are moving with velocity $v = 0$ in system. We give heat to it, in fact k SQEs with speed c enter the system, and particles of system absorb them. In a real environment the inherent power of a system cannot be zero, even in space, because there is cosmic background radiation in space.

First law of sub quantum energy thermodynamics

A system works on the environment with inherent power$P > 0$. To stabilize or increase the internal energy of a system, we must give heat energy to system with power $P' \geq p$.

The second law of sub quantum thermodynamics

There is no actual physical process by which we can make the inherent power of a system P one-way.

Consider that in an actual physical process the inherent power is not constant. Because heat energy incomes and outgoes of an actual systems.

Third law of sub quantum thermodynamics

An actual physical system never approaches the basic-level energy.

There is no physical process to take a system to the thermodynamic basic-level state.

Entropy and sub quantum energy

Entropy (ΔS) of a system is equal to its inherent power (P), $\Delta S = $ P, so entropy of a system approaches zero only at basic-level thermodynamics.

What is CPH Theory?

Time in physical being

It's quite clear that Isaac Newton founded classical mechanics on the view that space is something distinct from body and time is something that passes uniformly regardless of whatever happens in the world. For this reason he spoke of absolute space and absolute time, so as to distinguish these entities from the various ways by which we measure them which he called relative spaces and relative times. On the other hand, Einstein's Special Theory of Relativity predicted that time does not flow at a fixed rate: moving clocks appear to tick more slowly relative to their stationary counterparts.

Einstein generalized Special Theory of Relativity to include gravitation. In general relativity, space-time is curved by matter and not only distances stretch or shrink (depending on their direction with respect to the gravitational field) but also the flow of time appears to dilate.

Quantum mechanics does not neglect the time either. In standard model, photon does not experience time. Some new theories suggest that time does not exist at the quantum level. What is the nature of physical time, really?

The sub quantum definition of time: any physical being does not keep its content energy in interaction with other physical entity, experience passing time.

By this definition any physical entity that is keeping energy content, does not experience passing time, in other words, its existence is independent of time.

Quantum mechanics and time

In quantum mechanics, all particles have variable content of energy (except graviton), even photons can gain energy in interaction with other particles. Therefore, energy of photon changes. Most importantly, in pair production, a photon is converted to "electron-positron" pair. These are all reasons that the photon will experience passing time, but in a long journey in space, it moves with limit speed c, as long as it does not interact with other particles or fields, it preserves its content of energy and in this travelling , does not experience passing time. However, when photon interacts with other particles or fields, experiences passing time. Thus photon that moves in real space-time with speed of light, experiences passing time, besides other quantum particles experience passing time. It means that time exists in quantum mechanics and all particles have a finite lifetime.

Relativity and time

In special relativity, moving clock works slower than stationary clock. Time dilation in special relativity must be investigated along with contraction of length. Because they are inseparable from each other. Contraction of a physical object means compactness of atoms and sub atomic particles. Whatever atoms are compacted more to each other, the inherent power of system decreases for any reason that is considered. Consider a radioactive element instead of a clock, radioactive

elements in high speeds radiate less than low speed. "Radioactive decay of particles moving at high speeds has been measured to occur less frequently than radioactive decays for particles moving at lower speeds"[25]. Here simultaneously two relativistic effects, expansion of time and contraction of length must be considered, reduction of volume and dilation of time have direct relation with each other. Because due to reduction of volume, inherent power of radioactive elements decreases. In addition, time dilation in general relativity happens by reduction of volume, due to gravitational pressure. The clock that is on the earth is under gravitational pressure more than a clock that lies at the top of a mountain.

Thermodynamics and time

From viewpoint of sub quantum thermodynamics, any system with inherent power P works on the physical environment, so its content of energy is not constant. Therefore, from thermodynamic viewpoint all systems experience passing time. Then it is acceptable that by thermodynamic insight to the time, thermodynamic time is oriented and from the past to the future.

In thermodynamics that its study domain is large systems (relative to quantum particles), any physical existent (system) has its special location on the time axis from the past to the future. On the other hand, in thermodynamics, heat exchange of systems are studied in observable universe. The observable universe is a real space-time where it's speed is always smaller or equal than the speed of light, in such speed, always we have: $v \leq c$. The time is a real quantity and it should be used in computations in thermodynamics.

In quantum mechanics, some particles (such as photon) do not experience passing time, but in thermodynamics, any thermodynamic system (from a capsule of gas until observable universe), either have oriented time axis for themselves from the past to the future and the time never stops.

The sub quantum definition of clock

According to CPH theory, everything (except graviton) has an inherent power $P > o$ radiation continuously energy (electromagnetic radiation) and this process is repeated. That means in real space-time everything is a clock. If we consider the objects as a clock, the ticking of clock is radiation objects. Some objects are so irregular that we do not use them as a clock, and someone are regular clocks than others. In quantum mechanics, a photon is a unit of radiation (in terms of quantum mechanics) and does not experience passing time. When this proposition is acceptable that the energy of photon does not change and it was an unstructured particle, while it is not and energy of the photon also changes. But this attitude of quantum mechanics is a good guide for understanding the physical time.

Assume that the observable universe would collapse due to gravity. Again, a new universe appears by another big bang. We suppose a smart existent like human lives in the next universe, the question is: How he/she will know that we have lived before him/her? All the materials in the

What is CPH Theory?

observable universe converted to energy and energy converted to matter again. How do we know there was a universe before the present universe or it has not been existed at all? We do not know the answer of this question. However, we know that any physical existent in this universe does not destroy and just it converts to another thing, converting energy to mass and vice versa, in fact, field converts to energy, energy converts to matter-antimatter and vice versa.

The fact is that the Earth, solar system and the universe existed before us and after us will exist too. Human as a clock compares himself with older clocks, and from this comparison concludes that there exist something that is called time, and the time is independent of physical existents. While any attempt to explain or define time, independent of physical existents has been inconclusive. A physical existent with its own space and time forms its special shape and after a number of ticking, decays or converts to other physical existent.

At the lowest level of physical universe, in a small slice of space (in quantum vacuum), the three spaces, real space-time, virtual space-time and non-obvious space are intertwined and "quantum energy" is appeared. Just for non-obvious space, time does not exist, and beyond the non-obvious space, everything experiences passing time.

Conclusion

To date, there is no way to explain the process that describes how particles produce exchange particles in modern physics. According to the results of reconsidering relativistic Newton's second law, we can definitely say that the best way for unifying the interactions is generalizing interaction between charged particles to photon structure and vice versa. This new view on photon means that we can redefine the graviton and electromagnetic energy. Electromagnetic energy converts to matter and anti-matter such as charged particles. Charged particles use gravitons and generate electromagnetic field. This way of looking at the problem shows how two same charged particles repel each other in far distance and absorb each other at a very small distance.

Thus far, physicists have been able to merge electromagnetic and the weak nuclear force into the electroweak force and work is being done to merge electroweak and quantum chromodynamics into a *QCD*-electroweak interaction. Beyond grand unification, there is also speculation that it may be possible to merge gravity with the other three gauge symmetries into a grand unified theory. But there is no way to explain how particles produce exchange particles in modern physics. A new and different way (that we have suggested) for unifying the interactions is generalizing color charge from nuclear to photon structure. This new view on color charge means that we can redefine graviton and electromagnetic energy (Sub quantum energy). This looking shows how two same charged particles repel each other in far distance and absorb each other at a very small distance.

Attention to photon structure and using new definitions for graviton, we can use the sub-quantum space to describe the nature of time in order to understand better the nature of space-time, and review of thermodynamics laws and entropy. As long as we do not review relativistic Newton's second law, physics does not stand on its actual position.

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References:

[1] Photon Structure - Resolution of the Wave-Particle Duality, Published Dec. 10, 1979 by Timothy Edward Long, http://www.photonstructure.com

[2] Jonathan M. Butterworth, "Structure of the Photon" Department of Physics and Astronomy University College London, London, WC1E 6BT, United Kingdom

http://www.slac.stanford.edu/econf/C990809/docs/butterworth.pdf

[3] Stefan Söldner-Rembold, "Physicists study photon structure", CERN COURIER, 1999, http://cerncourier.com/cws/article/cern/28060

[4] Pound, R. V.; Rebka Jr. G. A. "Apparent weight of photons". Physical Review Letters 4 (7), 1960

[5] H Javadi · F Forouzbakhsh · H Daei Kasmaei, "Photon-Graviton Interaction and CPH Theory" 2016

https://www.researchgate.net/publication/308890409_Photon-Graviton_Interaction_and_CPH_Theory?ev=prf_pub

http://gsjournal.net/Science-Journals/%7B$cat_name%7D/View/6655

[6] Hossein Javadi, et, at. "Adaptive Review of Three Fundamental Questions in Physics " page 28

https://www.researchgate.net/publication/302313653_Adaptive_Review_of_Three_Fundamental_Questions_in_Physics

http://gsjournal.net/Science-Journals/%7B$cat_name%7D/View/6493

[7] William O. Straub, "WEYL SPINORS AND DIRACíS ELECTRON EQUATION" 2005, http://www.weylmann.com/weyldirac.pdf

[8] Hermann Weyl, "GRAVITATION AND THE ELECTRON", PALMUR PHYSICAL LABORATORY, PRINCETON UNIVSRSITY, Communicated March 7, 1929

[9] H Javadi · F Forouzbakhsh · H Daei Kasmaei, "Generalization of the Dirac's Equation and Sea" 2016

https://www.researchgate.net/publication/303988070_Generalization_of_the_Dirac%27s_Equation_and_Sea?ev=prf_pub

http://gsjournal.net/Science-Journals/%7B$cat_name%7D/View/6552

[10] Su-Yang Xu, et, at. "Discovery of a Weyl fermion state with Fermi arcs in niobium arsenide", Nature Physics 11, 748–754 (2015) doi:10.1038/nphys3437

[11] Steven R. Elliott, "Colloquium: Majorana Fermions in Nuclear, Particle and Solid-state Physics", 2014, arXiv:1403.4976v2

[12] Francis F, & Chen, "*Introduction to Plasma Physics and Controlled Fusion*", Plenum Press. 1984

[13] De Guillebon L., et. al., "A gyro-gauge independent minimal guiding-center reduction by Lie-transforming the velocity vector field", arXiv: 1211.5792v2, physics.plasm-ph, 2013

[14] The Cosmological Constant, http://abyss.uoregon.edu/~js/glossary/cosmological_constant.html

[15] MALCOLM S. LONGAIR, "A Brief History of Cosmology", Carnegie Observatories Astrophysics Series, Vol.2 Measuring and Modeling the Universe, 2004, ed. W. L. Freedman (Cambridge: Cambridge Univ. Press)

http://www.astro.caltech.edu/~george/ay21/readings/longair.pdf

[16] - The Friedmann Equation,

https://ned.ipac.caltech.edu/level5/Peacock/Peacock3_2.html

http://hyperphysics.phy-astr.gsu.edu/hbase/astro/fried.html

[17] ADAM G. A RIESS, et, at., "OBSERVATIONAL EVIDENCE FROM SUPERNOVAE FOR AN ACCELERATING UNIVERSE AND A COSMOLOGICAL CONSTANT", THE ASTRONOMICAL JOURNAL, 116:1009È1038, 1998 September

[18] All about science, Big Bang Theory - An Overview, http://www.big-bang-theory.com/

[19] Francis F, & Chen, "*Introduction to Plasma Physics and Controlled Fusion*", Plenum Press. 1984

What is CPH Theory?

[20] Freund A., "Exclusive annihilation p pbar to gamma gamma in a generalized parton picture" arXiv: 0208061v1, hep-ph, 2002

[21] Freund A., "Exclusive annihilation p pbar to gamma gamma in a generalized parton picture" arXiv: 0208061v1, hep-ph, 2002

[22] Bros, J., Moschella, U., Damour, T., & Darrigol, O. (2005). The Geometry of Relativistic Spacetime: from Euclid's Geometry to Minkowski's Spacetime. *Séminaire Poincaré, 1*, 1-45

[23] Chappell, J. M., Iqbal, A., Iannella, N., & Abbott, D. (2012). Revisiting special relativity: A natural algebraic alternative to Minkowski spacetime. *PloS one, 7*(12), e51756.

[24] Horodecki, R., Horodecki, P., Horodecki, M., & Horodecki, K. (2009). Quantum entanglement. *Reviews of Modern Physics, 81*(2), 865.

[25] http://muller.lbl.gov/teaching/Physics10/Pages2009Spring/ReviewNote-final/Relativity_Universe.pdf