



## How the universe works: highlight CPH Theory

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### **Abstract**

At present, the greatest problem in theoretical physics is quantum gravity and the unification of forces. Physicists are trying to solve this problem in the context of modern physics or to think beyond modern physics.

In all of these efforts, the classical physic has been ignored, while nature is unique and all physical phenomena, from the microscopic or the macroscopic ones, are obeying the same law. CPH theory (Creative particles of Higgs Theory) is based on the magnitude speed of energy to matter and vice versa can be generalized.

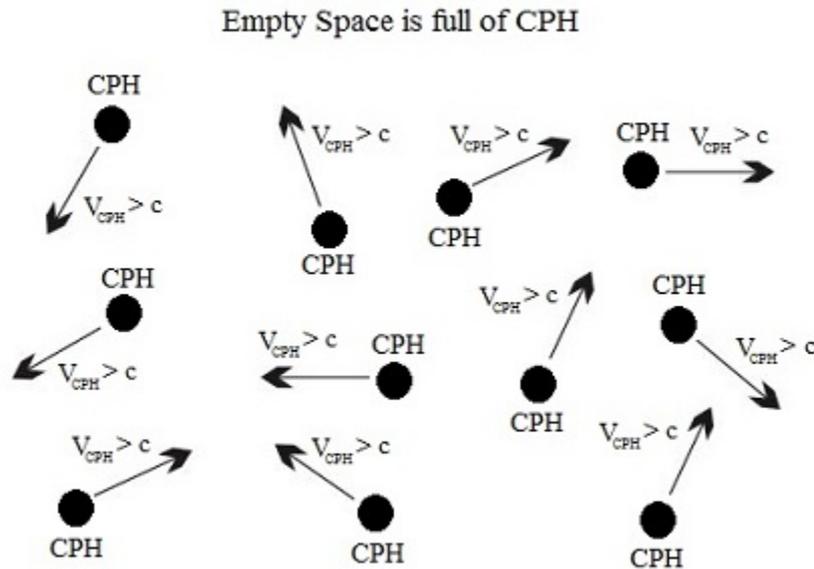
**Keywords:** CPH Theory, virtual photon, cosmology, birthplace fundamental forces, unification, sub quantum energy

# How the universe works: highlight CPH Theory

## What is a vacuum?

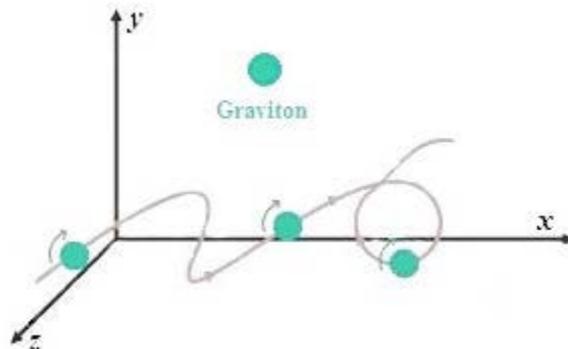
A quantum fluctuation is a temporary change in the amount of energy in a point in space, is explained in Werner Heisenberg's uncertainty principle.

A vacuum is full of CPHs. A CPH has invariable mass  $m_{CPH}$  and moves with a constant amount speed  $V_{CPH}$  in all inertial frames:



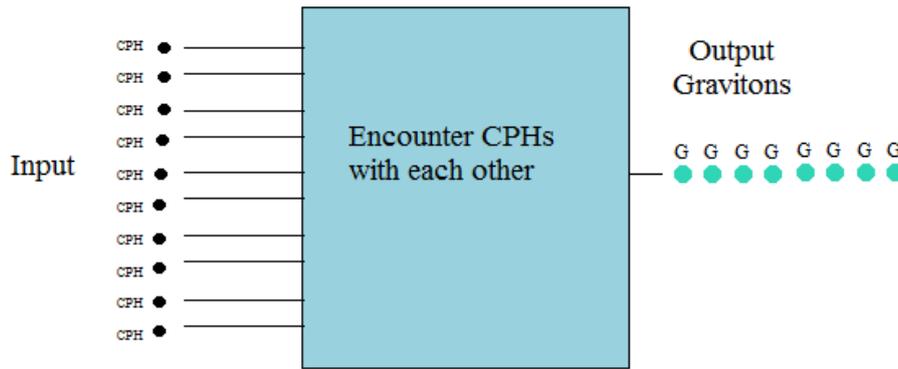
CPHs intact with each other, take spin and convert to graviton G, so that the total amount linear speed of graviton  $V_{GT}$  and non-linear speed of graviton  $V_{GS}$  is constant and equal  $V_{CPH}$  in all inertial frames:

$$V_{GT} + V_{GS} = V_{CPH} = \text{constant}$$



Hypothetical path of a graviton in the Cartesian coordinate system

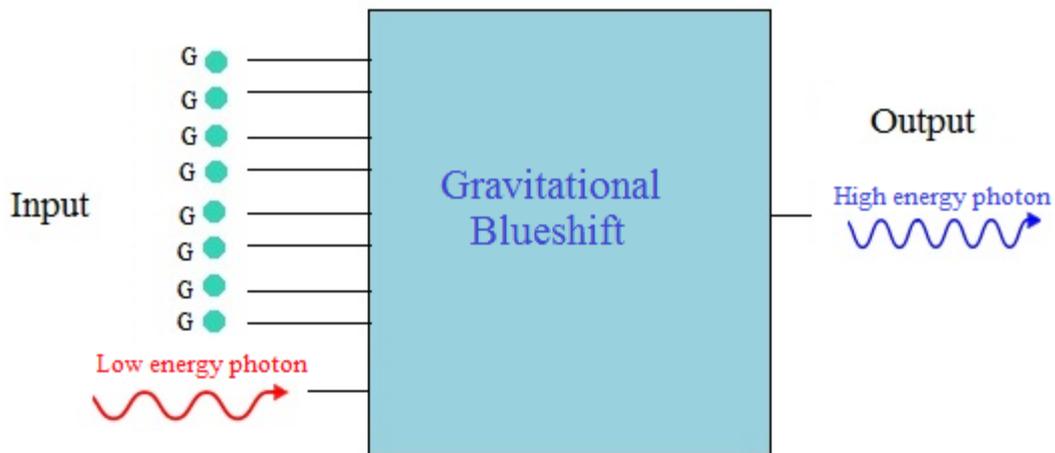
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When CPH has spin, it calls graviton

## Gravitational blue-shift (and red-shift)

When a photon falls in the gravitational field its energy (also frequency) increases that is called gravitational blue-shift;



Gravity force converts to electromagnetic energy.

## Graviton properties

In the CPH Theory, gravitons have properties that when gravity works on the photon, can alter the intensity of electric and magnetic fields of the photon. These features are compatible with general relativity, quantum mechanics, and experimental observations. In addition, these characteristics of Graviton can be obtained from the Dirac equation and the Dirac Sea.

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Photon is carrying two perpendicular electric field and magnetic field. The photon is electrically neutral and particles forming the electric field must neutralize each other. There are two groups, positive color-charges  $G^+$ , and negative color-charges  $G^-$  in the structure of photon that form photon's electric field and neutralize each other. Because these electric fields are moving, they create magnetic fields around themselves. Simultaneously by producing positive and negative electric fields, two magnetic fields are produced around the electric fields do form. Therefore, it will be made two groups, right round magnetic-colors  $G_m^+$ , and left round magnetic-colors  $G_m^-$  is shown in the CPH matrix:

$$CPH = \begin{bmatrix} \kappa G^+ & \kappa G^- \\ G_m^+ & G_m^- \end{bmatrix}$$

## Sub-Quantum Energy (SQE)

We use CPH matrix to define positive and negative sub quantum energies as follow: The first column of CPH matrix is defined positive sub quantum energy and the second column of CPH matrix is defined negative sub quantum energy, so;

$$\text{Positive Sub Quantum Energy: } SQE^+ = \begin{bmatrix} \kappa G^+ \\ G_m^+ \end{bmatrix}$$

$$\text{Negative Sub Quantum Energy: } SQE^- = \begin{bmatrix} \kappa G^- \\ G_m^- \end{bmatrix}$$

Positive and negative sub quantum energies are shown as follow:

$$\text{Positive Sub Quantum Energy; } SQE^+ : \triangleright$$

$$\text{Negative Sub Quantum Energy; } SQE^- : \triangleleft$$

## Virtual photons

There are two types of virtual photons, positive and negative virtual photons which are defined as follows:

$$\text{Positive virtual photon; } k \triangleright = \gamma^+$$

$$\text{Negative virtual photon; } k \triangleleft = \gamma^-$$

Where  $k$  is a natural number

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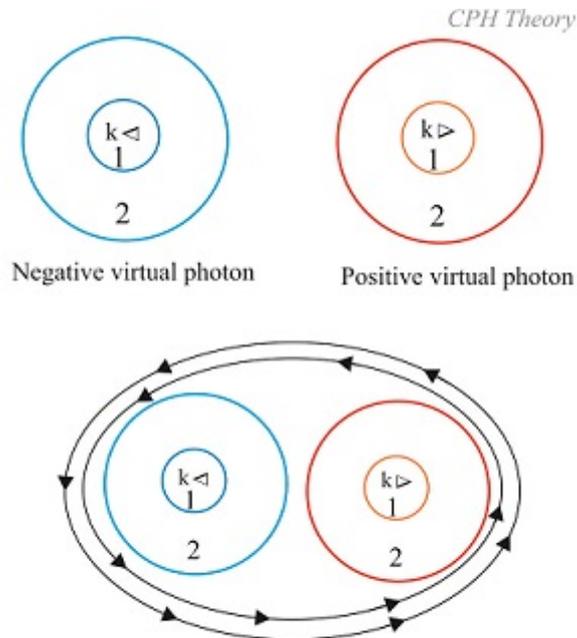
A real photon is formed of a positive virtual photon and a negative virtual photon:

$$\gamma^+ + \gamma^- = \gamma$$

$$(n \triangleright + n \triangleleft) = n(\triangleright + \triangleleft) \text{ or } n|\triangleright\rangle + n|\triangleleft\rangle = \gamma$$

$$\gamma^+ = k \triangleright, \gamma^- = k \triangleleft \rightarrow \gamma = \gamma^+ + \gamma^-$$

There, n and k are natural numbers. So far, the production of electromagnetic energy (photons) was described by using gravitational blue-shift, in reverse phenomena photons decay to negative and positive virtual photons. In redshift, virtual photons also decay to positive and negative sub quantum energies (SQEs), and sub quantum energies (SQEs) decay to charge-colors and magnetic-colors, too.



A photon is formed of  $k \triangleright + k \triangleleft$ , but magnetic fields around  $k \triangleright$  and  $k \triangleleft$  prevent them from combination

So, photons are combination of positive and negative virtual photons. Photon is a very weak electric dipole that is consistent with the experience and these articles are asserted. In addition, this property of photon (very weak electric dipole) can describe the absorption and emission energy by charged particles.

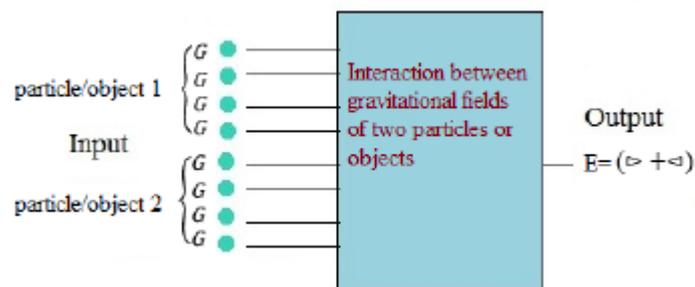
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Gravitational energy  $\Leftrightarrow$  Electromagnetic energy

Electromagnetic energy  $\Leftrightarrow$  *particle – antiparticle*

## Gravity force

When two particles/objects stay on each other gravitational field, their gravitons combine together and become energy and pulls them toward each other.

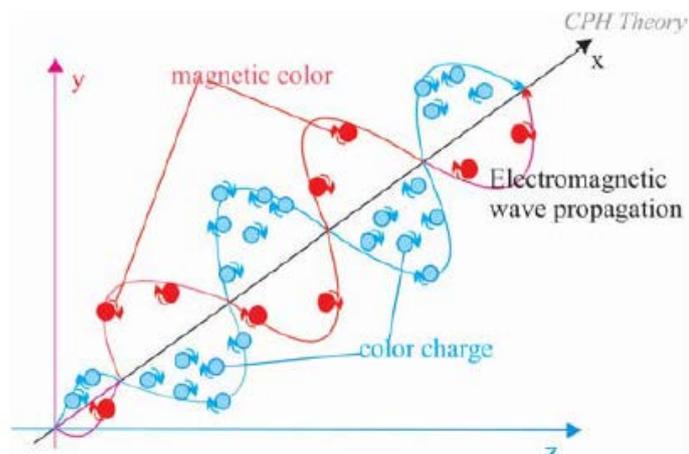


Gravitons convert to electromagnetic energy

## Speed of graviton

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 the photon, so they move faster than light speed.

$$|V_G| = |V_{GT}| + |V_{GS}| > |c|$$



# How the universe works: highlight CPH Theory

## The Graviton Principle

Graviton is the smallest unit of energy in nature, with a constant mass of  $m_G$  in, which always moves at a constant amount of speed in all inertial reference of the frame, and in any interaction with other gravitons and other particles, its amount speed remains constant. So that:

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

According to the Graviton principle, graviton carries two types of transmission energy  $E_{GT}$  and non-transmission energy  $E_{GS}$  relative to inertial frame, and the energy of graviton  $E_G$  is always constant, such that:

$$E_G = E_{GT} + E_{GS} = \text{constant}$$

## The Principle of Sub Quantum Energy

A sub quantum energy is a part of photon's energy that has the properties of electric and magnetic field, with constant mass  $m_{SQE}$ , which always moves at the speed of  $|V_{SQE}| > |c|$  relative to all inertial frames such that:

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

## The speed of light

According to the principle of special relativity, the speed of light in a vacuum is constant for all inertial observers and equal to  $c$  and is independent of the motion of the light source. This principle can be proved using the SQE principle. If the photon speed is generally equal to  $v_{light}$ , its linear speed  $v_{lightT}$  varies from one medium to another and in a vacuum equal to the speed of light  $v_{lightT} = c$ , so we will have according to the SQE principle:

$$\nabla v_{light} = 0$$

Thus the value of linear speed of photon, such as graviton and sub quantum energy, is a function of the conditions of propagation medium, but the total amount of transmission speed  $v_{lightT}$  and non-transmission speed  $v_{lightS}$  of photon is always constant and equal  $|v_{light}|$ , such that:

$$|v_{light}| = |v_{lightT}| + |v_{lightS}| = \text{constant}$$

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## Dirac equation and CPH matrix

According to Klein-Gordon Equation and Dirac equation we can write:

$$E^2 = p^2 c^2 + (mc^2)^2 = \left( \beta mc^2 + \sum_{j=1}^3 \alpha_j cp_j \right)^2$$

For a particle at  $p = 0$  we will have:

$$E^2 = (mc^2)^2 = (\beta mc^2)^2$$

Considering the  $\beta$  matrix, we can write:

$$\beta mc^2 \rightarrow \begin{bmatrix} mc^2 & 0 & 0 & 0 \\ 0 & mc^2 & 0 & 0 \\ 0 & 0 & -mc^2 & 0 \\ 0 & 0 & 0 & -mc^2 \end{bmatrix}$$

For eigenvalues and with considering  $p = 0$ , we will have:

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

In general, the above equation does not restrict mass and energy in terms of quantity. In addition, for zero rest mass of particles, the Dirac equation was reduced to the Weyl equation. Weyl equation predicted the existence of zero resting mass fermions with spin 1/2. WE can define  $\gamma$  matrix as follow:

$$\gamma = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$$

$$\gamma mc^2 \rightarrow \begin{bmatrix} k \triangleright & 0 \\ 0 & k \triangleleft \end{bmatrix}$$

In which  $k \triangleright$  is positive virtual photon of  $\gamma^+$  that carries positive electric force and forms positive electric field, and so  $k \triangleleft$  is negative virtual photon of  $\gamma^-$  which carries negative electric force and forms negative electric field. Each real photon consists of two virtual photons. Then we will have:

$$\gamma^+ = k \triangleright, \gamma^- = k \triangleleft \rightarrow \gamma = \gamma^+ + \gamma^-$$

As charged particles absorb or repel each other and are ineffective to neutral particles, the same sign virtual photons repel each other and different sign virtual photons absorb each other, and form quantum energies and accelerate them to each other. So force does not exist in its classical meaning, and Newton's laws do not say anything about its nature. Therefore, only in the interaction between particles, energy, and momentum are transmitted. So force is a mathematical tool for simplifying computation.

# How the universe works: highlight CPH Theory

## Dirac Sea and CPH matrix

In CPH theory, by the definition of photon's structure, the Dirac Sea is a physical reality that is not only true for positrons but is an inseparable part of nature and even Weyl fermions can be deduced from it.

## Birthplace of Fundamental forces

In modern physics, around fundamental particles, including charged particles, it is assumed that there is the electric and gravitational field. But it is not clear how the fundamental particles produce these fields. In modern physics, there is no explanation as to why two positively charged particles repel each other in long distances (relative to the radius of the atom's nucleus) but attract each other in short distances. Using the structure of fundamental particles, we can define the birthplace of the fundamental forces and explain the reason for the production of strong and weak nuclear forces, the reason for the spontaneously broken symmetry and the emergence of the four fundamental forces.

## Sub Quantum electrodynamics

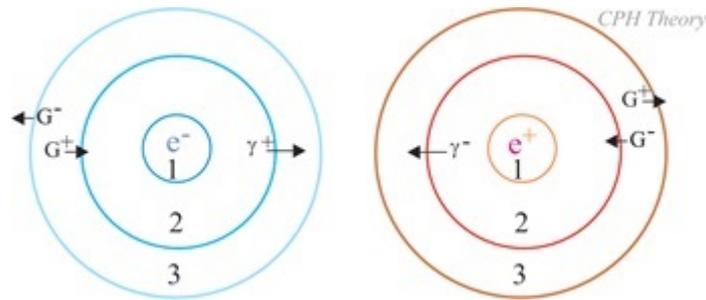
Consider a charged particle (such as an electron) that creates an electric field around itself and is constantly emitting virtual photons whose range is infinite. Electron is a set of negative charge-colors that are protected by the magnetic field caused by the magnetic-colors surrounding it. By the electron spinning motion, a number of positive charge-colors are compressed and converted to a positive virtual photon  $\gamma^+$  and are repelled by its magnetic field. Likewise, positron absorbs the negative charge-colors, and the magnetic field around it compresses the negative charge-colors and emits them as a negative virtual photon  $\gamma^-$ . An operator can be defined that describes the process of producing positive virtual photons by electron:

$$\frac{d}{dt} \triangleleft s(G^+) = a \triangleright = \gamma^+$$

In which, (a) is a natural number. Likewise, positron, like an electron, acts like a generator and generates and emits negative virtual photons, and we will have:

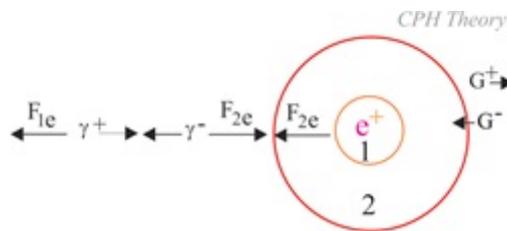
$$\frac{d}{dt} \triangleright s(G^-) = a \triangleleft = \gamma^-$$

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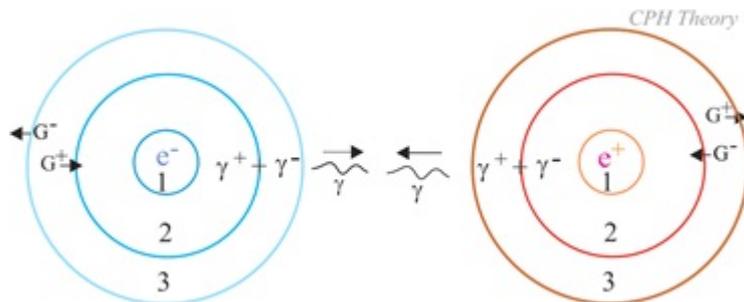
Electrons and positrons absorb each other with negative and positive virtual photons.

When  $a \triangleright = \gamma^+$  from electron arrives at region 2 around positron, it is combined with  $a \triangleleft = \gamma^-$  to form a real photon.



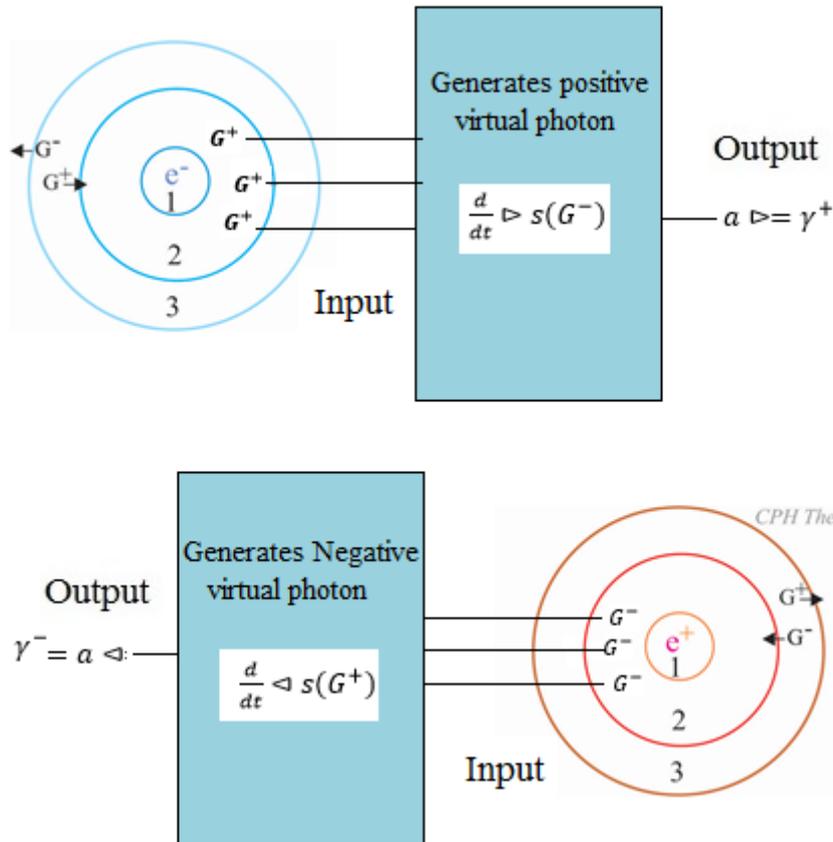
Positron acceleration toward electron according to Newton's second law

When  $a \triangleleft = \gamma^-$  reaches from positron to region 2 around electron, combines with  $a \triangleright = \gamma^+$  and forms a real photon and the two particles accelerate towards each other.



Generation and combination of virtual photons by electron and positron

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Charged particles as generators produce virtual photons

All fundamental forces are made up of sub quantum energy.

### Sub Quantum QCD

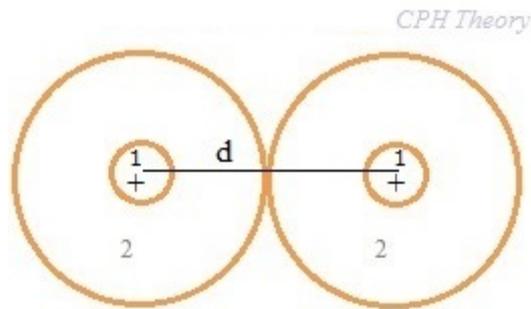
Basically, the unification of forces is not a new subject. Since the nineteenth century, some physicists have attempted to create a unified theoretical framework that could unite the essential forces of nature. Here, the focus is on the approach of CPH theory on the birthplace and mechanism of the fundamental forces generation. In the preceding section, sub-quantum electrodynamics is explained, here sub-quantum chromodynamics will be explained.

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## Nuclear force

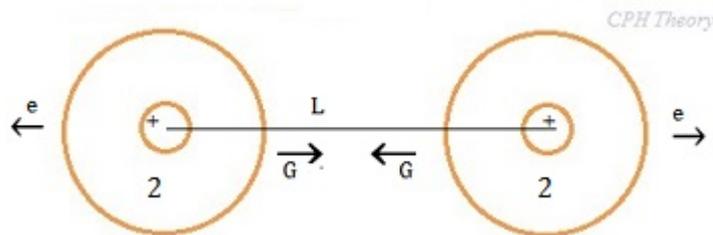
The positively charged particles do not repulse each other at short distances, that is, at short distances (relative to the radius of the nucleus) the repulsive force between positively charged particles becomes the attractive force. This is exactly what quantum chromodynamics cannot explain, but CPH theory can.

Consider the distance between the center of mass of two positive charged particles as  $d$ , such that region 2 of the two particles are contiguous.



The distance of the mass center of two positively charged particles while their region 2 is closed together. Region 3 has been discarded here.

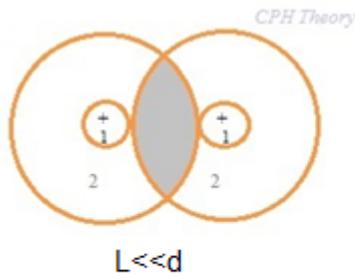
In general, we consider the distance between the center of mass of two particles with positive electric charge as  $L$ . If  $L \gg d$ , the charge-colors repelled by each particle, it has no effect on the charge-colors surrounding the second particle, in this case, particles produce only gravitational and electromagnetic interaction.



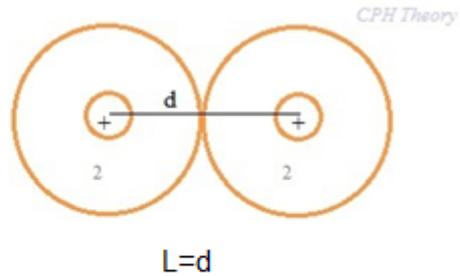
The letters  $e$  and  $G$  of the arrows represent electrical and gravitational force, respectively.

# How the universe works: highlight CPH Theory

It is important to note that region 2 is the place where virtual photons are produced or are the birthplace of electromagnetic interaction.

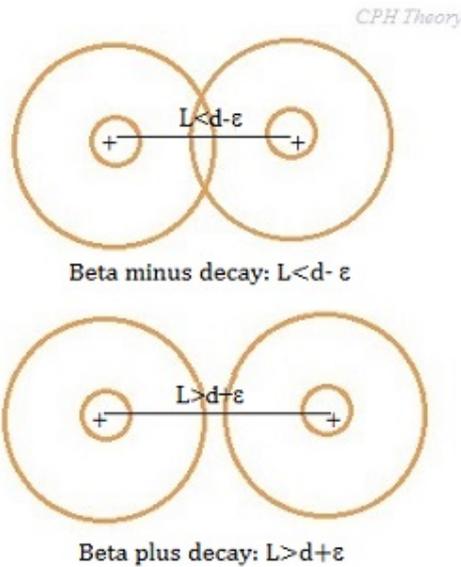


Interference regions 2 of two positive charged particles is the birthplace of strong interaction



The boundary between the birthplace of the electromagnetic interaction and strong interaction

In CPH theory, if distance  $L = d$  is constant or the amount of change is not effective, nucleus is stable.



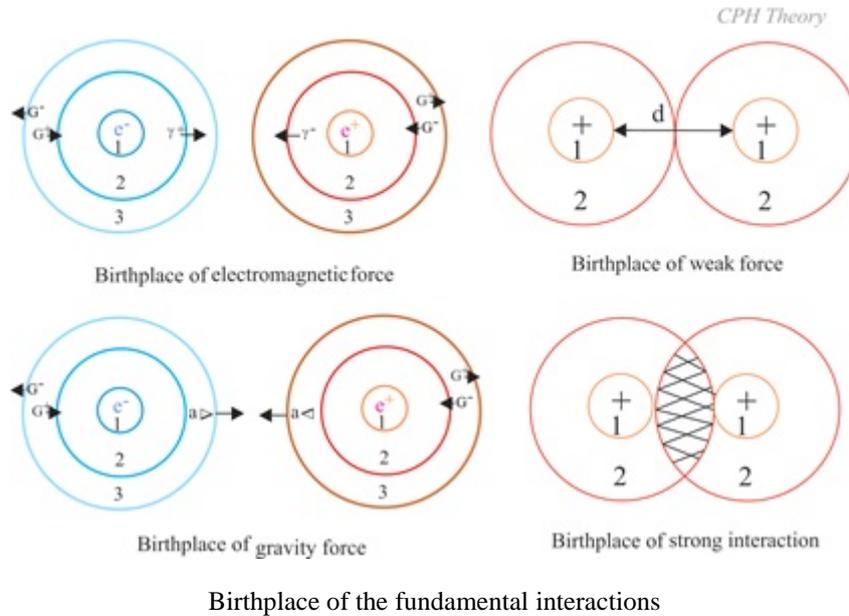
Penetration of Birthplace of Forces on Each Other

If distance  $L$  decreases and  $L < d - \epsilon$ , that means the influence of the weak-interaction birthplace on the strong-interaction birthplace, atomic number increases, the electric charge of nucleus increases. Beta decay is negative.

## How the universe works: highlight CPH Theory

If distance  $L$  is greater than  $d$ , that is  $L > d + \epsilon$ , it means that the birthplace of electromagnetic interaction penetrates into the weak nuclear birthplace, atomic number will decrease, and beta decay is positive.

In general, the unification theory of forces is not compatible with the nature of fundamental forces, because these forces are a function of the interaction of particles and the distance between them, which creates the birthplace of forces.



### Cosmological equation

In the CPH theory, gravitational singularity and cosmological equation are obtained using the structure of fundamental particles, because when we know the structure of particles, we can explain their behavior everywhere, even inside the black holes.

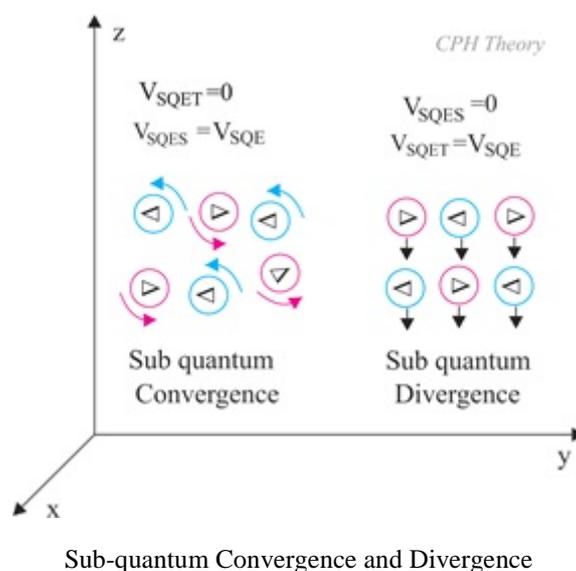
**1- Sub Quantum Divergence:** Whenever an object/particle is falling to a black hole, and before reaching surface of the black hole, all of the non- transmission speeds of its constituent sub quantum energies become transmission speeds:

$$\text{Sub quantum Divergence; } V_{SQET} \rightarrow V_{SQE} \Leftrightarrow V_{SQES} \rightarrow 0$$

**2- Sub Quantum Convergence:** If all transmission speeds of the SQEs of an object/particle tend to zero, we say that object/particle has involved with sub quantum convergence, meaning that in sub quantum convergence, we will have:

$$\text{Sub quantum Convergence: } V_{SQES} \rightarrow V_{SQE} \Leftrightarrow V_{SQET} \rightarrow 0$$

## How the universe works: highlight CPH Theory



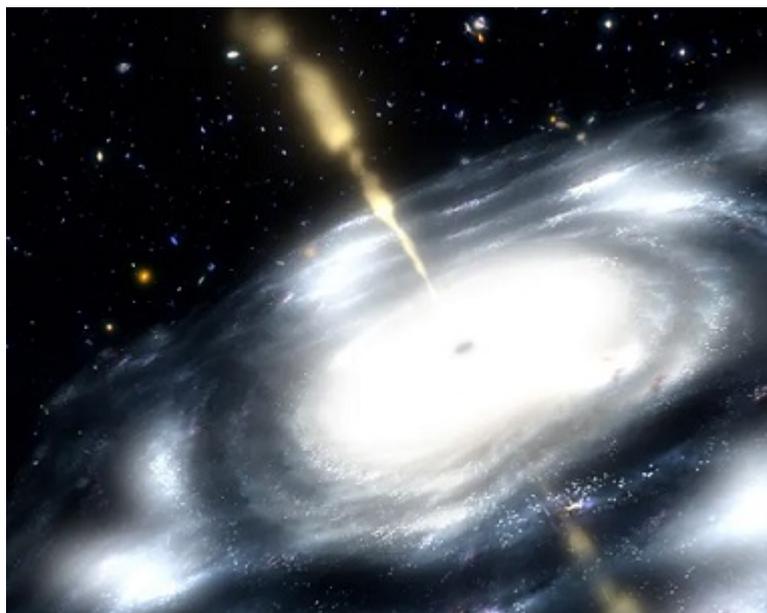
Therefore, gravitational singularity can be defined in CPH theory. There are three types of singularities in black holes:

- 1- **Normal singularity:** All black holes have singularities, in normal singularity, bodies that fall into the black hole is pulled and then decayed, but do not undergo sub-quantum divergence.
- 2- **Sub-quantum divergent singularity:** In supermassive black holes, any object that falls into it undergoes the sub quantum divergence called black hole with sub-quantum divergent singularity. Or, briefly, divergent black holes.

**Using the sub-quantum divergence, the relativistic jets of supermassive black holes can be explained.**

3- **Absolute singularity:** Black holes in which there are two sub quantum divergence and convergence properties have absolute singularities, which we call them absolute black holes. In the absolute black hole, the falling objects undergo sub quantum divergence; there is also sub quantum convergence in the core of black hole. And the absolute black hole explodes.

## How the universe works: highlight CPH Theory



Artist's concept shows a galaxy with a supermassive black hole at its core. NASA

Relativistic jets from a supermassive black hole

### Physical nature of time

In special relativity, the moving clock works slower than the stationary clock. According to general relativity, the clock that is in stronger gravitational field works slower than the clock that is in the weaker gravitational field. In thermodynamics, entropy is also known as the time arrow. In quantum mechanics it is claimed that time does not exist in quantum scale. Quantum mechanics claims that photons do not experience the passing time.

### Which particles do not experience time really?

All visible objects and particles such as fundamental particle experience time. Virtual particles and sub quantum energy like real photon experience time. Sub quantum energies are born of a combination of charge-colors and magnetic-colors, and when they decay into charge-colors and magnetic-colors end their lives.

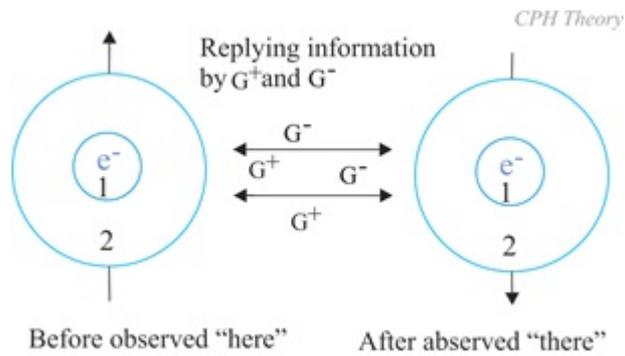
Gravitons never decay, neither create, nor destroys, so it does not experience time. It also has no thermodynamic properties, meaning it lacks the time arrow and everything happens at the same time from the point of view of the gravitons.

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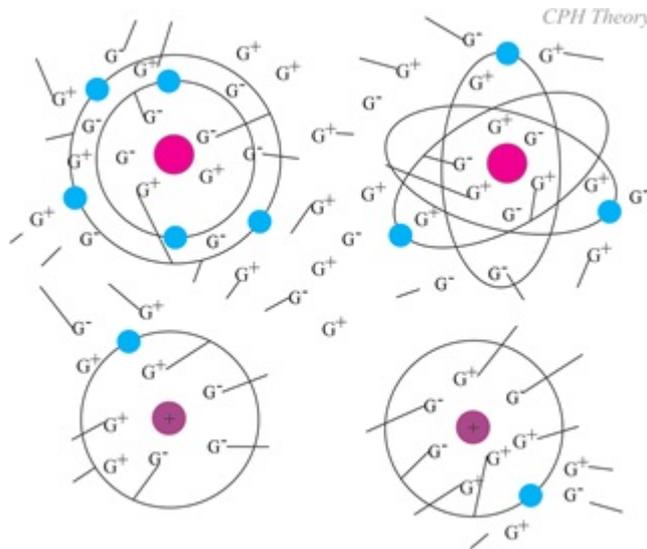
## Quantum entanglement

Gravity is a flow of exchange of gravitons or charge-colors, charge-colors carry all the necessary information from the source. In fact, gravity is not just a force, but a network and a flow between particles to keep them together, even though they were very far apart.

Therefore, quantum entanglement can be explained by exchanging gravitons between particles.



Quantum Entanglement



Atom has gravitational binding energy with its surrounding atoms and is related to space with releasing charge-color.