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Graviton: Virtual photon and Quantum Chromodynamics

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Abstract:

The strong interaction or strong force is today understood to represent the interactions between quarks and gluons as detailed by the theory of quantum chromodynamics (QCD). The strong force is the fundamental force mediated by gluons, acting upon quarks, antiquarks, and the gluons themselves.

This article shows how homonymous charge particles absorb each other in very small distance. Generally, two homonymous charged particles produce binding energy, in small distance. This looking where based on CPH theory and it is continuing of Graviton and virtual photons [1].

Keyword: graviton, photon, color charge, magnetism color, negative and positive virtual photon, neutron, proton, unified

Introduction

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.

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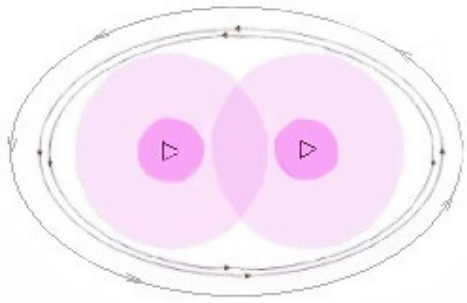
According to the results of graviton and Newton's second law [2] we can definitely say that the best way for unifying the interactions is generalizing color charge from nuclear to photon. This new view on color charge means that we can redefine graviton and electromagnetic energy. Gravitons behave like charge particles and in the interaction between gravity and photon, gravitons convert to negative and positive color charges and magnetic color too. These color charges and magnetic color form the negative and positive virtual photon, and a real photon is made up of negative and positive virtual photon [1]. Electromagnetic energy converts to matter and anti-matter such as charged particles. Charged particles use gravitons and generate electromagnetic field by. In fact a charged particle is a generator to producing virtual photons, that they are negative and positive virtual photons. This looking shows how two same charged particles repel each other in far distance and absorb each other at a very small distance. And in the end, this article shows how quarks form protons and neutrons.

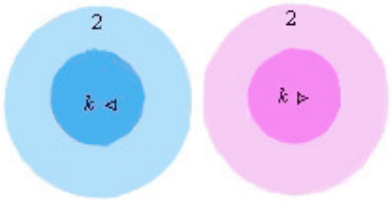
In general, since it appears that all known interactions between objects can be described with only negative and positive color charges and magnetic color.

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 *SQE*s (or $\rhd$, $\lhd$) in photon structure [1]. When you convert energy into matter, the properties of interaction between *SQE*s are also transferred from the photon to particle–antiparticle.



A. Magnetic field around two same *SQEs.*



B. A photon is formed of $k \rhd + k \lhd$, but magnetic fields around $\rhd$ (s) and $\lhd$ (s) prevent them from this combination

Fig1; Sets of *SQEs*

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The amount of the positron mass is equivalent to energy k_+SQE and $k_+SQE = k \rhd$ [1]. Now we will see that how the electrical properties of $\rhd s$ (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 $\rhd$ are in a position that the magnetic fields of these two particles cause them to attract each other (Figure 1-A). In this case, a number of magnetic loops are formed around the sub particles $\rhd$ and prevent them from being dispersed and a quantum positive particle is formed. But a photon is not formed of same sub particles $\rhd$, there are equal numbers of $\rhd$ and $\lhd$ in the structure of photon (Figure 1-B). As two opposite charged particles interact with each other, these two particles also tend to combine together, but magnetic fields around $k \rhd and\ k \lhd$ prevent them from this combination (figure 2-A). With this approach, let's look at pair production and decay which is given by;

$$k_+SQE = k \rhd\!\!\rightarrow e^+ ,\ \ k\_SQE = k \lhd\!\!\rightarrow e^- \qquad (1)$$

For two photons (figure 2-B):

$$k \rhd + k \lhd = 2\gamma = \left(\frac{k}{2} \rhd + \frac{k}{2} \lhd\right) + \left(\frac{k}{2} \rhd + \frac{k}{2} \lhd\right) \qquad (2)$$

For three photons:

$$k \rhd + k \lhd = 3\gamma = 3\left(\frac{k}{3} \rhd + \frac{k}{3} \lhd\right) \qquad (3)$$

This approach to photon is a useful step to explain the real-photon processes and the quantum chromo dynamic. In $p\bar{p} \rightarrow \gamma\gamma$ annihilation in *QCD* [3], compare decay of electron-positron and proton-antiproton using the *SQE*s;

$$p\bar{p} \rightarrow \gamma + \gamma \qquad (4)$$

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;

$$k_+SQE = k \rhd = e^+ , k\_SQE = k \lhd = e^- \qquad (5)$$

$$u = \frac{2}{3} k \rhd , d = \frac{1}{3} k \lhd \qquad (6)$$

$$\bar{u} = \frac{2}{3} k \lhd , \bar{d} = \frac{1}{3} k \rhd \qquad (7)$$

So relation (4) is given by;

$$p + \bar{p} = (uud + n_1\mathrm{g}) + \left(\bar{\mathrm{u}}\bar{\mathrm{u}}\bar{\mathrm{d}} + \mathrm{n}_2\mathrm{g}\right) \rightarrow \gamma + \gamma = n(\rhd + \lhd)$$

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

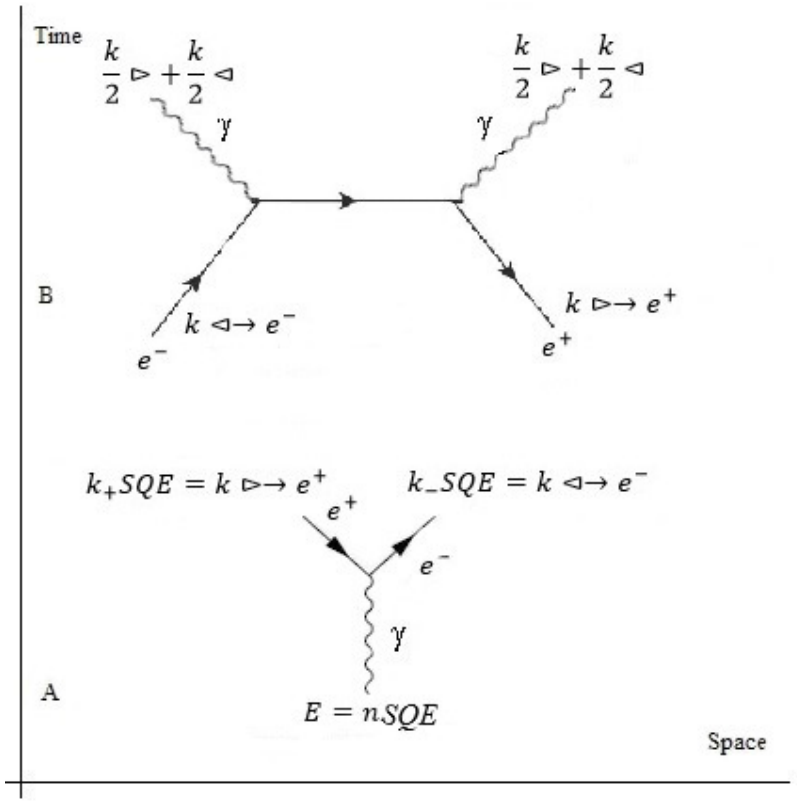

Fig 2; pair production and decay by using negative and positive *SQE*

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 acceleration the number of *SQE*s increases and the heavier particles are produced with different properties. The reactions $e^-e^+ \rightarrow \pi^+\pi^-$ and $e^-e^+ \rightarrow \bar{N}N$ with $N = p$, N are studied in a non-perturbative quark model [4]. In relation $e^-e^+ \rightarrow \pi^+\pi^-$ 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 [5]. 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*

As we know in quantum mechanics the strong interaction is observable in two areas: on a larger scale (about 1 to 3 (fm)), it is the force that binds protons and neutrons (nucleons)

together to form the nucleus of an atom. On the smaller scale (less than about 0.8 fm, the radius of a nucleon), it is the force (carried by gluons) that holds quarks together to form protons, neutrons, and other hadrons particles.

In generally, since it appears that all known interactions between objects can be described with only negative and positive color charges. According to quantum chromodynamics, a proton is made up of two up quarks (u) with $(+\frac{2}{3})$ charge and a down quark (d) with $(-\frac{1}{3})$ charge. 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 3).

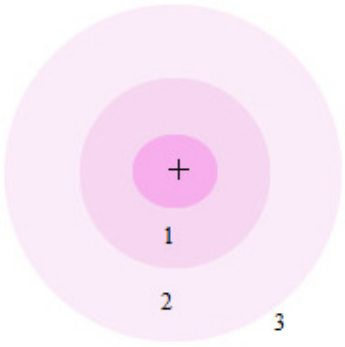

Fig3; Locations around each positive charged particle

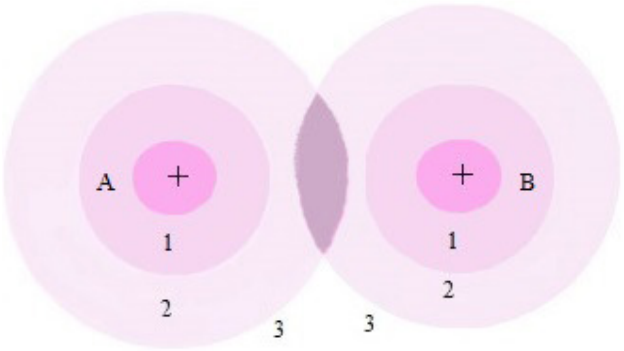

Fig4; interconnect two positive charged particles

In real space, every charged particle is plunging in a sea of gravitons. Location3 (figure 3) 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 [1]. Positive charged particle repels positive color charges and absorbs negative color charges. Therefore, negative color charges enter into location1 (figure 3). In location1, negative color charges convert to negative photon that given by;

$$\frac{d}{dt} \rhd \mathrm{s} = a \lhd = \gamma^{-} \qquad (8)$$

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 4).

There is a set color charges in location2 of A and B interconnect (grey part of figure 4) that is generated by particle A, described as follows:

$$\{(G^{-}, G^{+}) \,|\, G^{-}, G^{+} \in \text{field of A}\}$$

Charged particle A repels positive color charges G^{+}, they move toward B particle, and negative color charges G^{-} move toward A. Also, charged particle B generates a set of positive and negative color charges G^{-}, G^{+}as follows;

$$\{(G^{-}, G^{+}) \,|\, G^{-}, G^{+} \in \text{field of B}\}$$

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;

$$a \rhd + a \lhd = \gamma \qquad (9)$$

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.

Conclusion:

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.

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