Did LIGO Detect Being Gravity Waves or Noises?

Abstract In recent years, LIGO has repeatedly claimed to detect gravitational waves. This paper points out that these so-called gravitational wave findings are not true. These noises were abundant in LIGO laser interferometers. LIGO has previously calculated a large number of theoretical waveform of gravitational waves according to numerical relativity method and stored them in a database. Then select several noises which satisfy the time correlation condition and are similar to the theoretical waveform in the database. Take these noise waveform, modify them, package them, and announce the discovery of gravitational waves. So LIGO's gravitational wave discovery was all fiction. In fact, they didn't find any astronomical or astrophysical equivalents for gravitational wave bursts. LIGO team also used band-pass and band-stop filters to process the theoretically calculated gravitational wave forms, resulting in severe distortions. Such processed curves are no longer representative of gravitational waves of general relativity, and care meaningless to comparing they with so-called observed data. In addition, according to the theoretical calculation of general relativity, the process of two black holes moving around each other and merging, producing gravitational waves would last more than three seconds. However, the observed data from LIGO experiment was consistent with the theoretical waveform only in the time window of 0.1 ~ 0.13 seconds. In LIGO's publications and communications to the scientific community and the social public, non of these issues were meansioned. LIGO's so-called gravitational wave discovery was essentially a computer simulation and graphics-matching game that has nothing to do with actual astronomical and astrophysical processes.

Key Words: LIGO, Gravity wave detection, General relativity, Numerical relativity, Black hole collisions, Binary neutron star mergers, Computer simulations, Band-pass and band-stop filters, Pattern matching

1. Introduce

In February 2016, LIGO announced that it had detected gravitational wave signals from the collision of two black holes (GW150914)[1]. According to the LIGO's report, the gravitational wave event occurred in a distant galaxy 1.3 billion light years away from Earth. Two black holes of 36 and 29 solar masses merged into a black hole of 62 solar masses, and three solar masses of matter were converted into gravitational waves and radiated into space. In the final moments of black hole merger, the peak of gravitational wave radiation was more than 10 times stronger than electromagnetic radiation in the entire observable universe.

Since then, theoretical and experimental researches on gravitational waves have become upsurge in the world. Observations of gravitational wave bursts have become the norm, with more than 50 gravitational-wave events reported so far by LIGO and Virgo collaboration[2, 3, 4]. Physicists have even declared the coming of gravitational-wave astronomy era.

The theory and experiment of LIGO gravitational wave detection are based on general relativity. According to the current theory, the gravitational field equation of general relativity can be transformed into the linear wave equation under the weak field approximation, so the general relativity predicts the existence of gravitational waves. LIGO's detections of gravitational waves were believed to reconfirm Einstein's gravity theory of curved space-time.

However, in May 2022, the author published an paper entitled " Einstein's Equations of Gravity Fields Have No Linear Wave Solutions Under Weak Conditions"[5]. Through strict and concrete calculations, the following five points are proved.

1. The gravitational wave metric used in the current theory and experiments is not a direct result of solving the gravitational field equations of general relativity, but an unproven hypothesis.

2. This gravitational wave metric satisfies the wave equation $\partial^2 h_{\mu\nu} = 0$, but it does not satisfy the vacuum gravitational field equation $R_{\mu\nu} = 0$ of general relativity in weak field conditions, not to mention in strong fields, so it does not describe the gravitational waves of general relativity

3. The reason for this problem was that four harmonic coordinate conditions used in the deduction of gravity wave equation. However, these four harmonic coordinate conditions were untenable, so the Einstein's equations of gravitational fields can not be simplified into linear wave equations under weak field conditions.

4. If the four harmonious coordinate conditions are transformed into another coordinate system so that they can be satisfied, the metric of gravitational wave also becomes a constant, means that the gravitational field disappears, let alone gravitational waves.

5. What the LIGO experiment detected was the gravitational waves generated by black hole collisions, in which $h_{\mu\nu}$ was not a small quantity of the first order in the extreme strong field conditions, let alone the liner wave solutions. General relativity, however, uses linear wave equation in weak field condition to deal with gravitational waves generated by black hole collisions, the theory is contradictory.

6. In the deduction of the formula of gravitational retard radiation in general relativity, there exist chaotic calculation and wrong coordinate transformation, leading to the invalidity of the formula.

Therefore, the author's conclusions are that the Einstein's equations of gravitational field has no linear wave solution under any condition and can not predict the existence of gravitational waves. But how could LOGO detect something that general relativity did not predict, and multiply announce the findings of gravitational waves?

This paper analyzes this problem from the experimental point of view, and revealed what detected by LIGO were the noises which meet some time-related condition, rather than gravitational waves. These noise wave-forms abundantly appeared on the laser interferometers of LIGO and can be easily found in the database of LIGO database.

For example, for the GW150914 gravitational wave event, J. Creswell o et al in the Bohr Institute in Copenhagen, Denmark, found eight noise wave-forms which were very similar to the gravitational wave waveform within the 30 seconds of the so-called gravitational wave eruption [6]. We and Policarpo Ulianov in Brazil we also found three noise waves very similar to the gravitational wave wave-forms within three seconds of the so-called gravitational wave eruption. So the things were not like LIGO term claiming that the probability that GW150914 were actually noise occurs only once in 260 thousand years. These so-called gravitational waves were a frequent occurrence.

The influences of band pass filter and band stop filter used in LIGO experiment are also discussed. According to he calculation of numerical relativity, the eruption of gravitational waves took about three seconds, but LIGO could not find a matching noise wave that lasts as long as three seconds.

Therefore, LIGO had to use bandpass filter and bandwidth filter to process theoretical wave-forms calculated by general relativity, reducing more than 200 oscillation periods to less than 10 periods, resulting in severe deformation of theoretical gravitational wave-forms. LIGO announced the discovery of gravitational waves by comparing these distorted wave-forms with the noise patterns appearing on laser interferometers.With this last and litter similarity, announce the discovery of gravitational waves.

In this paper, we also carefully analyzes the so-called fifth binary neutron star merger event GW170817 announced by LIGO and Virgo [7, 8]. The fifth gravitational wave detection would not have been possible without Fermi satellite's gamma-ray burst warning. Meanwhile, the so-called gravitational wave signal only appeared on LIGO's two interferometers, but not on VIRGO's interferometers.

However, according to the observations of space telescopes, gamma-ray bursts occur almost every day in the universe. Up to now, more than thousands of gamma-ray bursts had been observed. Why didn't LIGO find them every days until this time of Fermi satellite's warning?

Finally, the basic physics principles of LIGO’s gravitational wave detection are discussed. It is pointed out that the so-called gravitational wave discovery violates the most basic principles of physics. For example, LIGO claimed to have measured the length changes of 10^{-18} m in interferometers, which was 1,000 times smaller than the radius of atomic nucleus. Not only it completely deviates from the accuracy that can be achieved under existing experimental conditions, but it is impossible against the uncertainty principle of quantum mechanics.

Therefore, the conclusion of this paper is that LIGO experiments have not found gravitational waves. The so-called gravitational wave detection has no theoretical basis and technically impossible to achieve. They are essentially computer simulations and graphics-matching games that has nothing to do with actual astronomical and astrophysical processes.

2 What LIGO detected were noises not gravity waves.

2.1 The basic procedure of LIGO’s gravity wave detection

According to general relativity, gravitational waves are generated when two black holes collide and merge. A large number of theoretical waveforms of gravitational waves and different parameters were calculated by using numerical relativity method. LIGO stored these data in a library of waveforms called template waveforms. Meanswhile, two laser interferometers were set up at Hanford,Washington (H1) and Livingston, Louisiana (L1) with a distance of 3000 Km.

Laser interference continuously receives noises and signals from the outside, generating various waveforms. To eliminate noises, LIGO processed mixed waves with two filters. The band-pass filter removed noise beyond the frequency of gravitational waves, and the band-stop filter removed noise generated by instruments. The rest waveform was considered contains gravitational wave signals, mixed with the noise with the same frequency as gravitational waves.

Suppose that a similar shape waveform appeared on both laser interferometers at two moments 7 ms apart, such as the two waveforms on the left and the right sides of the first row in Fig.2, LIGO’s computer system automatically compared the waveform with the theoretical gravitational waveforms in the database. If there appended to have one theoretical waveform similar to that appear on the laser interferometer such as the second row in Fig.1, it was considered to detect gravitational waves!

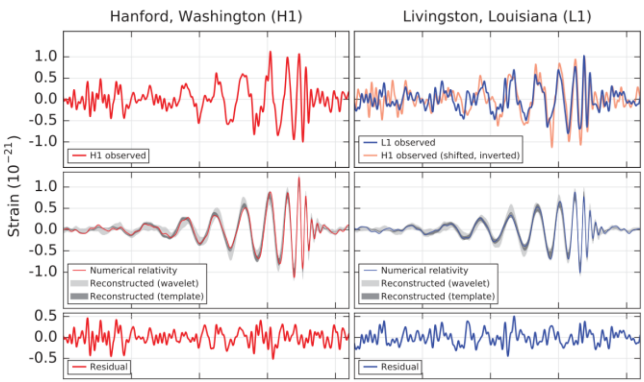


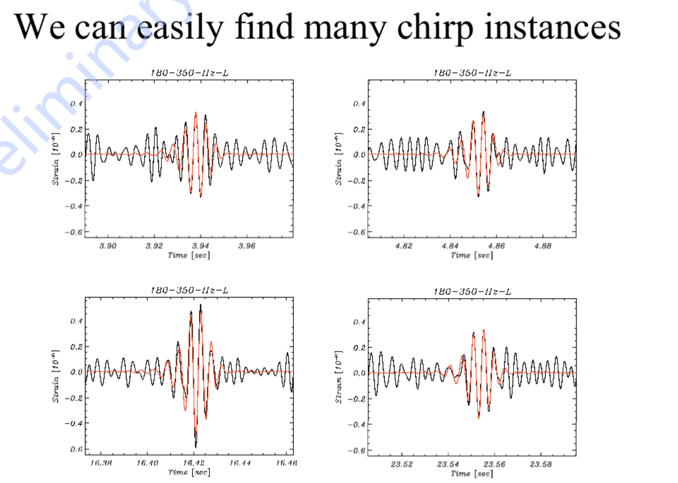
Fig.1 The observed and theoretical waveforms in GW150914 .
The first row was the waveforms observed on two interferometers,
the second row was the theoretically calculated waveforms. The third
row was the difference between two, which was considered to represent noise.

Based on the preconditions of this theoretical waveform, LIGO was able to deduce that there were two black holes of what different masses colliding in somewhere billions of light years from the earth. How much mass was converted into gravitational waves and sent to the earth to produce this wave form on the laser interferometers.

LIGO team knew that their gravitational wave detection method was logically untenable. Because laser interferometer was surrounded by a large amount of noises. It is entirely possible that the two noises having no causal relationship but having similar waveforms and appearing on both interferometers within the time of 7ms. In order to justify it, LIGO term used some mathematics method to do calculation and obtained the result that for the so-called gravitational wave event GW170912, the probability of two noises with similar waveforms appearing on both interferometers was once in 260,000 years. Therefore, GW170912 can be considered as a gravitational wave event.

2.2 The evidence that GW170912 event was noise.

Is this really the case? J. Creswell et al. in Bohr Institute in Copenhagen published an paper in September 2017, showing that they found many noise waveforms that were very similar to the so-called gravitational waveform in LIGO’s databases as shown in Fig.2. In the figure, it can be seen that 8 noise waveforms appearing within 24 seconds, indicting that the frequency of noises appearing was very great.



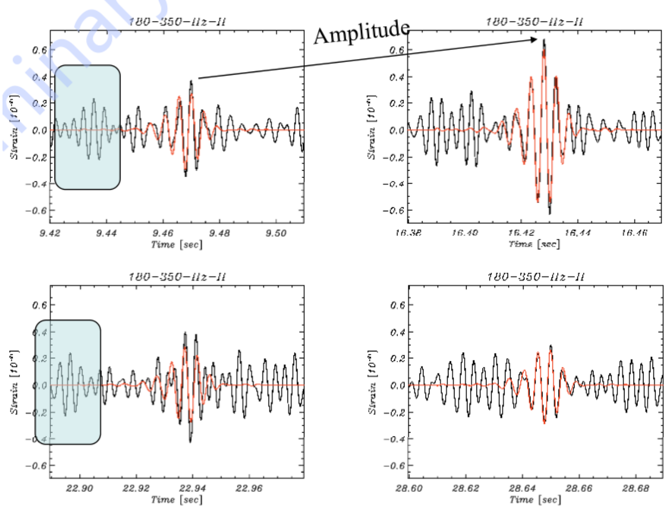


Fig.2 A large number of noise waveforms similar to theoretical gravitational waves existed in LIGO experiment. The red curves represented theoretical waveforms calculated by numerical Relativity, the black curves represented the noise waveforms near the moment of GW150914 event bursting.

We and Policarpo Ulianov in Brazil also found many noises waveforms in LIGO's database, which looked like the gravitational wavefrom of GW150914 event as shown in Figs.3 ~ 5 (https://losc.ligo. org/s/ events/GW150914/LOSC_Event_tutorial_GW150914.html.). They appeared after 0.5 ~ 2.9 seconds of so-called gravity wave bursts. The black curves represented the theoretical gravitational waveforms calculated by numerical relativity, and the green curves represented the noise wavesforms.

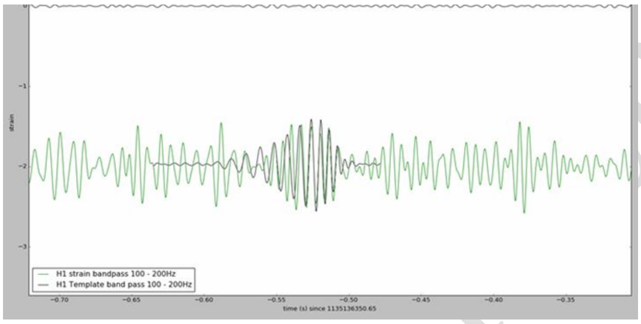


Fig.3 About 0.50 seconds before LIGO's so-called gravitational wave burst，the noise waveform (green curve) appeared in Hanford interferometer and the theoretical waveform calculated by numerical relativity (black curve).

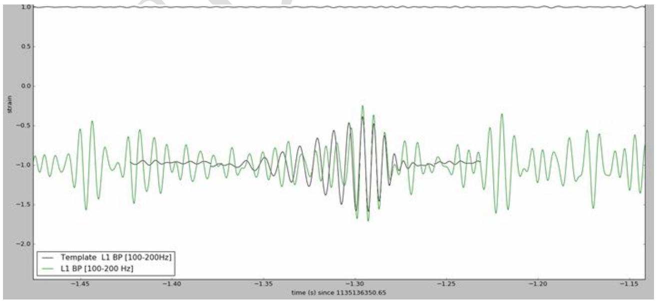


Fig.3 About 1.3 seconds before LIGO's so-called gravitational wave burst，the noise waveform (green curve) appeared in Livingston interferometer and the theoretical waveform calculated by numerical relativity (black curve).

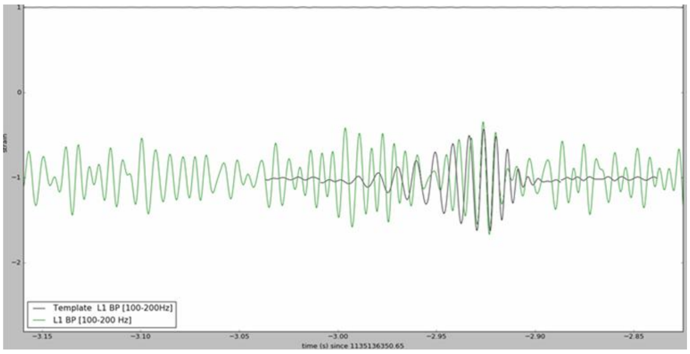


Fig.5 About 2.9 seconds before LIGO's so-called gravitational wave burst，the noise waveform (green curve) appeared in Livingston interferometer and the theoretical waveform calculated by numerical relativity (black curve).

In fact, we found dozens of similar waveforms in LIGO data in several minutes before and after the explosion of GW150914. So the appearance of such waveforms is a systemic phenomenon for LIGO's experiments, instead of so-called gravitational waves. They did not happen once every 260,000 years as LIGO team thought, but rather frequently occurs.

This explains why LIGO was able to detect gravitational wave bursts so often. In more than 3,000 years of human history, there had been only a dozen recorded supernova explosions being observed, an average of one every 300 years. Black hole mergers are more violent astronomical phenomena, which should be much rarer than supernova explosions. How can we see them every few months or even a few days?

2 The problems caused by using filters in gravitational wave detection.

It needs to emphasize that the curves in Fig.1 are not the original recorded data. According to LIGO's publishing paper, all curves in Fig.1, including those detected and those calculated by numerical relativity, were filtered by band filter and band-reject filter [1]. The frequency of gravitational wave in GW15 0914 event was thought to be 35 to 350Hz, and the band filter was used to filter noise at frequencies other than that. Band - stop filter was used to eliminate strong spectral lines produced by experimental instruments. The signals received on the laser interferometer passed through these two filters, and the remand contained the so-called signals of gravitational waves.

However, this method caused many problems as shown below.

1. With the use of band pass filter, the signals with frequency range of 35 ~ 350Hz was retained, which must contain the ambient noise in this range of frequency. Since some of the frequencies in the gravitational wave may be the same as those eliminated by the band stop filter, it was possible to eliminate the corresponding frequency components of gravitational wave by using band stop filter. Therefore, after using band pass and band stop filters, the remaining components could not be completely gravitational waves. It still contained ambient noise and was missing some components of gravitational waves.

As shown in Fig.6, using LIGO's data processing methods, the green curve in Fig.6 roughly represented the remaining waveform after band pass and bandstop filters were used, whose composition was very complex, but LIGO did not publish this original graph.

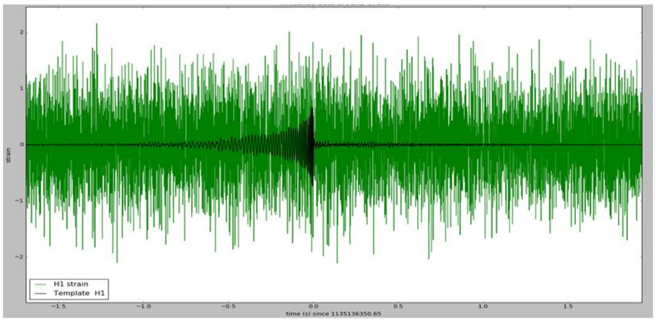


Fig. 6. Measured waveforms (green curve) and theoretically calculated waveforms (black curve) after band-pass and band-stop filters were used.

2. According to LIGO's publishing paper, the waveform of the first line in Fig.1 was subtracted from the waveform of the second line to obtain the waveform of the third line, which represents the noise received by the laser interferometer. It can be seen that the amplitude of this noise was much smaller than that of gravitational waves. However, the reality was that the retained noise should still be much stronger than gravitational waves in the 35-350 Hz frequency range.

3. The problem is not only that, the second line in Fig.1 was not actually the original calculated waveform of theoretical gravitational wave, but the theoretical waveform processed by filters. According to LIGO’s published paper, the waveform of theoretical gravitational waves is actually represented by the first red line in Fig.7. This was a very regular curve that was completely different from the second line in Fig.1. The oscillation time of the curve in Fig.7 was at least 3 seconds rather than 0.1 seconds, and it could not be included in the curve of first line Fig.1. If the waveform in Fig.7 was compared with the first line in Fig.1, it was impossible to conclude that gravitational waves had been found.

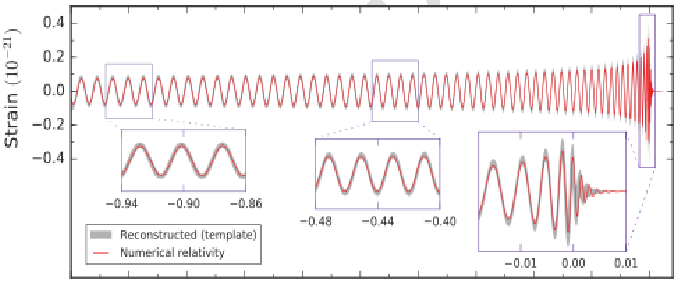


Fig.7 The original graph of gravitational waves of GW151226 calculated by using numerical relativity.

4.Then came the crucial step. LIGO’s team processed the theoretical waveform in Fig.7 with band-pass and band-stop filters, turning it into the red line waveform in Fig.8. The green line is the original image without filter processing. The image in Fig.9 is an enlargement of the image in Fig.8. Obviously, the filtered gravitational wave curves were so distorted that they did not represent the original theoretical gravitational waves. But LIGO’s team used them to replace the theoretical waveforms of numerical relativity without any explanation.

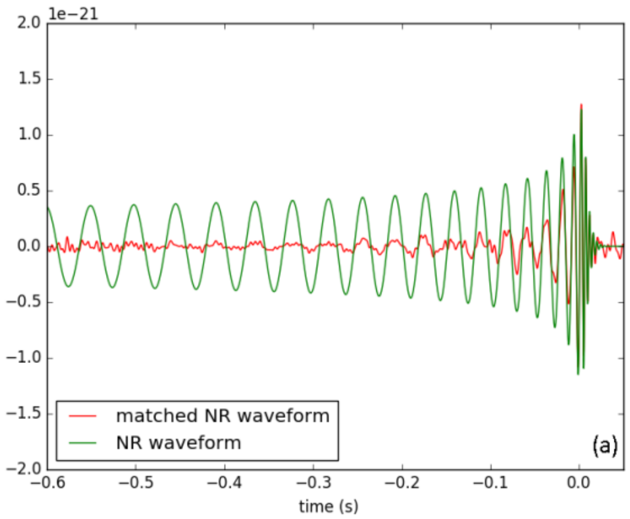


Fig.8 The Waveforms of theoretical gravitational waves after bandpass and bandstop filter processing. The green curve was the waveform without filter processing, and the red curve was the waveform after filter processing.

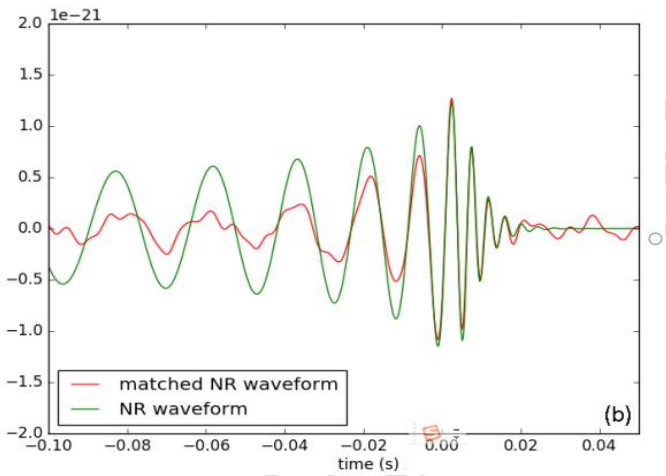


Fig.9 The Detail magnification of Fig.8

5. This also raises a principle problem. Theoretical gravity wave curves contain neither environmental noises nor instrument noises, why should filters be used to deal with them? LIGO term could not face this problem.

6. In addition, it can be seen from Fig.7 and Fig.8 that red curves and green curves are somewhat similar only during a time window of about 0.1 seconds, and completely different during the rest time of 3 seconds. Of the total gravitational wave event window larger than three seconds, 0.1 second accounts for less than one twentieth. Yet with this similarity of less than one-twentieth of time, LIGO announced the discovery of gravitational waves. Regardless of the difference of waveforms in the most of time, as well as numerical relativistic gravitational wave curve processed by filters does not represent the original gravitational wave at all!

7. LIGO term was aware of the problems caused by using this method, but they never discussed or mentioned the consequences of using filters in their paper and announcement to the media and the public. They do not publish graphical comparisons before and after band-pass and band-stop filters were used,

ignoring the fact that most of time the measured waveform was inconsistent with theoretically calculated waveform, leaving no one to know to what extent the theoretical and experimental curves agree.

8. In fact, the background noise of LIGO experiments was very great. Gravitational waves, if they existed, were completely drowned out. In this sense, LIGO's detection of gravitational waves was meaningless. For the detection of gravitational wave, band pass filter and band stop filter were invalid. No matter what kind of filter was used, current technology can not effectively extract such weak gravitational wave signals from such high background noise.

4. The problems in the firth gravity detection of LOGO and VIRGO

4.1 The Gravitational wave coming from Fermi satellite's gamma-ray burst warning

On October 16, 2017, LIGO and VIRGO jointly announced the fifth detection of gravitational waves. Unlike the previous four, the fifth gravitational wave was produced by the merger of two neutron stars, along with the corresponding electromagnetic radiation observed by dozens of observatories around the world. The first four were believed to cause by the merger of two black holes, and no corresponding astronomical phenomena had been observed. Therefore, the fifth gravitational wave detection had special significance, which was considered as "seeing the explosion of gravitational waves."

But is this really the case? We now discuss LIGO's fifth gravitational wave detection and point out that this detection of gravitational waves is also unreliable.

1. According to LIGO Executive Director David Reitze’s speaking at the press conference, the gravitational wave signal was first detected by NASA's Fermi satellite Gamma-ray Burst Monitor, which automatically sent an alert to the relevant astronomical observatories. After being alerted, LIGO's automated analysis system took about six minutes to find a corresponding signal on one of the instruments, two seconds before Fermi's Gamma-ray Burst Monitor signal.

Therefore, LIGO's detection of gravitational waves was an afterthought. Without Fermi satellite’s warning, there would have no the fifth detection of gravitational waves. However, according to space telescope observations, Gamma-ray bursts occur almost every day in the universe, as a matter of course. Up to now, thousands of gamma-ray bursts had been observed. Why did not LIGO detect any corresponding gravitational waves, but only after Fermi's warning this time? And LIGO has been almost invisible again since 2017?

2. This gravitational wave event were only detected by LIGO's laser interferometers, but not by VIRGO. LIGO's explanation was that VIRGO was not in a correct position on Earth, or that earth's material was blocking the gravitational waves. But VIRGO's absence also helped for the spatial location of the fifth gravitational wave event. However, we know that gravity can not be blocked by matter. At night, for example, we can not see the sun, but the sun's gravity still exerts on us. Gravitational waves should be impossible to block, just as matter can not block neutrinos.

So the truth is that LIGO's detectors did not find the signals of neutron star merger at all. After receiving Fermi satellite's warning, LIGO team checked the data and followed up two similar but not identical noise waves (processed by filters) that appeared on two LIGO's laser interferometers two seconds earlier. But these were actually accidentally similar noise waves. VIRGO's detector had no such noise. However, LIGO term found that it could be explained as that VIRGO was not in the observable zone and this fact could be used for the orientation of gravity wave source, then the noise waveform was packaged and claimed to be a gravitational wave signal.

4.2 No theoretical and experimental waveforms were published

LIGO's paper on the gravitational waves generated by neutron star mergers were different from previous four. There was neither comparison between the theoretical and experimental gravitational waveforms, nor comparison between the waveforms from two laser interferometers at two different locations. Why did LIGO not publish those details as they did before? The reason may be simple that due to the sudden nature of the incident, LIGO's database had no the right samples to provide details. Theoretically, this gravitational wave oscillates for more than 100 seconds with thousands of cycles. It is impossible to match the 100-second waveform on LIGO's laser interferometers.

4. 3 It is impossible to detect the length change of 10^{-19} m

The LIGO’s published paper on the fifth gravitational wave detection did not provide the waveform of gravitational wave, but provided the noise wave pattern as shown in Fig.9. The blue line described a wave called transient pulse interference (Glitch), and the yellow line described noise. According to LIGO’s paper, the transient pulse interference wave occurred 1.1 seconds before neutron star merger, and its origin was unclear.

As being seen in Fig.10, the strain caused by noise was 1.5×10^{-20}. According to LIGO's paper, strain 1.5×10^{-20} corresponded to the length change of 1.5×10^{-17} m of interferometer arms . As noted in LIGO’s paper, the strain induced by noise was 150 times greater than that caused by gravitational waves. The strain caused by the binneutron gravitational wave was 10^{-22}, corresponding to the length change was 10^{-19} m for interferometer arms, which was 10 times smaller than the length change caused by black hole merger. Therefore, LIGO term said that the waveform signal of gravitational waves could not be seen in Fig.10.

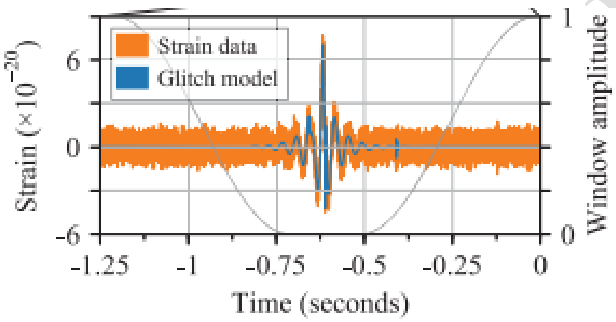


Fig.10 Noise wave patterns during binary neutron star merger

The problem was that the length change of 10^{-18} m caused by black hole mergers had raised huge questions, because this was 1,000 times smaller than the radius of an atomic nucleus! So far, no physicists other than LIGO team had been able to measure such small length changes. As Professor W. W. Engelhardt of the Planck Institute in Germany stated in his open letter to the Nobel Prize Committee, LIGO team has never conducted independent experiments to prove that they were able to detect the length change of 10^{-18} m, how could they claim to be able to detect the length change of 10^{-18} m in the gravity wave experiments? [9]

In fact, 10^{-18} meter is so far into the ultra-microscopic realm that the Uncertainty principle of quantum mechanics makes such precise measurements impossible. According to the Uncertainty formula of quantum mechanics, if a proton's position changes is 10^{-18} meters, the proton's velocity changes is about 300 times the speed of light according to Newtonian mechanics. According to special relativity, proton’s velocity change is almost as fast as the speed of light.

This means that all the atoms in the two mirrors of LIGO laser interferometer oscillated dozens of times at the speed of light in 0.1 second under the action of gravitational waves, and the whole system has long since collapsed! How can LIGO detected a change of length 10^{-19} meter that was 10 times smaller in the event of binary neutron star merger?

In addition, as shown in Fig.10, the strain of noise is 150 times greater than that of gravitational waves. However, LIGO's paper stated that the signal-to-noise ratio of gravitational waves to noise amplitude is 32.4, that is, the amplitude of gravitational waves was 32.4 times greater than that of noise, which was obviously contradictory.

5 LIGO’s gravitational wave detection violates the basic laws of physics

1. Mei Xiaochun published an paper entitled " The precise calculation of constant terms in the motion equation of planets and light in general relativity" in 2021 [10,11]. It is pointed out that the constant term in the motion equations of general relativity have not been seriously discussed so far. According to the Schwarzschild metric and geodesic equations of Riemannian geometric equation, it is proved strictly that the constant term in the time-dependent planetary motion equation of general relativity must be equal to zero. Since this constant term does not exist, general relativity can only describe the parabolic orbital motion (with minor corrections) of bodies in the solar system. It can not describe the elliptic and hyperbolic orbital motion, so that it is meaningless using general relativity to calculate the perihelion precession of Mercury.

In this paper, Mei xiaochun also prove that the time-independent orbital equation of light in general relativity is untenable and contradictory to the time-dependent motion equation of light. According to the time-independent orbital equation, the deflection angle of light in the solar gravitational field is $1.75''$. But according to the time-dependent motion equation of light, the deflection angle of light is a slight modification of the predicted value $0.875''$ of the Newton's theory of gravity. The reason is that the time-independent orbital equation of general relativity is missing a constant term and is certainly invalid.

2. The question then arise, how could Eddington et al measured what general relativity did not actually predict, and claimed to observe a deflection angle $1.75''$ of light in the solar gravitational field?

In July 2020, Mei Xiaochun and Huang Zhixun published a paper pointing out that the measurements of Eddington et al had serious problems[12, 13]. These measurement ignored the refraction of light by material on the solar surface, and used very complex statistical methods, introduced a large number of fitting parameters to meet the measurement consistent with the predictions of general relativity. In fact, if these methods were adopted, by choosing different fitting parameters, the gravitational deflection of light could also satisfy the prediction of the Newtonian theory of gravity, negating general relativity.

Because the perihelion precession of Mercury and the gravitational deflection of light are two of the most basic and important experimental verifications of general relativity, Einstein's curved space-time gravity theory is also rejected from the experiments. The gravitational waves predicted by general relativity are out of the question.

3. General relativity uses curved space-time to represent gravity, the idea itself is a big problem. Physics only observes objects moving along curves in a gravitational field, never observes the curvature of time and space. Using the curvature of space-time to represent gravity not only completely contradicts basic human knowledge, but also causes endless problems [14] .

General relativity assumed the existence of singular black hole, which is actually a space-time singularity with no structure of matter. As we all know, singularity is a morbid thing and meaningless in mathematics and physics [15,16,17]. In fact, such space-time singularities had never been observed in astronomy, they can not exist in nature. However, LIGO's theoretical basis of gravitational waves was based on the collision of two space-time singularities, and used the so-called numerical relativity to calculate the process.This is very absurd. How could two singularities without volumes can collide and merge?

3. The formula used in general relativity to calculate the length change caused by gravitational waves deals with two free particles in vacuum. LIGO’s interferometers were fixed on the ground using steel tubes which were subject to electromagnetic interactions, rather than free particles in vacuum. The electro-magnetic force is 10^{40} times larger than gravitational force, so gravitational wave can not overcome electromagnetic force and change the length of steel pipe. This is equivalent to that a knife made of tofu can not cut glass. In fact, on the earth's surface, all the formulas of general relativity for gravitational waves can not be effective due to the existence of electromagnetic interactions. All the key data in LIGO’s experiments are wrong [18].

5. Let's simply calculate how much gravitational potential energy is released during the collision and merger of two singularities. According to LIGO’s data, two black holes weigh 29 and 36 solar masses, respectively. Three solar masses of matter, roughly the energy of $6.5\times10^{47} J$, were converted into gravitational waves after the collision. The two black holes rotate each other initially at 30% of light’s speed, with the kinetic energy of about $3.5\times10^{47} J$. The initial distance between two black holes is 350 kilometers, and the initial gravitational potential energy is $8.0\times10^{47} J$. After the collision, if two singularities merge to form a single singularity, the distance between them is zero, and the gravitational potential energy released by them would be infinite, and the whole universe would be destroyed!

According to LIGO's experimental accuracy, if the distance between two black holes after the collision and merger is $10^{-18} J$, the potential energy of gravity which translates into gravitational waves and releases in sky is g $2.8\times10^{89} J$, which is 10^{42} times more than three solar masses. Based on LIGO's calculations, the merger process lasts one second.

The gravitational wave energy flow density on the earth, 1.3 billion light years away from the source of the burst, is $1.4\times10^{3} J/s\cdot m^{2}$. However, we know that the average solar current density at the earth's surface is $1.4\times10^{3} J/s\cdot m^{2}$. Therefore, gravitational wave energy flow density is 10^{31} times greater than the density of solar energy flow. In its action, not only the earth would be destroyed, even the solar system and the Milky Way would cease to exist! The LIGO team used numerical relativity to calculate the collision behavior of singular black holes, but lacks the most basic calculation of the transformation of gravitational potential energy of black hole merger.

6. In July 2016, Mei Xiaochun, Huang Zhixun, Policarpo Ulianov and Yu Ping published an paper pointing out that two important factors were ignored in LIGO’s experiment [19]. One was that the influence of gravitational waves on the wavelength of light was not considered, and the other was that the speed of light was not a constant when the gravitational field existed. Therefore, it is impossible to observe gravitational waves with Michelson laser interferometer.

In fact, Michelson used Michelson interferometers trying to find the absolute motion of the earth, but got zero results. The basic principle of LIGO experiment was the same as that of Michelson's experiment. The phase of light wave was a constant during the experiment. Experiments with Maxsonian interferometer yielded zero results, which doomed LIGO’s experiment to find gravitational waves.

6 Conclusions

Einstein's equations of gravitational field are highly nonlinear ones. Mei xiaochun proved rigorously that it has no linear wave solutions even in weak field conditions. General relativity had not predicted the existence of gravitational waves. LIGO’s experiments are based on general relativity, so it is impossible to detect gravitational waves predicted by general relativity, let alone prove the validity of general relativity through so-called gravitational wave discovery.

It is pointed out in this paper that the essence of LIGO experiments is to treat noise as gravitational waves, which frequently appeared on LIGO's laser interferometer. LIGO simply took some noise with similar waveforms and time-dependent on both laser interferences, dressed them up and packaged them, and claimed to have found gravitational waves.

LIGO’s team claimed to be able to detect the length changes of 10^{-18} m in the gravitational wave interferometer, which is completely impossible based on the current measurement techniques. The basic principle of quantum physics limits the accuracy of such measurements. In fact, LIGO had no independent experiments to prove that it could achieve this kind of measurement accuracy, so there was no reason to think that it can achieve this kind of accuracy in gravitational wave detection.

LIGO’s experiments were conducted on the earth's surface, where the laser interferometer was fixed to the ground using a steel tube and the laser mirror was suspended from a steel tube bracket, subject to the electromagnetic force. The electromagnetic force is 10^{40} times larger than gravity. Gravitational waves can not overcome the electromagnetic force to change the length of laser interferometer arms. In fact, the calculation of general relativity about gravitational waves was effective only for two free particles in a vacuum. Due to the influence of electromagnetic interaction on the earth's surface, all the formulas of general relativity on gravitational waves can not be used, and all the key data of LIGO experiment are wrong.

All in all, it is theoretically and technically impossible for LIGO to detect gravitational waves. LIGO's so-called gravitational wave discovery is just a game of computer simulation and graphic matching that has nothing to do with actual astronomical and astrophysical processes.

References

1. B. P. Abbott et al. Observation of Gravitational Waves from a Binary Black Hole Merger, Physical Review Letters, 2016, 116, 061102.
2. Abbott, B.P. , et al. Physical Review Letters, 2016, **116**, 241103 1-14.
3. ABBOTT B P, ABBOTT R, ABBOTT T D, et al（LIGO Scientific Collaboration and Virgo Collaboration）. GWTC-1 :A gravitational-wave transient catalog of compact binary mergers observed by LIGO and VIRGO during the first and second observing runs［J］. Physical Review X, 2019, 9 :031040.
4. ABBOTT B P, ABBOTT R, ABBOTT T D, et al（LIGO Scientific Collaboration and Virgo Collaboration）. GWTC-2 : compact binary coalescences observed by LIGO and VIRGO during the first half of the third observing run［EB/0L］. https : //arxiv. org/abs/2010. 14527.
5. Mei Xiaochun, Einsteins's equations of gravity fields have no linear wave solutions under weak conditions, International Astronomy and Astrophysics Research Journal 4(2): 26-48, 2022; https://journaliaarj.com/index.php/IAARJ/article/view/65 .

6. James Creswell, Sebastian von Hausegger, Audrew D. Jackson, Hao Liu, Pavel Naselsky, On the Time Lags of the LIGO Signals, Abnormal Correlation in the LIGO Data, Journal of Cosmology and Astropartical Physics, 2017, August.

7. B. P. Abbott et al. (LIGO Scientifific Collaboration and Virgo Collaboration), GW170814: A Three Detector Observation of Gravitational Waves from a Binary Black Hole Coalescence, Phys. Rev. Lett. 119, 141101 (2017).
8. B. P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), GW170817: Observation of Gravitational Waves from a Binary Neutron Star Inspiral, Phys. Rev. Lett. **119**, 161101 (2017).
9. W. W. Engelhardt, Open Letter to the Nobel Committee for Physics 2016, https://www.researchgate.net/publication/304581873
10. Mei Xiaochun, The Precise Calculations of the Constant Terms in the Equations of Motions of Planets and Photons of General Relativity,Physics Essays, 2021, 34, 2, http://dx.doi.org/10.4006/0836-1398-34.2.183,https://physicsessays.org/browse-journal-2/product/1861-9-mei-xiaochun-the-precise-calculations-of-the-constant-terms.html.
11. Mei Xiaochun，Four Mistakes in the Original Paper of Einstein in 1915 to Calculate the Precession of Mercury's Perihelion， SCIREA Journal of Physics, April 14, 2022, Volume 7, Issue 2, April 2022, http://dio.org/10.54647/physics14418, https://www.scirea.org/journal/PaperInformation?PaperID=7180.
12. Mei Xiaochun, Huang Zhixun, The Measurements of Light Gravity Deflection of General Relativity were invialed, International Astronomy and Astrophysics Research Journal, 3(3): 7-26, 2021. https://www.journaliaarj.com/index.php/IAARJ/article/view/44.
13. Mei Xiaochun，Using the Newton Theory of Gravity to Calculate the Deflection of Light in the Solar System and the Orbital Poles of Lights Motion of General Relativity，SCIREA Journal of Physics, March 24, 2022, Volume 7, Issue 1, February 2022, https://doi:10.54647/14417, https://www.scirea.org/journal/PaperInformation?PaperID=7180
14.Wang Linjun, Centennial Review of General Relativity, 2016，Vol. 6 No. 4， http://dx.doi.org/10.12677/MP.2016.64011 https://www.hanspub.org/journal/PaperInformation.aspx?paperID=18101
15.Mei Xiachun, The Precise Inner Solutions of Gravity Field Equations of Hollow and Solid Spheres and the Theorem of Singularity, International Journal of Astronomy and Astrophysics, 2011, 1, 109-116.
16.Mei Xiachun, The Singularities of Gravitational Fields of Static Thin Loop and Double Spheres Reveal the Impossibility of Singularity Black Holes Journal of Modern Physics, 2013, 4, 974-982.
17.Mei Xiachun, The Calculations of General Relativity on Massive Celestial Bodies Collapsing into Singular Black Holes Are Wrong, International Journal of Astronomy and Astrophysics, 4, 656-667.
18. Mei X, Yu P. Did LIGO really detect gravitational waves?—The Existence of Electromagnetic Interaction Made the Experiments of LIGO Invalid, Journal of Modern Physics, 2016, (7)：1098～1104, DOI: 10.4236/jmp.2016.710098, https://www.scirp.org/journal/paperinformation.aspx?paperid=67485.
19. Mei Xiaochun, Huang Zhixun，Policarpo Ulianov, Yu Ping，LIGO experiments can not detect gravitational waves by using laser Michelson interferometers, Journal of Modern Physics, 2016, 7, 1749-1761, http://dx.doi.org/10.4236/jmp.2016.713157.