The Proof that Gravity Field Equations of General Relativity Have No Linear Wave Solutions Under Weak Condition and Problems Existing in the Formula of Gravity Radiation

Abstract In general relativity, the metric of gravitational field is written as $g_{\mu\nu} = G_{\mu\nu} + h_{\mu\nu}$ and it is proved that as long as $h_{\mu\nu}$ is a small quantity of first order, by using four harmonic coordinate conditions, the Einstein's gravitational field equation in vacuum can be transformed into a linear wave equation $\partial^2 h_{\mu\nu} = 0$, thus proving the existence of gravitational waves. It is proved in this paper that there are mane serious problems in this proof. 1. The gravitational wave metric used in the theory and detection of gravitational wave is not the direct result by solving the gravitational field equation of general relativity, but a hypothesis that has not been proved in mathematics and physics. 2. This gravitational wave metric does not satisfy the gravitational field equation $R_{\mu\nu} = 0$ of general relativity in vacuum and therefore does not describe the gravitational wave of general relativity. 3. The four harmonic coordinate conditions used to derive the linear wave equation of gravitational wave in general relativity are not tenable, which is the main reason why the gravitational wave metric does not satisfy the motion equation of general relativity. 4. Four harmonious coordinate conditions can be satisfied by transforming them to other coordinate systems. But in this case, the metric of gravitational waves also becomes constants, meaning that the gravitational field disappears, let alone the gravitational waves. 5. The present gravitational wave detection only considers the extremely strong fields of black hole collisions in which $h_{\mu\nu}$ is not a small quantity. The gravitational wave theory of general relativity contradicts itself. 6. The gravitational wave delayed radiation formula of general relativity is also untenable due to the chaotic calculations and wrong coordinate transformations, leading to the invalidity of the formula. 7. This paper also discusses the derivation of the equation of gravitational wave based on the revised Newton's theory of gravitation by introducing magneto-like gravitational component, and the existence of gravitational wave can be proved. 8. Finally, Chen Yongming's formula of electric-like gravitational wave radiation based on Newton's theory of gravity is introduced. The theory is used to calculate the gravitational wave radiation of pulsar binary PSR1913+16, and the result is that the gravitational wave reduces the distance of binary by 3.12 mm per period. Taylor and Hulls observed a decrease of 3.0951 mm per cycle, a difference of less than 1% comparing with the calculation by the Chen Yongming's formula. So the conclusion of this paper is that general relativity does not prove the existence of gravitational waves and the gravitational wave metric used in the current theoretical and detection of gravitational wave metric is wrong. We can describe gravitational radiation in terms of the revised Newtonian gravity theory in flat space-time, the Einstein's gravity theory of curved space-time is unnecessary.

Keywords General relativity, Linear wave equations, Gravitational wave radiation, Harmonic coordinate conditions, Magnetic dipole radiation, Electric quadrupole radiation, Pulsed binary PSR1913+16, Chen Yongming's gravitational radiation formula

1. Introduction

Since LIGO announced that it had detected gravitational wave signals from the collision of two black holes in February 2016[1], the theoretical and experimental researches on gravitational wave have formed an upsurge in the world. With more than 50 gravitational-wave events reported so far by LIGO and Virgo collaboration, the observations of gravitational wave bursts have become norm events. 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. However, as we all know, Einstein's gravitational field equation was a highly nonlinear equation, and generally there were no linear wave solutions. The existence of gravitational waves has been controversial throughout history.

Einstein thought that gravitational waves did not exist at his early age and even wrote a paper with Nathan Rosen and substituted it to Physical Review. The reviewer wrote a 10-page response, pointed out the errors and rejected the paper [2]. In fact, it was not until 1936 that Einstein changed his mind and published a paper accepting the existence of gravitational waves.

So how did general relativity prove the existence of gravitational waves? This paper discusses the problem in detail and comes to the opposite conclusion. It is concluded that Einstein's equations of gravitational field have no linear wave solution under the weak condition and can not predict the existence of gravitational waves.

This paper first introduces the deriving process of gravitational waves from general relativity. Write the metric tensor of gravitational field as [3]

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

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 Einstein's equations of gravitational field in vacuum can be transformed into the following linear wave equation [3] under the condition of weak field.

$$\partial^2 h_{\mu\nu} = \left(\frac{1}{c^2} \frac{\partial^2}{\partial t^2} - \nabla^2 \right) h_{\mu\nu} = 0 \qquad (2)$$

Thus the existence of gravitational waves was predicted.

At present, general relativity uses following metric to describe gravity wave

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

Where【3】:

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

To take $\omega / c = k$, Eq,(4) satisfies wave equation (2).

It should be noted that general relativity does not obtain the metric of Eq.(4) by solving Einstein's equations of gravitational field, but directly assumes that the metric of gravitational waves should be Eqs.(3) and (4). By the detailed calculation, this paper indicates following three points

1. Whether or not the weak field approximation is considered, the metric tensor of Eq.(4) does not satisfy the Einstein's gravitational field equation $R_{\mu\nu} = 0$ in vacuum and is therefore not the solution of

motion equation of general relativity. In other words, although Eq.(4) can satisfy $\partial^2 h_{\mu\nu} = 0$, it does not describe gravitational waves in curved space-time.

2. The metric tensor of Eq.(4) can not satisfy the harmonic coordinate condition, or they can not make the harmonic coordinate condition equal to zero, results in that the metric of gravitational wave does not satisfy the gravitational field equation.

3. By transforming the harmonic coordinate conditions to another frame of reference, they can be equal to zero. In the new coordinate system. However, the metric tensors of Eq.(4) becomes constants. That means that the gravitational field disappears, not to mention gravitational waves.

In addition, the generation of gravitational waves is thought to be a physical phenomenon of extreme conditions, requiring extremely strong gravitational interactions. In particular, it is impossible to obtain the linear wave equation of Eq.(2) with $\alpha / r \sim 1$ for the gravitational waves generated by the 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. The wave equation (2) can not be used in the process of black hole collisions.

In fact, in electromagnetic theory, wave equations and electromagnetic radiation exist regardless of the strength of electromagnetic field. The calculation of General relativity is inconsistent with natural laws. The theory and detection of gravitational wave are inconsistent on this issue.

It is also proved that the gravitational wave delayed radiation formula of general relativity is also invalid. This formula uses 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 is proportional to $\dddot{\rho}\, x_i x_k$ which is independent of the derivative of coordinates with respect to time. However, in the specific calculation, it is transformed to the follow coordinate, which makes the radiation formula 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 by experiments, they can only be the Newton's gravitational waves, not the gravitational waves of the Einstein's curved space-time.

Finally, the Chen Yongming's formula of electro-like gravitational wave radiation is introduced. The formula is used to calculate the gravitational wave radiation of PSR1913+16. The result is that gravitational waves reduce the distance between the binary star by 3.12 millimeters per cycle. Taylor and Hulls observed a decrease of 3.0951 mm per cycle, a difference of less than 1% comparing with the calculation of Chen Yongming's formula. So we can describe gravitational radiation in terms of gravity theory of flat space-time, the Einstein's gravity theory of curved of space-time is unnecessary.

Therefore, the conclusion of this paper is that the Einstein's equations of gravitational field can not be transformed into linear wave equations under both weak or strong field conditions, and general relativity can not predict the existence of gravitational waves.

Therefore, the conclusion of this paper is that general relativity does not predict the existence of gravitational waves, and the current metric used to describe gravitational waves in theory and experiment is wrong. We can describe gravitational radiation with the revised Newtonian theory of gravity by introducing magnetic-like gravity in flat space-time, the Einstein's theory of gravity of curved spacetime is unnecessary.

2 Revised Newtonian theory of gravity and radiation formulas

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, and the electrostatic force and the gravitation between them are:

$$\vec{F}_e = \frac{q_1 q_2 \vec{r}}{4\pi\varepsilon_0 r^3} \qquad \vec{F}_{eg} = \frac{G m_1 m_2 \vec{r}}{r^3} \tag{5}$$

As long as let $1/4\pi\varepsilon_0 \to G$, $q_1 \to m_1$ 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 since early physics studied objects moving much less than the speed of light, the magnetic-like component of gravity was hard to be founded. Many of the 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. In fact, many people in history had proposed the concept of magnetic-like component of gravity [5]. Assuming that the gravitational magnetic-like component can also be written in the form of magnetic component in electromagnetism with

$$\vec{F}_{mg} = \frac{\mu_g}{4\pi} \frac{\vec{J}_{g1} \times (\vec{J}_{g2} \times \vec{r})}{r^3} \tag{6}$$

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

$$\vec{B}_{gi} = \frac{\mu_g}{4\pi} \frac{\vec{J}_{gi} \times \vec{r}}{r^3} \tag{7}$$

Similarly, the propagation speed of gravity can be obtained

$$c_g = \frac{1}{\sqrt{\varepsilon_g \mu_g}} \tag{8}$$

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 [6]. According to the above definition, we have

$$\varepsilon_g = -\frac{1}{4\pi G} \qquad \mu_g = -\frac{4\pi G}{c_g^2} \tag{9}$$

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 form

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

$$\nabla \times \vec{E}_g = -\frac{\partial \vec{B}_g}{\partial t} \qquad \nabla \times \vec{B}_g = \mu_g \vec{J}_g + \mu_g \varepsilon_g \frac{\partial \vec{E}_g}{\partial t} \qquad (10)$$

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

$$\vec{F}_g = m_g(\vec{E}_g + \vec{V} \times \vec{B}_g) \qquad (11)$$

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

$$\vec{E}_g = -\nabla \varphi_g - \frac{\partial \vec{A}_g}{\partial t} \qquad \vec{B}_g = \nabla \times \vec{A}_g \qquad (12)$$

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

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

$$\left(\frac{1}{c^2}\frac{\partial^2}{\partial t^2} - \nabla^2\right)\varphi_g(\vec{x},t) = \frac{\rho_g(\vec{x},t)}{\varepsilon_0} \qquad (13)$$

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

$$\vec{A}_g(\vec{r}) = \frac{\mu_g e^{ikR}}{4\pi R}\int \vec{J}_g(\vec{r}\,')d^3\vec{r}\,' \qquad (14)$$

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

$$\vec{A}_g(\vec{r}) = \frac{-k\mu_g e^{ikR}}{4\pi R}\int \vec{J}_g(\vec{r}\,')(\vec{n}\cdot\vec{r}\,')d^3\vec{r}\,' \qquad (15)$$

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

$$\vec{E} = -\nabla \varphi - \frac{1}{c}\frac{\partial \vec{A}}{\partial t} \qquad \vec{B} = \nabla \times \vec{A} \qquad (16)$$

By introducing the gauge transformation【6】:

$$\vec{A} \to \vec{A} + \nabla \phi \qquad \varphi \to \varphi - \frac{1}{c}\frac{\partial}{\partial t}\phi \qquad (17)$$

and substituting Eq.(17) in Eq.(16), $\vec{E}$ and $\vec{B}$ are proved unchanged. Therefore, electromagnetic potential has a certain arbitrariness, and the following Lorentz norm conditions can be introduced to simplify the motion equations of electromagnetic fields.

$$\frac{1}{c}\frac{\partial}{\partial t}\varphi + \nabla \cdot \vec{A} = 0 \qquad (18)$$

3 The proof of general relativity to exist gravitational wave

3.1 The coordinate condition in general relativity

In the derivation of linear wave equation of gravitational waves, besides the weak field condition, the coordinate condition are needed to eliminate some terms that destroy the linear equation. If the coordinate conditions are not used, the linear wave equation can not be obtained. Before discussing gravitational waves in 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

$$R_{\mu\nu} - \frac{1}{2} g_{\mu\nu} R = -kT_{\mu\nu} \qquad (19)$$

Multiply Eq.(19) by $g^{\mu\nu}$ and contract the index, let $R^{\mu}_{\mu} = R$, $T^{\mu}_{\mu} = T$ and considering $g^{\mu\nu} g_{\mu\nu} = 4$, we get $R = kT$. By substituting it in Eq.(19), the equation of gravitational field can be written as:

$$R_{\mu\nu} = -k\left(T_{\mu\nu} - \frac{1}{2} g_{\mu\nu} T\right) \qquad (20)$$

Where is $R_{\mu\nu}$ the Ricci tensor, $T_{\mu\nu}$ is the energy momentum tensor, constant $\kappa = 8\pi G / c^4$. $R_{\mu\nu}$ is symmetric tensor with 10 components in the four dimensional space-time. The metric tensor $g_{\mu\nu}$ has 10 components. In principle, as long as $T_{\mu\nu}$ is known, we can determine the space-time metric $ds^2 = g_{\mu\nu} dx^{\mu} dx^{\nu}$ of gravitational field by solving Eq.(19) or (20).

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

$$G^{\mu}_{\nu,\mu} = \left(R^{\mu}_{\nu} - \frac{1}{2}\delta^{\nu}_{\mu} R\right)_{,\mu} = 0 \qquad (21)$$

So there are only 6 independent Ricci tensors, not enough to determine 10 metric tensors by the Einstein's equations of the gravitational field. In order to be able to uniquely determine the metric tensor $g_{\mu\nu}$, four constraints are need. There are several ways to do this.

1. Directly specify the values of four metric tensors. For example, taking $g_{10} = g_{20} = g_{30} = g_{40} = 0$, remaining 6 $g_{\mu\nu}$ can be obtained by solving the Einstein's equations of gravitational field [7]. 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 $g_{\mu\nu} = 0$ when $\mu \neq \nu$, that is the precise solution of 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 $g_{\mu\nu}$ [7] :

$$\frac{1}{\sqrt{-g}}\frac{\partial}{\partial x^{\nu}}(\sqrt{-g}\, g^{\mu\nu}) = 0 \qquad (22)$$

It is important to note that in this condition, we must assume that all 10 $g_{\mu\nu}$ 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.

3.Another useful coordinate condition is [7]

$$g^{\mu\nu} g_{\mu\nu,\rho} = 0 \tag{23}$$

4. It should be noted that the coordinate condition is not coordinate transformation, but used to delete some quantities in this coordinate system, which does not involve transformation to other coordinate systems. In fact, the Lorentz condition of electromagnetic theory 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 to say 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 [8].

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 at the same time.

5. It is physically permissible for electromagnetic fields to eliminate the arbitrariness of electromagnetic potential by means of Lorentz condition (18). The reason is that electromagnetic potential is not a physical quantity that can be measured directly. However, the metric of general relativity is different. It describes the length of space and the interval of time. It is a physical quantity that can be measured directly. Transforming to another coordinate system means that the measure of time and space has changed, which can be measured directly. Gravity is thought as the curvature of space-time in general relativity, so a change in the metric tensor means a change in gravitational field, it means that the gravitational field is no longer original one.

3.2 The derivation of gravitational wave equations in 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 the result 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 [3]

$$h_\mu^\nu = g^{\nu\lambda} h_{\mu\lambda} \approx (G^{\nu\lambda} - h^{\nu\lambda}) h_{\mu\lambda} \approx G^{\nu\lambda} h_{\mu\lambda} \tag{24}$$

$$h = g^{\mu\nu} h_{\mu\nu} \approx (G^{\mu\nu} - h^{\mu\nu}) h_{\mu\nu} \approx G^{\mu\nu} h_{\mu\nu} \tag{25}$$

The higher order terms $h^{\nu\lambda} h_{\mu\lambda}$ and $h^{\mu\nu} h_{\mu\nu}$ are ignored in Eqs.(24) and (25). Also, by ignoring the higher order terms, the Christopher symbols are written as

$$\Gamma_{\mu\nu}^{\rho} = \frac{1}{2} G^{\sigma\rho} (h_{\rho\nu,\mu} + h_{\rho\nu,\mu} - h_{\mu\nu,\rho}) \tag{26}$$

$$\Gamma^{\sigma}_{\mu\sigma} = \frac{1}{2} G^{\sigma\rho} (h_{\rho\mu,\sigma} + h_{\sigma\rho,\mu} - h_{\mu\sigma,\rho}) \tag{27}$$

The Ricci tensors are simplified as

$$R_{\mu\nu} = \Gamma^{\sigma}_{\mu\sigma,\nu} - \Gamma^{\sigma}_{\mu\nu,\sigma} + \Gamma^{\sigma}_{\rho\nu}\Gamma^{\rho}_{\mu\sigma} - \Gamma^{\sigma}_{\rho\sigma}\Gamma^{\rho}_{\mu\nu} \approx \Gamma^{\sigma}_{\mu\sigma,\nu} - \Gamma^{\sigma}_{\mu\nu,\rho} \tag{28}$$

Let

$$\chi^{\sigma}_{\nu} = h^{\sigma}_{\nu} - \frac{1}{2}\delta^{\sigma}_{\nu} h \tag{29}$$

$$\chi_{\mu\nu} = h_{\mu\nu} - \frac{1}{2} G_{\mu\nu} h \tag{30}$$

By means of formulas above, the Ricci tensor can finally be simplified as

$$R_{\mu\nu} = \frac{1}{2}\partial^2 h_{\mu\nu} - \frac{1}{2}\chi^{\sigma}_{\nu,\mu\sigma} - \frac{1}{2}\chi^{\sigma}_{\mu,\nu\sigma} \tag{31}$$

Then to introduce four harmonic coordinate conditions

$$\partial^2 x^{\mu} = \frac{1}{\sqrt{-g}} \frac{\partial}{\partial x^{\nu}} (\sqrt{-g}\, g^{\mu\nu}) = 0$$

$$= (G^{\mu\nu} - h^{\mu\nu})_{,\nu} + \frac{1}{\sqrt{-g}} (G^{\mu\nu} - h^{\mu\nu})(\sqrt{-g})_{,\nu} \tag{32}$$

By the approximate calculation of Eq. (32), we have

$$\sqrt{-g} = \sqrt{-(G - h^{\sigma}_{\sigma})} \approx 1 + \frac{1}{2} h^{\sigma}_{\sigma} \tag{33}$$

Substituting Eq.(33) in Eq.(29) and ignoring higher order terms, we get

$$\partial^2 x^{\mu} = -h^{\mu\nu}_{,\nu} + \frac{1}{2} G^{\mu\nu} h_{,\nu} = 0 \tag{34}$$

By considering Eq.(34), it can be obtained from Eq.(29)

$$\frac{\partial \chi^{\nu}_{\mu}}{\partial x^{\nu}} = h^{\nu}_{\mu,\nu} - \frac{1}{2}\delta^{\nu}_{\mu} h_{,\nu} = h^{\nu}_{\mu,\nu} - \frac{1}{2} h_{,\mu} = 0 \tag{35}$$

Eq.(35) is considered to be equivalent to the Lorentz norm condition in classical electromagnetic theory. Substituting this result into Eq.(30), it can be obtained

$$R_{\mu\nu} = \frac{1}{2}\partial^2 h_{\mu\nu} \qquad R = R^{\mu}_{\mu} = \frac{1}{2}\partial^2 h \tag{36}$$

Substituting Eq.(36) in Eq. (19), the result is

$$\frac{1}{2}\partial^2 h_{\mu\nu} - \frac{1}{4} G_{\mu\nu}\partial^2 h = -kT_{\mu\nu} \tag{37}$$

By considering Eq.(30) , Eq.(37) can be written as

$$\partial^2 \chi_{\mu\nu} - 2\Lambda(G_{\mu\nu} + h_{\mu\nu}) = -2kT_{\mu\nu} \tag{38}$$

According to (19), in a vacuum, energy momentum tensor $T_{\mu\nu} = 0$ as well as $T = 0$. The equation of gravitational field is $R_{\mu\nu} = 0$. According to Eq.(36), the wave equation (2) is obtained. Therefore, $h_{\mu\nu}$ satisfies the linear wave equation under the condition of weak field. The existence of gravitational waves is predicted by general relativity.

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

4.1 Under the condition of weak condition, Gravitational wave metric of general relativity does not satisfy Einstein's equations of gravitational field

At present, the gravitational wave detection uses Eq.(2) to describe the gravitational wave generated by the collision of two black holes, and the solution of the equation is written as [3]

$$h_{\mu\nu} = A_{\mu\nu} e^{ik_\sigma x^\sigma} \tag{39}$$

According to the theory of gravity wave in general relativity, only six of ten components of $h_{\mu\nu}$ were independent. Therefore, Eq.(39) can be written as [4] :

$$h_{11} = h' \cos(\omega t - kz) \qquad h_{22} = h' \cos(\omega t - kz) \tag{40}$$

Therefore, we have $h_{11} = h_{22}$. Other $h_{\mu\nu}$ are zero. Eq.(40) indicated that gravitational wave was a transverse wave, propagating along z-axis and causing space contraction or extension in x-axis and y-axis directions. The metric tensors $g_{00} = 1$, $g_{11} = -(1 + h_{11})$, $g_{22} = -(1 + h_{22})$ and $g_{33} = -1$, the others were zero.

$$g_{\mu\nu} = [1,\ -(1 + h_{11}),\ -(1 + h_{22}),\ -1] \tag{41}$$

It is proved below that the metrics (40) and (41) do not satisfy the Einstein's equation $R_{\mu\nu} = 0$ of gravitational field. So even if the existing experiments really detect gravitational waves, they are not that of Einstein's theory.

According to the Riemannian geometry, the Christopherian symbols are defined as【3】:

$$\Gamma^\lambda_{\mu\nu} = \frac{1}{2} g^{\lambda\alpha} \left(\frac{\partial g_{\nu\alpha}}{\partial x^\mu} + \frac{\partial g_{\alpha\mu}}{\partial x^\nu} - \frac{\partial g_{\mu\nu}}{\partial x^\alpha} \right) \tag{42}$$

Where

$$g^{00} = 1 \qquad g^{11} = -1/(1 + h_{11}) \qquad g^{22} = -1/(1 + h_{22}) \qquad g^{33} = -1 \tag{43}$$

The others are zero. Based on Eq.(40) and (43), there are 12 Christopherian symbols which are not equal to zero.

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

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

$$\Gamma^1_{13} = \Gamma^1_{31} = \frac{h_{11,z}}{2(1 + h_{11})} \qquad \Gamma^2_{23} = \Gamma^2_{32} = \frac{h_{22,z}}{2(1 + h_{22})} \tag{44}$$

Here

$$h_{11,t} = \frac{\partial h_{11}}{c\partial t} = -\frac{\omega}{c} h' \sin(\omega t - kz) \qquad h_{22,t} = \frac{\partial h_{22}}{c\partial t} = -\frac{\omega}{c} h' \sin(\omega t - kz)$$

$$h_{11,z}=\frac{\partial h_{11}}{\partial z}=kh'\sin(\omega t-kz) \qquad h_{22,z}=\frac{\partial h_{22}}{\partial z}=kh'\sin(\omega t-kz) \tag{45}$$

By considering Eqs.(29), (44) and (45), as well as $h_{11}=h_{22}$, the components of Ricci tensor are

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

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

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

$$+\frac{(h_{11,t})^2}{4(1+h_{11})^2}+\frac{(h_{22,t})^2}{4(1+h_{22})^2}=\frac{2(1+h_{11})h_{11,tt}-(h_{11,t})^2}{2(1+h_{11})^2}$$

$$=-\frac{\omega^2h'^2[1+\cos^2(\omega t-kz)]+2\omega^2h'\cos(\omega t-kz)}{2c^2[1+h'\cos(\omega t-kz)]^2}\neq 0 \tag{46}$$

Similarly, it is calculated with

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

$$=-\Gamma^{0}_{11,0}-\Gamma^{3}_{11,3}+\Gamma^{0}_{11}\Gamma^{1}_{10}+\Gamma^{3}_{11}\Gamma^{1}_{13}-\Gamma^{0}_{11}\Gamma^{2}_{02}-\Gamma^{3}_{11}\Gamma^{2}_{32}$$

$$=-\frac{h_{11,tt}}{2}-\frac{h_{11,zz}}{2}+\frac{(h_{11,t})^2}{4(1+h_{11})}+\frac{(h_{11,z})^2}{4(1+h_{11})}-\frac{h_{11,t}h_{22,t}}{4(1+h_{11})}-\frac{h_{11,z}h_{22,z}}{4(1+h_{22})}$$

$$-\frac{h_{11,tt}}{2}-\frac{h_{11,zz}}{2}=\frac{(\omega^2/c^2+k^2)h'\cos(\omega t-kz)}{2}\neq 0 \tag{47}$$

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

$$=-\Gamma^{0}_{22,0}-\Gamma^{3}_{22,3}+\Gamma^{2}_{02}\Gamma^{0}_{22}+\Gamma^{3}_{22}\Gamma^{2}_{23}-\Gamma^{1}_{31}\Gamma^{3}_{22}-\Gamma^{1}_{01}\Gamma^{0}_{22}$$

$$=-\frac{h_{22,tt}}{2}-\frac{h_{22,zz}}{2}+\frac{(h_{22,t})^2}{4(1+h_{22})}+\frac{(h_{22,z})^2}{4(1+h_{22})}-\frac{h_{11,z}h_{22,z}}{4(1+h_{11})}-\frac{h_{11,t}h_{22,t}}{4(1+h_{22})}$$

$$-\frac{h_{22,tt}}{2}-\frac{h_{22,zz}}{2}=\frac{(\omega^2/c^2+k^2)h'\cos(\omega t-kz)}{2}\neq 0 \tag{48}$$

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

$$=\Gamma^{1}_{31,3}+\Gamma^{2}_{32,3}+\Gamma^{1}_{13}\Gamma^{1}_{31}+\Gamma^{2}_{23}\Gamma^{2}_{32}$$

$$=\frac{(1+h_{11})h_{11,zz}-(h_{11,z})^2}{2(1+h_{11})^2}+\frac{(1+h_{22})h_{22,zz}-(h_{22,z})^2}{2(1+h_{22})^2}+\frac{(h_{11,z})^2}{4(1+h_{11})}+\frac{(h_{22,z})^2}{4(1+h_{22})}$$

$$= \frac{2(1+h_{11})h_{11,zz} - (h_{11,z})^2}{4(1+h_{11})^2} + \frac{2(1+h_{22})h_{22,zz} - (h_{11,z})^2}{4(1+h_{11})^2}$$

$$= -\frac{k^2 h'^2 [1+\cos^2(\omega t - kz)] + 2k^2 h' \cos(\omega t - kz)}{2[1+h'\cos(\omega t - kz)]^2} \neq 0 \qquad (49)$$

Under the weak field condition, the terms including h'^2 are ignored, R_{11} and R_{22} are unchanged, R_{00} and R_{33} are still not equal to zero with

$$R_{00} \approx -\frac{\omega^2 h' \cos(\omega t - kz)}{c^2} \neq 0 \qquad R_{33} \approx -k^2 h' \cos(\omega t - kz) \neq 0 \qquad (50)$$

The overall result is that we have $R_{\mu\nu} \neq 0$ in the general case. By considering $\omega / c = k$, we have $R_{00} = R_{33}$ and $R_{11} = R_{22}$. In the weak field approximation, the results are $R_{00} = R_{33} = -R_{11} = -R_{22}$. The metric tensor of Eqs.(40) and (41) do not satisfy the Einstein's equation of gravitational field and does not describe gravitational waves of general relativity.

4.2 The metric of gravitational waves does not satisfy the harmonic coordinate condition

Considering the importance of the harmonic coordinate conditions in deriving the gravitational wave equation, it is necessary to calculate whether the metric of Eq.(40) meets the coordinate conditions.

$$h = h^{\mu}_{\mu} = G^{\mu\sigma} h_{\sigma\nu} = G^{11} h_{11} + G^{22} h_{22} = -2h' \cos(\omega t - kz)$$

$$h^0_0 = 0 \qquad h^1_1 = h^2_2 = -h' \cos(\omega t - kz) \qquad h^3_3 = 0 \qquad (51)$$

According to Eq.(35), we have $h^{\nu}_{0,\nu} = h_{,0}/2$, $h^{\nu}_{1,\nu} = h_{,1}/2$, $h^{\nu}_{2,\nu} = h_{,2}/2$ and $h^{\nu}_{3,\nu} = h_{,2}/2$. According to Eq.(51), we have

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

$$h^{\nu}_{1,\nu} = h^0_{1,0} + h^1_{1,1} + h^2_{1,2} + h^3_{1,3} = h^1_{1,1} = \frac{\partial}{\partial x} h^1_1 = 0$$

$$h^{\nu}_{2,\nu} = h^0_{2,0} + h^1_{2,1} + h^2_{2,2} + h^3_{2,3} = h^2_{2,2} = \frac{\partial}{\partial y} h^2_2 = 0$$

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

$$h_{,0} = \frac{\partial h}{c\partial t} = \frac{2\omega h'}{c} \sin(\omega t - kz) \neq 0 \qquad h_{,1} = \frac{\partial h}{\partial x} = 0$$

$$h_{,2} = \frac{\partial h}{\partial y} = 0 \qquad h_{,3} = \frac{\partial h}{\partial z} = -2kh' \sin(\omega t - kz) \neq 0 \qquad (52)$$

Therefore, we have $h^{\nu}_{0,\nu} \neq h_{,0}/2$ and $h^{\nu}_{3,\nu} \neq h_{,3}/2$, the metric tensor of Eq.(40) can not satisfy the coordinate condition (35), resulting that the equation of gravitational field can not be the form of linear wave as show in Eq.(2). The reason will be analyzed below.

4.3 The problems caused by transforming harmonic coordinate conditions to other

coordinate systems

According to Eq.(52), if $h_{,0}$ and $h_{,3}$ which are not equal to zero are transformed to another coordinate system $(\vec{x}', t')$ and make them equal to zero, there is $\sin(\omega t' - kz') = 0$ or $\omega t' - kz' = \pi / 2$. The metric tensors of gravitational wave become $h'_{11} = h'_{22} = h' \cos(\omega t' - kx') = h' \cos \pi / 2 = h'$ = constant, in the new coordinate system. It means that there is no gravitational field, not mention gravitational waves. Therefore, it is impossible to transform the gravitational field equation of general relativity into wave equation through coordinate transformation.

More generally, Eq.(35) is not equal zero in the original frame of reference, or $h^{\nu}_{\mu,\nu} \neq h_{,\mu} / 2$. It is impossible to make them equal by transforming them into any frame of reference . For example, in one frame of reference, we have $1 \neq 2$. It is impossible for it becoming $1 = 2$ by transform it into another frame of reference, otherwise the human mathematical system would collapse. Moreover, when general relativity derives the wave equation of gravitational field, the coordinate system used is already arbitrary, and there is no need to transform to other reference system.

4.4 The metric of gravitational waves can not be simplified if using coordinate condition

From the discussion in Section 3.1, when some metric tensors are predetermined, the coordinate conditions are not needed 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. General relativity assumes that the metric of gravitational waves have the form of Eq.(3). That means that except $g_{11} \neq 1$ and $g_{22} \neq 1$, the other $g_{\mu\nu}$ are equal to 1. In this case, there is no need to use the coordinate condition. Otherwise it means artificially removing certain terms from the equation of motion, which may lead to inconsistencies and unacceptable.

We take the schwarzschild metric, a spherically symmetric solution of general relativity in vacuum, as an example to illustrate this problem. The Schwarzschild metric is

$$ds^2 = c^2\left(1 - \frac{\alpha}{r}\right)dt^2 - \frac{1}{1 - \alpha / r} dr^2 - r^2(d\theta^2 + \sin^2\theta d\varphi^2) \tag{53}$$

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

$$G_{\mu\nu} = \left(1, \ -1, \ -r^2, \ -r^2 \sin^2\theta \right) \tag{54}$$

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

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

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

When solving the equations of gravitational field, general relativity assume $h_{00} \neq 0$, $h_{11} \neq 0$, other $h_{\mu\nu} = 0$ in advance. This means that the metric tensor has been restricted, so that there is no need to use coordinate conditions. If coordinate conditions are still used, contradictory results will be caused. According to Eq.(54), we have:

$$h = h^{\sigma}_{\sigma} = h^0_0 + h^1_1 + h^2_2 + h^3_3 \tag{57}$$

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

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

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

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

Therefore, we have

$$h = -1 - \frac{\alpha}{r} + \frac{1}{1 - \alpha / r} \qquad (61)$$

$$h_{,1} = \frac{\alpha}{r^2}\left[1 - \frac{1}{(1 - \alpha / r)^2}\right] \qquad (62)$$

$$h_{1,\nu}^{\nu} = h_{1,0}^0 + h_{1,1}^1 + h_{1,2}^2 + h_{1,3}^3 = h_{1,1}^1 = -\frac{\alpha}{r^2 (1 - \alpha / r)^2} \qquad (63)$$

According to Eqs.(35), (62) and (53), we get

$$h_{1,\nu}^{\nu} - \frac{1}{2} h_{,1} = -\frac{\alpha}{r^2 (1 - \alpha / r)^2} - \frac{\alpha}{2r^2}\left[1 - \frac{1}{(1 - \alpha / r)^2}\right] = 0 \qquad (64)$$

From Eq.(64), the result is

$$\left(1 - \frac{\alpha}{r}\right)^2 = -1 \qquad \text{or} \qquad \frac{\alpha}{r} = 1 - i \qquad (65)$$

α / r becomes a complex number! Substituting it it Eq.(39), not only does the Schwarzschild metric change its original form, turning curved space-time into flat space-time, but also became an complex number, completely meaningless!

4.5 The equations of gravitational field after harmonic coordinate conditions are considered

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

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

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

$$+ (1 + h_{03}) dtdz - (1 + h_{12}) dxdy - (1 + h_{13}) dxdz - (1 + h_{23}) dydz \qquad (66)$$

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

$$\frac{1}{c^2}\frac{\partial^2}{\partial t^2} h_{\mu\nu} - \frac{\partial^2}{\partial x^2} h_{\mu\nu} - \frac{\partial^2}{\partial y^2} h_{\mu\nu} = 0 \qquad (67)$$

There are 6 independent equations, adding the restrictions of 4 harmonic coordinate conditions as shown in Eq.(24) with

$$h^{\mu 0}_{,0} + h^{\mu 1}_{,1} + h^{\mu 2}_{,2} + h^{\mu 3}_{,3} = \frac{1}{2}(G^{\mu 0} h_{,0} + G^{\mu 1} h_{,1} + G^{\mu 2} h_{,2} + G^{\mu 3} h_{,3}) \tag{68}$$

Since Eq.(68) 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.(67). It is difficult to guarantee that equations in Eq.(67) have the simple form as Eq.(53).

4.6 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, higher-order terms need to 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.(20) ~ (24) 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 radiation exists in both strong and weak fields. According to general relativity, gravitational waves are produced under weak field conditions, and they will not be produced under strong field conditions. This conclusion is too strange to be unaccepted.

The current gravitational wave detection of general relativity do not consider these problems at all. The wave equation obtained in the weak field conditions are 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 three solar masses were transformed into gravitational waves radiating into space. At the final moment of two black hole's merger, 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, the term of LIGO used the sinusoidal oscillation waveform of the spatial metric under weak field condition to describe the gravitational waves generated at the final moment (about 0.3 seconds) of two black hole's collision as shown below[1].

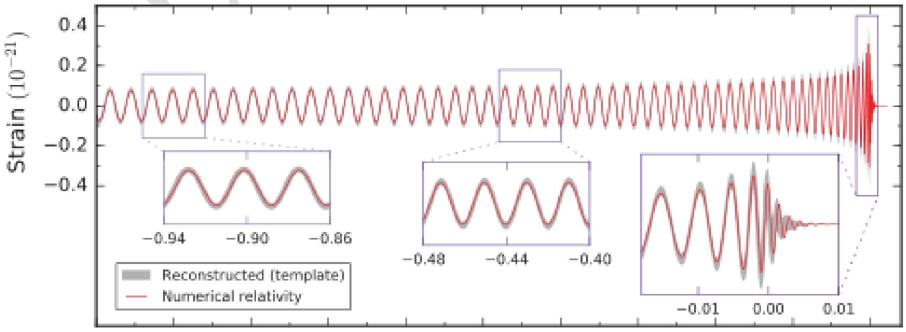

Fig.1 The original graph of gravitational waves from the GW151226 event

4.7 Gravitational waves of revised Newtonian theory

In fact, with the introduction of magnetic-like gravity components, the Newton's theory of gravity, also produces gravitational waves. If general relativity is correct, it should be a modification of the Newton's theory of gravity, and it should also be a modification of the Newton's theory of gravitational waves. Whereas the lowest order of the Newtonian gravity is dipole radiation, the lowest order of general relativity is quadrupole moment radiation. Quadrupole moment radiation is much smaller than dipole radiation. So in the problem of gravitational waves, general relativity is not a correction of the Newtonian gravity. It can not cover the Newtonian gravity and can not be right.

To sum up, the Einstein's gravitational field equation is a nonlinear equation and can not have a linear wave solution. Or, general relativity is impossible to predict the existence of gravitational waves. If gravitational waves are found experimentally, they can only be one in the sense of the Newton's theory of gravity, not one in the sense of the Einstein's theory of curved spacetime.

5 The problems in the gravitational wave delayed radiation formula of general relativity

5.1 Delayed radiation formula of gravitational wave of general relativity

It is proved below that there are serious problems in the gravitational wave retailed radiation formula of general relativity. It is a patchwork formula that contains a large number of errors. Hilbert proved that when the harmonic coordinate condition of Eq.(30) was used, the solution of Eq.(35) was [3]

$$\chi_\mu^\nu = \frac{\kappa}{2\pi}\int \frac{T_\mu^\nu(r',t-r/c)}{r}dV \qquad (69)$$

Eq.(55) described the delayed solution of gravitational wave radiation in weak field condition, which was the basis of gravitational wave radiation theory of general relativity. However, it is known from the previous discussion that the coordinate condition will cause serious problems, so Eq.(30) is invalid, and Eq.(69) 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.(69) can be written as

$$\chi_\mu^\nu = \frac{\kappa}{2\pi R}\int T_\mu^{\nu *}dV \qquad (70)$$

The asterisk represents the delayed quantity. The theoretical calculation and observation condition of above formula is that the observer is in a stationary coordinate system, away from the source material. The source material moves in the origin near the original point of coordinate system. The energy momentum tensor of the system contains the velocity and acceleration of material, resulting in gravitational field described by Eq.(70).

According to the field equation (35) and the harmonic coordinate condition (30), it can be obtained with $T_{\mu,\nu}^\nu = 0$, or

$$T_{k,i}^i + T_{k,0}^0 = 0 \qquad\qquad T_{0,i}^i + T_{0,0}^0 = 0 \qquad (71)$$

Multiply the first equation of Eq.(71) by space coordinate x^j and integrate it with respect to whole space. Considering that the space-time coordinates in the equation of gravitational field (including the energy momentum tensor) are independent, that is, x^j and x^0 are unrelated to , or $\partial x^j/\partial x^0 = 0$, we can get [3] :

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

$$= \int T_k^{\ j} dV - \int \frac{\partial (T_k^i x^j)}{\partial x^i} dV \tag{72}$$

Applying the Gauss's theorem and the infinite boundary conditions, the second term on the right-hand side of Eq.(72) is zero. Decrease the upper index of above formula and take into account symmetry, it can be obtained

$$\int T_{kj} dV = -\frac{1}{2}\frac{\partial}{\partial x^0}\int (T_{0k} x_j + T_{0j} x_k) dV \tag{73}$$

Multiply Eq.(71) by $x^k x^j$, considering that space coordinates x^k, x^j have nothing to do with time coordinate x^0, a similar result to Eq.(72) can be obtained by using the same method

$$\frac{\partial}{\partial x^0}\int T_{00} x_k x_j dV = -\int (T_{0k} x_j + T_{0j} x_k) dV \tag{74}$$

From Eq.(73) and (74), it can be obtained

$$\int T_{kj} dV = \frac{1}{2}\frac{\partial}{(\partial x^0)^2}\int T_{00} x_k x_j dV \tag{75}$$

Substituting $T_{00} = \rho(x_k, x_0) c^2$ and $x_0 = ct$ in Eq.(75), the result is

$$\int T_{kj} dV = \frac{1}{2}\frac{\partial}{\partial t^2}\int \rho(x_k, t) x_k x_j dV = \frac{1}{2}\int \ddot{\rho}(x_k, t) x_k x_j dV \tag{76}$$

The physical meaning of Eq.(76) is that the integral of energy momentum tensor against space can be expressed by the second time derivative $\ddot{\rho}(x_k, t)$ of energy density against time. Since tensor T_{kj} has six independent components, involving velocity and acceleration of matter, it is difficult to understand its details in general physical processes. After expressed by Eq.(76), we only need to know the relationship between one component T_{00} and time, thus the difficulty of problem is decreased.

Based on it, the quadrupole moment is introduce with

$$Q_{kj} = \int \rho(x_k, x_0) x_k x_j dV \tag{77}$$

The tensor of quadrupole moment is defined as

$$D_{kj} = 3Q_{kj} - \delta_{kj} Q_{ii} \tag{78}$$

Eq.(70) is rewritten as

$$\chi_{\mu\nu} = \frac{2G}{4\pi\ r_0^*}\frac{\partial^2}{\partial t^2}\int \rho(x_k, t) x_k x_j dV = \frac{2G}{4\pi\ r_0^*}\int \ddot{\rho}(x_k, t) x_k x_j dV = \frac{2G\ddot{Q}_{kj}}{4\pi\ r_0^*} \tag{79}$$

The energy momentum tensor of gravitational field was expressed by the form of Landau-Lifshitz [7], and the radiation intensity of gravitational waves in the solid angle along the direction of $z-$axis is

$$dI = \frac{2G}{4\pi\ c^5}(\dddot{Q}_{11}^2 + \dddot{Q}_{12}^2) d\Omega = \frac{G}{36\pi\ c^5}\left[\left(\frac{\dddot{D}_{11} - \dddot{D}_{22}}{2}\right)^2 + \dddot{D}_{12}^2\right] d\Omega \tag{80}$$

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

$$-\frac{dE}{dt}=4\pi\frac{d\bar{I}}{d\Omega}=\frac{G\dddot{D}_{ij}^{2}}{45c^{5}}=\frac{G}{45c^{5}}\left(\dddot{Q}_{ij}^{2}-\frac{1}{3}\dddot{Q}_{kk}^{2}\right) \tag{81}$$

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

According to Eq.(76), the quadratic and cubic partial derivatives of quadrupole moments with respect to time are only for the energy density in Eq.(77), i.e.

$$\ddot{Q}_{kj}=\int\ddot{\rho}(x_k,t)x_k x_j dV \qquad \ddot{Q}_{kj}=\int\ddot{\rho}(x_k,t)x_k x_j dV \tag{82}$$

Therefore, the quadratic and cubic partial derivatives of quadrupole moment tensors with respect to time in Eqs.(80) and (81) are only for energy density, and the radiated power is independent of the derivative of space coordinates with respect to time. But general relativity does not works as that. Alternatively, the radiated power was made related to the derivative of spatial coordinates with respect to time, completely violates the original formula and results in serious inconsistencies.

For this purpose, general relativity introduces coordinate transformations [3]

$$x_1=x_1'\cos\omega t-x_2'\sin\omega t \qquad x_2=x_1'\sin\omega t+x_2'\cos\omega t \qquad x_3=x_3' \qquad t=t' \tag{83}$$

(x_k',t') in the formula are called the following coordinates. The above transformation is actually the Galilean transformation in Newtonian mechanics, in which the Jacobian determinant is equal to 1 and the volume element is a constant with $\rho=\rho_0$. Let the density of matter be a constant, invariant under transformation. The spindle coordinate system is adopted, and the moment of inertia is written as

$$I_{ij}=\int\rho_0 x_k' x_j' dV' \tag{84}$$

Assume that the rotational axis x_3' is of one principal axis of inertia ellipsoid sphere, and the other two principal axes are x_1' and x_2' and. Eq. (77) can be rewritten as [3] :

$$Q_{11}(t)=\int\rho_0 x_1 x_1 dV=\int\rho_0(x_1'\cos\omega t-x_2'\sin\omega t)^2 dV'$$
$$=\frac{1}{2}(I_{11}+I_{22})+\frac{1}{2}(I_{11}-I_{22})\cos 2\omega t \tag{85}$$

Similarly

$$Q_{22}(t)=\frac{1}{2}(I_{11}+I_{22})-\frac{1}{2}(I_{11}-I_{22})\cos 2\omega t \tag{86}$$

$$Q_{12}(t)=\frac{1}{2}(I_{11}-I_{22})\sin 2\omega t \tag{87}$$

$$Q_{13}(t)=Q_{23}(t)=0 \qquad Q_{33}(t)=I_{33}(t) \tag{88}$$

The calculation results are

$$\dddot{Q}_{11}^{2}=16(I_{11}-I_{22})^2\omega^6\sin^2 2\omega t \tag{89}$$

$$\dddot{Q}_{22}^{2}=16(I_{11}-I_{22})^2\omega^6\sin^2 2\omega t \tag{90}$$

$$\dddot{Q}_{12}^{2}=16(I_{11}-I_{22})^2\omega^6\cos^2 2\omega t \tag{91}$$

$$(\dddot{Q}_{kk})^2 = (\dddot{Q}_{11} + \dddot{Q}_{22} + \dddot{Q}_{33})^2 = 0 \tag{92}$$

$$(\dddot{Q}_{kj})^2 = (\dddot{Q}_{11}^2 + \dddot{Q}_{22}^2 + 2\dddot{Q}_{12}^2)^2 = 32\omega^6 (I_{11} - I_{22})^2 \tag{93}$$

Substituting them in Eq.(81), the last formula of radiation power is

$$-\frac{dE}{dt} = \frac{32G\omega^6}{5c^5}(I_{11} - I_{22})^2 = \frac{32G}{45c^5}\omega^6 I^2 e^2 \tag{94}$$

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

1. This is a process of stealing concepts to change Eq. (82) into Eqs. (89) ~ (94). In Eq.(82), the derivative of time is only for material (energy) density and not for space-time coordinates. But in Eqs.(89) ~ (94), 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 new frame of reference, the energy density becomes $\rho(x_k, t) \to \rho'(x'_k, t')$. According to Eqs.(83) ~ (85), we have

$$Q'_{11}(t') = \int \rho'(x'_k, t')(x'_1 \cos\omega\, t' - x'_2 \sin\omega\, t')^2 dV' \tag{95}$$

$$Q'_{22}(t') = \int \rho'(x'_k, t')(x'_1 \sin\omega\, t' + x'_2 \cos\omega\, t')^2 dV' \tag{96}$$

$$Q'_{12}(t') = Q'_{21}(t') = \int \rho'(x'_k, t')(x'_1 \cos\omega\, t' - x'_2 \sin\omega\, t')(x'_1 \sin\omega\, t' + x'_2 \cos\omega\, t')^2 dV' \tag{97}$$

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

$$\dddot{R}_{kj}(t') = \int \dddot{\rho}'(x'_k, t') x'_k x'_j dV' \tag{98}$$

For example, in the statics reference frame with

$$\rho(x_k, t) = \frac{a}{(x_1^2 + x_2^2)} + \frac{bx_1^2}{t^2} \qquad \dddot{\rho}(x, t) = \frac{-24bx_1^2}{t^5} \tag{99}$$

According to Eqs.(83) ~ (85), in the new coordinate system, $\dddot{\rho}(x, t)$ becomes

$$\dddot{\rho}'(x', t') = \frac{-24b(x'_1 \cos\omega\, t' - x'_2 \sin\omega\, t')^2}{t'^5} \tag{100}$$

So in the following coordinate system, the derivative of quadrupole moment tensor with respect to time also involves only the energy density, not the quadrupole moment coordinates with

$$\dddot{Q}_{11} = \dddot{R}_{11}\cos^2\omega\, t' + \dddot{R}_{22}\sin^2\omega\, t' - \frac{1}{2}(\dddot{R}_{12} + \dddot{R}_{21})\sin 2\omega\, t' \tag{101}$$

$$\dddot{Q}_{22} = \dddot{R}_{11}\sin^2\omega\, t' + \dddot{R}_{22}\cos^2\omega\, t' + \frac{1}{2}(\dddot{R}_{12} + \dddot{R}_{21})\sin 2\omega\, t'' \tag{102}$$

$$\dddot{Q}_{12} = \dddot{Q}_{12} = (\dddot{R}_{11} - \dddot{R}_{11})\sin\omega\, t' \cos\omega\, t' + \dddot{R}_{12}(\cos^2\omega\, t' - \sin^2\omega\, t') \tag{103}$$

$$(\dddot{Q}_{kk})^2 = (\dddot{Q}_{11} + \dddot{Q}_{22} + \dddot{Q}_{33})^2 = (\dddot{R}_{11} + \dddot{R}_{22})^2 = F_1(\dddot{R}_{11}, \dddot{R}_{22}) \tag{104}$$

$$(\dddot{Q}_{kj})^2 = (\dddot{Q}_{11}^2 + \dddot{Q}_{22}^2 + 2\dddot{Q}_{12}^2)^2 = F_2(\dddot{R}_{11}, \dddot{R}_{22,} \dddot{R}_{12}, \sin\omega t', \cos\omega t') \qquad (105)$$

Where F_1 and F_2 are very complex functions. Substituting them in Eq.(81), w e obtain

$$-\frac{dE}{dt} = \frac{G}{45c^5}\left(F_2 - \frac{1}{3}F_1\right) \qquad (106)$$

Eq.(106) is completely different from Eq.(94). So Eq.(94) is actually independent of general relativity and is not a result of the Einstein's theory of gravity. Even if it is true, it does not prove that the gravitational radiation theory of general relativity is correct.

3. As mentioned earlier, in a stationary reference frame, the motion of source matter is already taken into account when Eq.(107) is derived. Gravitational waves 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 necessary to transform to the following coordinate system. The reason why general relativity had transformed Eq. (107) to the following coordinate system was that according to the calculation method of general relativity, no correct formula can be obtained.

4. There are two explanations for Eqs.(96) ~ (98). One is that the observer does not move and the material system rotates. The other is that the material system does not move and the observer moves. The derivation of Eq.(94) actually takes into account the motion of material system, otherwise $\dddot{\rho} = 0$ and there would be no radiation of gravitational waves. Therefore, it is unnecessary for us to make the material system rotate. So Eqs.(96) ~ (98) only represent the rotation of observer, not the rotation of material system.

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

$$\rho(\vec{x}, t) = \frac{a}{x_1^2 + bx_2^2} \qquad \dddot{\rho}(\vec{x}, t) = 0 \qquad (107)$$

According to Eq.(76), there is no gravitational wave radiation. However, after the transformation to the following reference system, according to Eq.(83), we have $\dddot{\rho}'(\vec{x}', t') = 0$, then there will be gravitational wave radiation. Since Equation (83) represents the observer changing from a stationary reference frame to another reference frame, it means that there is no gravitational wave radiation in the system when the observer is stationary, and there is gravitational radiation when observer moves. Whether the system has gravitational radiation depends on the motion state of observer, which is physically absurd.

6. The principle of general relativity holds that the description of physical laws is independent of the choice of reference frame. But in this case, the description of gravitational wave radiation is clearly related to the choice of reference frame. General relativity is a contradictory .

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

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

According to general relativity, let $x_1' = r$, $x_2' = x_3' = 0$, we have $I = I_1 = Mr^2$, $\rho = \rho_0 =$ constant, the ellipticity $e = 1$, so we get:

$$-\frac{dE}{dt} = \frac{32G}{45c^5}\omega^6 M^2 r^4 \qquad (108)$$

For example, for Jupiter moving around the sun, the mass is $M = 1.90\times10^{27}Kg$, the orbital radius is $r = 7.78\times10^{11}m$, the angular velocity is $\omega = 1.68\times10^{-8}/s$. Substituting them in (108), the calculating result is $-dE/dt = 5.23\times10^{3}J/s$. 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 Eq.(81), Eqs.(77) and (78) apply only to the continuous distribution of matter, not to the motion of a single particle. Therefore, the gravitational radiation equation (108) cannot be reduced to Eq.(81) 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.(81), the gravitational radiation intensity is zero. However, according to the current understanding of general relativity, we have

$$\omega^2 = \frac{G(M_1+M_2)}{R^3} \qquad I = \frac{M_1M_2}{M_1+M_2}R^2 \qquad e=1 \tag{109}$$

R is the distance of double star, by substituting it into Eq. (94), it can be obtained

$$-\frac{dE}{dt} = \frac{32G^4M_1^2M_2^2(M_1+M_2)}{5c^5R^5} \tag{110}$$

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

$$-\frac{dE}{dt} = \frac{32G^4M_1^2M_2^2(M_1+M_2)}{5c^5R^5}f(e) \tag{111}$$

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 wave radiation, which meant that gravitational waves were indirectly observed [2]. However, the error between observation and theoretical prediction is 20%, and depends 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% [3,4].

The result was recognized by the scientific community as confirming the gravitational wave radiation theory of general relativity, and Taylor and Hulse were awarded the 1993 Nobel Prize in Physics. The binary pulsar psrj0377-3039a /B, discovered in 2003, is also considered to conform to the radiation formula of general relativity [5,6].

However, as discussed above, Eq. (111) is not a result of general relativity, because it can not be reduced to Eq. (81) of general relativity. If the observations of the pulsar binaries PSR1913+16 and PSRJ0377-3039 A/B are correct, it means that the results of general relativity are wrong. Eq.(111) is actually a patchwork, or rather, it is the result of general relativity simulating classical electromagnetic radiation theory. Because of the different theoretical basis, the gravitational radiation formula of general relativity is neither fish nor fowl.

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

The following briefly introduces Chen Yongming's theory of gravitational like-electric quadrupole moment radiation [8]. Chen published a article entitled “Mass-electric equivalent and Gravitational Wave” in China Basic Science in 2008. He proposed the Newton's electric-like quadrupole moment radiation formula and calculated gravitational radiation ofpulsar binary star PSR1913+16 in detail. The results are very consistent with the actual observation.

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 is equal to zero, and the quasi-magnetic dipole moment is equal to a constant. The system performed quasi-electric quadrupole moment radiation, and the quasi-electric quadrupole moment tensor was

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

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. Therefore, unlike general relativity. According to the gravity theory of flat space, in a stationary coordinate system, the spatial coordinates in the quasi-electric quadrupole moment tensor are functions of time. Considering the time derivative of the 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:

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

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

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

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

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

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 complicated calculation, Chen Yongming obtained the following result

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

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 theory of gravity in flat space-time. The Einstein's theory of curved space-time is unnecessarily. According to general relativity，the existence of gravitational waves is impossible, the gravitational radiation formula should be Eq. (116) instead of Eq. (104).

7 Conclusions

In May, 2021，Mei xiaochun published a paper proving that the calculation of constant terms in the planetary motion equation in the solar system based on general relativity was wrong. By strict calculation, the constant term should be equal to zero. Thus general relativity can describe only the parabolic orbital motions (with minor corrections) of objects in the solar system, it can not describe the elliptical and hyperbolic orbital motions [9]. So general relativity's calculation result of Mercury's perihelion 43 second centennial 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. 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 Newton's theory of gravity, and can not be [14]. The time dependent and time independent equations 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, Mei Xiaochun and Huang Zhixun published a paper pointing out that Eddington et al. 's measurements of gravitational deflection of light was invalid [10]. The reason is that this kind of measurement did not consider the influence of solar surface gas on light deflection and other factors, but also introduces 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 in the gravitational field of the sun will be repeated in gravitational waves. By writing the metric of gravitational field in the form $g_{\mu\nu} = G_{\mu\nu} + h_{\mu\nu}$ in general relativity, it is proved that the vacuum gravitational field equation $R_{\mu\nu} = 0$ can be transformed into the linear wave equation $\partial^2 h_{\mu\nu} = 0$ as long as $h_{\mu\nu}$ is a small quantity of first order，as well as the harmonic coordinate conditions are adopted，so as to predict the existence of gravitational waves. On this basis, without solving the equations of gravitational field, the metric of Eq.(2) was used to describe and detect gravitational waves in theory and experiments.

In this paper, it is proved by detailed calculations that the metric of Eq.(4) does not satisfy the vacuum Einstein gravitational field equation, whether or not the approximation condition of first order small quantity is adopted. Therefore, it is impossible for the Einstein's gravitational field equation to be transformed into linear wave equation and predict the existence of gravitational waves under weak field conditions.

The reason for this result is that the metric of Eq.(4) does not satisfy the four harmonic coordinate conditions to make the coordinate conditions be equal to zero. Even if the harmonic coordinate condition is changed to another coordinate system so that it can be equal to zero, in the new coordinate system, the metric of gravitational waves becomes constants so that the gravitational field disappears, let alone the gravitational waves.

This paper also discusses the use of coordinate conditions, which are incorrectly used in general relativity to simplify the equations of motion, resulting in contradictory results. The gravitational wave prediction of general relativity is the result of faulty use of mathematical conditions, not a real one.

In addition, what the current gravitational wave detection considers is the extremely strong field condition of black hole collision, $h_{\mu\nu}$ is not the first order small quantity, so it is impossible to get the linear wave equation of gravitational wave. However, linear wave equation was used to describe the gravitational waves generated by black hole collisions, and the gravitational wave theory of general relativity is 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 modified from the Newton's gravity theory and introduces 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 and its radiation with flat space-time gravity theory, the Einstein's gravity theory of curved space-time in unnecessary.

The problems existing in the current gravitational wave detection experiments will be discussed in the following paper.

The authors thank Professor Huang Zhixun, School of Information Engineering, Communication University of China, for his discussion. In fact, it is professor Huang Zhixun's suggestion that aroused the author's interest in this issue and drew the conclusion of this paper.

References

1. Abbott B P, et.al. Observation of gravitational wave from a binary black hole merger, Phys Rev Lett，2016，116：06112 1～16.
2. Friends of Physics, https://www.sohu.com/a/67899679_372481.
3. Liu Liao, Zhao Zheng, General Relativity, Higher Education Press, 2004, p.88,133.
4. Fang Honglie, Optical Polarization Cavity and Gravitational Wave Detection, Science Press, 2016，p.237.
5. Mei Xiaochun, The Third Space-time Theory and Gravity and Cosmology in Flat Space-time, Intellectual Property Press, 2012，p.269.
6. Laplace, P.，Mechanique celecte, [M], Volumes published from 1799-1852, Einstein’s translation: Chelsca Pulb, New York, 1966.
7. Feng Linbao, Liu Xuecheng, Liu Chengming, General Relativity, Jilin Science and Technology Press, 1995，p.88.
8. Hulse R. A., Taylor., Astrophys. J. 1975, L. 51, p.195.
9. Weiberg J. M., Taylor J. H., Observations of post-Newtonian timing effect in the binary pulsar PSR 1913+16, Phys Rev Lett, 1984, 52;1348.
10. Zongwei Li, PSR1913+16, Chinese Physics Letters, 1994, vol. 13, No. 3, p.1.
11. Lyne A. A Double-Pulsar System: A Rare Laboratory for Relativistic Gravity and Plasma, Physics [J]. Science, 2004,5561(303:1 153.
12. CAMPANELLI M, Accurate Evolutions of Orbiting Black-Hole Binaries without Excision [J]. Phys Rev Lett, 2006, 96:111 101.

13. Chen yongming, Mass electric equivalent and gravitational waves, Basic Science in China, 2008, no.1, p.1.
14. Mei Xiaochun,The Precise Calculations of the Constant Terms in the Equations of Motions of Planetsand light of General Relativity, Physics Essays，2021, 34 (2), p.183 ~ 192. https://www.researchgate.net/publication/351730530_The_precise_calculations_of_the_constant_terms_in_the_equations_of_motions_of_planets_and_photons_of_general_relativity.
15. Mei Xiaochu, Huang Zhixun, The Measurement of Light's Gravity Deflection of General Relativity were invalid, International Astronomy and Astrophysics Research Journal, 3(3): 7-26, 2021.