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Einstein’s Equations of Gravity Fields have No Linear Wave Solutions under Weak Conditions

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Author’s contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

In the theory of gravity wave of general relativity, the metric of gravitational field was written as $g_{\mu\nu} = G_{\mu\nu} + h_{\mu\nu}$.It was proved that as long as $h_{\mu\nu}$ 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 $\partial^2 h_{\mu\nu} = 0$, thus predicting the existence of gravitational waves. It is proved in this paper that there are many serious problems in the theory of gravity wave of general relativity. 1. The gravitational wave metric used in the theory and the detection of gravitational wave is not a 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 $R_{\mu\nu} = 0$ in vacuum under weak condition. Therefore, the Einstein's equations of gravitational field can not be reduced to linear wave equations, and general relativity does not and can not predict the existence of gravitational waves. 3. The four harmonic coordinate conditions were used to derive the linear wave equation of gravitational wave in general relativity, but they are not tenable. This is the main reason why the gravitational wave metric does not satisfy the motion equation of general relativity. 4. The harmonious coordinate conditions can be satisfied by transforming them to other coordinate systems. But in this case, the metric tensors of gravitational wave become constants, meaning that the gravitational field disappears, let alone the gravitational waves. 5. The present gravitational wave detection was regarded to involve the extremely strong field of black hole collision in which

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$h_{\mu\nu}$ was not a small quantity without wave solutions. However, general relativity still used linear wave equations to describe gravitational waves generated by the collision of black holes. 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. 7. This paper also discusses the existence of gravitational wave based on the revised Newton's theory of gravitation by introducing magneto-like gravitational component. 8. Finally, Chen Yongming's formula of electric-like gravitational wave radiation based on the Newton's theory of gravity is introduced. The theory is used to calculate the gravitational radiation of pulsar binary PSR1913+16, and the result is that the gravitational radiation 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. 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 to detect 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. 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. 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, the Einstein's equations of gravitational fields were highly nonlinear ones and generally have no linear wave solutions. In fact, 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]. It was not until 1936 that Einstein changed his mind and published a paper to accept the existence of gravitational waves.

In 2017, J.-F. Pommaret in Ecole des Ponts Paris Tech published an paper in Journal of Modern Physics titled "Why Gravitational Waves can not exist" [3]. The paper reexamines 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 gravity equations and proving that gravitational waves do not exist from mathematical angle.

The method of Pommaret's paper was to identify the differential indeterminates of Ritt and Kolchin with the jet coordinates of Spencer, in order to study Differential Duality by using only linear differential operators with coefficients in a differential field K. In particular, the linearized second order Einstein operator and the formal adjoint of the Ricci operator are both parametrizing the 4 first order Cauchy stress equations but themselves can not be parametrized. In the framework of Homological algebra, this result is not coherent with the vanishing of a certain second extension module and leads to question the proper origin and existence of gravitational waves.

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 the 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 the experiments of general relativity does not satisfy the Einstein's equation of gravitational field. So general relativity can not predict the existence of gravitational waves. Even the experiments really detected gravitational waves, they are unrelated to general relativity.

In general relativity, the metric tensor of gravity field was written as [4]:

$$g_{\mu\nu} = G_{\mu\nu} + h_{\mu\nu} \tag{1}$$

Where $G_{\mu\nu}$ is the Minkowski metric of flat space -time, $h_{\mu\nu}$ and its derivatives are small quantities. Besides, there are no other restrictions. Based on Eq.(1), general relativity proved that Einstein's equations of gravity field in vacuum can be transformed into following linear wave equation under the condition of weak field [4].

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

Thus the existence of gravitational waves was predicted.

At present, general relativity uses following metric to describe gravity wave [5]

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

Suppose that gravity wave propagates along the z axis, we take [5]

$$h_{11} = h_1 \cos(\omega t - kz)$$

$$h_{22} = h_2 \cos(\omega t - kz) \tag{4}$$

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

It should be noted that general relativity did not obtain the metric of Eq.(4) by solving the Einstein's equations of gravitational field, but directly assumed that the metric of gravitational waves should be in the forms of Eqs.(3) and (4). By the detailed calculation, this paper reveals 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 therefore it is 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 the gravity waves of general relativity 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. However, in the new coordinate system, the metric tensors of Eq.(4) becomes constants, meaning that the gravitational field disappears, not to mention gravitational waves.

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 wave equation of Eq.(2) for 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 wave equation (2) 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 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 gravity 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. The formula is used to calculate the gravitational radiation of PSR1913+16. The result is that gravitational radiation reduced 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 the Newtonian gravity theory in 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. General relativity can not predict the existence of gravitational waves, its theory of gravity waves was wrong. We can describe gravity radiation with the revised Newtonian theory of gravity by introducing magnetic-like gravity in flat space-time, the Einstein's gravity theory of curved space-time is unnecessary.

2. REVISED NEWTONIAN THEORY OF GRAVITY AND RADIATION FORMULA

As we known that the Newtonian formula of gravity is exactly the same in form as the electrostatic force formula of classical electro-magnetic 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:

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

As long as to 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 theory of 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 may 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 [6]. 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 and many other problems in cosmology [7].

According to above definition, we get:

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

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 following form

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

$$\nabla \times \vec{E}_g = -\frac{\partial \vec{B}_g}{\partial t}$$

$$\nabla \times \vec{B}_g = \mu_g \vec{J}_g + \mu_g \varepsilon_g \frac{\partial \vec{E}_g}{\partial t} \tag{10}$$

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

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

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

$$\vec{E}_g = -\nabla \phi_g - \frac{\partial \vec{A}_g}{\partial t} \quad \vec{B}_g = \nabla \times \vec{A}_g \tag{12}$$

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

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

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

In the free space far 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:

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

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

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

Because electromagnetic potential $A_\mu = (\vec{A}, i\phi)$ 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

$$\vec{E} = -\nabla\phi - \frac{1}{c}\frac{\partial \vec{A}}{\partial t} \quad \vec{B} = \nabla \times \vec{A} \tag{16}$$

By introducing the gauge transformation [6]:

$$\vec{A} \to \vec{A} + \nabla\varphi \quad \phi \to \phi - \frac{1}{c}\frac{\partial}{\partial t}\varphi \tag{17}$$

and substituting Eq.(17) in Eq.(16), the forms of $\vec{E}$ and $\vec{B}$ are proved unchanged. Therefore, electromagnetic potentials have a certain arbitrariness, and the following Lorenz gauge condition can be introduced to simplify the motion equations of electromagnetic fields.

$$\frac{1}{c}\frac{\partial}{\partial t}\phi+\nabla\cdot\vec{A}=0 \tag{18}$$

3. THE PROOF OF GENERAL RELATIVITY TO EXIST GRAVITIONAL WAVE

3.1 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 gravity wave theory. The Einstein's equation of gravity field is

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

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 them in Eq.(19), the equation of gravitational field can be written in another form

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

Where $R_{\mu\nu}$ is 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 $T_{\mu\nu}$ are 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 Einstein tensor $G_{\mu\nu}$ are obtained:

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

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 $g_{\mu\nu}$, 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 $g_{\mu\nu}$ 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 $g_{\mu\nu}=0$ when $\mu\neq\nu$, that is the precise solution called as the Schwarzs - child metric obtained from the Einstein gravitational field equation.

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

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

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 [8]

$$g^{\mu\nu} g_{\mu\nu,\rho} = 0 \quad (23)$$

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 [9].

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.

In classic electromagnetic field theory, it is physically permissible to eliminate the arbitrariness of electromagnetic potential by means of the Lorentz gauge condition (18). The reason is that electromagnetic potential is not a physical quantity that can be measured directly. However, the metric of general relativity 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 time and space are changed, which can be measured directly. Gravity is thought as the curvature of space-time in general relativity, so the change of metric tensor means the change of gravitational field, meaning that the gravitational field is no longer original one.

3.2 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 [4] .

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

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

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:

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

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

The Ricci tensors are simplified as

$$R_{\mu\nu} = \Gamma_{\mu\sigma,\nu}^{\sigma} - \Gamma_{\mu\nu,\sigma}^{\sigma} + \Gamma_{\rho\nu}^{\sigma} \Gamma_{\mu\sigma}^{\rho} - \Gamma_{\rho\sigma}^{\sigma} \Gamma_{\mu\nu}^{\rho} \approx \Gamma_{\mu\sigma,\nu}^{\sigma} - \Gamma_{\mu\nu,\rho}^{\sigma} \quad (28)$$

Let $$\chi_{\nu}^{\sigma} = h_{\nu}^{\sigma} - \frac{1}{2} \delta_{\nu}^{\sigma} h \quad (29)$$

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

By means of formulas above, the Ricci tensor can finally be simplified as [4]

$$R_{\mu\nu} = \frac{1}{2} \partial^2 h_{\mu\nu} - \frac{1}{2} \chi_{\nu,\mu\sigma}^{\sigma} - \frac{1}{2} \chi_{\mu,\nu\sigma}^{\sigma} \quad (31)$$

Then to introduce four harmonic coordinate conditions

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

$$=(G^{\mu\nu}-h^{\mu\nu})_{,\nu}+\frac{1}{\sqrt{-g}}(G^{\mu\nu}-h^{\mu\nu})(\sqrt{-g})_{,\nu}=0 \qquad (32)$$

By taking the approximate calculation of Eq.(32), the result is

$$\sqrt{-g}=\sqrt{-(G-h_\sigma^\sigma)}\approx 1+\frac{1}{2}h_\sigma^\sigma \qquad (33)$$

Substituting Eq.(33) in Eq.(32) and ignoring higher order terms, we get

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

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

$$\frac{\partial \chi_\mu^\nu}{\partial x^\nu}=h^\nu_{\mu,\nu}-\frac{1}{2}\delta^\nu_\mu h_{,\nu}=h^\nu_{\mu,\nu}-\frac{1}{2}h_{,\mu}=0 \qquad (35)$$

Eq.(35) is considered to be equivalent to the Lorenz gauge condition in classical electromagnetic theory. Substitute this result in Eq.(30) and obtain

$$R_{\mu\nu}=\frac{1}{2}\partial^2 h_{\mu\nu} \qquad R=R^\mu_\mu=\frac{1}{2}\partial^2 h \qquad (36)$$

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

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

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

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

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

4. GRAVITATIONAL WAVE METRIC OF GENERAL RELATIVITY DOES NOT SATISFY EINSTEIN'S EQUATIONS OF GRAVITATIONAL FIELD

4.1 Gravitational Wave Metric of General Relativity does not Satisfy Einstein's Equations of Gravitational Field under the Condition of Weak 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 was written as [4]

$$h_{\mu\nu}=A_{\mu\nu}e^{ik_\sigma x^\sigma} \qquad (39)$$

According to the theory of gravity wave in general relativity, only six of ten components of $h_{\mu\nu}$ were independent, in which only two were meaningful. So Eq.(39) can be written as the form of Eq.(2). For simplification, we take $h_1=h_2=h'$ in Eq.(2) without affecting the results of this paper to let

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

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

We have $h_{11}=h_{22}$, and the others are zero. Eq.(40) indicates that gravitational wave is a transverse wave, propagating along z-axis and causing space contraction or extension in the x-axis and the 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 are zero.

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

It is proved below that whether or not the weak field conditions are considered, the metrics (40) and (41) do not satisfy the Einstein's gravitational field equation $R_{\mu\nu}=0$ in vacuum. 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 [4]

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

Where

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

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

$$\Gamma^0_{11} = \frac{h_{11,t}}{2} \qquad \Gamma^0_{22} = \frac{h_{22,t}}{2} \qquad \Gamma^3_{11} = \frac{h_{11,z}}{2}$$
$$\Gamma^3_{22} = \frac{h_{22,z}}{2} \qquad \Gamma^1_{10} = \Gamma^1_{01} = \frac{h_{11,t}}{2(1+h_{11})}$$
$$\Gamma^2_{02} = \Gamma^2_{20} = \frac{h_{22,t}}{2(1+h_{22})}$$
$$\Gamma^1_{13} = \Gamma^1_{31} = \frac{h_{11,z}}{2(1+h_{11})}$$
$$\Gamma^2_{23} = \Gamma^2_{32} = \frac{h_{22,z}}{2(1+h_{22})} \tag{44}$$

Where

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

By considering Eqs.(28), (44) and (45), as well as $h_{11} = h_{22}$, the non-zero components of Ricci tensor are.

$$R_{00} = \Gamma^{\sigma}_{0\sigma,0} - \Gamma^{\sigma}_{00,\sigma} + \Gamma^{\sigma}_{\rho 0}\Gamma^{\rho}_{0\sigma} - \Gamma^{\sigma}_{\rho\sigma}\Gamma^{\rho}_{00}$$
$$= \Gamma^1_{01,0} + \Gamma^2_{02,0} + \Gamma^1_{10}\Gamma^1_{01} + \Gamma^2_{20}\Gamma^2_{02}$$
$$= \frac{(1+h_{11})h_{11,tt} - (h_{11,t})^2}{2(1+h_{11})^2}$$
$$+ \frac{(1+h_{22})h_{22,tt} - (h_{22,t})^2}{2(1+h_{22})^2}$$
$$+ \frac{(h_{11,t})^2}{4(1+h_{11})^2} + \frac{(h_{22,t})^2}{4(1+h_{22})^2}$$
$$= \frac{2(1+h_{11})h_{11,tt} - (h_{11,t})^2}{2(1+h_{11})^2}$$
$$= -\frac{\omega^2 h'\left(1+h'\cos(\omega t - kz)\right)\cos(\omega t - kz)}{c^2[1+h'\cos(\omega t - kz)]^2}$$
$$- \frac{\omega^2 h'^2 \sin^2(\omega t - kz)}{2c^2[1+h'\cos(\omega t - kz)]^2} \neq 0 \tag{46}$$

$$R_{11} = \Gamma^{\sigma}_{1\sigma,1} - \Gamma^{\sigma}_{11,\sigma} + \Gamma^{\sigma}_{\rho 1}\Gamma^{\rho}_{1\sigma} - \Gamma^{\sigma}_{\rho\sigma}\Gamma^{\rho}_{11}$$
$$= -\Gamma^0_{11,0} - \Gamma^3_{11,3} + \Gamma^0_{11}\Gamma^1_{10}$$
$$+ \Gamma^3_{11}\Gamma^1_{13} - \Gamma^0_{11}\Gamma^2_{02} - \Gamma^3_{11}\Gamma^2_{32}$$
$$= -\frac{h_{11,tt}}{2} - \frac{h_{11,zz}}{2} + \frac{(h_{11,t})^2}{4(1+h_{11})}$$
$$+ \frac{(h_{11,z})^2}{4(1+h_{11})} - \frac{h_{11,t}h_{22,t}}{4(1+h_{11})} - \frac{h_{11,z}h_{22,z}}{4(1+h_{22})}$$
$$= \frac{(\omega^2/c^2 + k^2)h'\cos(\omega t - kz)}{2} \neq 0 \tag{47}$$

$$R_{22} = \Gamma^{\sigma}_{2\sigma,2} - \Gamma^{\sigma}_{22,\sigma} + \Gamma^{\sigma}_{\rho 2}\Gamma^{\rho}_{2\sigma} - \Gamma^{\sigma}_{\rho\sigma}\Gamma^{\rho}_{22}$$
$$= -\Gamma^0_{22,0} - \Gamma^3_{22,3} + \Gamma^2_{02}\Gamma^0_{22}$$
$$+ \Gamma^3_{22}\Gamma^2_{23} - \Gamma^1_{31}\Gamma^3_{22} - \Gamma^1_{01}\Gamma^0_{22}$$
$$= -\frac{h_{22,tt}}{2} - \frac{h_{22,zz}}{2} + \frac{(h_{22,t})^2}{4(1+h_{22})}$$
$$+ \frac{(h_{22,z})^2}{4(1+h_{22})} - \frac{h_{11,z}h_{22,z}}{4(1+h_{11})} - \frac{h_{11,t}h_{22,t}}{4(1+h_{22})}$$
$$= \frac{(\omega^2/c^2 + k^2)h'\cos(\omega t - kz)}{2} \neq 0 \tag{48}$$

$$R_{33} = \Gamma^{\sigma}_{3\sigma,3} - \Gamma^{\sigma}_{33,\sigma} + \Gamma^{\sigma}_{\rho 3}\Gamma^{\rho}_{3\sigma} - \Gamma^{\sigma}_{\rho\sigma}\Gamma^{\rho}_{33}$$
$$= \Gamma^1_{31,3} + \Gamma^2_{32,3} + \Gamma^1_{13}\Gamma^1_{31} + \Gamma^2_{23}\Gamma^2_{32}$$
$$= \frac{(1+h_{11})h_{11,zz} - (h_{11,z})^2}{2(1+h_{11})^2}$$

$$+\frac{(1+h_{22})h_{22,zz}-(h_{22,z})^2}{2(1+h_{22})^2}$$
$$+\frac{(h_{11,z})^2}{4(1+h_{11})}+\frac{(h_{22,z})^2}{4(1+h_{22})}$$
$$=\frac{2(1+h_{11})h_{11,zz}-(h_{11,z})^2}{2(1+h_{11})^2}$$
$$=-\frac{k^2h'(1+h'\cos(\omega t-kz))\cos(\omega t-kz)}{[1+h'\cos(\omega t-kz)]^2}$$
$$-\frac{k^2h'^2\sin^2(\omega t-kz)}{2[1+h'\cos(\omega t-kz)]^2}\neq 0 \tag{49}$$

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

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

The overall result is $R_{\mu\nu}\neq 0$ in general. By considering $\omega/c=k$, we get $R_{00}=R_{33}$ and $R_{11}=R_{22}$. Under the weak field approximation condition, we have $R_{00}=R_{33}=-R_{11}=-R_{22}$. The metric tensors of Eqs.(40) and (41) do not satisfy the Einstein's equation of gravitational field and do 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 harmonic coordinate conditions in the process of deriving gravitational wave equation, it is necessary to calculate whether the metric of Eq.(40) meets the coordinate conditions. We have

$$h=h^{\mu}_{\mu}=G^{\mu\sigma}h_{\sigma\mu}=G^{11}h_{11}+G^{22}h_{22}$$
$$h^0_0=0 \qquad h^3_3=0$$
$$h^1_1=h^2_2=-h'\cos(\omega t-kz)$$
$$h=-2h'\cos(\omega t-kz) \tag{51}$$

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

$$h^{\nu}_{0,\nu}=h^0_{0,0}+h^1_{0,1}+h^2_{0,2}+h^3_{0,3}=0$$
$$h^{\nu}_{1,\nu}=h^0_{1,0}+h^1_{1,1}+h^2_{1,2}+h^3_{1,3}$$
$$=h^1_{1,1}=\frac{\partial}{\partial x}h^1_1=0$$
$$h^{\nu}_{2,\nu}=h^0_{2,0}+h^1_{2,1}+h^2_{2,2}+h^3_{2,3}$$
$$=h^2_{2,2}=\frac{\partial}{\partial y}h^2_2=0$$
$$h^{\nu}_{3,\nu}=h^0_{3,0}+h^1_{3,1}+h^2_{3,2}+h^3_{3,3}=0$$
$$h_{,0}=\frac{\partial h}{c\partial t}=\frac{2\omega h'}{c}\sin(\omega t-kz)\neq 0$$
$$h_{,1}=\frac{\partial h}{\partial x}=0 \qquad h_{,2}=\frac{\partial h}{\partial y}=0$$
$$h_{,3}=\frac{\partial h}{\partial z}=-2kh'\sin(\omega t-kz)\neq 0 \tag{52}$$

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

4.3 Problems Caused by Transform-ing Harmonic Coordinate Condi-tion 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, we have $\sin(\omega t'-kz')=0$ or $\omega t'-kz'=n\pi$. The metric tensors of gravity wave becomes $h'_{11}=h'_{22}=h'\cos(\omega t'-kx')=$ $=h'\cos n\pi=\pm h'=$ constants 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 the linear 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 becoming 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 it to other reference system.

4.4 The Metrics of Gravity Waves Can Not Be Simplified If 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. General relativity assumes that the metric tensors 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, the coordinate condition can not be used again. Otherwise it means artificially to remove certain terms from the equation of motion and may cause inconsistencies.

We take the Schwarzschild metric as an example to illustrate this problem with

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

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

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

In order to solve the equations of gravity field, general relativity assume $h_{00} \neq 0$, $h_{11} \neq 0$, other $h_{\mu\nu} = 0$ in advance. This means that the forms of the metric tensor has been restricted, so that there is no need to use the coordinate conditions. If coordinate conditions are still used, contradictory results will be caused. According to Eq.(55), we have:

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

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

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

$$h_2^2 = G^{22}h_{22} = 0 \qquad h_3^3 = G^{33}h_{33} = 0$$
$$h_1^0 = G^{\rho 0}h_{\rho 1} = 0 \qquad h_1^2 = G^{\rho 2}h_{\rho 1} = 0$$
$$h_1^3 = G^{\rho 3}h_{\rho 1} = 0 \tag{60}$$

Therefore, we get

$$h = -1 - \frac{\alpha}{r} + \frac{1}{1-\alpha/r} \tag{61}$$

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

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

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

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

From Eq.(64), the result is

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

In this case, α/r becomes a complex number! Substituting it in 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 space-time, completely meaningless!

4.5 Equations of Gravity Field 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

$$\begin{aligned}ds^2 &= c^2(1+h_{00})dt^2-(1+h_{11})dx^2\\&-(1+h_{22})dy^2-(1+h_{33})dz^2\\&+c(1+h_{01})dtdx+c(1+h_{02})dtdy\\&+c(1+h_{02})dtdy(1+h_{22})dy^2\\&+(1+h_{03})dtdz-(1+h_{12})dxdy\\&-(1+h_{13})dxdz-(1+h_{23})dydz\end{aligned} \tag{66}$$

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

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

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

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

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 the solutions of Eq.(67) having the simple form of Eq.(40).

4.6 The Gravity Field Equation Has No Wave Solution Under Strong Field Condition

The generation of gravity waves is thought to be a physical phenomenon under extreme conditions, requiring extremely strong gravity 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 gravity 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) will contain the terms $h_{\mu\sigma}h_{\sigma\nu}$, the equations of gravity field have complicated forms without linear wave solutions.

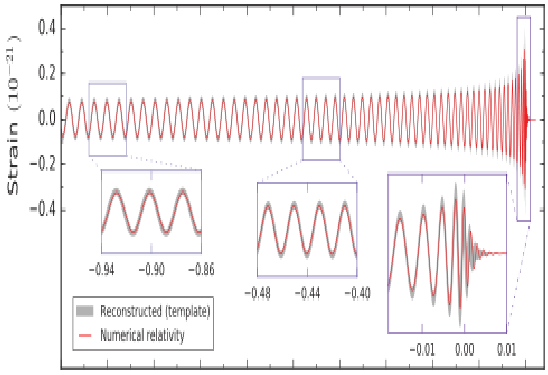

Fig. 1. The original graph of gravitational wave from LIGO's paper on GW151226

However, we know that electromagnetic wave radiation exists in both strong and weak fields. According to general relativity, gravity waves were produced under weak field conditions, but would not be produced under strong field conditions. This is too strange to be unaccepted.
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 the metric of sinusoidal oscillation waveform to describe the gravitational waves generated at the final moment as shown in Fig.1.

4.7 The Gravity Waves of the Revised Newtonian Theory

In fact, with the introduction of magnetic -like gravity components, the Newton's theory of gravity can also lead to the existence of gravitational aves. If general relativity was correct, it would be the modification of Newton's theory of gravity. The lowest order radiation of Newtonian gravity is dipole radiation, the lowest order radiation of general relativity is quadrupole moment radiation, which is much smaller than the dipole radiation. For the problem of gravitational waves, general relativity is not a correction of the Newtonian gravity so it can not cover the Newtonian gravity and can not be correct.

To sum up, the Einstein's gravitational field equation is a nonlinear equation and can not have a linear wave solution. general relativity can not predict the existence of gravitational waves. Based on general relativity, gravitational waves can not be found.

5 THE PROBLEMS IN GRAVITY DELAYED RADIATION FORM-ULA OF GENERAL RELATIVITY

5.1 The Gravity Delayed Radiation Formula of General Relativity

The general solution of Eq.(38) is the super-position of a linear wave solution and a special solution. The linear wave solution is shown in Eq.(40). Hilbert proved that when the harmonic coordinate condition was used, the special solution of Eq.(38) was [4]

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

Eq.(69) described the delayed solution of gravity radiation in weak field condition. However, it is known from the previous discussion that the coordinate condition did not hold, so 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

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

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 (38) and the harmonic coordinate condition (30), it can be calculated with $T_{\mu,\nu}^\nu = 0$, or

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

Multiply the first equation of Eq.(71) 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 [3]

$$\begin{aligned}\frac{\partial}{\partial x^0}\int T_k^0 x^j dV &= -\int T_{k,i}^i dV \\ &= \int\left[T_k^i \delta_i^j - \frac{\partial(T_k^i x^j)}{\partial x^i}\right] dV \\ &= \int T_k^j dV - \int \frac{\partial(T_k^i x^j)}{\partial x^i} dV\end{aligned} \tag{72}$$

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 for 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

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

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

Since tensor T_{kj} has six independent component, 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 the component T_{00} and time, thus the difficulty of problem is decreased.

Based on it, quadrupole moment is introduced 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 is expressed by the form of Landau-Lifshitz, and the radiation intensity of gravity 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 Problems in Radiation Formula of Gravity 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.

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

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

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 the coordinate transformations [4]

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

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.

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

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.(77) is rewritten as [4]

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

Similarly

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

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

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

The calculation results are

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

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

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

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

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

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

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

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.(82) into Eqs.(89) ~ (93). In Eq.(82), the derivative of time is only with respected to material (energy) density and not to space coordinates. But in Eqs.(89) ~ (93), 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.(83), the results should be

$$\begin{aligned} Q_{11}'(t') &= \int \rho'(x_k', t') \\ &\times (x_1' \cos\omega t' - x_2' \sin\omega t')^2 dV' \end{aligned} \tag{95}$$

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

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

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

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

For example, in the statics reference frame with

$$\rho(x_k, t) = \frac{a}{(x_1^2 + x_2^2)} + \frac{bx_1^2}{t^2}$$

$$\dddot{\rho}(x,t) = \frac{-24bx_1^2}{t^5} \quad (99)$$

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

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

So in 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

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

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

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

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

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

Substituting them in Eq.(81), we obtain

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

Where F_1 and F_2 are very complex functions. So Eq.(106) is completely different from Eq.(94) which actually has nothing to do with general relativity. 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.(81) 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. (81) to the following coordinate system is that based on Eq.(81), no correct result can be obtained.

4.There are two explanations for the transformation of Eq.(83). 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.(74) 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. Eqs.(95) ~ (98) 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 $\dddot{Q}_{jk}(x_k, t) = 0$, then the gravitational wave radiation should be equals zero. Such as

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

According to Eq.(76), 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.(83) 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.

5.3 The Influence On Measurement of Gravity radiation of General Relativity

For these reasons, general relativity using Eq.(94) 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.(94) and get

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

For example, for Jupiter moving around the sun, the mass of Jupiter 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 inEq.(108),the 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), Eq.(77) apply only to the continuous distribution of matter, not to the motion of a single particle. So the gravitational radiation formula (108) can not 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

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

Where R is the distance of double stars. By substituting them 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 the elliptical motion, the radiation frequency is not single. 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 radiation, which meant that gravitational radiation were indirectly observed. 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.(111) is not a result of general relativity, because it can not be reduced to Eq.(81). 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.(111) 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.

6. QUASI-ELECTRIC QUADRU-POLE MOMENT RADIATION FORMULA OF REVISED NEWTONIAN'S THEORY OF GRAVITY

The following briefly introduces Chinese scholar Chen Yongming's theory of gravitational like-electric quadrupole moment radiation [14]. 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

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

In Eq.(112), r and 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

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

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

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

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

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

The elliptical orbits of pulsar binary PSR1913+16 are very similar with parameters $m_1 = 1.387M_0$, $m_2 = 1.441M_0$, 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

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

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. Gravitational waves can not be predicted based on general relativity and the gravity radiation formula should be Eq.(116) instead of Eq. (94).

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 [15]. 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 [15]. 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 [16]. 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 $g_{\mu\nu} = G_{\mu\nu} + h_{\mu\nu}$ and using the harmonic coordinate conditions in general relativity, it was proved that the vacuum gravitational field equation $R_{\mu\nu} = 0$ can be transformed into the linear wave equation $\partial^2 h_{\mu\nu} = 0$ to predict the existence of gravity waves under the condition of weak field.

On this basis, without solving the equations of gravitational field, the metric of Eqs.(3) and (4) were used to describe gravitational waves in theory and detect gravitational waves in experiments.

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

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

This paper also discusses the use of coordinate conditions to simplify the motion equation. General relativity has not correctly used it, resulting in contradictory results. The gravity wave prediction of general relativity is a result of faulty use of mathematical condition, not a real existence.

In addition, what the current gravitational wave detection discusses was the extremely strong field condition of black hole collision, in which $h_{\mu\nu}$ was not a small quantity. It was impossible to get the linear wave equation of gravitational wave in general situations. However, linear wave equation was still used to describe the gravity waves generated by black hole collisions.

The gravity wave theory of general relativity was contradictory.

At the same time, it is proved that the gravitational 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 gravity radiation formula obtained by Chen Yongming. Using this formula to calculate the gravity radiation of pulsar binary PSR1913+ 16, the result is only 1% different from Taylor and Hulse's observations. Therefore, we can describe gravity wave and its radiation in flat space-time, the Einstein's gravity theory of curved space-time is unnecessary.

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

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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