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The Proofs that the Einstein's Equations of Gravity Fields Have No Liner Plane and Spherical Wave Solutions

Mei Xiaochun [1], Huang Zhixun [2], Yuan Canlun [3]

[1] Department of Theoretical Physics and Pure Mathematics, Institute of Innovative Physics in Fuzhou, China

[2] School of Information Engineering, Communication University of China, Beijing, China

[3] Department of Foundational Physics, Institute of Innovative Physics in Fuzhou, China

Abstract

General relativity introduced the harmonic coordinate condition under the weak field condition and obtained the linear plane wave solution based on the Einstein's equations of gravitational fields, declaring the existence of gravitational waves. But so far, general relativity has never proved the existence of spherical gravitational waves. This paper proves that under the conditions of weak fields, the metrics of planar and spherical waves can not satisfy the harmonic coordinate conditions, unless the maximum amplitudes of gravitational waves are equal to zero, implying no gravitational waves. Therefore, the Einstein's equations of gravitational field can not be transformed into wave equations, and general relativity can not predict the existences of gravitational waves. This paper also discusses the problem of correctly using the coordinate conditions in general relativity and compares the harmonic coordinate conditions with the Lorentz gauge conditions of electromagnetic theory. It shows that the Lorentz gauge condition is naturally true for the electromagnetic waves in free space.

But the harmonic coordinate condition of general relativity is not naturally trues and will result in that the gravitational wave amplitudes become zero, so their results are completely different.

Keywords: General relativity, Harmonic coordinate conditions, Linear plane gravity waves, Spherical gravity waves, Lorentz gauge condition, Gravity wave detection

1 Introduction

One of the authors of this paper, Mei Xiaochun published a paper in March 2022, proving that the Einstein's equations of gravitational fields have no linear plane wave solutions under the weak field conditions [1]. This problem is more strictly discussed in this paper. Meanwhile, it is further proved that the Einstein's equations of gravitational fields have no spherical wave solutions under the weak field conditions too.

It is well known that the Einstein's equations of gravitational fields are highly nonlinear ones without no linear wave solutions. To obtain the wave solutions, general relativity introduce two conditions. The first is the weak field approximation condition and the second is the harmonic coordinate conditions. Under theses two conditions, general relativity proves that the Einstein's equations of gravity fields can be transformed into the planar linear wave equations and the existence of gravitational waves.

By considering the matching of freedom degrees between the metric tensors and the Ricci tensors, there are only two independent metric tensors. General relativity assumed that they are $h_{22} = -h_{11}$ and h_{12} [2, 3] . It is proved in this paper that these three metric tensors can not satisfy the harmonic coordinate conditions, unless the maximum amplitudes of gravitational waves are zero, meanings that there are no gravitational waves.

Bedsides, the component h_{12} at the direction of spacial crossing $dxdy$ can not be measured experimentally, so it has no practical significance. In fact, in the existing gravitational wave experiments, the component h_{21} is never considered [4]. If we do not consider h_{21} , two independent gravitational wave metric tensors becomes h_{11} and h_{22} . In this case, it is impossible to have $h_{22} = -h_{11}$, the harmonic coordinate conditions is still not satisfied.

We know that a plane wave travels in one direction and its amplitude does not vary with the distance from the source, but a spherical wave travels in all directions and its amplitude varies inversely with the distance from the source, so spherical gravitational waves are more important in practical astrophysical processes. But so far, general relativity has never proved the existence of spherical gravitational waves.

It is also proved that Einstein's equations of gravitational field have no spherical wave solutions because the metric tensor of spherical waves can not satisfy the harmonic coordinate conditions, unless the gravitational wave amplitudes are zero, otherwise the serious contradiction will be caused.

In addition, the coordinate conditions of general relativity are compared with the Lorentz gauge conditions of classical electromagnetic theory. It shows that for the free plane wave of electromagnetic theory, the Lorentz gauge condition holds naturally and never lead to the zero amplitude of electromagnetic wave. But the coordinate conditions of general relativity do not hold naturally, resulting in zero amplitude of gravitational waves. Both are completely different.

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

2 The proof that the Einstein's equations of gravity fields have no linear plane wave solutions.

2.1 The metric of linear plane gravitational wave

According to the gravitational wave theory of general relativity, under the weak field condition, the metric tensors of gravitational wave are written as [2,3]

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

Where $G_{\mu\nu}$ are the metric tensors in the Minkowski space, $h_{\mu\nu}$ and their derivatives are small quantities. Meanwhile, following four harmonic coordinate conditions are used to simplify the Einstein's equations of gravitational fields.

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

Based on theses two conditions, general relativity proves that the Einstein's equations of gravitational fields can be transformed into the linear wave equations in free space and proves the existence of gravitational waves.

$$R_{\mu\nu} = \partial^2 h_{\mu\nu} = 0 \tag{3}$$

By considering the matching of freedom degrees between the metric tensors and the Ricci tensors, there are only two independent metric tensors. They are assumed to be $h_{22} = -h_{11}$ and h_{12}, so the four dimensional line element in the curved space-time can be written as [2, 3]

$$ds^2 = c^2 dt^2 - (1 + h_{11}) dx^2 - (1 + h_{12}) dxdy - (1 + h_{22}) dy^2 - dz^2 \tag{4}$$

Assuming that the gravity waves propagate along the z-axis with $\omega / c = k$, the solutions of Eq.(3) are

$$h_{11} = h_1 \cos(\omega t - kz) \qquad h_{22} = h_2 \cos(\omega t - kz) \qquad h_{12} = h_0 \cos(\omega t - kz) \tag{5}$$

In the formula, the initial phase angles are taken to be zero. By taking $\omega / c = k$, Eq.(5) satisfies the wave equation (3). Therefore, it is thought that general relativity proves the existence of linear plane gravity waves.

2.2 The metrics of linear plane gravitational waves do not satisfy the harmonic coordinate conditions

It is proved below that the solutions of Eq.(5) can not satisfy the harmonic coordinate conditions. According to the definition of general relativity, we have [1, 2]

$$h = h_\mu^\mu = G^{\mu\sigma} h_{\sigma\mu} = G^{11} h_{11} + G^{21} h_{12} + G^{22} h_{22} \tag{6}$$

Where $G^{00} = 1$, $G^{00} = G^{22} = G^{21} = -1$. The others are zero. So we have

$$h_0^0 = h_0^1 = h_0^2 = h_0^3 = h_1^3 = h_2^3 = h_3^3 = 0$$

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

$$h_2^2 = -h_2 \cos(\omega t - kz) \tag{7}$$

So Eq.(6) can be written as

$$h = -h_1 \cos(\omega t - kz) - h_2 \cos(\omega t - kz) - h_0 \cos(\omega t - kz) \tag{8}$$

The harmonic coordinate conditions of Eq.(2) are

$$h^{\nu}_{0,\nu} = h_{,0}/2 \qquad h^{\nu}_{1,\nu} = h_{,1}/2 \qquad h^{\nu}_{2,\nu} = h_{,2}/2 \qquad h^{\nu}_{3,\nu} = h_{,2}/2 \tag{9}$$

According to Eq.(7), we have

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

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

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

$$h^{\nu}_{3,\nu} = h^{0}_{3,0} + h^{1}_{3,1} + h^{2}_{3,2} + h^{3}_{3,3} = 0 \tag{10}$$

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

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

$$h_{,3} = \frac{\partial h}{\partial z} = -k(h_1 + h_2 + h_0)\sin(\omega t - kz) \tag{11}$$

It should be noted that general relativity assumes $h_{22} = -h_{11}$. According to Eq.(5), it means $h_2 = -h_1$. Thus, two problems are caused.

The first is to substitute $h_2 = -h_1$ in Eq.(11), we get

$$h_{,0} = \frac{\omega h_0}{c}\sin(\omega t - kz) \neq 0 \qquad\qquad h_{,3} = -kh_0 \sin(\omega t - kz) \neq 0 \tag{12}$$

Comparing Eq.(12) with Eq.(10), the result is $h^{\nu}_{0,\nu} \neq h_{,0}/2$ and $h^{\nu}_{3,\nu} \neq h_{,3}/2$. So the harmonic conditions do not hold.

The second is that h_1, h_2 and h_0 are the maximum amplitudes of gravity waves, they are defined as non-negative numbers. So it is impossible to have $h_2 = -h_1$, unless $h_1 = h_2 = 0$, which indicates that there are no gravitational waves.

Therefore, even under the weak field conditions, the Einstein's equations of gravitational fields can not be transformed into linear plane wave equations, and general relativity can not predict the existence of planar gravity waves. Unfortunately, the present theory of gravitational waves of general relativity has not done serious calculations for this problem so far.

2.3 The situation when the metric tensor h_{12} does not exist.

Eq.(4) contains the term h_{12} in the direction of space intersecting $dxdy$. This component of gravity waves can not be measured in experiments, so it had no practical physical significance. In fact, many textbooks and literature on the gravity wave theory of general relativity avoid discussing this term, and the gravity wave detection experiments completely ignore this term [4].

Since it is so, why do physicists not eliminate it by using the diagonal method of matrix, or do not consider it at the beginning? The answer was that, if it is not considered, two metric tensors should be independent of each other. We can not assume $h_{22} = -h_{11}$, the harmonic coordinate condition can not hold too.

In this case, we directly use following metrics to do calculation

$$ds^2 = c^2dt^2 - (1 + h_{11})dx^2 - (1 + h_{22})dy^2 - dz^2 \qquad (13)$$

$$h_{11} = h_1 \cos(\omega t - kz) \qquad h_{22} = h_2 \cos(\omega t - kz) \qquad (14)$$

Substituting Eq.(14) in the Einstein's equation of gravity field, from $R_{00} = 0$ and $R_{33} = 0$, we can obtain [1]

$$h_1 \cos(\omega t - kz) + h_2 \cos(\omega t - kz) = 0 \qquad (15)$$

Substituting Eq.(14) in the harmonic coordinate condition, the result is

$$h_1 \sin(\omega t - kz) + h_2 \sin(\omega t - kz) = 0 \qquad (16)$$

From Eqs.(15) or (16) , we get $h_1 + h_2 = 0$, or $h_1 = -h_2$. Since h_1 and h_2 are the maximum amplitudes of waves and defined as non-negative numbers, it is impossible to have $h_1 = -h_2$, unless $h_1 = h_2 = 0$, that means no gravity waves. So when h_{12} is not considered, the metric tensors of Eq.(14) can not satisfy the gravity field equation and the harmonic coordinate conditions too.

This is the biggest problem for the gravity wave theory of general relativity. In order to get the gravity waves, general relativity had to introduce four coordinates conditions and gravity wave component h_{12} and assume $h_{11} = -h_{22}$, resulting in the zero amplitudes of gravity waves. Even thought, four coordinates conditions can not yet be satisfied. Because h_{12} does not exist in practice, the theory can not be self-consistent. So we can only think that the gravity waves of general relativity are artificially cobbled together, not the result of the theory itself.

3 The Einstein's equation of gravity field has no spherical wave solutions.

3.1 The classical mechanical motion equation of spherical wave and its solutions

At present, the gravity wave theory of general relativity only considers liner plane waves, and the gravity wave experiments only detect plane waves. The problem is that a plane wave propagate in a particular direction, and its amplitude and intensity remain constant. But the gravity waves generated in the process of astrophysics can not be a linear plane waves. If the gravity waves generated by the so-called black-hole collisions are plane waves with constant amplitudes and intensities, when they arrive at the earth, they could destroy the earth.

Therefore, if general relativity can predict the existence of gravity waves really, the solutions of spherical wave solution should be obtained from the Einstein's equations of gravity fields. In the following, we still consider the weak field approximation, and prove that it is impossible to obtain spherical wave solutions based on the Einstein's equations of gravity field.

Assuming that the waves propagate at the speed of light, according to classical mechanics theory, the motion equation of three-dimensional wave in free space is

$$\frac{1}{c^2}\frac{\partial^2}{\partial t^2}\psi = \nabla^2\psi \qquad (17)$$

Using the spherical coordinate system, let $x = r\sin\theta\cos\varphi$, $y = r\sin\theta\sin\varphi$ and $z = r\cos\varphi$, we have $r = \sqrt{x^2 + y^2 + z^2}$, Eq.(17) can be written as [5]

$$\frac{1}{c^2}\frac{\partial^2}{\partial t^2}(r\psi) = \nabla^2(r\psi) \qquad (18)$$

The solution of Eq.(18) is

$$\psi = \frac{A}{r}\cos(\omega t - kr) \qquad (19)$$

Where the initial phases are taken as zero and A is the maximum amplitude of spherical wave.

3.2 The metric tensors of spherical gravity waves of general relativity

According to general relativity, gravity waves cause the expansion and contraction of spatial distance. In the case of spherical waves, the expansion and contraction of space have spherical symmetry along the x, y, z axis. Similar to Eqs.(4) and (13), the metric of gravity waves can be written in the following form.

$$ds^2 = c^2 dt^2 - (1+h_{11})dx^2 - (1+h_{22})dy^2 - (1+h_{33})dz^2 \qquad (20)$$

$$h_{11} = h_{22} = h_{33} = \frac{A}{r}\cos(\omega t - kr) \qquad (21)$$

It is shown below that, under the weak field conditions, the metric tensors of Eq.(21) can not not satisfy the harmonic coordinate conditions of general relativity too, and therefore they can not be solutions of the Einstein's equations of gravity fields.

3.3 Gravity field equations of general relativity have no spherical wave solutions

According to the definition of Eq.(6) and Eq.(21), we have

$$h_0^0 = h_0^1 = h_0^2 = h_0^3 = h_1^2 = h_1^3 = h_2^3 = 0$$

$$h_1^1 = h_2^2 = h_3^3 = -\frac{A}{r}\cos(\omega t - kr) \qquad (22)$$

Therefore, we have

$$h = -\frac{3A}{r}\cos(\omega t - kr) \qquad (23)$$

So we get

$$h_{0,\nu}^{\nu} = h_{0,0}^{0} + h_{0,1}^{1} + h_{0,2}^{2} + h_{0,3}^{3} = 0 \qquad (24)$$

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

$$= \frac{Ax}{r^2}\left[\frac{1}{r}\cos(\omega t - kr) - k\sin(\omega t - kr)\right] \qquad (25)$$

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

$$= \frac{Ay}{r^2}\left[\frac{1}{r}\cos(\omega t - kr) - k\sin(\omega t - kr)\right] \qquad (26)$$

$$h^{\nu}_{3,\nu} = h^0_{3,0} + h^1_{3,1} + h^2_{3,2} + h^3_{3,3} = \frac{\partial h^3_3}{\partial z}$$

$$= \frac{Az}{r^2}\left[\frac{1}{r}\cos(\omega t - kr) - k\sin(\omega t - kr)\right] \qquad (27)$$

$$h_{,0} = -\frac{1}{c}\frac{\partial}{\partial t}\frac{3A}{r}\cos(\omega t - kr) = \frac{3\omega A}{cr}\sin(\omega t - kr) \qquad (28)$$

$$h_{,1} = \frac{\partial h}{\partial x} = \frac{3Ax}{r^2}\left[\frac{1}{r}\cos(\omega t - kr) - k\sin(\omega t - kr)\right] \qquad (29)$$

$$h_{,2} = \frac{\partial h}{\partial y} = \frac{3Ay}{r^2}\left[\frac{1}{r}\cos(\omega t - kr) - k\sin(\omega t - kr)\right] \qquad (30)$$

$$h_{,3} = \frac{\partial h}{\partial z} = \frac{3Az}{r^2}\left[\frac{1}{r}\cos(\omega t - kr) - k\sin(\omega t - kr)\right] \qquad (31)$$

According to Eq.(24) and (28), by comparing with Eq.(9), we have

$$\frac{3\omega A}{2cr}\sin(\omega t - kr) \neq 0 \qquad (32)$$

Therefore, the harmonic coordinate condition $h^{\nu}_{0,\nu} = h_{,0}/2$ does not hold, unless the amplitude $A = 0$, meaning that there is no spherical gravity wave.

Accoring to Eq.(25) and (29), by comparing with Eq. (9), we have

$$\frac{Ax}{r^2}\left[\frac{1}{r}\cos(\omega t - kr) - k\sin(\omega t - kr)\right]$$

$$\neq \frac{3Ax}{2r^2}\left[\frac{1}{r}\cos(\omega t - kr) - k\sin(\omega t - kr)\right] \qquad (33)$$

The harmonic coordinate condition $h^{\nu}_{1,\nu} = h_{,1}/2$ does not hold. To make both sides Eq.(33)

being equal, it demands $3/2=1$, obviously absurd. Similarly, according to Eq.(26) and (30), we have $h^{\nu}_{2,\nu} \neq h_{,2}/2$. According to Eq.(27) and (31), we have $h^{\nu}_{3,\nu} \neq h_{,3}/2$.

Therefore, for the spherical gravity waves, four harmonic coordinate conditions of general relativity are not tenable. It is impossible to obtain spherical gravity waves from the Einstein's equations of gravity fields.

3.4 The constriction of using coordinate conditions in general relativity

General relativity often uses the coordinate conditions to simplify the equations of gravity fields. However, the use of coordinate conditions is conditional. It can not be used casually, otherwise serious contradiction will be caused.

Because there are 4 Bianchi identities, there are only 6 independent Ricci tensors. So there are only six independent gravity field equations for general relativity. However, there are 10 independent metric tensors $g_{\mu\nu}$. Six equations are not enough to determine 10 metric tensors, so four independent coordinate conditions are needed to determine 10 metric tensors completely.

However, in some cases, due to the the existence of symmetry, the numbers of independent metric tensors are decreased. In this case, no coordinate conditions are needed.

For example, considering the Schwarzschild metric for a spherically symmetric vacuum gravity field

$$ds^2 = c^2\left(1-\frac{\alpha}{r}\right)dt^2 - \frac{1}{1-\alpha/r}dr^2 - r^2(d\theta^2 + \sin^2\theta d\varphi^2) \qquad (34)$$

There are only two metric tensors g_{00} and g_{11} which are independent and unknown before solving the equations of gravity field. But there are six independent equations of gravity field, it is enough to determine two metric tensors and get $g_{00} = 1-\alpha/r$ and $g_{11} = (1-\alpha/r)^{-1}$.

If the harmonic coordinate conditions are used in this case, the numbers of equations to determine the metric tensor become 10, the contradiction will be caused and leads to absurd results $\alpha/r = 1-i$, $g_{00} = i$ and $g_{11} = -i$. The square of line element become an imaginary number [1].

Similarly, for the linear plane gravity waves, independent and unknown metric tensors are only h_{11} and h_{22}, and six equations of gravity field are sufficient to determine them. So it is unnecessary to introduce the harmonic coordinate conditions again. For spherical surface gravity waves, only an independent metric tensor is required. If the coordinate condition is also used, too many equations will inevitably cause contradictions. The results had to be that the amplitudes of the gravity waves are equal to zero.

3.5 The comparison of the coordinate condition of general relativity with the Lorentz gauge condition of classical electromagnetic theory

Physicists often compare the coordinate conditions of general relativity with the Lorentz gauge conditions of classical electromagnetic theory to justify the use of coordinate conditions in general relativity, but they are not comparable. The Lorentz gauge conditions of electromagnetic theory is

$$\frac{1}{c}\frac{\partial}{\partial t}\varphi + \nabla \cdot \vec{A} = 0 \qquad (35)$$

Assume that the electromagnetic potentials satisfy the wave equations in free space

$$\vec{A} = \vec{A}_0 \cos(\omega t - \vec{k}\cdot\vec{x}) \qquad \varphi = \varphi_0 \cos(\omega t - \vec{k}\cdot\vec{x}) \qquad (36)$$

Substituting Eq.(36) in Eq.(35), and let $\vec{k}\cdot\vec{A}_0 = k'\left|\vec{A}_0\right| = k'\varphi_0$, we get

$$\left(\frac{\omega}{c} - k'\right)\varphi_0 \cos(\omega t - \vec{k}\cdot\vec{x}) = 0 \qquad (37)$$

Taking $\omega / c = k'$, the Lorentz gauge conditions are inevitably satisfied. This is a nature relation, without needing to make the amplitude of electromagnetic wave be equal to zero.

General relativity uses the harmonic coordinate condition, obtained result is that the amplitudes of gravity waves are equal to zero, actually denies the existence of gravity wave. So the Lorentz gauge condition of electromagnetic theory is not the same as the coordinate condition of general relativity, both will lead to completely different results.

Conclusions

It is well known that the Einstein's equations of gravity fields are highly nonlinear ones and can not have linear wave solutions. The current view of physicists is that by using the harmonic coordinate conditions in the weak fields, linear plane wave equations can be obtained and the existence of gravity waves can be predicted.

It is proved in this paper that in order to satisfy the harmonic coordinate conditions, the maximum amplitudes of linear plane gravitational waves must be zero. Therefore, the Einstein's equations of gravity field have linear wave solutions, and general relativity can not predict the existence of planar linear gravity waves.

Since the plane wave propagates only at a specific direction, its maximum amplitude remains constant during the propagation process. Such waves are rare in practical astronomy and astrophysics. In actual physics, spherical waves are more common. The so-called gravity waves generated by black hole collisions and mergers are better described as spherical waves if they exist really. However, the authors have not find any proof that spherical gravity waves can be derived from general relativity.

In this paper, it is proved that the metric tensors of spherical gravity waves can not satisfy the harmonic coordinate condition, which also leads to the result that the amplitudes of spherical gravity wave are equal to zero. So it is also impossible to obtain the spherical gravity wave equation based on the Einstein's gravity field equation. This proof of impossibility is simpler and more explicit than the proof of impossibility of linear planar gravity waves, so spherical waves do not exist according to general relativity.

Since 2016, LIGO’s team announced to detect so-called gravitational waves many times [6,7,8]. LIGO's experiments were based on general relativity, how can they detect something that general relativity does not predict? The authors made a deep research on this problem and published an paper in May 2022 , pointed out that LIGO did not actually detect gravity waves [9].

It was revealed that the so-called gravity wave waveforms in LIGO’s experiment were actually noises, which exists in a large number in the laser interferometers [9,10]. LIGO’s team had previously calculated a large number of theoretical waveforms of gravitational waves by using numerical relativity methods and stored them in a database. Then the team selected several noise waveforms which satisfied the time correlation condition and were similar to the theoretical waveforms in the database. These noise waves were then embellished and packaged and announced as gravity waves. Therefore, LIGO's discovery of gravity waves was a fiction, and no any astrophysical phenomenon corresponding to gravitational wave bursts had been found in practical astronomical observation.

The LIGO team also used band-pass and band-stop filters to process the theoretically calculated gravity wave forms, resulting in severe distortions. Such processed curves were no longer represented the gravitational waves of general relativity, it was meaningless to compare them with so-called observed data.

In addition, according to the theoretical calculations of general relativity, the process that two black holes orbited each other and merged, produced gravity waves lasted for more than three seconds. However, the measured data from LIGO experiment was consistent with the theoretical waveform only in a time window of 0.1 seconds. Even the theoretical waveform were processed through filters, the measured data were inconsistent with the theoretical waveform in 95% of the time. LIGO's so-called gravity wave discovery was essentially a computer simulation and graphics-matching game that had nothing to do with actual astronomical and astrophysical processes.

In addition, LIGO's experiments violated many basic rules of physics. For example, LIGO team claimed to be able to detect a length change of 10^{-18} meter on the laser interferometer arms. This change of length is 1,000 times smaller than the radius of an atomic nucleus, far beyond the capabilities of current science and technology. The uncertainty laws of quantum mechanics also made such measurements impossible.

According to general relativity, the change of spatial distance caused by gravitational waves were only for two free particles in a vacuum. However, LIGO's laser interferometers and glass reflectors were anchored to the earth's surface via steel tubes. Because the electromagnetic interaction of the earth's matter was much larger than the interaction of gravity, the so-called gravitational wave was impossible to change the length of laser interferometer and produced interference effect. LIGO's detection of gravity waves from the so-called black hole merger can be ruled out simply by the presence of electromagnetic interactions.

Therefore, the conclusion of this paper is that the Einstein's equations of gravitational fields can neither have linear plane gravity wave solutions nor spherical wave solutions. It was impossible for LIGO to detect gravity waves that had not been predicted by general relativity. Therefore, physical society should re-examine and re-evaluate the theory and detection of gravitational waves based on the Einstein's equation of gravitational fields.

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