International Journal of the Physical Sciences Vol. 6(18), pp. 4342-4347, 9 September, 2011
Available online at http://www.academicjournals.org/IJPS
DOI: 10.5897/IJPS10.415
ISSN 1992-1950 ©2011 Academic Journals

Full Length Research Paper

A model about our Galaxy

JianXin Kang[1,2] and Wei Yuan[1]*

[1]Northeast Agricultural University, Harbin 150006, China.
[2]Harbin Institute of Technology, Harbin 150001, China.

Accepted 29 July, 2011

We assumed the energy flow of the nuclear related with Dirac field, and compared it with Dirac equation. We found that energy flow equation has the same form with Dirac equation. There have been results taken from different item, which has the same mass of the energy that changed trend as the clock changed. We calculated the relationship of mass and radius of planet in solar system with the equations just to compare with special relativity; the theory data is fitting well, only a little excursion, and this is as a result of neglect spin of star. The figure shows that there are two kinds of clock in solar system: mass clock and length clock. And as the clock of Sun changed, it can be observed that the move speed of Jupiter is smaller than other planet. Taking the length clock that exist and is equal in all the solar system, we get the length clock and theory calculated by the satellite of Jupiter and Saturn, the spin effect always exist, and the theory and observed data of Jupiter fitting very well.

Key words: Quantum gravity, general relativity, Dirac field, electromagnetic field, Galaxy model.

INTRODUCTION

One of the most active fields in cosmology is dark mass of our universe. Many cosmological models have been proposed to interpret this mysterious phenomenon. Astrophysical observations are pointing out huge amounts of dark matter needed to explain the observed large scale structures. Up till now, no experimental evidence has been found to explain such mysterious components, someone believes this problem could be considering dark matter as shortcomings of general relativity theory and claiming for searching a correct theory of gravity by matching of observational data.

For the construction of correct cosmological model, we may need to know the relationship of quantum physics and general relativity. The two physical theories had a lasting impact on the natural sciences and society in last century; quantum physics successfully describes the physical phenomena of microcosmos, and Einstein's general relativity defines events on enormous scales. Both theories break with the notions physics and bring completely new physical concepts to the fore. The intellectual challenge of combining the quantum principle with the elegant theory of general relativity is so appealing that many great physicists deal on this subject (Enrique, 1989).

Here, we are not going to investigate this issue, instead of only find the clue if quantum physics and general relativity have a relationship in atom. We first admit that both theories are correct and need not to be modified, and try to find the equal part of the Dirac field and gravitational field in atom. The mathematics we used is not accurate, and the atom model is not correct, but the results may give us the correct prediction of the galaxy model.

NON-DISCREETLY OR WRONG DEDUCTION IN ATOM

Invariant of electromagnetic field

The microscopic particle can be described by the theory of quantum physics and general relativity. Thinking about an atom, the atomic nucleus is fitting in the general relativity. When it adds electrons, the atom is also fitting in Einstein's field equation; the difference between them is the space metric. Outside a nuclear, only the electromagnetic field is strong, the space outside an atom is closed to flat; the electromagnetic field may be changed by electrons. The changed electromagnetic field may be having relationship with the Dirac field.

*Corresponding author. E-mail: yw_kjx@163.com. Tel: +8613633605767.

The follow deduction is not accurate and only gives us thought to get the model of our galaxy. An atom is a stable system, so we believed that the electron had very close relationship with nuclear. Thinking about that the electron only connects with the nuclear generated electromagnetic field, and our job is to be done in this special electromagnetic field. It was noticed that we only thought of electromagnetic field in here. Taking the nuclear as a spin charged ball, we noticed it was wrong, and only tried it. The electromagnetic tensor of nuclear is (Klotz, 1982; Gui et al., 1984):

$$F_{\mu\nu} = \frac{e}{\rho^4}\begin{pmatrix} 0 & A & -B & 0 \\ -A & 0 & 0 & qA \\ B & 0 & 0 & -pB \\ 0 & -qA & pB & 0 \end{pmatrix} \tag{1}$$

We find the invariant of electromagnetic field as usual:

$$\begin{vmatrix} \lambda & A & -B & 0 \\ -A & \lambda & 0 & qA \\ B & 0 & \lambda & -pB \\ 0 & -qA & pB & \lambda \end{vmatrix} \tag{2}$$

$$= \lambda^4 + (A^2 + B^2 + p^2B^2 + q^2A^2)\lambda^2 + (pAB - qAB)^2 = 0$$

Taking the λ as invariant, so we can solve the equation:

$$\lambda^2 = \frac{1}{2}[-(A^2+B^2+p^2B^2+q^2A^2) \pm \sqrt{(A^2+B^2+p^2B^2+q^2A^2)^2 - 4(pAB-qAB)^2} \tag{3}$$

If we take the $F_{\mu\nu}F^{\mu\nu}$ and λ as invariant, we have the result:

$$p = q \tag{4}$$

How the electromagnet field parameter changed

We must find the relationship of the parameter of Equation (1) when the changed electromagnetic field gives a changed curvature. In reality, in the border of atom, there have Dirac field. We need to know the space character of electron location. The space may be fitting in the condition of vacuum, but the electron is moving, it is not spherically symmetry so we supposed:

$$R_{\mu\mu} = 0$$

It is not strictly proved. If we chose $R_{\mu\nu} = 0$, we have a frankly result that all the parameter is zero. It is also a solution, but it has no use for us, it only describes the spherical symmetry vacuum.

For keeping the space fitting of Equation (5), the parameter of Equation (1) may have relationship with each other. In reality, the electron is far away from nuclear in atom scale; the curved space has little effect. We get the energy momentum tensor used in a general relativity in flat space:

$$R_{\mu\nu} = kT_{\mu\nu} = k(F_{\mu\lambda}F_{\lambda\nu} - \frac{1}{4}\delta_{\mu\nu}F_{\mu\nu}F_{\mu\nu}) \tag{6}$$

$$T_{\mu\mu} = \begin{vmatrix} \frac{-A^2+B^2+p^2B^2-q^2A^2}{2} & & & \\ & \frac{A^2-B^2-p^2B^2+q^2A^2}{2} & & \\ & & \frac{A^2+B^2-p^2B^2-q^2A^2}{2} & \\ & & & \frac{-A^2-B^2+p^2B^2+q^2A^2}{2} \end{vmatrix} \tag{7}$$

It is not necessary written down all components. According to the Equation (5):

$$\begin{aligned} -A^2 + B^2 + p^2B^2 - q^2A^2 = 0 \\ A^2 + B^2 - p^2B^2 - q^2A^2 = 0 \end{aligned} \tag{8}$$

So we can get Equation 9:

$$\begin{aligned} B^2 = q^2A^2 \\ A^2 = p^2B^2 \end{aligned} \tag{9}$$

Referencing the Equation (4), we had the result as:

$$p = q = \pm 1, \quad A = B \tag{10}$$

$$A = B = p = q = 0 \tag{11}$$

This is the relationship of parameter we found, this was found in the flat space, it shows when the nuclear electromagnet field fitting in $R_{\mu\mu} = 0$, has changed result.

Suppose energy flow same with Dirac equation

According to the equation of invariant value of electromagnetic field; in the flat space, the energy momentum tensor equation is: (4)

$$T_{\mu\nu} = F_{\mu\lambda}F_{\lambda\nu} - \frac{1}{4}\delta_{\mu\nu}F_{\mu\nu}F_{\mu\nu} \tag{12}$$

Taking the equation (10) and chosing *p*=*q*=1, we have:

$$F_{\mu\kappa}F_{\kappa\nu}=E\begin{pmatrix}-1&0&0&1\\0&-1&1&0\\0&1&-1&0\\1&0&0&-1\end{pmatrix}=-E\begin{pmatrix}1&&&\\&1&&\\&&1&\\&&&1\end{pmatrix}+E\begin{pmatrix}&&&1\\&&1&\\&1&&\\1&&&\end{pmatrix} \tag{13}$$

Where $E\rho^8/e^2=A^2+B^2=2A^2=2B^2$.

We can use equation $\frac{\partial T_{ik}}{\partial x_k}=0$ to give the electromagnetic field energy equation, this electromagnetic field make the space of outside atom lie flat, but we have suppose $R_{\mu\mu}=0$, this means $T_{\mu\mu}=0$, so the energy equation only have one item. But actually $p=q=1$ can't have solution in Equation (1), so we take $T_{\mu\mu}\neq 0$, and see the relation with Dirac equation in this situation.

Now we chose the first line of Equation (13) to analyze, through general relativity, we have been known in the flat space that energy momentum tensor satisfy:

$$\frac{\partial T_{0k}}{\partial x_k}=\frac{\partial T_{00}}{\partial t}+\frac{\partial T_{01}}{\partial x_1}+\frac{\partial T_{02}}{\partial x_2}+\frac{\partial T_{03}}{\partial x_3}=0$$

Suppose that space time has a very approach to flat, to keep that $T_{\mu\mu}\neq 0$, and energy momentum tensor approximately satisfied.

So we have:

$$\frac{\partial T_{0k}}{\partial x_k}=\frac{\partial(F_{0\lambda}F_{\lambda 0}-\frac{1}{4}F_{\mu\nu}F_{\mu\nu})}{\partial t}+\frac{\partial(F_{0\lambda}F_{\lambda 3})}{\partial x_3}=0 \tag{14}$$

$$-\frac{\partial E}{\partial t}+\frac{\partial E}{\partial x_3}-\frac{\partial(\frac{1}{4}F_{\mu\nu}F_{\mu\nu})}{\partial t}=0 \tag{15}$$

We compare Equation (15) with Dirac equation, if the first or third item is the mass item in Dirac equation, the equation can be likened to Dirac equation. For the $F_{\mu\nu}F_{\mu\nu}$, which is the invariant of electromagnet field, we chose it as a part of mass to make Equation (15) the same with Dirac equation. We must give another definition of mass; it is the changed part of energy along with clock changed in space-time. So we can boldly suppose that:

$$\frac{\partial(\frac{1}{4}F_{\mu\nu}F_{\mu\nu})}{\partial t}=K=mc^2E \tag{16}$$

For every component of Equation (13), which is equal, Equation (15) can be changed:

$$(-\frac{\partial E}{\partial t}+\alpha\nabla\bullet E-mc^2E)=0 \tag{17}$$

We get an equation like Dirac equation.

MODEL ABOUT OUR GALAXY

We take the above suppose result, and suppose that this result is generally in universities. The form is:

$$\frac{\partial E}{\partial t}=m \tag{18}$$

Notice here t is clock, and if the movement of object is not considered, Equation (18) give the absolute mass in university. Just like special relativity theory, Equation (18) gives an unchanged value about moving mass. The unchanged value is mass of our cognition.

In special relativity theory, the time and the energy of mass can be changed:

$$t=d\tau=\frac{d\tau_0}{\sqrt{1-\frac{v^2}{c^2}}};\qquad E=\frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}c^2\qquad L=\sqrt{1-\frac{v^2}{c^2}}L_0 \tag{19}$$

If we take Equation (19) into Equation (18), it found that the ratio is unchanged when the object is moved. It is known that the gravity of field changed clock of space time, and the different curvature. In reality, the mass look can't created spontaneously, but if the clock is changed (just like an object changing the clock suddenly), the energy must be changed to keep the Equation (18) equal. If we just suppose the changed energy is the added mass in curved space, it means according to Equation (18), the mass must be increased as the clock changed. Note we can't distinguish the planet of solar system that is be created or attracted. We assume that mass increases as clock changed in university. Equation (18) looks like it means that the expansion of our universe is infinity, because the solution is an exponential function. But when $\Delta t\to 0$, we have $\Delta E\to 0$, this shows the universe approach stability. The equation also give a theorem, this is the space-time that always keep to flat.

Actually, we can choose the border of integral variable. If is an object and the mass is m_0, because of theorem, mass added origin mass turned in to m_1, at same time, the clock from t_0 to t_1, so we get:

$$\frac{m_1}{m_0}=e^{\frac{t_1-t_0}{c^2}} \tag{20}$$

The created mass can change clock:

$$t_2 - t_1 = c^2 \ln \frac{m_1}{m_0} \quad (21)$$

$$d(t_2 - t_1) \approx \frac{m_0}{m_1} \quad (22)$$

This means if our galaxy closes to stop increase, the m_0/m_1 closes to zero.

Same with Equation (18), and compare with special relativity Equation (19), we have:

$$Lt = L_0 \quad (23)$$

We can give the exact addition of mass located for space used in Equation (18) and Equation (23). Note *t* is negative. Equation (18) and Equation (23) means mass, space and clock is ensemble, if there have mass, there must have clock and space. Equation (18) and Equation (23) give our cosmos model. Just like general relativity, clock in Equation (23) has same form, but it is a little different here.

We chose the experimental date:

$$\frac{m_0}{m_0 + \Delta m} = 0.9986 \quad (24)$$

Comparing the data with theory, we must simply choose:

$t = \Delta t = 0.0014$.

We also have solution in Equation (18):

$$m = e^t \quad (25)$$

And using Equation (23), we have:

$$\frac{dm}{dL} = \frac{L_0}{L^2} \exp(-L_0 / L) \quad (26)$$

Now we can give the exact mass located in solar system. Here *L* is scale of space, and L_0 is diameter of sun. If we chose L_0 as the diameter of sun, from Equation (23), we know if L=L_0 , t=1, but we also know the experiment date t=0.0014, this means in reality, if the clock becomes 1 like Equation(23), the clock must divide 0.0014. Adding the mass item, Equation (26) become:

$$\frac{dm}{dL} = \Delta m \frac{L_0}{L^2 * t} \exp(-\frac{L_0}{L * t}) \quad (27)$$

Because there have lone time after solar system formed, the clock can be changed as star changed its mass. Also, adding the outside space can be changed. We must give two clocks: the first clock is mass clock, it affects the planet of star first created; and length clock, it affects the figure of star system. So Equation (29) can be rewritten:

$$\frac{dm}{dL} = m_0 t_0 \frac{L_0}{L^2 * t_1} \exp(-\frac{L_0}{L * t_1}) \quad (28)$$

t_0 is mass clock, t_1 is length clock. In large scale, there have $t_0 \approx t_1$, like our galaxy, but in small scale, such as planet, $t_0 \neq t_1$. The length clock give the final situation of star, and mass clock give the beginning situation of star.
Note here *L* is radius in real situation, because only the mass show the space created. We numerically calculated solar system used in Equation (29), the results are shown in Figure 1.

The observation data is the ratio of planet mass and distance of solar system, and the theory and observation data is compared in Figure 1. For simplicity, we have not thought of the effect of spin. In general relativity and Equation (23), the spin of star made clock smaller and made the orbit of planet longer. In Figure 1, this effect also exists. This means that the exact curve must move right a little. We found in solar system that the mass clock is different with length clock. Because the length clock may be changed from mass clock; and mass can't create spontaneity, there is a result from Figure 1, as clock changed; the moving speed of Jupiter is smaller than other planet. We know the sun lost its mass, its clock changed smaller, it can be observed. We also found Asteroid belt locatation in steep part of curve in Figure 1.

The large planet of solar system have same form compared with solar system, we can used data of above to calculate it. Estimate length clock of planet:

$$t_p \frac{L_p}{Lt_2} = t_s \frac{L_s}{Lt_1} \quad (29)$$

p denote planet; s denote sun. Because we get the ratio of clock, for simplicity, we used general relativity form to estimate. The used data is shown in Figure 1. The add length clock of solar system is estimated at about 0.0018. According to general relativity, the ratio of clock of Sun and Jupiter is about 100, so the length clock of Jupiter is about 0.18. In addition to the observed date estimate mass clock, we can get the mass clock and length clock of planet. The value is shown in Table 1.The theory calculated the two planets. The theory curve and observed data are shown in Figure 2. The theory curve of Jupiter is located left a little, and we think it is the effect of spin of Jupiter, which is the same reason with Figure 1. The theory curve of Saturn is very inaccurate, this may be corona of Saturn that give much effect to our data, or the satellite of Saturn is forming now. The curve also locates left a little. Clock means that the space changed, the length clock is bigger than mass clock, and this also means space changed. Because it cannot all explain that

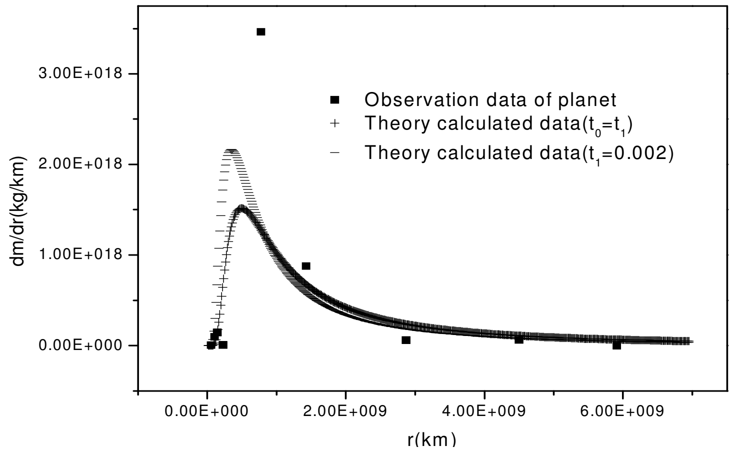
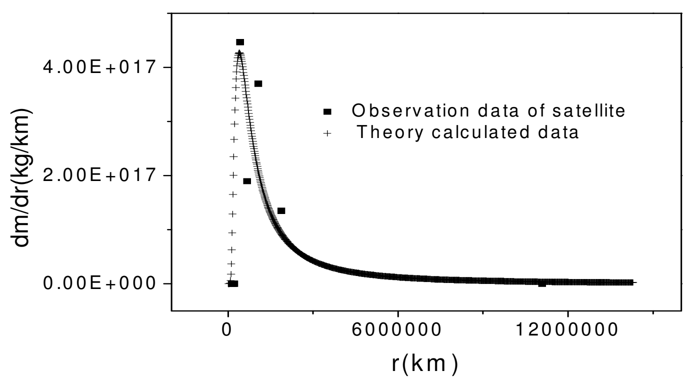


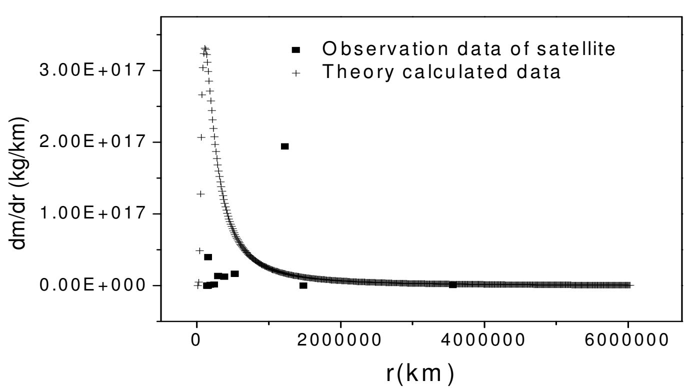
Figure 1. Theory calculated data compared with existing data in solar system.

Table 1. The clock of planet.

Planet	Mass clock	Length clock
Jupiter	2e-4	0.18
Saturn	2.46e-4	0.5446



(a) Jupiter



(b) Saturn

Figure 2. Theory calculated data compared with existing data in Jupiter and Saturn.

planet add its mass after burning for long time, we admit that our solar system all exist in length clock. This means our solar system take pressure force. In this situation, all the classic theory is still correct.

Since 1937, we have known that the gravitational potentials of galaxy clusters are too deep to be caused by a Newtonian r^{-2} gravitational force law (Zwicky, 1937). There are proposed solutions either of invoke quantities of non-luminous dark matter (5) or alterations to the gravitational force law (Bekenstein, 2004; Brownstein and Moffat, 2007). Previous works have used objects in which the visible baryonic and hypothesized dark matter are spatially coincident, which left room for counter-arguments.

Since measurements of spiral galaxies rotation curves signals a circular velocity higher than what is predicted on the basis of the observed luminous mass and the Newtonian potential, the above result suggests the possibility that our theory may fill the gap between theory and observations without the need of additional dark matter.

In the place far away from center of our galaxy, so that $\Delta t \to 0$, this means t is closed to constant. In general relativity, we can know if t/r is in direct proportion to the gravity, or the centripetal force of star is in direct proportion to r, so the $v \to \mathrm{constant}$, v is the circular velocity.

CONCLUSION

We found although Equations (18) and (23) are very simple, but it can give a very interesting result, planets may be not formed occasional, it formed and moved by law. The only problem is we must add the spin effect of star to Equation (23). Equations (18) and (23) which also gives an idea, the mass, space and clock is ensemble, we can not depart them. The theory should more accurate in large scale, our solar system still small, the difference of mass clock and length clock is big.

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