On the new quark and neutrino model based on virtual space-time

Zhi Cheng

（9 Bairong st. Baiyun District, Guangzhou, China. 510400. gzchengzhi@hotmail.com）

Abstract: In this paper, I try to reconstruct the quark model based on virtual space-time. It seems that the new quark model is able to get the same results with standard model. So I continue to analysis the virtual photon wave equation, and obtain the new neutrino model. It points out that the neutrino is the mass wave that step crossing the real and virtual space-time.

Key words: Virtual space-time; quark; neutrino

The quark model had been supported by lots of experimental data. However, the standard model cannot explain why quarks have fractional charge. This paper reconstructs the quark model based on the hypothesis of hyper-symmetrical space-time. It can explain the origin of fractional charge. It also obtains a neutrino model.

1 The characteristic of two different space-time

Hyper-symmetrical space-time involves two different symmetrical space-time structures that is the real and virtual space-time. The two different space-time can be distinguished by the velocities [3,4]. It is the in the real space-time structure when the velocity is smaller than the speed of light. Otherwise, it is in the virtual space-time structure.

We can also find that the charged particles are electrons in real space-time, and the correspondence particles are magnetic monopoles in virtual space-time. So we can call the real space-time as electric space-time, and the virtual space-time as magnetic space-time.

We can also find that the virtual space-time corresponds to mass space-time, and the real space-time corresponds to energy space-time from paper [1, 2].

Table 1 gives the classification of these two space-time structures.

Table 1 The classification of two space-time structures

Virtual space-time	Real space-time
Magnetic space-time	Electric space-time
Mass space-time	Energy space-time
3-Dimensional time	3-Dimensional space
Static space-time	Dynamic space-time
Micro-space-time	Macro-space-time

Negative space-time	Positive space-time

2 The proton's structure

We can see that the proton's electric-magnetic radius is bigger than r_c from the calculation of paper [1]. Table 2 shows the comparison of electron and proton's electric-magnetic radius with r_c.

Table 2 The comparison of electron and proton's electric-magnetic radius with r_c (meter)

r_c	5.443606×10^{-16}
Electron' s electric-magnetic radius a	7.6736127×10^{-19}
Proton' s electric-magnetic radius b	1.4089924×10^{-15}

We can see the proton's electric-magnetic radius is bigger than r_c. So if r_c is the interface between virtual space-time and real space-time, the proton's electric-magnetic radius is in real space. It also means that if proton has internal structure, it can be detected through fundamental interaction. Modern high energy experiments have shown that the hadrons like proton are consisted with quarks. The three quarks' charge is uniformly distributed in proton's surface (bigger than r_c) in order to produce the observed physical effects.

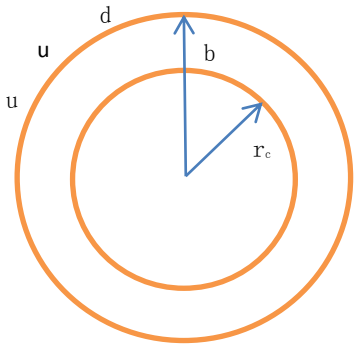

Figure 1 the relationship between proton's electric-magnetic radius and quark's charge(Not to scale)

We can calculate the total charge of three quarks is "e". It is equal to proton's charge.

The total static electric field energy of three quarks is

$$Z = Z_u + Z_d + Z_u = \left(\frac{2}{3}\right)^2 \frac{e^2}{8\pi\varepsilon b} + \left(\frac{1}{3}\right)^2 \frac{e^2}{8\pi\varepsilon b} + \left(\frac{2}{3}\right)^2 \frac{e^2}{8\pi\varepsilon b} = \frac{e^2}{8\pi\varepsilon b} \quad (1)$$

It is equal to the static electric field energy of a proton. It also shows that the rationality of quark's fractional charge.

Why quarks have fractional charge can also be solved by following equations (For a proton,

it is consisted by three quarks, uud).

$$\begin{cases} u+u+d=1 \\ u^2+u^2+d^2=1 \end{cases}$$

The results are

$$\begin{cases} u=\dfrac{2}{3} \\ d=-\dfrac{1}{3} \end{cases}$$

We know that the proton's static electric energy is smaller than its mass energy from paper [2]. Since the mass is relative to the gravitation. So we can calculate the proton's mass radius.

$$r_p=\frac{m_p c l_p^{\,2}}{\hbar} \qquad (2)$$

Where l_p is the Plank length. We can see that the proton's mass radius is very smaller. It is about 10^{-55} meter. So a particle will have very smaller chance to collide with the proton's kernel that is about the large of proton's mass radius. It is consistent with the deep ep inelastic scattering experiment result [5].

The electron's electric-magnetic radius is in virtual space-time since its radius is smaller than rc. Therefore, even if the electrons have internal structure, we cannot detect it through fundamental interactions. However, we still believe that the electrons have internal structure for the reason of electron's electric-magnetic radius is much larger than its mass radius. It may need new approach to study this internal structure. If the electron's internal structure is convinced, I suggest we can name it as Maons in honor of MAO Zedong's dialectical philosophy [6].

3 Evidence: Tau's decay

Electrons and Muons cannot decay to the hadrons that consisted of quarks. However, the Taus can decay to the mesons. The reason is that Tau's electric-magnetic radius is larger than r_c. It means that if Taus have internal structures, it can be detected through fundamental interaction in real space-time. The electrons and Muons' electric-magnetic radius in located in virtual space-time, so even they have internal structures, they will not produce observed physical effects in real space-time. It is consistent with the experimental results. Table 3 shows the comparison of three lepton's electric-magnetic radius with r_c. It shows that only Tau's radius larger than r_c.

Table 3 Three lepton's electric-magnetic radius (meter)

r_c	5.443606×10^{-16}
e's electric-Magnetic radius	7.6736127×10^{-19}
μ's electric-magnetic radius	1.586660×10^{-16}
τ's electric-magnetic radius	2.668230×10^{-15}

4 The wave equation across two different space-time

We can obtain the wave equation across two different space-time through the analyzing of Maxwell equations in hyper symmetric space-time [3,4].

$$\nabla_{xy}{}^2 F + \frac{\partial^2}{\partial x \partial y} F = 0 \tag{3}$$

This equation has many special solutions. For example

$$F = F_0 e^{i\mathbf{k}\cdot(\mathbf{X}+\mathbf{Y})-\omega(x+y)}$$

$$F = F_0 e^{-\mathbf{k}\cdot(\mathbf{X}+\mathbf{Y})-i\omega(x+y)}$$

$$F = F_0 e^{-\mathbf{k}\cdot\mathbf{X}-i\omega y+i\mathbf{k}\cdot\mathbf{Y}-\omega x}$$

$$F = F_0 e^{-i\mathbf{k}\cdot\mathbf{X}-i\omega y+i\mathbf{k}\cdot\mathbf{Y}-i\omega x}$$

$$F = F_0 e^{i\mathbf{k}\cdot\mathbf{X}-i\frac{\omega}{c}y-\mathbf{k}\cdot\mathbf{Y}-\frac{\omega}{c}x}$$

$$F = F_0 e^{i\mathbf{k}\cdot\mathbf{X}-i\frac{\omega}{c}y} e^{-\mathbf{k}\cdot\mathbf{Y}-\frac{\omega}{c}x}$$

And etc.

Here we analysis one of the special solution

$$F = F_0 e^{i\mathbf{k}\cdot\mathbf{X}-i\frac{\omega}{c}y} e^{-\mathbf{k}\cdot\mathbf{Y}-\frac{\omega}{c}x} \tag{4}$$

It shows that the electric field oscillation is in normal status in real space-time. However, the electric field is decaying in exponential curve in virtual space-time.

To keep the symmetry, formula (5) must co-exist with formula (4).

$$G = G_0 e^{-\mathbf{k}\cdot\mathbf{X}-\frac{\omega}{c}y} e^{i\mathbf{k}\cdot\mathbf{Y}-i\frac{\omega}{c}x} \tag{5}$$

It seems that all of two wave function's amplitude will disappear to zero wherever they are in which space-time. So they cannot interact with other electric-magnetic fields for the zero electric-magnetic field amplitudes. However, the wave can still propagate in one of space-time. It means that wave function (4) and (5) can still propagate the momentum and energy that are the k and ω. We can use electric and magnetic field strength to represent the motion energy, and use mass to represent the static energy. Since the amplitudes of electric or magnetic field strength are zero, it means that these two wave functions (4) and (5) cannot propagate motion energy. We are sure that they propagate the static energy. Since the photons are electric-magnetic wave, they propagate the motion energy. The other particles that can propagate in the speed of light are neutrinos. So we can use wave function (4) and (5) to represent the propagations of neutrinos. It means that the neutrinos can be regarded as the mass streams in the speed of light.

It can be used to explain why neutrino can propagate in the speed of light with non-zero mass. We can also understand why neutrino's cross sections of interacting with other particles are so smaller. It is because the neutrino can only involve in the process that can change the particle's mass. For example, the neutrinos can only collide with the mass radius of protons by ignoring the electric field of protons. Since the proton's mass radius is much smaller (the proton's mass radius is 10^{-55}m, while its electric-magnetic radius is 10^{-16}m), the neutrinos are able to easily pass through very thick objects without interacting with it.

5 Discussion

I make more deeply research on the structures of elementary particles in this paper based on my previews works. I proposed a quark and neutrino model based on hyper-symmetric space-time. However, the model is quite rough. I expect that the views in this paper can be consistent with the conclusions made by modern theoretic physics. Although I had successfully explained why quarks have fractional charges, I still cannot calculate each quark's mass. I hope that I can explain it based on my follow-up works.

The neutrino model proposed in this paper can better solve the problem why neutrino can propagate in the speed of light with non-zero mass. It can also better explain why neutrino's interaction cross sections are so smaller. How to improve neutrino's interaction cross section in order to improve the detection accuracy is for further study.

Reference

[1] Cheng, Z. On the Relationship Between Proton-Mass and Electron-Mass. http://vixra.org/abs/1606.0010. 2016-06-01 09:57:13

[2] Cheng, Z. On the Origin of Gravitational Force. http://vixra.org/abs/1605.0136. 2016-05-13 09:05:17

[3] 程智.时空对称结构的麦克斯韦方程组.北京：中国科技论文在线. http://www.paper.edu.cn/html/releasepaper/2012/08/132/.[2012-08]

[4] Cheng, Z. Hyper-Symmetric Maxwell Equations and Its Applications [EB/OL]. http://vixra.org/abs/1408.0149 *2014-08-23 02:56:46*.

[5] Mo, Luke W., and Yung-Su Tsai. "Radiative Corrections to Elastic and Inelastic ep and up Scattering." Reviews of Modern Physics 41.1 (1969): 205.

[6] Le quotidien communiste. Life, Matter, the Universe, part 6: Mao Zedong's cosmology in the GPCR – the universe as an onion. http://lesmaterialistes.com/english/life-matter-universe-part-mao-zedong-s-cosmology-gpcr-universe-onion (Retrieved in 2016.6)