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The Mechanism of Graviton Exchange between Bodies, Part II

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Abstract

Further to Special Relativity, modern physics includes two great theories which describe universe in a new different way. One of them is Quantum Mechanics which describes elementary particles, atoms and molecules and the other one is General Relativity which has been replaced the Newtonian Gravitational Law by space-time curvature. Quantum gravity is a part of quantum mechanics which is expected to combine these two theories, and it describes gravity force according to the principles of quantum mechanics which has not got the desired result, yet.

In CPH theory, after reconsidering and analyzing the behavior of photon in the gravitational field, a new definition of graviton based on carrying the gravity force is given. By using this definition, graviton exchange mechanism between bodies/objects is described. As the purpose of quantum gravity is describing the force of gravity by using the principles of quantum mechanics, all the large bodies such as stars and galaxies which are made up of atoms and elementary particles, quantum gravity should explain the graviton exchange mechanism between atoms and elementary particles, too. In the previous paper (part I), a new definition of the relationship has been given in

which the relation between gravity (graviton) and electromagnetic (photon) have been described. In this part, the graviton exchange mechanism in the beneath of layer have studied and analyzed and it finally has been tried to generalize and extend the graviton exchange mechanism from between particles and atoms to large bodies.

Note: For those who have not studied part [1], it is recommended first to study it and then this part.

Key words: Gravitational binding energy, color charges, magnetic color, graviton, virtual photon

Introduction

In The Mechanism of Graviton Exchange between Bodies [1], we have presented the new definition of graviton, sub quantum energy and virtual photons as follows:

1 - **Graviton mass, energy and amount of its speed are constant, but its identity is changing**

In interaction between graviton G and photon and with other particles or also themselves, gravitons behave as if they have charge and magnetic effects. These are referred to as negative color-charge G^-, positive-color G^+ charge and magnetic-color G_m . From this, it can be shown that a photon is made of color-charges and magnetic color.

It is important that we note the speed of graviton G that is given with V_G, (also speed of color-charges V_{G^-} , V_{G^+} and speed of magnetic-color V_{G_m}) is faster than light speed, so $V_G > c$ that V_G is the total speed of transmission speed V_{GT} and non-transmission V_{GS} of graviton or color-charge and magnetic-color [1 , 2 and 3].

$$V_{Gy} + V_{Gz} = V_G = constant > c \qquad (1)$$

$$V_{G^-} = V_{G^+} = V_{G_m} = V_G$$

2 – **Sub Quantum Energy (SQE):** All photons have common physical properties except the value of energy. Therefore, at least electromagnetic energy can be defined as follows [1, 2 and 3]:

$$E_{minimum} = \frac{hc}{\lambda_{max}} \ , where \ E_{minimum} \ is \ detectable \qquad (2)$$

$E_{minimum}$ includes two parts that it can be written as follows:

$$E_{minimum} \rightarrow \begin{bmatrix} +\frac{E_{minimum}}{2} & 0 \\ 0 & -\frac{E_{minimum}}{2} \end{bmatrix} \qquad (3)$$

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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 the following relations:

$$\text{Positive Sub Quantum Energy; } SQE^+: \triangleright = +\frac{E_{minimum}}{2} \qquad (4)$$

$$\text{Negative Sub Quantum Energy; } SQE^-: \triangleleft = -\frac{E_{minimum}}{2} \qquad (5)$$

3 – **Virtual photons:** By using the definition of positive and negative sub quantum energies $\triangleright$, $\triangleleft$ in which k is a natural number, we use γ that is sign or symbol of electromagnetic energy:

$$\gamma^+ = k \triangleright, \ \gamma^- = k \triangleleft \rightarrow \gamma = \gamma^+ + \gamma^- \qquad (6)$$

Where, $k \triangleright$ 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 [1, 2 and 3].

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 (page 40, [9]). Assume that $2k$ positive and negative color-charges (kG^+, kG^-) enter a 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 fields 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 opposite, each magnetic field cover its color-charges and prevents them of escaping (page 28, [9]). 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) [4].

Graviton exchange and sub quantum energy

Force is described as energy per distance that shown by:

$$F = -\frac{dU}{dx} \qquad (7)$$

And reconsidering relativistic Newton's second law [3 and 5] is given by:

$$F = \pm \frac{v}{c^2}\frac{dE}{dt} + m\frac{dv}{dt} \qquad (8)$$

Let's review relations (8) and (7) with respect to the concepts and principles of quantum mechanics. In quantum mechanics the fundamental forces are carried by the bosons. In this article, we focus on the force of gravity which is carried by gravitons and the electromagnetic force which is carried by positive and negative virtual photons. Considering the left side of both relations (8) and (7) to the concept of the boson, without a second particle, e.g. an electron, it will be meaningless. In other words, a boson in interaction with the second particle alters the potential

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energy given in relation (7) or change the energy and momentum of the second particle which is given in relation (8). In simpler statement, until a boson does not interact with other particle, it remains as boson which carries force. For this reason, when a charged particle is placed in the electric field of the second charged particle, due to interactions between their electric fields, both particles are accelerated and their energy and momentum change (Fig. 1).


Fig1: Two charged particles are accelerated in each other electric field (without connection)

In Fig. 1, the energy and momentum of two charged particles are changed, but the energy has mass that is describable by relation (8) and special relativity. It means that in interaction between two electric fields, the energy is generated and be absorbed to the particles. The direction of energy movement determines the direction of acceleration which is describable by relation (6) (page 40 [3]).

Generation and absorption of the gravitational energy by two bodies which are located in their gravitational fields of each other are done by interaction between their gravitational fields, too. According to Newton's universal gravitation law, the gravitational force between two objects is directly proportional to the product of their masses. Then, if we describe any gravitational interaction between two or more atoms/subatomic particles, we can generalize and extend this description to large bodies such as stars and even the galaxies. Therefore, we continue consideration of the gravitational interaction between two subatomic particles.

Notice to the electron in the center of a spherical space in Fig. (2-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, G^-s escape from electron's locality and G^+s move toward the electron and enter the area 2, In the area 2, G^-s are compressed and turned to positive virtual photon and are released that is show as $a \triangleright = \gamma^+$, there, a is a natural number. (Fig. 2-A). Same as electron, positron's behavior is like a generator, but spinning positron produces and emits negative virtual photons that is show as $a \triangleleft = \gamma^-$ (Fig. 2-B). Here we will focus on the area 3, that gravitational energy is produced. To read the process of virtual photons production see (pages 32-44, [3]).

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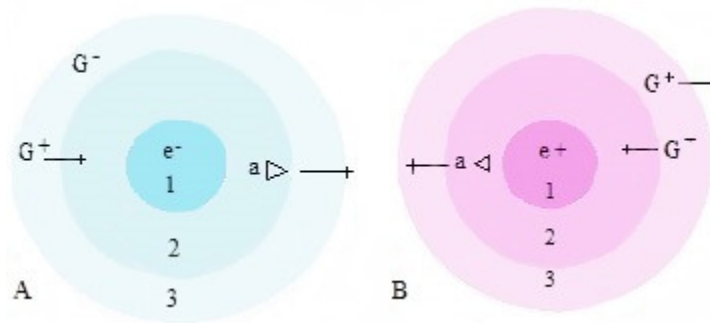
A. Electron; Area3, G convert to G^- , G^+, then G^- moves to far and G^+ moves to area2

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 electron, magnetic field compacts G^-s and repels virtual negative photon that shown by $a \triangleleft$

Fig 2: Around charged particles

Positive and negative color-charges G^- , G^+ are produced in the area (3) of all positive and negative charged particles (Fig. 3). In the case of a negative electric charge e^- , positive color-charges G^+ move toward the area (2) while they are making positive virtual photons γ^+ and negative color-charges G^- leave around the negative electric charge and they release in the space (Fig.3).

In the case of a positive electric charge e^+ , negative color-charges G^- move toward the area (2) while they are making negative virtual photons γ^-, and positive color-charges G^+ leave around the positive electric charge and they are released in the space (Fig.3).
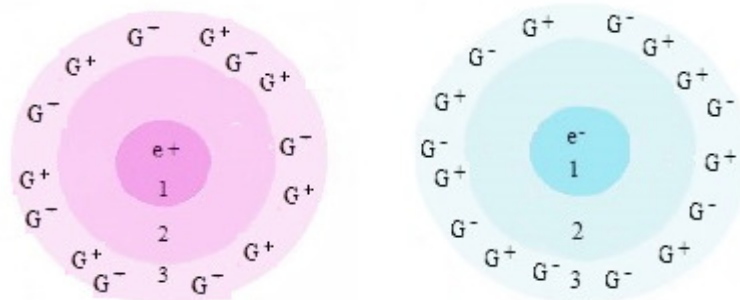
Fig 3: Positive and negative color-charges are produced surrounding the charged particles in area (3).

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Hence, a lot number of negative color-charges G^- are moving outwards in the area (3) around the negative charged particles e^- . And a lot number of positive color-charges G^+ are moving outwards in the area (3) around the positive charged particles e^+ , (Fig 4).
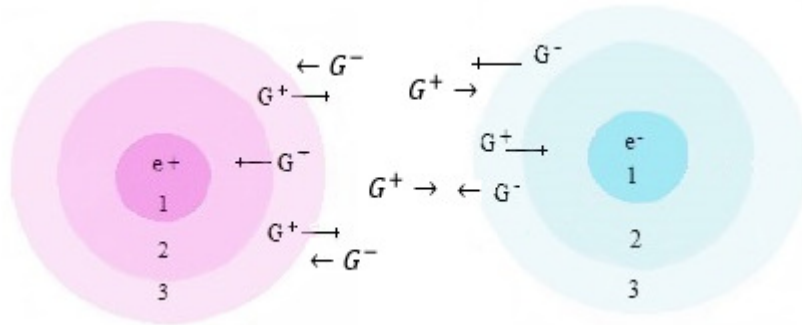

Fig. 4: Around the charged particles in area (3)

According to Fig. (4), a lot number of positive color-charges G^+ move from the positive charged particle toward the negative charged particles e^- , and negative color-charges G^- move from negative charged particle toward the positive charged particle e^+ and they combine in each other (in area 3) and produce the sub quantum energies $\triangleright c$, $\triangleleft$, then gravity energy is produced $(\triangleright + \triangleleft) = E_{gravity}$ and these two particles accelerate toward each other (Fig. 5). For more description of the mechanism of energy production by color-charge and magnetic-color see (pages 32, [3]).
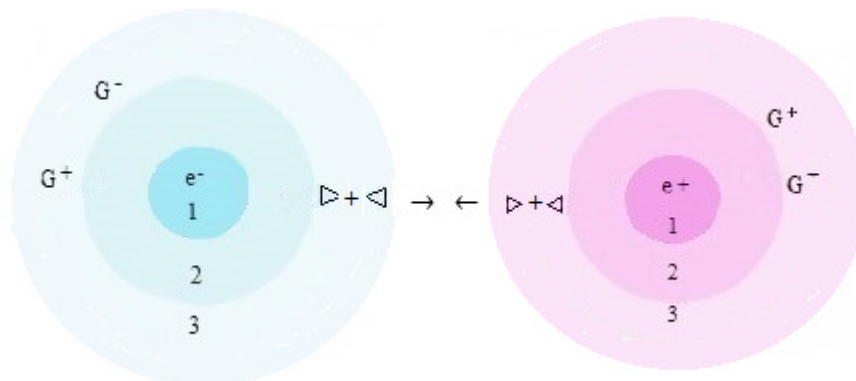

Fig. 5: Gravitational energy is produced in area (3) and two particles are accelerated toward each other

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Although the mechanism of gravitational energy generation of two identical sign charged particles is similar with two different sign charged particles, but the method of generation of G^-, G^+ and sub quantum energies is different. In order to explain the generation process of gravitational energy between two identical sign charged particles, it is necessary to explain the process of the generated electromagnetic energy by the interaction of their electrical repulsion.

Consider an electron which generates and emits positive virtual photons $\gamma^+ = a \triangleright$ (page 41, [3]). A positive virtual photon $\gamma^+ = a \triangleright$ which has a mass m_{γ^+} and momentum mc approaches toward the electron from its right side (Fig. 6) and it collides with a positive virtual photon $\gamma^+ = a \triangleright$ which has been generated by electron in neighborhood area (3). Both positive virtual photons move with speed c.

In this collision, both two positive virtual photons disintegrate and they change into positive color-charges G^+ or positive sub quantum energies $\triangleright$. A lot number of G^+ combine with negative color-charges G^-. They are absorbed in electrons which supply the necessary electromagnetic energy for accelerating of repulsive electrical force between two electrons. A lot number of these positive color – charges G^+ are released in the space which behave the same as Fig. (4). A few of them combine with negative color - charges G^- and they generate the gravitational energy between two electrons in area (3).

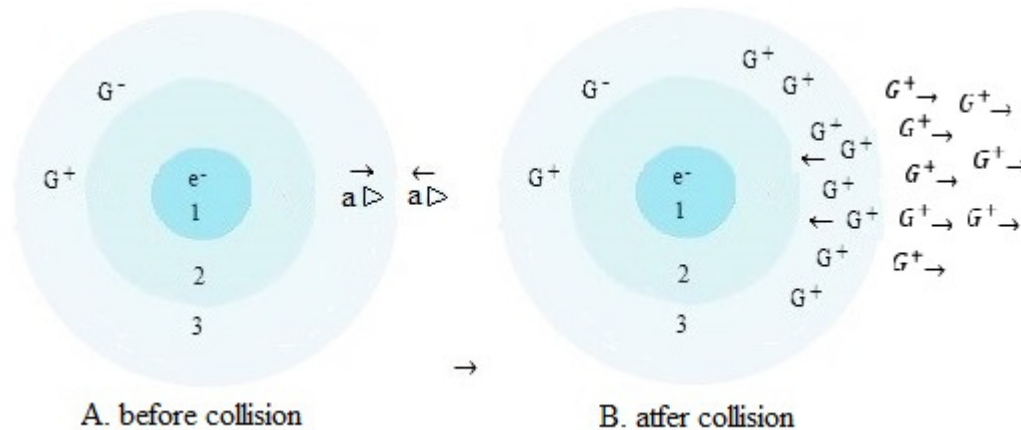A. before collision   B. atfer collision

Fig. 6: Collision of two positive virtual photons around a negative charged particle

According to the above description, both charged particles and neutral particles are producing and exchanging gravitational energy by exchanging gravitons. We call this gravitational binding energy which causes atoms and molecules attract each other and it makes large bodies such as planets, stars and galaxies. Neutral particles such as photons are attracted by

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exchanging gravitons with other particles, too, because neutral particles are made up of positive and negative sub quantum energies. An example of interaction between photon and graviton has been given in the article. [5].

In structure of atom, each particle is linked with its adjacent particle by gravitational binding energy. Moreover, it is related by releasing the color-charges in the space. Each atom is linked with neighboring atoms by gravitational binding energy and by releasing color-charges; it shows its presence (Fig 7). Thus, large bodies such as stars and galaxies are created.
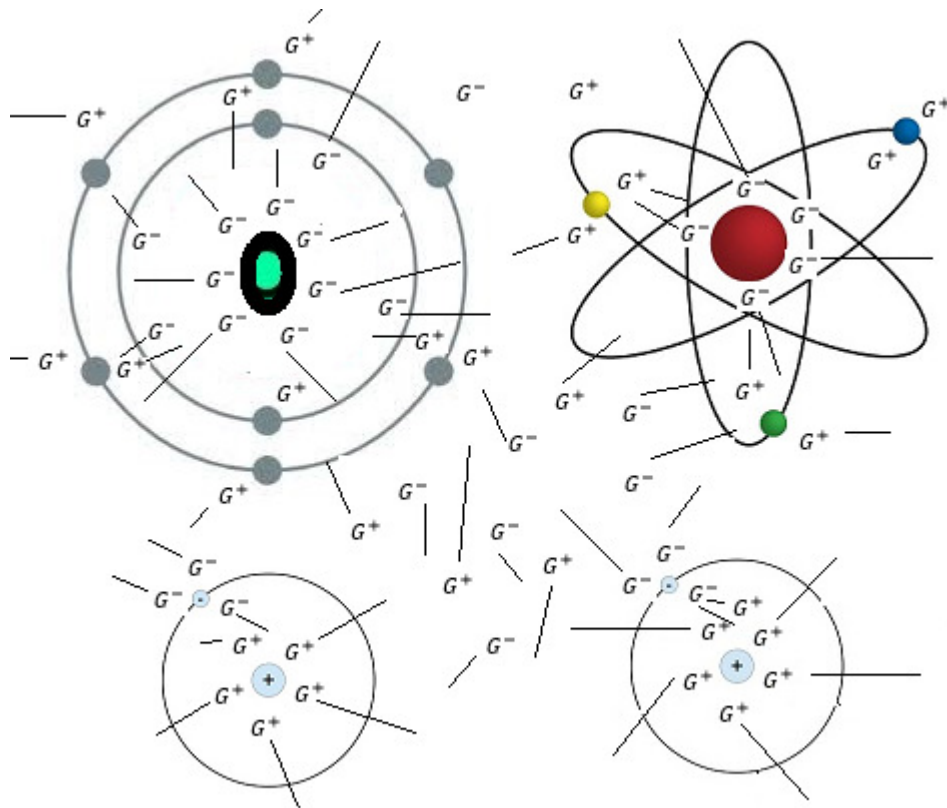

Fig. 7: Each atom has a gravitational binding energy with the surrounding atoms and it is related with the space by releasing color-charges.

Conclusion

In the recent decades, quantum gravity has been the biggest problem in physics. This problem caused physicists to work on two theories in quantum mechanics and general relativity to be compatible by presenting mathematical equations. But in CPH Theory, it has been working directly with reviewing and analysis of the physical phenomena such as structure of elementary particles

and their interaction to be described. That is why the graviton exchange mechanism between bodies according to structure of particles have been reviewed and analyzed.

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