General Relativity Can Not Predict the Existence of Linear Plane Gravitational Waves

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General Relativity Can Not Predict the Existence of Linear Plane Gravitational Waves＊

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Abstract In the theory of gravity wave of general relativity, the metric tensors of gravitational field was written as $g_{uv} = G_{uv} + h_{uv}$. It was proved that as long as h_{uv} was a small quantity of first order under weak condition, by using four harmonic coordinate conditions, the Einstein's gravitational field equation in vacuum can be transformed into a linear wave equation, three wave solutions are obtained with $h_{11} = h_1 \cos(\omega t - kz)$, $h_{22} = -h_{11}$ and $h_{12} = h_0 \cos(\omega t - kz)$. It is proved in this paper that theses three solutions can not satisfy the harmonic coordinate conditions, so the Einstein's equation of gravity field can not be transformed into the linear wave equation. The metric tensors $h_{22} = -h_{11}$ indicates $h_1 = -h_2$ for the maximum amplitudes. However, the maximum amplitudes are non-negative numbers, so it is impossible to have $h_1 = -h_2$, unless $h_1 = h_2 = 0$, which indicates that there are no gravity waves. On the other hand, the component h_{12} of gravity waves at the direction of space intersecting $dxdy$ was unable to be measured in experiments and had no practical significance. The present gravitational wave detection was regarded to involve the extremely strong fields of black hole collisions in which h_{uv} was not a small quantity, no wave solution can be obtained based on general relativity. The gravitational wave delayed radiation formula of general relativity is also proved untenable due to the chaotic calculations and wrong coordinate transformations. This paper also discusses the possibility of gravitational wave based on the revised Newton's theory of gravitation by introducing the magneto-like gravitational component. Chen Yongming's formula of electric-like gravitational wave radiation based on the Newton's theory of gravity is introduced. The conclusion of this paper is that the theory of gravity wave of general relativity can not be correct. We can describe gravitational radiation in terms of the revised Newtonian gravity theory in flat space-time.

Keywords General relativity, Linear planar wave equations, Gravitational wave, Harmonic coordinate conditions, Delayed radiation, Pulsed binary PSR1913+16, Chen Yongming's radiation formula

1 Introduction

Since LIGO announced to detect gravitational wave signals from the collision of two black holes in February 2016 [1, 2], the theoretical and experimental researches on gravitational wave have formed an upsurge in the world. More than 50 gravitational-wave events have been reported so far by LIGO and VIRGO collaboration, the observations of gravitational wave bursts have become norm events [3]. Physicists even declared that the era of gravitational-wave astronomy has arrived. But is this really the case?

The current theoretical research and the experimental detection of gravitational waves were based on general relativity. The discovery of gravitational waves was considered to make up the last piece of general relativity. The Einstein's gravity theory of curved space-time obtained the final and perfect verification.

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However, as we all know, the Einstein's equations of gravitational fields were highly nonlinear ones and generally have no linear wave solutions. In 2017, J. F. Pommaret published an paper titled "Why Gravitational Waves can not exist" [4]. The paper re-examines the mathematical foundations of general relativity and gauge theory by using modern methods of nonlinear differential equations and partial differential equations, giving some mathematical constraints on the solutions of Einstein's gravitational equations and proving that gravitational waves do not exist from mathematical angle.

Pommaret's papers was highly mathematical abstract and difficult to understand for non-mathematical professionals. In addition, the weak field condition was not considered in this paper. So what we need to study in further is whether the Einstein's equations of gravitational fields have linear wave solutions under weak field condition.

This paper discusses this problem in detail in the angle of theoretical physics. It is pointed out that even under the weak field condition, the gravitational wave metric used in the theory and experiments of general relativity does not satisfy the Einstein's equations of gravitational field too. So general relativity can not predict the existence of gravitational waves.

In general relativity, the metric tensor of gravitational field was written as [5]

$$g_{\mu\nu} = G_{\mu\nu} + h_{\mu\nu} \qquad (1)$$

Where $G_{\mu\nu}$ is the Minkowski metric of flat space-time, $h_{\mu\nu}$ and its derivatives are small quantities. Based on Eq.(1), general relativity proved that under the condition of weak field, Einstein's equations of gravitational field in vacuum can be transformed into the linear wave equation

$$R_{\mu\nu} = \partial^2 h_{\mu\nu} = 0 \qquad (2)$$

therefore to predict the existence of gravity wave.

By considering the matching of freedom degrees between the metric tensor $g_{\mu\nu}$ and the Ricci tensor $R_{\mu\nu}$, it is thought there are only two independent metric tensors. They are $h_{11} = -h_{22}$ and h_{12} [5, 6]. The metric of gravity wave is written as

$$ds^2 = c^2 dt^2 - (1+h_{11})dx^2 - (1+h_{12})dxdy - (1+h_{22})dy^2 - dz^2 \qquad (3)$$

Suppose that gravity wave propagates along the z axis, the metric have following forms

$$h_{11} = h_1 \cos(\omega t - kz) \qquad h_{22} = -h_1 \cos(\omega t - kz) \qquad h_{12} = h_0 \cos(\omega t - kz) \qquad (4)$$

Let $\omega / c = k$, Eq.(4) satisfy the linear wave equation (2).

However, it is proved in this paper that by substituting Eq.(4) in the four harmonic coordinate conditions, the result is

$$h_1 \sin(\omega t - kz) - h_1 \sin(\omega t - kz) + h_0 \sin(\omega t - kz) = h_0 \sin(\omega t - kz) \neq 0 \qquad (5)$$

Eq.(5) indicates that the harmonic coordinate conditions can not hold, so Eq.(4) is not the solutions of the Einstein's equation of gravity field. Besides, general relativity assume $h_{11} = -h_{22}$, which means $h_1 = -h_2$. However, h_1 and h_2 are the maximum amplitudes which are defined as non-negative numbers, so $h_1 = -h_2$ is impossible, unless $h_1 = h_2 = 0$, indicating that there is no gravitational wave.

In fact, Eq.(2) contains a crossing term $dxdy$, which corresponds to gravitational wave h_{12} that can not be measured and do not exist in reality and meaningless in physics. Many literature of gravity theory of general relativity do not consider this item, and gravitational wave experiments completely ignore this term

[7].

This is the biggest problem for the gravitational wave theory of general relativity. In order to get gravitational waves, physicists have to assume $h_{11} = -h_{22}$ and introduce gravitational wave component h_{12} . Because h_{12} dose not exist actually and the harmonic coordinate conditions can not hold due to the introducing of h_{12} , the the theory is not self-consistent.

This paper also discusses the matching of the degree of freedom between the metric tensors of gravitational wave and the Recci tensors. It is pointed out that the harmonic coordinate condition can not be used after the gravitational wave metric is simplified, otherwise it will cause contradiction. The result is that the amplitudes of gravitational wave become zero.

The harmonic coordinate condition of general relativity is compared with the Lorentz gauge condition of electromagnetic theory. It is pointed out that for free electromagnetic wave, due to $k = \omega / c$, the Lorentz gauge condition is naturally tenable. But for the gravitational wave theory of general relativity, the harmonic coordinate condition does not naturally hold, which leads to the result that the amplitudes of gravity waves become zero.

In addition, the generation of gravitational waves was thought to be physical phenomenon under extreme conditions, requiring extremely strong gravitational interactions. In particular, it was impossible to obtain the linear equation of gravitational waves generated by so-called black-hole collisions. But it is strange that according to the derivation of general relativity, gravitational waves can only be generated under the condition of weak field, and will not be generated under the condition of strong field. So the gravitational wave theory of general relativity contradicts itself. The linear wave equation can not be used in the process of black hole collisions.

It is also proved that the gravitational delayed radiation formula of general relativity can not hold. This formula used the so-called quadrupole moment $\ddot{\rho}\, x_i x_k$ to describe the energy momentum tensor T_{ik} . The gravitational wave radiation formula obtained was proportional to $\dddot{\rho}\, x_i x_k$ which was independent of the derivative of coordinates with respect to time. However, in the concrete calculation, it was transformed to the follow coordinate system, in which the radiation formula was related to the derivative $\dddot{x}'_i$ of space coordinate. This is obviously violates the basic principle of mathematical transformation, resulting in the invalid of gravitational wave radiation formula.

It is pointed out that the linear wave equation of gravitational wave can be obtained by introducing magnetic-like gravity component into the Newton's theory of gravity, and the existence of gravitational wave can also be predicted by the revised Newton's theory of gravity. If gravitational waves can be detected in experiments, they can only be the gravitational waves of the modified Newton's theory, not the gravitational waves of Einstein's theory of curved space-time. Finally, the Chen Yongming's formula of electro-like gravitational wave radiation is introduced.

2 The proof of general relativity for the existence of gravitational wave

2.1 The coordinate condition of motion equation of general relativity

In the derivation of the linear wave equation of gravitational waves of general relativity, besides weak field condition, so-called coordinate conditions are needed to be used to eliminate some terms that do not satisfy linear equation. If the coordinate conditions are not used, linear wave equation can not be obtained. Before discussing gravitational waves of general relativity, we need to clarify the concept of coordinate conditions.

Cosmological constants do not need to be considered in gravitational wave theory. The Einstein's equation of gravitational field is

$$R_{\mu\nu} - \frac{1}{2} g_{\mu\nu} R = -kT_{\mu\nu} \tag{6}$$

Multiply Eq.(7) by $g^{\mu\nu}$ and contract the index, let $R_u^\mu = R$, $T_u^\mu = T$ and considering $g^{\mu\nu} g_{u\nu} = 4$, we get $R = kT$. By substituting them in Eq.(6), the equation of gravitational field can be written in another form

$$R_{\mu\nu} = -k\left(T_{\mu\nu} - \frac{1}{2} g_{\mu\nu} T\right) \tag{7}$$

Where $R_{u\nu}$ is Ricci tensor, $T_{u\nu}$ is energy momentum tensor, constant $\kappa = 8\pi G / c^4$. $R_{u\nu}$ is symmetric tensor with 10 components in the four dimensional space-time. The metric tensor $g_{u\nu}$ has 10 components. In principle, as long as $T_{u\nu}$ are known, we can determine the space-time metric $ds^2 = g_{u\nu} dx^u dx^\nu$ of gravitational field by solving Eq.(6) or (7).

On the other hand, from the Bianchi identity of Riemann curvature tensor, following four relations about the Einstein tensor $G_{u\nu}$ are obtained:

$$G^\mu_{\nu,\mu} = \left(R^\mu_\nu - \frac{1}{2} \delta^\nu_\mu R\right)_{,\mu} = 0 \tag{8}$$

So there are only 6 independent Ricci tensors, not enough to determine 10 metric tensors according to the Einstein's equations of the gravitational field. In order to be able to uniquely determine the metric tensor $g_{u\nu}$, four constraint conditions are need. There are several ways to get them.

1. Directly specify the values of four metric tensors. For example, taking $g_{10} = g_{20} = g_{30} = g_{40} = 0$, remaining 6 $g_{u\nu}$ which can be obtained by solving the Einstein's equations of gravitational field [8]. In fact, in general relativity, we usually do that. For example, for the equation of gravitational field in vacuum with spherically symmetry, it is assumed $g_{u\nu} = 0$ when $\mu \neq \nu$, that is the precise solution called as the Schwarzschild metric obtained from the Einstein gravitational field equation.

2. By introducing four deDonder relations, also called as the harmonic coordinate conditions, to eliminate the arbitrariness of $g_{u\nu}$ [8]

$$\frac{1}{\sqrt{-g}} \frac{\partial}{\partial x^\nu} (\sqrt{-g} g^{\mu\nu}) = 0 \tag{9}$$

It is important to note that in this condition, we must assume that all 10 $g_{u\nu}$ are not equal to zero, otherwise there may be too many equations of gravitational field, leading to contradictory results. In addition, the constraint conditions introduced in Eq.(22) can not contradict the equations of gravitational field, otherwise the coordinate conditions adopted are inappropriate. For example, if you get $g_{11} = g_{00} - g_{21}$ from the equation of gravitational field, the coordinate condition $g_{11} = g_{00} + g_{21}$ is inappropriate.

It should be noted that the coordinate conditions are not coordinate transformations, but used to delete some quantities in this coordinate system. It just like the Lorentz condition of electromagnetic theory, which is not a coordinate transformation, but used to eliminate the degree of freedom of electromagnetic potential in this coordinate system. Some textbooks describe the coordinate conditions of general relativity as coordinate transformation, declaring that if the coordinate conditions are not valid in some coordinate systems, they can be transformed to another coordinate system to make the coordinate conditions valid [6].

However, the truth is that the coordinate condition itself does not involve the new coordinate system, and all quantities are defined in the original coordinate system. In addition, in the original coordinate system, if it is impossible to make the linear wave equation and coordinate conditions valid at the same time, when it is transformed to new coordinate system, generally speaking, it is also impossible to make the linear wave equation and coordinate conditions hold simultaneously.

2.2 The derivation of gravitational wave equations of general relativity

Under the approximation condition of weak field, the metric tensor of gravitational field is written as Eq.(1). Where $G_{\mu\nu}$ is the Minkowski flat space-time metric, $h_{\mu\nu}$ and its derivatives are small quantities of first order. Beyond that, there are no other restrictions for $h_{\mu\nu}$. General relativity takes Eq.(1) as the starting point and derives that $h_{\mu\nu}$ satisfies the linear wave equation. The following is a brief description of deriving. Under the approximation condition of weak field with [5]

$$h_{\mu}^{\nu} = g^{\nu\lambda} h_{\mu\lambda} \approx (G^{\nu\lambda} - h^{\nu\lambda}) h_{\mu\lambda} \approx G^{\nu\lambda} h_{\mu\lambda} \qquad (10)$$

$$h = g^{\mu\nu} h_{\mu\nu} \approx (G^{\mu\nu} - h^{\mu\nu}) h_{\mu\nu} \approx G^{\mu\nu} h_{\mu\nu} \qquad (11)$$

The higher order terms $h^{\nu\lambda} h_{\mu\lambda}$ and $h^{\mu\nu} h_{\mu\nu}$ are ignored in Eqs.(10) and (11). Also, by ignoring the higher order terms, the Christopher symbols are written as

$$\Gamma_{\mu\nu}^{\rho} = \frac{1}{2} G^{\sigma\rho} (h_{\rho\nu,\mu} + h_{\rho\nu,\mu} - h_{\mu\nu,\rho}) \qquad (12)$$

$$\Gamma_{\mu\sigma}^{\sigma} = \frac{1}{2} G^{\sigma\rho} (h_{\rho\mu,\sigma} + h_{\sigma\rho,\mu} - h_{\mu\sigma,\rho}) \qquad (13)$$

The Ricci tensors are simplified as

$$R_{\mu\nu} = \Gamma_{\mu\sigma,\nu}^{\sigma} - \Gamma_{\mu\nu,\sigma}^{\sigma} + \Gamma_{\rho\nu}^{\sigma} \Gamma_{\mu\sigma}^{\rho} - \Gamma_{\rho\sigma}^{\sigma} \Gamma_{\mu\nu}^{\rho} \approx \Gamma_{\mu\sigma,\nu}^{\sigma} - \Gamma_{\mu\nu,\rho}^{\sigma} \qquad (14)$$

Let

$$\chi_{\nu}^{\sigma} = h_{\nu}^{\sigma} - \frac{1}{2} \delta_{\nu}^{\sigma} h$$

$$\chi_{\mu\nu} = h_{\mu\nu} - \frac{1}{2} G_{\mu\nu} h \qquad (15)$$

By means of formulas above, the Ricci tensors can finally be simplified as [5]

$$R_{\mu\nu} = \frac{1}{2} \partial^2 h_{\mu\nu} - \frac{1}{2} \chi_{\nu,\mu\sigma}^{\sigma} - \frac{1}{2} \chi_{\mu,\nu\sigma}^{\sigma} \qquad (16)$$

Then to introduce four harmonic coordinate conditions

$$\partial^2 x^{\mu} = \frac{1}{\sqrt{-g}} \frac{\partial}{\partial x^{\nu}} (\sqrt{-g} g^{\mu\nu}) = (G^{\mu\nu} - h^{\mu\nu})_{,\nu}$$

$$+ \frac{1}{\sqrt{-g}} (G^{\mu\nu} - h^{\mu\nu}) (\sqrt{-g})_{,\nu} = 0 \qquad (17)$$

By taking the approximate calculation of Eq.(17), we have

$$\sqrt{-g} = \sqrt{-(G - h_{\sigma}^{\sigma})} \approx 1 + \frac{1}{2} h_{\sigma}^{\sigma} \qquad (18)$$

Substituting Eq.(17) in Eq.(18) and ignoring higher order terms, we get

$$\partial^2 x^{\mu} = -h_{,\nu}^{\mu\nu} + \frac{1}{2} G^{\mu\nu} h_{,\nu} = 0 \qquad (19)$$

By considering Eq.(19), it can be obtained from Eq.(14)

$$\frac{\partial \chi_{\mu}^{\nu}}{\partial x^{\nu}} = h_{\mu,\nu}^{\nu} - \frac{1}{2}\delta_{\mu}^{\nu} h_{,\nu} = h_{\mu,\nu}^{\nu} - \frac{1}{2} h_{,\mu} = 0 \qquad (20)$$

Eq.(20) is considered to be equivalent to the Lorenz gauge condition in classical electromagnetic theory. Substitute this result in Eq.(30) and obtain

$$R_{\mu\nu} = \frac{1}{2}\partial^2 h_{\mu\nu} \qquad (21)$$

$$R = R_{\mu}^{\mu} = \frac{1}{2}\partial^2 h \qquad (22)$$

Substituting Eqs.(21) and (22) in Eq. (16), the result is

$$\frac{1}{2}\partial^2 h_{\mu\nu} - \frac{1}{4} G_{\mu\nu}\partial^2 h = -kT_{\mu\nu} \qquad (23)$$

By considering Eq.(15) , Eq.(23) can be written as

$$\partial^2 \chi_{\mu\nu} - 2\Lambda(G_{\mu\nu} + h_{\mu\nu}) = -2kT_{\mu\nu} \qquad (24)$$

In vacuum, energy momentum tensor $T_{\mu\nu} = 0$ as well as $T = 0$. The equation of gravity field is $R_{\mu\nu} = 0$. According to Eq.(21), the wave equation is obtained with the form

$$\partial^2 h_{\mu\nu} = 0 \qquad (25)$$

In this way, it was considered that general relativity predicted the existence of gravitational waves.

3 Gravitational wave metric of general relativity does not satisfy Einstein's equations of gravitational field

3.1 The metric of gravity waves under weak field condition

In general relativity, the solutions satisfying the equation of gravity wave and the harmonic coordinate conditions are written as [5]

$$h_{\mu\nu} = A_{\mu\nu} e^{ik_{\sigma}x^{\sigma}} \qquad (26)$$

The initial phases are taken zero. Substituting it in Eq.(24) to get

$$k_{\mu}k^{\mu} = 0 \qquad\qquad k_{\mu}A_{\nu}^{\mu} = \frac{1}{2}k_{\nu}A_{\mu}^{\mu} \qquad (27)$$

By considering Eqs.(26), only 6 out of 10 $A_{\mu\nu}$ were independent. General relativity proved that only two of them in independent 6 $A_{\mu\nu}$ had physical meaning. They were A_{11}, A_{12} and $A_{22} = -A_{11}$, or $h_{22} = -h_{11}$, the others are zero.

Since the component h_{12} in the direction of space intersecting $dxdy$ does not actually exist, for the sake of simplicity, we first ignore h_{12} and consider h_{11} and h_{22} are independent each other, i.e. $h_{22} \neq -h_{11}$, to discuss the equations of gravitational field and the harmonic coordinate conditions. After that we consider the existence of h_{12} again. Write the gravitational wave metric as [4, 10]

$$ds^2 = c^2 dt^2 - (1 + h_{11})dx^2 - (1 + h_{22})dy^2 - dz^2 \qquad (28)$$

Where

$$h_{11} = h_1 \cos(\omega t - kz + \varphi_1) \qquad h_{22} = h_2 \cos(\omega t - kz + \varphi_2) \tag{29}$$

Because h_{11} and h_{22} are independent each other, we have $h_1 \neq h_2$. The non-zero metric tensor are

$$g_{00} = 1 \qquad g_{11} = -(1 + h_{11}) \qquad g_{22} = -(1 + h_{22}) \qquad g_{33} = -1 \tag{30}$$

3.2 The equation of gravity waves under weak field condition

According to the Riemannian geometry, the Christopherian symbols are defined as [5]

$$\Gamma^{\lambda}_{\mu\nu} = \frac{1}{2} g^{\lambda\alpha} \left(\frac{\partial g_{\nu\alpha}}{\partial x^{\mu}} + \frac{\partial g_{\alpha\mu}}{\partial x^{\nu}} - \frac{\partial g_{\mu\nu}}{\partial x^{\alpha}} \right) \tag{31}$$

Where

$$g^{00} = 1 \qquad g^{11} = -\frac{1}{1 + h_{11}} \qquad g^{22} = -\frac{1}{1 + h_{22}} \qquad g^{33} = -1 \tag{32}$$

The others are zero. Based on Eqs.(31) and (32), there are 12 Christopherian symbols which are not equal to zero.

$$\Gamma^0_{11} = \frac{h_{11,t}}{2} \qquad \Gamma^0_{22} = \frac{h_{22,t}}{2} \qquad \Gamma^3_{11} = \frac{h_{11,z}}{2} \qquad \Gamma^3_{22} = \frac{h_{22,z}}{2}$$

$$\Gamma^1_{10} = \Gamma^1_{01} = \frac{h_{11,t}}{2(1 + h_{11})} \qquad \Gamma^2_{02} = \Gamma^2_{20} = \frac{h_{22,t}}{2(1 + h_{22})}$$

$$\Gamma^1_{13} = \Gamma^1_{31} = \frac{h_{11,z}}{2(1 + h_{11})} \qquad \Gamma^2_{23} = \Gamma^2_{32} = \frac{h_{22,z}}{2(1 + h_{22})} \tag{33}$$

Here

$$h_{11,t} = \frac{\partial h_{11}}{c \partial t} = -\frac{\omega}{c} h_1 \sin(\omega t - kz)$$

$$h_{22,t} = \frac{\partial h_{22}}{c \partial t} = -\frac{\omega}{c} h_2 \sin(\omega t - kz)$$

$$h_{11,z} = \frac{\partial h_{11}}{\partial z} = k h_1 \sin(\omega t - kz)$$

$$h_{22,z} = \frac{\partial h_{22}}{\partial z} = k h_1 \sin(\omega t - kz) \tag{34}$$

As well as

$$h_{11,tt} = \frac{\partial^2 h_{11}}{c^2 \partial t^2} = -\frac{\omega^2}{c^2} h_1 \cos(\omega t - kz)$$

$$h_{22,tt} = \frac{\partial^2 h_{22}}{c^2 \partial t^2} = -\frac{\omega^2}{c^2} h_2 \cos(\omega t - kz)$$

$$h_{11,zz} = \frac{\partial^2 h_{11}}{\partial z^2} = -k^2 h_1 \cos(\omega t - kz)$$

$$h_{22,tt} = \frac{\partial^2 h_{22}}{c^2 \partial t^2} = -k^2 h_2 \cos(\omega t - kz) \tag{35}$$

By considering Eqs.(13), (34) and (35), under the condition of weak field, the non-zero components of Ricci tensors are

$$R_{00} = \Gamma^{\sigma}_{0\sigma,0} - \Gamma^{\sigma}_{00,\sigma} + \Gamma^{\sigma}_{\rho 0}\Gamma^{\rho}_{0\sigma} - \Gamma^{\sigma}_{\rho\sigma}\Gamma^{\rho}_{00}$$

$$= \Gamma^{1}_{01,0} + \Gamma^{2}_{02,0} + \Gamma^{1}_{10}\Gamma^{1}_{01} + \Gamma^{2}_{20}\Gamma^{2}_{02} \approx \Gamma^{1}_{01,0} + \Gamma^{2}_{02,0}$$

$$= \frac{(1+h_{11})h_{11,tt} - (h_{11,t})^2}{2(1+h_{11})^2} + \frac{(1+h_{22})h_{22,tt} - (h_{22,t})^2}{2(1+h_{22})^2}$$

$$= \frac{h_{11,tt}}{2(1+h_{11})^2} + \frac{h_{22,tt}}{2(1+h_{22})^2} \approx \frac{h_{11,tt}}{2} + \frac{h_{22,tt}}{2}$$

$$= -\frac{\omega^2}{2c^2}(h_1 + h_2)\cos(\omega t - kz) \neq 0 \tag{36}$$

$$R_{11} = \Gamma^{\sigma}_{1\sigma,1} - \Gamma^{\sigma}_{11,\sigma} + \Gamma^{\sigma}_{\rho 1}\Gamma^{\rho}_{1\sigma} - \Gamma^{\sigma}_{\rho\sigma}\Gamma^{\rho}_{11}$$

$$\approx -\Gamma^{0}_{11,0} - \Gamma^{3}_{11,3} \approx -\frac{h_{11,tt}}{2} - \frac{h_{11,zz}}{2}$$

$$= \frac{\omega^2}{2c^2} h_1 \cos(\omega t - kz) - \frac{k^2}{2} h_1 \cos(\omega t - kz) = 0 \tag{37}$$

$$R_{22} = \Gamma^{\sigma}_{2\sigma,2} - \Gamma^{\sigma}_{22,\sigma} + \Gamma^{\sigma}_{\rho 2}\Gamma^{\rho}_{2\sigma} - \Gamma^{\sigma}_{\rho\sigma}\Gamma^{\rho}_{22}$$

$$= -\Gamma^{0}_{22,0} - \Gamma^{3}_{22,3} = -\frac{h_{22,tt}}{2} - \frac{h_{22,zz}}{2}$$

$$= \frac{\omega^2}{2c^2} h_2 \cos(\omega t - kz) - \frac{k^2}{2} h_2 \cos(\omega t - kz) = 0 \tag{38}$$

$$R_{33} = \Gamma^{\sigma}_{3\sigma,3} - \Gamma^{\sigma}_{33,\sigma} + \Gamma^{\sigma}_{\rho 3}\Gamma^{\rho}_{3\sigma} - \Gamma^{\sigma}_{\rho\sigma}\Gamma^{\rho}_{33}$$

$$\approx \Gamma^{1}_{31,3} + \Gamma^{2}_{32,3} = \frac{(1+h_{11})h_{11,zz} - (h_{11,z})^2}{2(1+h_{11})^2}$$

$$+ \frac{(1+h_{22})h_{22,zz} - (h_{22,z})^2}{2(1+h_{22})^2} \approx \frac{h_{11,zz}}{2} + \frac{h_{22,zz}}{2}$$

$$= -\frac{k^2}{2}(h_1 + h_1)\cos(\omega t - kz) \neq 0 \tag{39}$$

So in general, we have $R_{00}=R_{33}\neq 0$ and $R_{11}=R_{22}=0$， the metric tensors (29) do not satisfy the Einstein's equation of gravity field. Because h_1 and h_2 are the maximum amplitudes which are non-negative numbers, Eq.(39) can not be equal to zero unless $h_1=h_2=0$, meaning no gravitational waves.

3.3 The harmonic coordinate conditions when $h_{12}=0$

We calculate the harmonic coordinate conditions. When $h_{12}=0$, we have

$$h_0^0=0 \qquad h_1^1=-h_1\cos(\omega t-kz) \qquad h_2^2=-h_2\cos(\omega t-kz) \qquad h_3^3=0$$

$$h=h_\mu^\mu=G^{\mu\sigma}h_{\sigma\nu}=G^{11}h_{11}+G^{22}h_{22}=-(h_1+h_2)\cos(\omega t-kz) \tag{40}$$

According to Eq.(20), we have

$$h_{0,\nu}^\nu=h_{,0}/2 \qquad h_{1,\nu}^\nu=h_{,1}/2 \qquad h_{2,\nu}^\nu=h_{,2}/2 \qquad h_{3,\nu}^\nu=h_{,2}/2 \tag{41}$$

So we obtain

$$h_{0,\nu}^\nu=h_{0,0}^0+h_{0,1}^1+h_{0,2}^2+h_{0,3}^3=0$$

$$h_{1,\nu}^\nu=h_{1,0}^0+h_{1,1}^1+h_{1,2}^2+h_{1,3}^3=h_{1,1}^1=\frac{\partial}{\partial x}h_1^1=0$$

$$h_{2,\nu}^\nu=h_{2,0}^0+h_{2,1}^1+h_{2,2}^2+h_{2,3}^3=h_{2,2}^2=\frac{\partial}{\partial y}h_2^2=0$$

$$h_{3,\nu}^\nu=h_{3,0}^0+h_{3,1}^1+h_{3,2}^2+h_{3,3}^3=0 \tag{42}$$

$$h_{,0}=\frac{1}{c}\frac{\partial h}{\partial t}=\frac{\omega}{c}(h_1+h_2)\sin(\omega t-kz)$$

$$h_{,1}=\frac{\partial h}{\partial x}=0 \qquad h_{,2}=\frac{\partial h}{\partial y}=0$$

$$h_{,3}=\frac{\partial h}{\partial z}=-k(h_1+h_2)\sin(\omega t-kz) \tag{43}$$

Therefore, the harmonic coordinate conditions do not hold in general

$$h_{0,\nu}^\nu\neq\frac{h_{,0}}{2} \qquad h_{3,\nu}^\nu\neq\frac{h_{,3}}{2} \tag{44}$$

It can be seen that the gravitational wave metric tensor of Eq.(29) does not satisfy the harmonic coordinate condition of Eq.(20) in general .

3.4 The harmonic coordinate conditions when $h_{12}\neq 0$

If $h_{12}\neq 0$， we have $h_1^2=-h_0\cos(\omega t-kz+\varphi_0)$， h in Eq.(54) becomes

$$h=h_\mu^\mu=G^{\mu\sigma}h_{\sigma\mu}=G^{11}h_{11}+G^{22}h_{22}+G^{21}h_{12}$$

$$h=h_\mu^\mu=G^{\mu\sigma}h_{\sigma\mu}=G^{11}h_{11}+G^{22}h_{22}+G^{21}h_{12}$$

$$= -(h_1 + h_2 + h_0)\cos(\omega t - kz) \tag{45}$$

We still have $h_{,1} = 0 \quad h_{,2} = 0$, as well as

$$h_{,0} = \frac{1}{c}\frac{\partial h}{\partial t} = \frac{\omega}{c}(h_1 + h_2 + h_0)\sin(\omega t - kz)$$
$$h_{,3} = \frac{1}{c}\frac{\partial h}{\partial t} = -k(h_1 + h_2 + h_0)\sin(\omega t - kz) \tag{46}$$

Similar to Eq.(42), we still have $h^{\nu}_{0,\nu} = 0$ and $h^{\nu}_{3,\nu} = 0$, but $h^{\nu}_{1,\nu}$ and $h^{\nu}_{2,\nu}$ become

$$h^{\nu}_{1,\nu} = h^{0}_{1,0} + h^{1}_{1,1} + h^{2}_{1,2} + h^{3}_{1,3} = h^{1}_{1,1} + h^{2}_{1,2} = \frac{\partial}{\partial x}h^{1}_{1} + \frac{\partial}{\partial y}h^{2}_{1} = 0$$

$$h^{\nu}_{2,\nu} = h^{0}_{2,0} + h^{1}_{2,1} + h^{2}_{2,2} + h^{3}_{2,3} = h^{1}_{2,1} + h^{2}_{2,2} = \frac{\partial}{\partial x}h^{1}_{2} + \frac{\partial}{\partial y}h^{2}_{2} = 0 \tag{47}$$

So we still have the result of Eq.(44), that is to say, when $h_{12} \neq 0$, the metric tensors of Eq.(29) still do not satisfy the harmonic coordinate conditions of Eq.(20).

3.5 Harmonic coordinate conditions result in gravity wave amplitude equal to zero

According to the gravitational field equations (36) and (39) , the condition for the existence of gravitational waves is

$$(h_1 + h_2)\cos(\omega t - kz) = 0 \tag{48}$$

According to Eq(41), the condition for the existence of gravitational waves is

$$(h_1 + h_2)\sin(\omega t - kz) = 0 \tag{49}$$

Because h_1 and h_2 are maximum amplitudes and defined to be positive numbers, to make Eqs.(48) and (49) tenable, the only way is to let $h_1 = h_2 = 0$. The result is that the gravity waves of general relativity do not exist.

In fact, Eqs.(48) and (49) are not independent. Taking $kz \to kz + \pi/2$, Eqs.(48) and (49) become the same. Therefore, it is unnecessary to set Eq.(48) equal to zero at all. But this is clearly not possible, so the harmonic coordinate conditions are not only redundant, but also can not be correct.

If $h_{12} \neq 0$, in order to make the harmonic coordinate tenable, according to Eq. (46), we should have

$$(h_1 + h_2 + h_0)\sin(\omega t - kz) = 0 \tag{50}$$

Similarly, because h_1, h_2 and h_0 are positive numbers, to make Eq.(50) tenable, the only way is to let $h_1 = h_2 = h_0 = 0$. The gravity waves of general relativity do not exist. In this case, even let $h_1 = -h_2$ as done in the current general relativity, Eq.(50) is still not equal to zero. There is still no gravity waves.

3.6 The comparison of harmonic coordinate conditions with Lorentz gauge conditions of electromagnetic theory

We compare Eq.(49) with the Lorentz gauge condition of electromagnetic theory to illustrate the problem of the coordinate condition of general relativity. It is assumed that the electromagnetic potential satisfies the wave equation in free space with

$$\vec{A} = \vec{A}_0 \cos(\omega t - \vec{k} \cdot \vec{x}) \qquad \varphi = \varphi_0 \cos(\omega t - \vec{k} \cdot \vec{x}) \tag{51}$$

Substituting them in the Lorentz gauge condition

$$\frac{1}{c}\frac{\partial}{\partial t}\varphi + \nabla \cdot \vec{A} = 0 \tag{52}$$

and let $\vec{k} \cdot \vec{A}_0 = k'|\vec{A}_0| = k'\varphi_0$, we get

$$\left(\frac{\omega}{c} - k'\right)\varphi_0 \cos(\omega t - \vec{k} \cdot \vec{x}) = 0 \tag{53}$$

As long as to take $\omega / c = k'$, the Lorentz gauge condition can be satisfied. So it is a nature relation without making amplitudes be equal to zero. General relativity uses the harmonic coordinate conditions, the result is that the amplitudes of gravitational waves are equal to zero, actually negating the existence of gravity waves. The Lorentz conditions of electromagnetic theory are completely different from the coordinate conditions of general relativity, leading to completely different results.

3.7 The coordinate transformation of harmonic coordinate condition leads to the non-existence of gravity wave of general relativity

If $h_{.0}$ and $h_{.3}$ in Eq.(59) are not equal to zero, by transforming them to another coordinate system (x', t') and make them equal to zero, we have $\sin(\omega t' - kz') = 0$ or $\omega t' - kz' = n\pi$. In the new coordinate system, the metrics of gravity wave become $h'_{11}\cos n\pi =$ constant, $h'_{22}\cos n\pi =$ constant. It indicates the disappears of gravity wave.

3.8 The metric of gravitational waves can not be simplified if the coordinate condition are used

As discussed in Section 3.1, if some metric tensors are predetermined, the coordinate conditions are unnecessary and can not be used, otherwise contradictions will be caused. However, general relativity does not follow this principle in the derivation of gravitational wave equations. This leads to the zero results for gravitational waves, which is the essence of the gravitational wave problem in general relativity.

General relativity assumes that the metric tensors of gravitational waves have the forms of Eqs.(3) and (4). That means that only 3 out of 10 $g_{\mu\nu}$ are unknown and seven are known. However, after Eq.(8) is considered, there are 6 independent Recci tensors. Six equations of gravitational field $R_{\mu\nu} = 0$ are not only sufficient to determine 3 metric tensors, but also redundant. Adding four harmonic coordinate conditions means seven equations to determine three unknown functions, which inevitably leads to contradictory results. Therefore, the gravitational wave problem of general relativity has only zero solution.

Let's take the Schwarzschild metric as an example further to illustrate this problem further. In order to solve the equations of gravitational field and obtain the Schwarzschild metric, general relativity assume two metric tensors g_{00} and g_{11} are unknown, the other 8 are known. So in principle, only two equations are enough to determinate g_{00} and g_{11}. It is unnecessary to introduce the coordinate condition. If the coordinate conditions are still used, contradictory results will be caused. The Schwarzschild metric is

$$ds^2 = c^2\left(1 - \frac{\alpha}{r}\right)dt^2 - \frac{1}{1 - \alpha / r}dr^2 - r^2(d\theta^2 + \sin^2\theta d\varphi^2) \tag{54}$$

According to the definition of Eq.(1), we have

$$G_{\mu\nu}=\left(\ 1,\ -1,\ -r^2,\ -r^2\sin^2\theta\right)$$

$$h_{\mu\nu}=\left(-\frac{\alpha}{r},\ 1-\frac{1}{1-\alpha/r},\ 0,\ 0\right) \tag{55}$$

When $\alpha/r<<1$, we have $h_{00}<<1$ as well as

$$h_{11}=1-\frac{1}{1-\alpha/r}<<1 \tag{56}$$

According to Eq.(68), we have:

$$h=h_\sigma^\sigma=h_0^0+h_1^1+h_2^2+h_3^3 \tag{57}$$

$$h_0^0=G^{\rho 0}h_{\rho 0}=G^{00}h_{00}+G^{10}h_{10}+G^{20}h_{20}+G^{30}h_{30}=G^{00}h_{00}=-\frac{\alpha}{r} \tag{58}$$

$$h_1^1=G^{01}h_{01}+G^{11}h_{11}+G^{21}h_{21}+G^{31}h_{31}=G^{11}h_{11}=-\left(1-\frac{1}{1-\alpha/r}\right) \tag{59}$$

$$h_2^2=G^{22}h_{22}=0 \qquad h_3^3=G^{33}h_{33}=0 \qquad h_1^0=G^{\rho 0}h_{\rho 1}=0$$

$$h_1^2=G^{\rho 2}h_{\rho 1}=0 \qquad h_1^3=G^{\rho 3}h_{\rho 1}=0 \tag{60}$$

Therefore, we get

$$h=-1-\frac{\alpha}{r}+\frac{1}{1-\alpha/r}$$

$$h_{,1}=\frac{\alpha}{r^2}\left[1-\frac{1}{(1-\alpha/r)^2}\right] \tag{61}$$

$$h_{1,\nu}^\nu=h_{1,0}^0+h_{1,1}^1+h_{1,2}^2+h_{1,3}^3=h_{1,1}^1=-\frac{\alpha}{r^2(1-\alpha/r)^2} \tag{62}$$

According to Eqs.(20), (61) and (62), we have

$$h_{1,\nu}^\nu-\frac{1}{2}h_{,1}=-\frac{\alpha}{r^2(1-\alpha/r)^2}-\frac{\alpha}{2r^2}\left[1-\frac{1}{(1-\alpha/r)^2}\right]=0 \tag{63}$$

According to Eq.(63), the result is

$$\left(1-\frac{\alpha}{r}\right)^2=-1 \qquad \text{or} \qquad \frac{\alpha}{r}=1-i \tag{64}$$

In this case, α/r becomes a complex number, leading to contradiction and serious problem. Substituting it in Eq.(54), not only does the Schwarzschild metric change its original form, turning curved space-time into flat space-time, but also became an complex space-time, completely meaningless!

3.9 The gravitational field equations after harmonic coordinate conditions are considered

If the harmonic coordinate conditions are taken into account, we can not do any simplification for the metric tensors. For the gravity field in vacuum, the arc element of four dimension space-time should

$$ds^2 = c^2(1+h_{00})dt^2 - (1+h_{11})dx^2 - (1+h_{22})dy^2 - (1+h_{33})dz^2$$

$$+c(1+h_{01})dtdx + c(1+h_{02})dtdy \ + c(1+h_{02})dtdy(1+h_{22})dy^2$$

$$+(1+h_{03})dtdz - (1+h_{12})dxdy \ -(1+h_{13})dxdz - (1+h_{23})dydz \qquad (65)$$

Here each $h_{\mu\nu}$ is the function of coordinate x, y, z, t , the equations of gravity fields are

$$\frac{1}{c^2}\frac{\partial^2}{\partial t^2}h_{\mu\nu} - \frac{\partial^2}{\partial x^2}h_{\mu\nu} - \frac{\partial^2}{\partial y^2}h_{\mu\nu} = 0 \qquad (66)$$

There are 6 independent equations, adding the restrictions of 4 harmonic coordinate conditions shown in Eq.(20) with

$$h^{\mu 0}_{,0} + h^{\mu 1}_{,1} + h^{\mu 2}_{,2} + h^{\mu 3}_{,3} = \frac{1}{2}(G^{\mu 0}h_{,0} + G^{\mu 1}h_{,1} + G^{\mu 2}h_{,2} + G^{\mu 3}h_{,3}) \qquad (67)$$

Since Eq.(67) is related to the first partial derivative of $h_{\mu\nu}$ with respect to space-time coordinates, it is equivalent to introduce the first partial derivative of $h_{\mu\nu}$ into Eq.(66). It is impossible to guarantee the solutions of Eq.(66) having the simple form of Eq.(29).

3.10 The gravitational field equation has no wave solution under strong field condition

The generation of gravitational waves is thought to be a physical phenomenon under extreme conditions, requiring extremely strong gravitational interactions. In the strong field case, the higher-order terms must be considered, the simplification of Eq.(1) does not hold, especially in the so-called black hole collision processes to generate gravitational wave. Because of $\alpha / r \sim 1$ in this case, using the weak field metric is completely unreasonable.

If the higher order terms are taken into account, Eqs.(10) ~ (14) will contain the terms $h_{\mu\sigma}h_{\sigma\nu}$, the equations of gravitational field have complicated forms without linear wave solutions. However, we know that electromagnetic wave radiation exists in both strong and weak fields. According to general relativity, gravitational waves were produced under weak field conditions, but would not be produced under strong field conditions. This is too strange to be unaccepted.

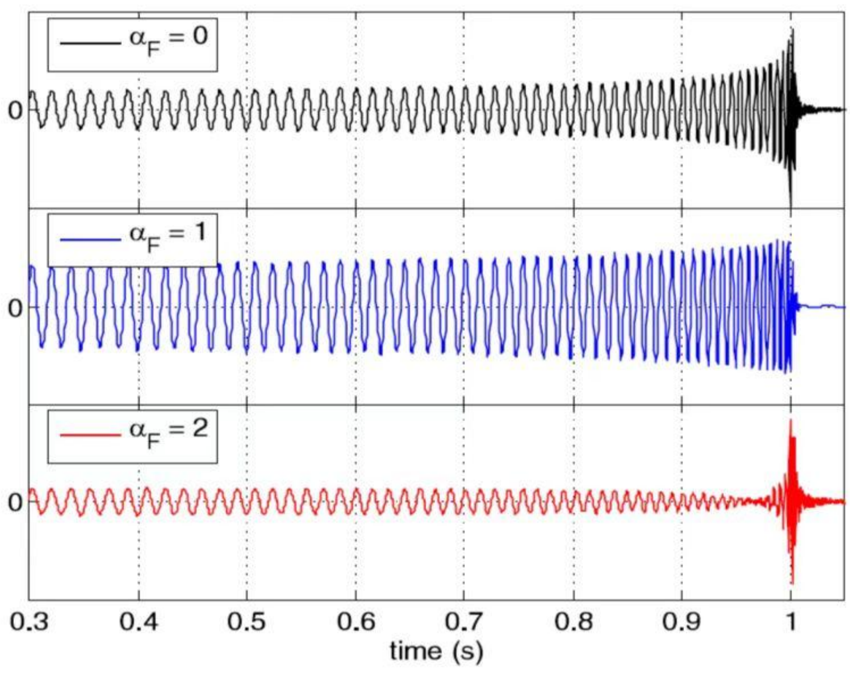

Fig.1 The original graph of gravitational wave from GW151226

gravitational waves erupt within 0.9 seconds.

The current gravitational wave detection based on general relativity did not consider these problems at all. The wave equation obtained in weak field was directly used to describe the gravitational waves generated by black hole collisions. In the gravity wave detection of GW151226 by LIGO, it was said that two black holes of 36 and 29 solar masses respectively merged into a black hole of 62 solar masses, and 3 solar masses were transformed into gravitational waves and radiated into space. At the final moment of two black hole's merger (about 0.3 seconds), the peak of gravitational wave radiation was more than 10 times stronger than the electromagnetic radiation intensity of the entire observable universe, which can be said to be the most tragic cosmic phenomenon. But curiously, LIGO's term used sinusoidal oscillation waveform to describe the gravitational waves generated at final moment (about 0.3 seconds) as shown in Fig.1. [2]

4 The problems in the gravitational delayed radiation formula of general relativity

4.1 The gravity delayed radiation formula of of general relativity

The general solution of Eq.(23) is the superposition of a linear wave solution and a special solution. Hilbert proved that when the harmonic coordinate condition was used, the special solution of Eq.(23) was [5]

$$\chi_{\mu}^{\nu} = \frac{\kappa}{2\pi} \int \frac{T_{\mu}^{\nu}(r', t - r/c)}{r} dV \qquad (68)$$

Eq.(68) described the delayed solution of gravitational radiation in weak field condition. However, it is known from the previous discussion that the coordinate condition did not hold, so Eq.(68) is also invalid.

If this problem is not considered, when $T_{\mu\nu}$ is distributed in a limited region and the observation point is far away from the field source, Eq.(68) can be written as

$$\chi_{\mu}^{\nu} = \frac{\kappa}{2\pi R} \int T_{\mu}^{\nu *} dV \qquad (69)$$

The asterisk represents the delayed quantity. The theoretical calculation and the observation condition of above formula is that the observer is in a stationary coordinate system, far away from the source material. The source material moves in the region near the original point of coordinate system. The energy momentum tensor of system contains the velocity and acceleration of material.

According to the field equation (23) and the harmonic coordinate condition (15), it can be calculated with $T_{\mu,\nu}^{\nu} = 0$, or

$$T_{k,i}^{i} + T_{k,0}^{0} = 0 \qquad T_{0,i}^{i} + T_{0,0}^{0} = 0 \qquad (70)$$

Multiply the first equation of Eq.(70) by space coordinate x^j and integrate it with respect to whole space. Considering that the coordinates of time and space in energy momentum tensor are independent, that is,

x^j and x^0 are unrelated to each other, or $\partial x^j / \partial x^0 = 0$ and get [5]

$$\frac{\partial}{\partial x^0}\int T_k^0 x^j dV = -\int T_{k,i}^i dV = \int\left[T_k^i \delta_i^j - \frac{\partial(T_k^i x^j)}{\partial x^i}\right]dV$$

$$= \int T_k^j dV - \int \frac{\partial(T_k^i x^j)}{\partial x^i} dV \qquad (71)$$

Applying the Gauss's theorem and the infinite boundary conditions, the second term on the right-hand side of Eq.(71) is zero. Decrease the upper index of above formula and take into account symmetry, it can be obtained

$$\int T_{kj} dV = -\frac{1}{2}\frac{\partial}{\partial x^0}\int (T_{0k}x_j + T_{0j}x_k) dV \qquad (72)$$

Multiply the second term of Eq.(70) by $x^k x^j$, considering that space coordinates x^k, x^j have nothing to do with time coordinate x^0 with $\partial(x^k x^j)/\partial x^0 = 0$, a similar result of Eq.(71) can be obtained

$$\frac{\partial}{\partial x^0}\int T_{00}x_k x_j dV = -\int (T_{0k}x_j + T_{0j}x_k) dV \qquad (73)$$

From Eq.(72) and (73), it can be obtained

$$\int T_{kj} dV = \frac{1}{2}\frac{\partial}{(\partial x^0)^2}\int T_{00}x_k x_j dV \qquad (74)$$

Substituting $T_{00} = \rho(x_k, x_0)c^2$ and $x_0 = ct$ in Eq.(74), the result is

$$\int T_{kj} dV = \frac{1}{2}\frac{\partial}{\partial t^2}\int \rho(x_k, t)x_k x_j dV = \frac{1}{2}\int \ddot{\rho}(x_k, t)x_k x_j dV \qquad (75)$$

Since tensor T_{ki} has six independent components, involving velocity and acceleration of matter, it is difficult to understand its details in general physical processes. When it is expressed by Eq.(75), we only need to know the relationship between the component T_{00} and time, thus the difficulty of problem is decreased.

Based on it, the quadrupole moment is introduced with

$$Q_{kj} = \int \rho(x_k, x_0)x_k x_j dV \qquad (76)$$

The tensor of quadrupole moment is defined as

$$D_{kj} = 3Q_{kj} - \delta_{kj}Q_{ii} \qquad (77)$$

Eq.(69) is rewritten as

$$\chi_{\mu\nu} = \frac{2G}{4\pi\, r_0^*}\frac{\partial^2}{\partial t^2}\int \rho(x_k, t)x_k x_j dV = \frac{2G}{4\pi\, r_0^*}\int \ddot{\rho}(x_k, t)x_k x_j dV = \frac{2G\ddot{Q}_{kj}}{4\pi\, r_0^*} \qquad (78)$$

The energy momentum tensor of gravitational field is expressed by the form of Landau-Lifshitz, and the radiation intensity of gravitational waves in the solid angle along the direction of $z-$axis is

$$dI = \frac{2G}{4\pi c^5}(\dddot{Q}_{11}^2 + \dddot{Q}_{12}^2)d\Omega = \frac{G}{36\pi c^5}\left[\left(\frac{\dddot{D}_{11} - \dddot{D}_{22}}{2}\right)^2 + \dddot{D}_{12}^2\right]d\Omega \tag{79}$$

After the statistical average over all space directions, the radiation power of energy is obtained as follows

$$-\frac{dE}{dt} = 4\pi\frac{d\bar{I}}{d\Omega} = \frac{G\dddot{D}_{ij}^2}{45c^5} = \frac{G}{45c^5}\left(\dddot{Q}_{ij}^2 - \frac{1}{3}\dddot{Q}_{kk}^2\right) \tag{80}$$

4.2 The problems in the radiation formula of gravity wave in general relativity.

According to Eq.(78) and (79), the quadratic and cubic partial derivatives of quadrupole moments with respect to time are only for the energy density in Eq.(74), i.e.

$$\ddot{Q}_{kj} = \int \ddot{\rho}(x_k, t)x_k x_j dV \qquad \dddot{Q}_{kj} = \int \dddot{\rho}(x_k, t)x_k x_j dV \tag{81}$$

Therefore, the quadratic and cubic partial derivatives of quadrupole moment tensors with respect to time in Eq.(80) are only for energy density, and the radiated power is independent of the derivative of space coordinates with respect to time.

However, Eq.(80) is not correct, general relativity then goes a step further and changes the radiation power in relation to the derivative of space coordinates with respect to time and introduces the coordinate transformations [5]

$$x_1 = x_1' \cos\omega t - x_2' \sin\omega t \qquad t = t'$$

$$x_2 = x_1' \sin\omega t + x_2' \cos\omega t \quad x_3 = x_3' \tag{82}$$

Where x_k', t' are called the following coordinates. The above transformations are actually the Galilean transformation in the Newtonian mechanics, in which the Jacobian determinant is equal to 1 and the volume element is a constant. Besides, general relativity needs to assume that the density of matter be a constant with $\rho = \rho_0$, invariant under the transformations of space-time coordinates. Then the spindle coordinate system is adopted and the moment of inertia is written as

$$I_{ij} = \int \rho_0 x_k' x_j' dV' \tag{83}$$

Assume that the rotational axis x_3' is one principal axis of inertia ellipsoid sphere, and the other two principal axes are x_1' and x_2'. Thus, Eq. (76) is rewritten as [5]

$$Q_{11}(t) = \int \rho_0 x_1 x_1 dV = \int \rho_0 (x_1' \cos\omega t - x_2' \sin\omega t)^2 dV'$$
$$= \frac{1}{2}(I_{11} + I_{22}) + \frac{1}{2}(I_{11} - I_{22})\cos 2\omega t \tag{84}$$

Similarly

$$Q_{22}(t) = \frac{1}{2}(I_{11} + I_{22}) - \frac{1}{2}(I_{11} - I_{22})\cos 2\omega t$$

$$Q_{12}(t) = \frac{1}{2}(I_{11} - I_{22})\sin 2\omega t$$

$$Q_{13}(t) = Q_{23}(t) = 0 \qquad\qquad Q_{33}(t) = I_{33}(t) \tag{85}$$

The calculation results are

$$\dddot{Q}_{11}^2 = 16(I_{11} - I_{22})^2 \omega^6 \sin^2 2\omega\, t$$

$$\dddot{Q}_{22}^2 = 16(I_{11} - I_{22})^2 \omega^6 \sin^2 2\omega\, t$$

$$\dddot{Q}_{12}^2 = 16(I_{11} - I_{22})^2 \omega^6 \cos^2 2\omega\, t$$

$$(\dddot{Q}_{kk})^2 = (\dddot{Q}_{11} + \dddot{Q}_{22} + \dddot{Q}_{33})^2 = 0$$

$$(\dddot{Q}_{kj})^2 = (\dddot{Q}_{11}^2 + \dddot{Q}_{22}^2 + 2\dddot{Q}_{12}^2)^2 = 32\omega^6 (I_{11} - I_{22})^2 \tag{86}$$

Substituting them in Eq.(80), the last formula of radiation power is obtained

$$-\frac{dE}{dt} = \frac{32G\omega^6}{5c^5}(I_{11} - I_{22})^2 = \frac{32G}{45c^5}\omega^6 I^2 e^2 \tag{87}$$

Here $I = I_{11} + I_{22}$ is the moment of inertia about the x_3 axis in the following coordinate system, $e = (I_{11} - I_{22})/I$ is the equatorial ellipticity of a rotating body.

In this way, several problems are caused as shown below.

1. This is a process of stealing concepts to change Eq.(80) into Eq.(87). In Eqs.(80) and (81), the derivative of time is only with respected to material (energy) density and not to space coordinates. But in Eqs.(86) and (87), the density of material (energy) is treated as a constant. The derivative of mass density with respect to time becomes the derivative of space coordinates with respect to time, which completely violates the basic rules of mathematical transformation.

2. If we had to transform to the following coordinate system, the correct method would be as follows. Assume that the energy density is $\rho(x_k, t)$ in the stationary frame of reference, in the new frame of reference, the energy density becomes $\rho(x_k, t) \to \rho'(x'_k, t')$. According to the transformation of Eq.(82), the results should be

$$Q'_{11}(t') = \int \rho'(x'_k, t')\ (x'_1 \cos\omega\, t' - x'_2 \sin\omega\, t')^2 dV'$$

$$Q'_{22}(t') = \int \rho'(x'_k, t')\ (x'_1 \sin\omega\, t' + x'_2 \cos\omega\, t')^2 dV'$$

$$Q'_{12}(t') = Q'_{21}(t') = \int \rho'(x'_k, t')\ (x'_1 \cos\omega\, t' - x'_2 \sin\omega\, t')$$

$$\times (x'_1 \sin\omega\, t' + x'_2 \cos\omega\, t')^2 dV' \tag{88}$$

Let $\dddot{\rho}(x_k, t) \to \dddot{\rho}'(x'_k, t')$, as well as

$$\dddot{R}_{kj}(t') = \int \dddot{\rho}'(x'_k, t') x'_k x'_j dV' \tag{89}$$

For example, in the statics reference frame with

$$\rho(x_k, t) = \frac{a}{(x_1^2 + x_2^2)} + \frac{bx_1^2}{t^2} \qquad\qquad \dddot{\rho}(x, t) = \frac{-24bx_1^2}{t^5} \tag{90}$$

According to Eq.(82), in the new coordinate system, $\dddot{\rho}(x,t)$ becomes

$$\dddot{\rho}'(x',t') = \frac{-24b(x_1'\cos\omega\, t' - x_2'\sin\omega\, t')^2}{t'^5} \qquad (91)$$

So in the following coordinate system, the derivative of quadrupole moment tensor with respect to time also involves only the energy density, not for the quadrupole moment coordinates. The results should be

$$\dddot{Q}_{11} = \dddot{R}_{11}\cos^2\omega\, t' + \dddot{R}_{22}\sin^2\omega\, t' - \frac{1}{2}(\dddot{R}_{12} + \dddot{R}_{21})\sin 2\omega\, t'$$

$$\dddot{Q}_{22} = \dddot{R}_{11}\sin^2\omega\, t' + \dddot{R}_{22}\cos^2\omega\, t' + \frac{1}{2}(\dddot{R}_{12} + \dddot{R}_{21})\sin 2\omega\, t''$$

$$\dddot{Q}_{12} = \dddot{Q}_{12} = (\dddot{R}_{11} - \dddot{R}_{11})\sin\omega\, t'\cos\omega\, t' + \dddot{R}_{12}(\cos^2\omega\, t' - \sin^2\omega\, t')$$

$$(\dddot{Q}_{kk})^2 = (\dddot{Q}_{11} + \dddot{Q}_{22} + \dddot{Q}_{33})^2 = (\dddot{R}_{11} + \dddot{R}_{22})^2 = F_1(\dddot{R}_{11}, \dddot{R}_{22})$$

$$(\dddot{Q}_{kj})^2 = (\dddot{Q}_{11}^2 + \dddot{Q}_{22}^2 + 2\dddot{Q}_{12}^2)^2 = F_2(\dddot{R}_{11}, \dddot{R}_{22,}\dddot{R}_{12}, \sin\omega t', \cos\omega t') \qquad (92)$$

Substituting them in Eq.(80), we obtain

$$-\frac{dE}{dt} = \frac{G}{45c^5}\left(F_2 - \frac{1}{3}F_1\right) \qquad (93)$$

Where F_1 and F_2 are very complex functions. So Eq.(93) is completely different from Eq.(87) which actually has nothing to do with general relativity, not the result of the Einstein's theory of gravity. Even if it is true, it does not prove the gravitational radiation theory of general relativity.

3. As mentioned earlier, in a stationary reference frame, the motion of source matter is already taken into account when Eq.(80) is derived. Gravitational radiation can be generated if the third derivative of source material density with respect to time is not zero. Observers can observe gravitational radiation in the stationary reference frame. It is unnecessary to transform to the following coordinate system. The reason why general relativity had to transform Eq. (80) to the following coordinate system is that based on Eq.(80), no correct result can be obtained.

4. There are two explanations for the transformation of Eq.(82). One is that the observer does not move but the material system rotates. The other is that the material system does not move and the observer rotates. The derivation of Eq.(80) actually takes into account the motion of material system, otherwise $\dddot{\rho} = 0$ and there would be no gravity radiations. Therefore, it is unnecessary for us to consider the rotation of material system. Eq.(82) only represent the rotation of observer.

5. If the material system is stationary in the frame of reference with $\dddot{\rho}(x_k,t) = 0$ and $\dddot{Q}_{ik}(x_k,t) = 0$, then the gravitational wave radiation should be equals zero. Such as

$$\rho(\vec{x},t) = \frac{a}{x_1^2 + bx_2^2} \qquad \dddot{\rho}(\vec{x},t) = 0 \qquad (94)$$

According to Eq.(80), there is no gravitational wave radiation. However, after transformed to the following reference system, according to Eq.(83), we have $\dddot{\rho}'(\vec{x}',t') \neq 0$, then there are gravitational wave radiation. Since Eq.(82) represents the observer changing from a stationary reference frame to another moving reference frame, it means that gravitational radiations are caused by the observer motions. This is absurd in physics.

6.The principle of general relativity declares that the laws of physics are independent of the choice of reference frame. But in this case, the description of gravitational radiation is clearly related to the choice of reference frame. This is a contradictory.

4.3 The influence on the measurement of gravity radiation of general relativity.

For these reasons, general relativity using Eq.(87) to calculate gravitational radiation, the obtained results are invalid.

I) For a particle (sphere) uniformly moving in a circle around the center of gravity field

Let $x_1' = r$, $x_2' = x_3' = 0$, we have $I = I_1 = Mr^2$, $\rho = \rho_0 =$ constant, the ellipticity $e = 1$, substitute them in Eq.(87) and get

$$-\frac{dE}{dt} = \frac{32G}{45c^5}\omega^6 M^2 r^4 \qquad (95)$$

For example, for Jupiter moving around the sun, the mass of Jupiter is $M = 1.90 \times 10^{27} Kg$, the orbital radius is $r = 7.78 \times 10^{11} m$, the angular velocity is $\omega = 1.68 \times 10^{-8} / s$. Substituting them in Eq.(90), the result is $-dE/dt = 5.23 \times 10^3 J/s$. The mechanical energy of Jupiter around the sun is $10^{35} J$. It will take 10^{24} years to radiate all its energy, so Jupiter's gravitational radiation is minimal.

However, according to the original definition of Eq.(80), Eq.(76) apply only to the continuous distribution of matter, not to the motion of a single particle. So the gravitational radiation formula (87) can not be reduced to Eq.(80) and can not be considered as a result of general relativity.

II) For the circular motion of two stars around each other

Assume that the circumferential radius of a pair of stars orbiting each other is the same as that of a single particle moving in a circle. According to the original understanding of Eq.(101), the gravitational radiation intensity is zero. However, according to the current understanding of general relativity, we have

$$\omega^2 = \frac{G(M_1 + M_2)}{R^3} \qquad I = \frac{M_1 M_2}{M_1 + M_2} R^2 \qquad e = 1 \qquad (96)$$

R is the distance of double star. By substituting them into Eq.(87), it can be obtained

$$-\frac{dE}{dt} = \frac{32G^4 M_1^2 M_2^2 (M_1 + M_2)}{5c^5 R^5} \qquad (97)$$

For the elliptical motion, the radiation frequency is not single. The radiation formula should be changed to

$$-\frac{dE}{dt} = \frac{32G^4 M_1^2 M_2^2 (M_1 + M_2)}{5c^5 R^5} f(e) \qquad (98)$$

Where $f(e)$ is a function related to eccentricity and R is the length of major axis of elliptical orbit.

In 1978, Taylor and Hulse announced the observation results of radio pulsar PSR1913+16 for four years and pointed out that the change of the period of pulsar orbit was consistent with the energy loss of gravitational radiation, which meant that gravitational radiation were indirectly observed [9]. However, the error between observation and theoretical prediction reached to 20%, and the theoretical calculation depended on the selection of orbital parameters of PSR1913+16. Subsequent studies found that the theoretical calculation was consistent with the observation, with an error of less than 0.4% [10,11].

The result was recognized by the scientific community as confirming the gravitational radiation theory of general relativity, and Taylor and Hulse were awarded the 1993 Nobel Prize in Physics. The binary pulsar PSRJ0737-3039A/B, discovered in 2003, was also considered to conform to the radiation formula of general relativity [12,13].

However, as discussed above, Eq.(87) is not a result of general relativity, because it can not be reduced to Eq.(80). If the observations of pulsar binaries PSR1913+16 and PSRJ0377-3039 A/B are correct, it means that the results of general relativity are wrong. Eq.(87) was actually a patchwork, or rather, it was the result that general relativity simulated classical electromagnetic radiation theory. Because both have completely theoretical basis, the gravitational radiation formula of general relativity is neither fish nor fowl.

5 The revised Newtonian theory of gravity and the radiation formulas

5.1 The Revised Newtonian theory of gravity

As we known that the Newtonian formula of gravity is exactly the same in form as the electrostatic force formula of classical electromagnetic theory. Assume that the charges are q_1 and q_2 for two objects with rest mass m_1 and m_2 respectively, electrostatic force and gravitation between them are

$$\vec{F}_e = \frac{q_1 q_2 \vec{r}}{4\pi\varepsilon_0 r^3} \qquad \vec{F}_{eg} = \frac{G m_1 m_2 \vec{r}}{r^3} \tag{99}$$

As long as $1/4\pi\varepsilon_0 \to G$, $q_1 \to m_1$ and $q_2 \to m_2$, we have $F_e \to F_g$.

However, classical electromagnetic theory has a magnetic component, but the Newtonian gravity does not have a magnetic-like component. In the Newton's time, experimental conditions were limited and it was impossible to discover the magnetic component of gravity. The reason is that the ratio of magnetic component to electric component is $F_m / F_e = V / c$. Because electrons generally move at high speeds, magnetic component was easy to be founded. But in the age of Newton, physics studied objects moving much less than the speed of light, the magnetic-like component of gravity was hard to be founded, but they exist really. The many so-called post-Newtonian effects of general relativity were actually the magnetic effects of Newtonian gravity.

It is therefore natural to assume that gravity has a magnetic-like component. Many people in history had proposed the concept of magnetic-like component of gravity [14]. Assuming that the gravitational magnetic-like component can also be written in the form of magnetic component in electromagnetism with

$$\vec{F}_{mg} = \frac{\mu_g}{4\pi} \frac{\vec{J}_{g1} \times (\vec{J}_{g2} \times \vec{r})}{r^3} \tag{100}$$

Where μ_g is the permeability-like of gravity, and $\vec{J}_{gi}$ is the mass flow density. Suppose that the intensity of magnetic-like gravitational field generated by the mass flow density at point $\vec{r}$ is $\vec{B}_g$ with

$$\vec{B}_{gi} = \frac{\mu_g}{4\pi} \frac{\vec{J}_{gi} \times \vec{r}}{r^3} \tag{101}$$

Similarly, the propagation speed of gravity can be obtained

$$c_g = \frac{1}{\sqrt{\varepsilon_g \mu_g}} \quad (102)$$

According to general relativity, gravity travels at the speed of light, but the speed of gravity needs to be determined experimentally, and so far no experiments have proved $c_g = c$. Many scholars believed that gravity should travel much faster than light. Because the speed of light is too small in the cosmic scale. The propagation speed of gravity being equal to the speed of light will even cause the instability of planetary motion orbits in the solar system and many other problems in cosmology [15].

According to above definition, we get

$$\varepsilon_g = -\frac{1}{4\pi G} \qquad \mu_g = -\frac{4\pi G}{c_g^2} \quad (103)$$

Thus, the motion equation set of the Newton's gravitational field can be obtained, which are completely consistent with the classical electromagnetic field equations in following form

$$\nabla \cdot \vec{E}_g(\vec{x},t) = \frac{\rho_g}{\varepsilon_g} \qquad \nabla \cdot \vec{B}_g(\vec{x},t) = 0$$

$$\nabla \times \vec{E}_g = -\frac{\partial \vec{B}_g}{\partial t} \qquad \nabla \times \vec{B}_g = \mu_g \vec{J}_g + \mu_g \varepsilon_g \frac{\partial \vec{E}_g}{\partial t} \quad (104)$$

A particle with gravitational mass m'_g moving at speed $\vec{V}'$ in the gravitational field generated by a particle with gravitational mass m_g moving at speed $\vec{V}$, the Lorentz formula of gravity can also be written as

$$\vec{F}_g = m_g(\vec{E}_g + \vec{V} \times \vec{B}_g) \quad (105)$$

By introducing the concept of gravitational magnetic potential $A_{gu} = (\vec{A}_g, i\varphi_g)$, the relationship between gravitational field strength and gravitational magnetic potential are also defined as

$$\vec{E}_g = -\nabla \varphi_g - \frac{\partial \vec{A}_g}{\partial t} \qquad \vec{B}_g = \nabla \times \vec{A}_g \quad (106)$$

The wave equations of gravitational field expressed by gravitational magnetic potential can be obtained

$$\left(\frac{1}{c^2} \frac{\partial^2}{\partial t^2} - \nabla^2 \right) \vec{A}_g(\vec{x},t) = \mu_g \vec{J}_g(\vec{x},t)$$

$$\left(\frac{1}{c^2} \frac{\partial^2}{\partial t^2} - \nabla^2 \right) \varphi_g(\vec{x},t) = \frac{\rho_g(\vec{x},t)}{\varepsilon_0} \quad (107)$$

In the free space away from the field source with $\vec{J}_g = 0$ and $\rho_g = 0$, the gravitational magnetic potentials satisfy the linear wave equation, thus proving the existence of gravitational waves. The dipole radiation of electric-like gravitational waves is

$$\vec{A}_g(\vec{r}) = \frac{\mu_g e^{ikR}}{4\pi R} \int \vec{J}_g(\vec{r}\,') d^3 \vec{r}\,' \quad (108)$$

The radiation formula of magnetic-like dipole moment and the electric-like quadrupole moment of gravitational waves is

$$\vec{A}_g(\vec{r}) = \frac{-k\mu_g e^{ikR}}{4\pi R}\int \vec{J}_g(\vec{r}')(\vec{n}\cdot\vec{r}')d^3\vec{r}' \tag{109}$$

Because electromagnetic potential $A_u = (\vec{A}, i\varphi)$ are not the physical quantities that can be measured directly, actually measurable physical quantities are electromagnetic field intensity $\vec{E}$ and $\vec{B}$, which are defined as

$$\vec{E} = -\nabla\varphi - \frac{1}{c}\frac{\partial\vec{A}}{\partial t} \qquad \vec{B} = \nabla\times\vec{A} \tag{110}$$

By introducing the gauge transformation [6]

$$\vec{A} \to \vec{A} + \nabla\phi \qquad \varphi \to \varphi - \frac{1}{c}\frac{\partial}{\partial t}\phi \tag{111}$$

and substituting Eq.(111) in Eq.(110), the forms of $\vec{E}$ and $\vec{B}$ are proved unchanged. Therefore, electromagnetic potentials have a certain arbitrariness, and the following Lorenz gauge condition (55) can be introduced to simplify the motion equations of electromagnetic fields to get Eq.(107).

5.2 The quasi-electric quadrupole moment radiation formula of revised Newton's theory of gravity

The following briefly introduces Chinese scholar Chen Yongming's theory of gravitational like-electric quadrupole moment radiation [16]. Chen published a paper entitled “Mass-electric Qquivalent and Gravitational Wave” in China Basic Science in 2008. He proposed the Newton's electric-like quadrupole moment radiation formula and calculated gravitational radiation of pulsar binary star PSR1913+16 in detail. The results were very consistent with the actual observations.

Chen introduced the analogical equivalent quantity $\lambda = \sqrt{4\pi\varepsilon_0 G}$ for mass and electricity, let $q_1 = \lambda m_1$, $q_2 = \lambda m_2$, the quasi-electric dipole moment of binary star system was equal to zero, and the quasi-magnetic dipole moment was equal to a constant. The system performed quasi-electric quadrupole moment radiation, and the quasi-electric quadrupole moment tensor was

$$\vec{\vec{D}}(t) = \frac{1}{2}\left[q_1 + \frac{m_2^2}{m_1^2}q_2\right]r^2\left[(1+3\cos 2\varphi)\vec{e}_x\vec{e}_x + (1-3\cos 2\varphi)\vec{e}_y\vec{e}_y - 2\vec{e}_z\vec{e}_z)\right] \tag{112}$$

In Eq.(112), r, φ represents the space coordinates of charge or particle, and the differential with respect to time describes the speed of charge or particle. According to the gravity theory of flat space, in a stationary coordinate system, the spatial coordinates in the quasi-electric quadrupole moment tensor are the functions of time. Considering the time derivative of quasi-electric quadrupole moment tensor, the radiation formula of gravitational waves can be obtained. Let the three-dimensional magnetic potential of magnetic-like force be

$$\vec{A}(\vec{r},t) = \frac{\mu_0}{2\pi cr}\vec{n}\cdot\frac{d^2\vec{\vec{D}}}{dt^2} \tag{113}$$

The intensity of gravitational field and the Boynting vector of gravitational radiation is

$$\vec{B}(\vec{r},t) = \nabla\times\vec{A}(\vec{r},t) \qquad \vec{E}(\vec{r},t) = c\vec{B}\times\vec{n} \qquad \vec{S}(\vec{r},t) = \vec{E}\times\vec{H} \tag{114}$$

The energy of gravitational radiation when a binary star system moves for a period is

$$\Delta W = \iint \left[\int S \frac{d\varphi'}{\varphi'} \right] r^2 \sin\theta d\theta d\varphi \qquad (115)$$

The elliptical orbits of pulsar binary PSR1913+16 are very similar, the parameters are $m_1 = 1.387M_0$, $m_2 = 1.441M_0$, in which $M_0 = 1.989\times10^{30}Kg$ is the solar mass, perihelion $r_1 = 7.4460\times10^8 m$ and aphelion $r_2 = 3.1536\times10^9 m$, period $T = 2.7907\times10^4 s$ and eccentricity $e = 0.617131$. By a complicated calculation, Chen Yongming obtained the following result

$$\Delta W = \frac{\mu_0}{4}\left[q_1 + \frac{m_1^2}{m_2^2} q_2 \right]^2 \frac{7.0857h^5}{(0.8835r_0)^6} = 5.429\times10^{28} J \qquad (116)$$

Where $h = 3.6077\times10^{-4} r_0^2 m^2 \cdot rad/s$. When two stars moves a period, the period time decreases $\Delta T = 7.65\times10^8 s$ and the distance between two stars decreases $\Delta r = 3.12mm$. Taylor and Hulse found that the distance between two stars decreased $\Delta r = 3.0951mm$. Chen's calculation is less than 1% comparing with Taylor's and Hulse's observations and can be considered in good agreement.

So gravitational radiation can be explained by the revised Newtonian theory of gravity in flat space. The Einstein's gravity theory of curved space-time is unnecessarily.

7 Conclusions

In May, 2021, the author published a paper proving that the calculation of constant terms in the planetary motion equation of general relativity was wrong. By the strict calculation, the constant term should be equal to zero. It means that general relativity can only describe the parabolic orbital motions (with minor corrections) of objects in the solar system, it can not describe the elliptical and hyperbolic orbital motions [17]. So general relativity's calculation result of 43 second a century on the Mercury's perihelion procession is meaningless.

It is also proved that the time-independent orbital equation of light of general relativity is wrong. The reason is that a constant term is missing from the equation, so the light's deflection angle $1.75''$ in the solar gravitational field predicted by general relativity is also wrong [17]. According to the time-dependent equation of motion of general relativity, the deflection angle of light in the solar gravitational field is only a slight correction of $0.875''$ with the magnitude order of 10^{-5} predicted by the Newton's theory of gravity. The time dependent motion equation and the time independent motion equation of light in general relativity contradict each other.

Since Eddington's observations in 1919, there had been more than a dozen astronomical measurements, all of them had unanimously claimed to confirm the predictions of general relativity, including the deflection of quasar radio waves in the sun's gravitational field after 1970. How can astronomers observe phenomena which general relativity wrongly predicts and do not actually exist in nature?

In August, 2021, the author and Huang Zhixun published a paper pointing out that Eddington et al. 's measurements of gravitational deflection of light was invalid [18]. The reason is that this kind of measurement does not consider the influence of solar surface gas and other factors. It also needs to introduce several fitting parameters in the experimental data processing and uses the least square method and other very complex statistical methods to make the measured data consistent with the prediction of general relativity. In fact, by using these methods, we can also reconcile the measurements with the predictions of the Newtonian gravity, negating general relativity.

The theoretical and experimental errors of general relativity concerning the deflection of light is repeated in the problems of gravitational waves. By writing the metric of gravitational field in the form $g_{uv} = G_{uv} + h_{uv}$ and using the harmonic coordinate conditions in general relativity, it was proved that the vacuum gravitational field equation $R_{uv} = 0$ can be transformed into the linear wave equation $\partial^2 h_{uv} = 0$ under the weak field condition and predict the existence of gravitational waves. But this discussion has not considered the initial phases of gravity waves and the component h_{12} of gravity waves is unmeasured in experiments and meaningless in physics.

To arrive at a self-consistent theory, general relativity assumes that the metric of gravitational waves is expressed by Eq. (2), in which only two of three components of metric tensor are independent. They are $h_{11} = -h_{22}$ and h_{12}. In this paper, it is proved that in order to satisfy both the wave equation and harmonic coordinate conditions in the weak field, the maximum amplitudes h_1, h_2 and h_0 of gravitational waves must be equal to zero, which means that there are no gravity waves.The gravitational wave theory of general relativity can not be correct.

In addition, what the current gravitational wave detection discusses was the extremely strong field condition of black hole collision, in which h_{uv} was not a small quantity, so it was impossible to get the linear wave equation of gravitational wave. However, linear wave equation was still used to describe the gravitational waves generated by black hole collisions. The gravitational wave theory of general relativity was contradictory.

At the same time, it is proved that the gravitational wave delayed radiation formula of general relativity is also untenable. The derivation process of this formula has some problems of chaotic calculation and wrong coordinate transformation, leading to the invalidity of this formula.

This paper also discusses the like-electromagnetic gravity theory based on the modified Newton's gravity theory and the gravitational wave radiation formula obtained by Chen Yongming. Using this formula to calculate the gravitational radiation of pulsar binary PSR1913+16, the result is only 1% different from Taylor and Hulse's observation.

Therefore, we can describe gravity wave and its radiation in flat space-time, the Einstein's gravity theory of curved space-time is unnecessary. Physicists should study and detect gravitational waves based on the modified theory of the Newtonian gravity.

The problems existing in the gravitational wave detection experiments can be seen in the paper “What Did LIGO Detect Being Gravitational Waves or Noises? ”[19].

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