International Astronomy and Astrophysics Research Journal

4(2): 46-59, 2022; Article no.IAARJ.87136

What Did LIGO Detect Being Gravitational Waves or Noises?

Mei Xiaochun [a*], Huang Zhixun [b], Hu Suhui [c] and Yuan Canlun [d]

[a] Department of Theoretical Physics and Pure Mathematics, Institute of Innovative Physics in Fuzhou, China.
[b] School of Information Engineering, Communication University of China, Beijing, China.
[c] Institute of Micro-System and Information Technology, Chinese Academy of Sciences, Shanghai, China.
[d] Department of Foundational Physics, Institute of Innovative Physics in Fuzhou, China.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/87136

Review Article

Received 11 March 2022
Accepted 22 May 2022
Published 27 May 2022

ABSTRACT

This paper reveals that LIGO's (Laser Interferometer Gravitational-Wave Observatory) so-called gravitational wave discoveries are all fictions. What LIGO detected were actually noises not gravitational waves. These noises abundantly appeared in LIGO's laser interferometers. LIGO had previously calculated a large number of theoretical waveform of gravitational waves according to numerical relativity method and stored them in a database. Then LIGO's team elected several noises which satisfied the time correlation conditions and were similar to the theoretical waveform in the database, modifying and packaging them, announced the discovery of gravitational waves. In fact, no any astronomical or astrophysical event was founded which was related to the corresponding gravitational wave bursts. LIGO's team also used band-pass and band-stop filters to process the theoretically calculated gravitational wave forms, resulting in severe distortions. Such processed curves were no longer to represent the gravitational waves predicted by general relativity. It was meaningless to compare them with so-called observed data. In addition, according to the theoretical calculation of general relativity, the process of two black holes merging and producing gravitational waves lasted 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

**Corresponding author: E-mail: mxc001@163.com;*

seconds. In LIGO's publications and communications to the scientific community and the social public, these issues were never mentioned. LIGO's so-called gravitational wave discovery was essentially a computer simulation and graphics-matching game that had nothing to do with actual astronomical and astrophysical processes.

Keywords: LIGO; gravitational wave detection; general relativity; numerical relativity; black hole collisions; computer simulations and image matching; band-pass and band-stop filters.

1. INTRODUCTION

In February 2016, LIGO (Laser Interferometer Gravitational-Wave Observatory) 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 were 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 detections were 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 predicted 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, Mei Xioachun 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 were proved.

1. The gravitational wave metric used in the current theory and experiments was not a direct result of solving the gravitational field equations of general relativity, but an unproven hypothesis.
2. This gravitational wave metric satisfied the wave equation $\partial^2 h_{\mu\nu}=0$, but it did 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 did not describe the gravitational waves of general relativity
3. The reason was that four harmonic coordinate conditions used in the deduction of gravitational wave equation 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 were transformed into another coordinate system so that they could be satisfied, the metric of gravitational wave also became a constant, indicating that the gravitational field disappeared, let alone gravitational waves.
5. What the LIGO detected was the gravitational waves generated by black hole collisions. The first order small quantity $h_{\mu\nu}$ can not be used in these extreme strong field conditions, let alone the liner wave solutions. However, general relativity used linear wave equation in weak field condition to deal with gravity waves generated by black hole collisions, the theories were contradictory.
6. In the deduction of the formula of gravitational retard radiation in general relativity, there existed chaotic calculation and wrong coordinate transformation, leading to the invalidity of the formulas.

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

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

For example, for the GW150914 gravitational wave event, James Creswell et al. [6] in the Bohr Institute in Copenhagen, Denmark, found eight noise wave-forms which were very similar to the theoretical gravitational wave waveform within the 30 seconds of the so-called gravitational wave eruption. We and Policarpo Ulianov in Brazil also found three noise waves very similar to the theoretical gravitational wave wave-forms within three seconds of the so-called gravitational wave eruption. So the things were not like LIGO team claiming that the probability that the gravitational wave in GW150914 were actually noise occurred 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 were also discussed. According to the calculation of numerical relativity, the eruption of gravitational waves took about three seconds, but LIGO could not find a matching noise wave that lasted 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.

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 be possible without the 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 interferometer's arms, 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.

2. WHAT LIGO DETECTED WAS NOISES NOT GRAVITATIONAL WAVES

2.1 The Basic Procedure of LIGO's Gravitational Wave Detections

According to general relativity, gravitational waves were generated when two black holes collided and merged. 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. Meanwhile, two laser interferometers were set up at Hanford,Washington (H1) and Livingston, Louisiana (L1) with a distance of 3000 Km between them.

Laser interference continuously received 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 to contain gravitational wave signals which were mixed with the noises with the same frequency as gravitational waves.

Suppose that a similar shape waveform appeared on both laser interferometers at two moments with about 7 ms apart, such as two waveforms on the left and the right sides of the first row in Fig. 1, 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 appeared on the laser interferometer such as the second row in Fig. 1, it was considered to detect gravitational waves!

Based on the preconditions of this theoretical waveform, LIGO deduced that two black holes with 36 and 29 solar masses collided in 1.3 billions of light years from the earth. 3 solar mass was converted into gravitational waves radiating into space and sent to the earth to produce this wave form on the laser interferometers.

LIGO's team knew that their gravitational wave detection method was logically untenable. Because laser interferometer was surrounded by a large amount of noises. It was entirely possible that the two noises having no causal relationship but having similar waveforms and appearing on both interferometers within the time of 7ms. So LIGO team used some mathematics method and obtained the result that the probability of two noises with similar waveforms appearing on both interferometers was once in 260,000 years. Therefore, GW170912 could 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 [6], showing that they found many noise waveforms that were very similar to the so-called gravitational waveform of GW170912 in LIGO's databases as shown in Fig. 2 marked that "we can easily find many chirp instances". In the figure, it can be seen that 8 noise waveforms appearing within 24 seconds, indicating that the frequency of noises appearing was very great.

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 Fig.3 ~ 5. They appeared after 0.5 ~ 2.9 seconds of so-called gravitational wave bursts. The black curves represented the theoretical gravitational waveforms calculated by numerical relativity, and the green curves represented the noise wavesforms.

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 was a systemic phenomenon for LIGO's experiments, instead of the so-called gravitational waveforms. They did not happen once every 260,000 years as LIGO team declared, but rather frequently occurred.

This explained 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 were more violent astronomical phenomena, which should be much rarer than supernova explosions. How could LIGO detect them every few months or even a few days?

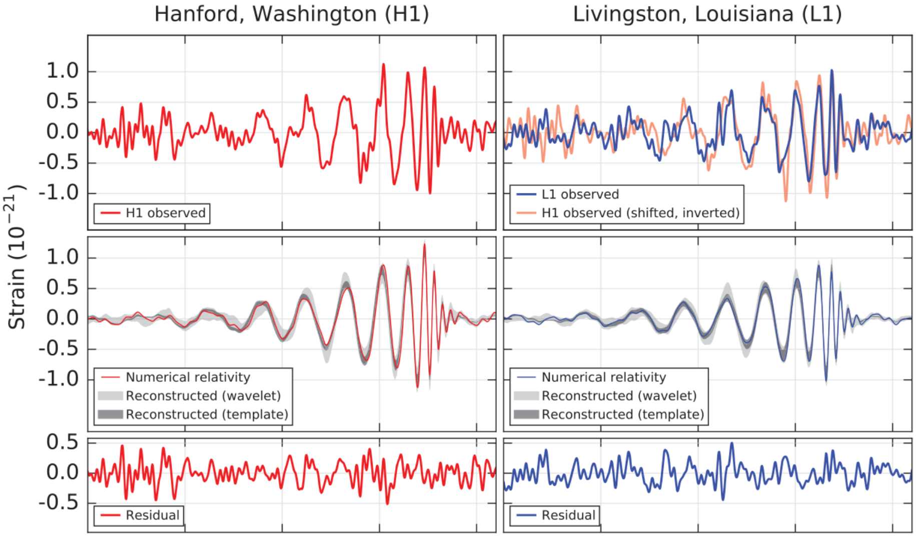
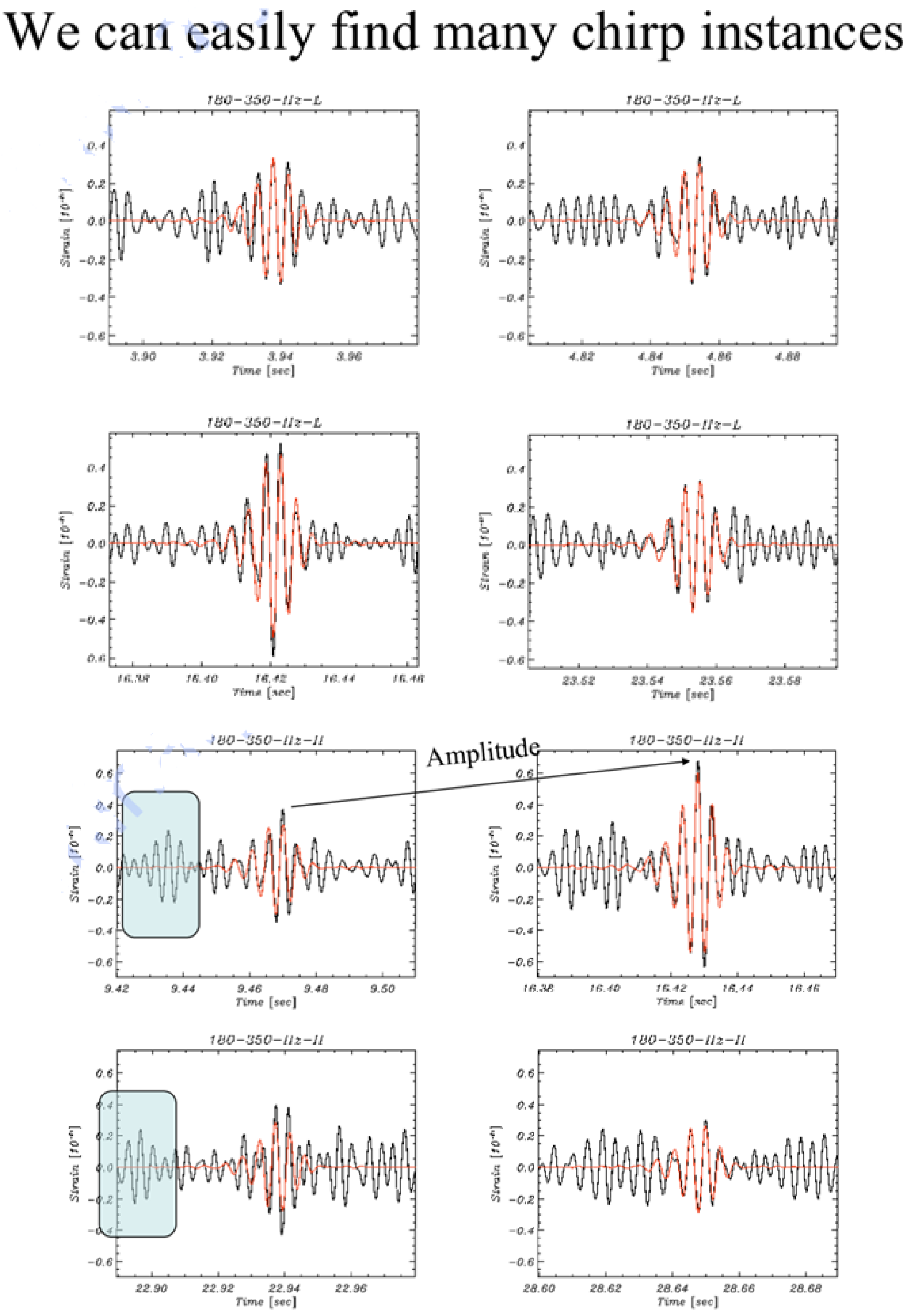


Fig. 1. The observed and theoretical waveforms in GW150914. The first row was the waveforms observed on two interferometers, the second row was the theoretically calculated and filtered waveforms. The third row was the difference between both, which was considered to be noises



We can easily find many chirp instances

Amplitude

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

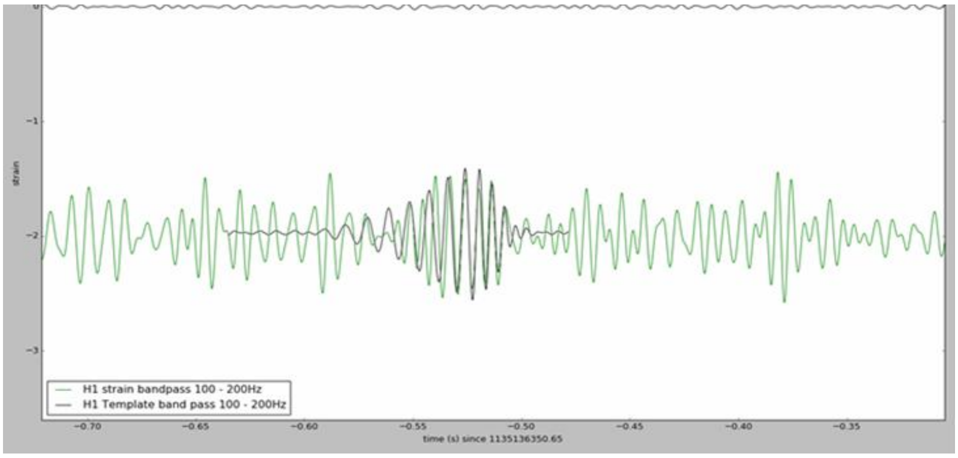


Fig. 3. About 0.50 seconds before LIGO's so-called gravitational wave burst, the noise waveform (green curve) appeared in Hanford interferometer and the theoretical and filtered waveform (black curve)

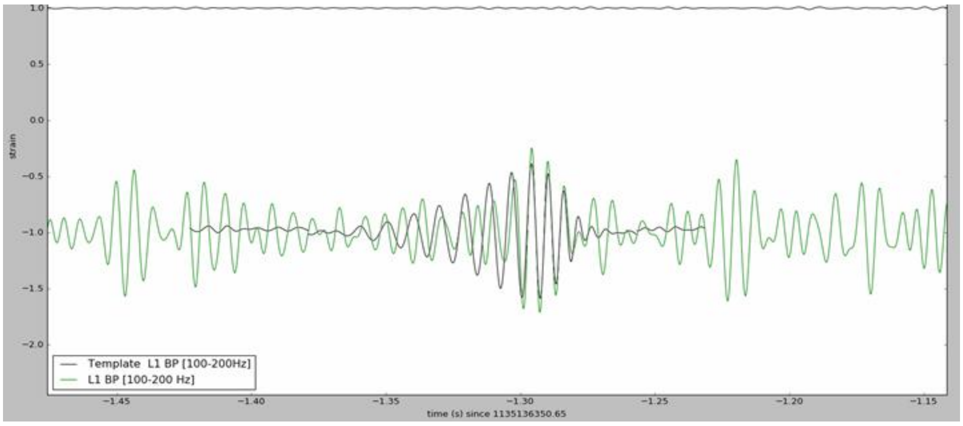


Fig. 4. About 1.3 seconds before LIGO's so-called gravitational wave burst, the noise waveform (green curve) appeared in Livingston interferometer and the theoretical and filtered waveform (black curve)

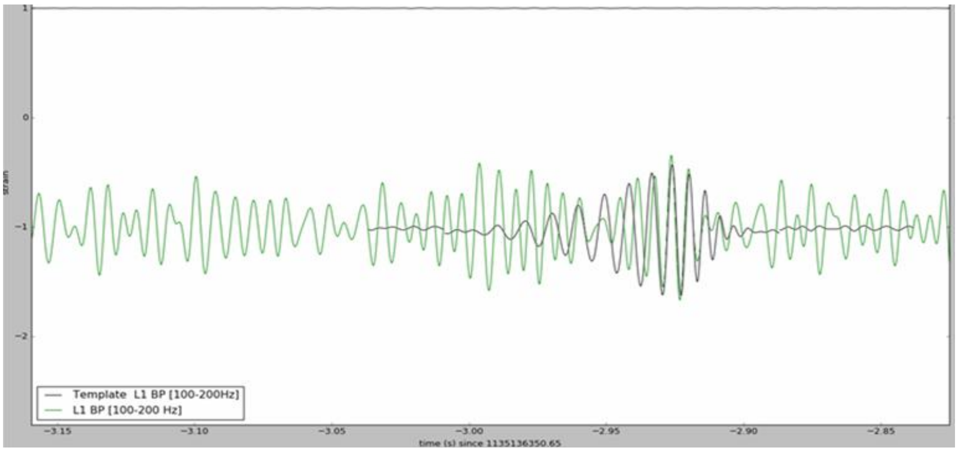


Fig. 5. About 2.9 seconds before LIGO's so-called gravitational wave burst, the noise waveform (green curve) appeared in Livingston interferometer and the theoretical and filtered waveform (black curve)

3. THE PROBLEMS CAUSED BY USING FILTERS IN GRAVITATIONAL WAVE DETECTION

It needs to emphasized that the curves in Fig. 1 were 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, by using LIGO's data processing methods, the green curve roughly represented the remaining waveform after band pass and bandstop filters were used, whose composition was very complex, but LIGO did not publish this kind of original graphs.

2. According to LIGO's published paper, the waveform of the first raw in Fig. 1 was subtracted from the waveform of the second raw 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 was not only that, the second raw 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 was actually represented by the red line in Fig. 7. This was a very regular curve that was completely different from the second raw 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 raw in Fig. 1. If the waveform of Fig. 7 was compared with the first raw in Fig. 1, it was impossible to conclude that gravitational waves had been found.

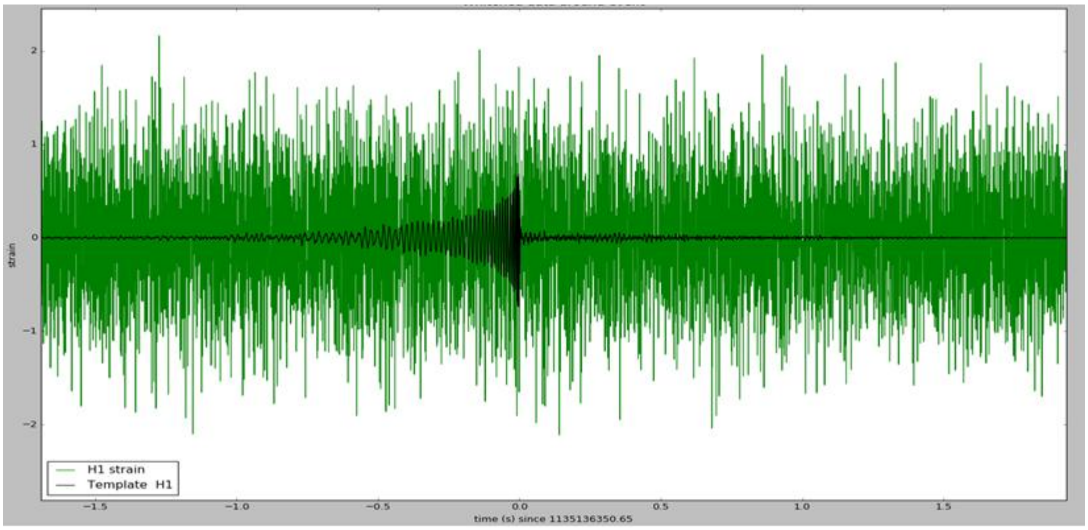


Fig. 6. Measured waveforms (green curve) and theoretically calculated waveforms (black curve) after band-pass and band-stop filters were used

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 curve waveform shown in Fig. 8. The green curve was the original one without filter processing. The image in Fig. 9 is an enlargement of the image of 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 to pretend gravitational waves.

5. This also raised a principle problem. Theoretical gravitational wave curves contained neither environmental noises nor instrument noises, why should filters be used to deal with them? LIGO team could not face this problem.

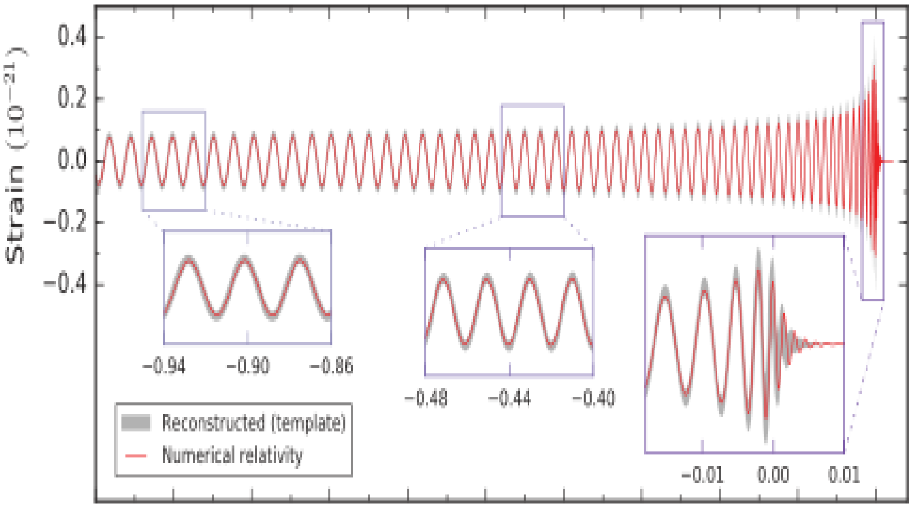


Fig. 7. The original graph (red line) of gravitational waves of GW151226 calculated by using numerical relativity

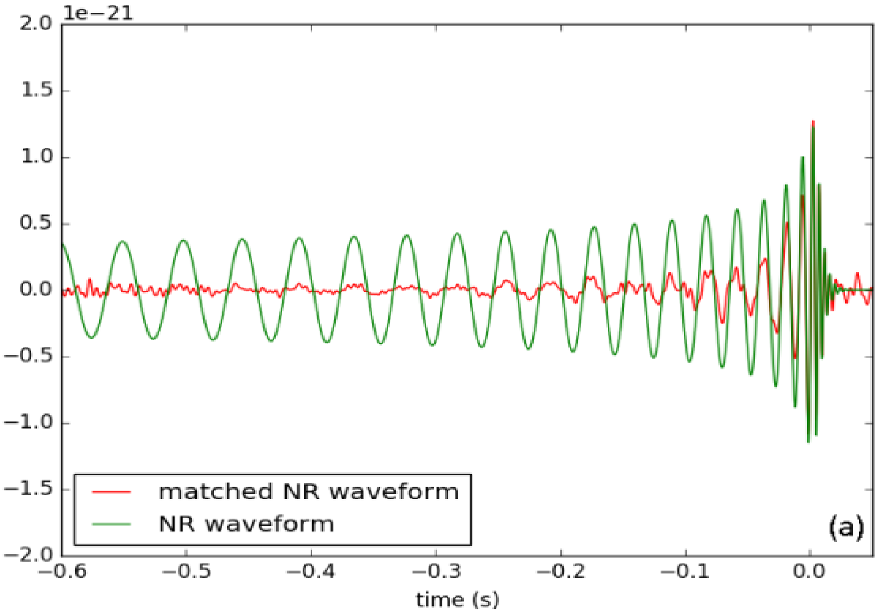


Fig. 8. The Waveforms of theoretical gravitational waves after bandpass and bandstop filter processing. The green curve was the waveform without filter processing, and the red curve was the waveform after filter processing

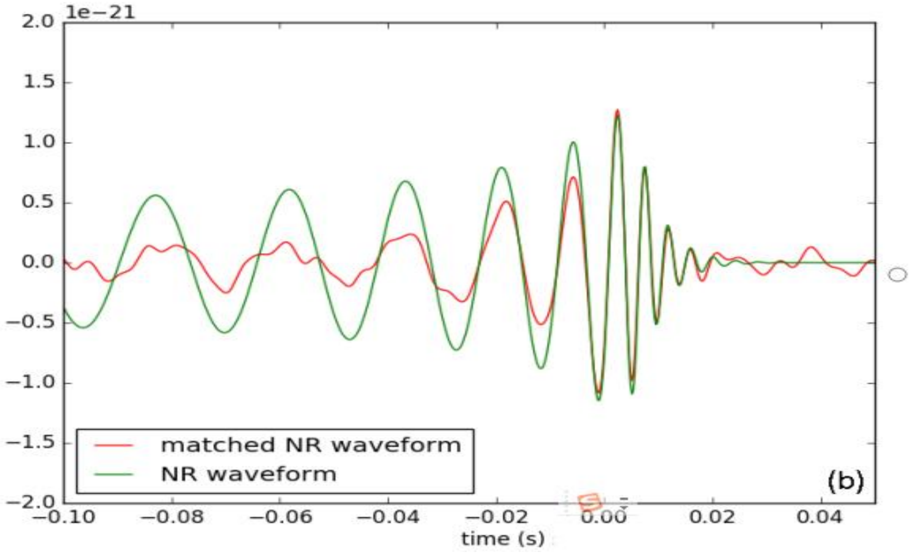


Fig. 9. The local magnification of Fig. 8

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 that numerical relativistic gravitational wave curve processed by filters does not represent the original gravitational wave at all!

7. LIGO team 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 did 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 knowing what extent the theoretical and experimental curves agreed with.

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 could not effectively extract such weak gravitational wave signals from such high background noise.

4. THE PROBLEMS IN THE FIRTH GRAVITATIONAL WAVE DETECTION

4.1 The Firth Gravitational Wave Event 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 was this really the case? We here discussed LIGO's fifth gravitational wave detection and pointed out that this detection of gravitational waves was 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, was a matter of routine. Up to now, thousands of gamma-ray bursts had been observed. Why did LIGO not detect any corresponding gravitational waves, but only after Fermi's warning in this time? And LIGO had been almost invisible again since 2017?

2. This gravitational wave event was 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 source. However, we knew that gravity could 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 was impossible to be blocked, just as the matter of Earth could not block neutrinos.
So the truth was 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 one or two LIGO's laser interferometer two seconds earlier. But this was accidentally similar noise wave. VIRGO's detector had not founded such noise. LIGO team found that this fact could be used for the orientation of gravitational wave source, then LIGO and VIRGO embellished and packaged the noise waveform, claiming it to be a gravitational wave signal.

4.2 LIGO did not Publish the Theoretical and Experimental Waveforms of the First Gravitational Wave Event

LIGO's paper on the gravitational waves generated by neutron star mergers were different from previous four. They did not publish the theoretical and experimental waveforms of the first gravitational wave event. 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. No suitable sample could matches the Gama burst waveform. Theoretically, this gravitational wave oscillated for more than 100 seconds with thousands of cycles. It was impossible to find a 100-second waveform on LIGO's laser interferometers.

4.3 It is Impossible to Detect the Length Change of 10^{-19} m

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. 10. The blue line described a wave called transient pulse interference (Glitch), and the orange line described the noises. The transient pulse interference wave occurred 1.1 seconds before neutron star merger, and its origin was unclear.

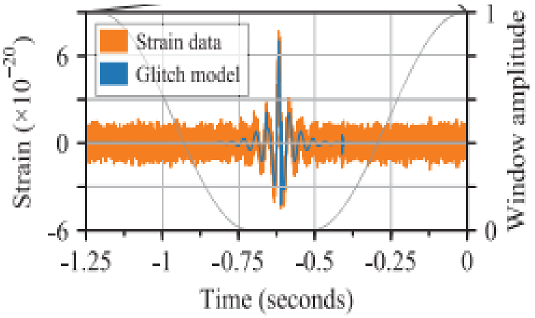


Fig. 10. Noise wave patterns during binary neutron star merger

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 team declared that the waveform signal of the firth gravitational wave event could not be seen in Fig. 10.

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 Planck Institute in Germany stated in his open letter to the Nobel Prize Committee, LIGO team had 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 gravitational wave experiments? [9].

In fact, 10^{-18} meter was 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 was 10^{-18} meters, its velocity changes was about 300 times the speed of light according to the Newtonian mechanics, and was almost as fast as the speed of light according to special relativity.

This indicted 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 had long since collapsed! How could LIGO detect 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 was 150 times greater than that of gravitational waves. However, LIGO's paper stated that the signal-to-noise ratio of gravitational waves was 32.4, that was, the amplitude of gravitational waves was 32.4 times greater than that of noise, which was obviously contradictory.

5. LIGO’s GRAVITY WAVE DETECTION VIOLATED THE BASIC LAWS OF PHYSICS

1. Mei Xiaochun published an paper entitled "The precise calculation of constant teams in the motion equation of planets and light in general relativity" in 2021 [10,11]. It was pointed out that the constant term in the motion equations of planets and light of general relativity had not been seriously discussed so far. According to the Schwarzschild metric and the geodesic equations of Riemannian geometry, it was 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 did not exist, general relativity could only describe the parabolic orbital motion (plus minor corrections) of celestial bodies in the solar gravitational field. It could not describe the elliptic and hyperbolic orbital motions, so the Einstein’s gravity theory of curved space-time did no hold. It was impossible and meaningless using general relativity to calculate the precession of Mercury’s perihelion.

2. In this paper, Mei xiaochun also proved that the time-independent orbital equation of light in general relativity was wrong 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 was $1.75''$. But according to the time-dependent motion equation of light, the deflection angle of light was a slight modification of the value $0.875''$ predicted by the Newton's theory of gravity. The reason was that the time-independent orbital equation of general relativity was missing a constant term so that it was certainly invalid.

3. The question then raised, how could Eddington et al measure what general relativity did not actually predict, and claimed to observe a deflection angle $1.75''$ of light in the solar gravitational field? [12,13,14].

In July 2020, Mei Xiaochun and Huang Zhixun published a paper, revealed that the measurements of Eddington et al had serious problems [15,16]. These measurements 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 precession of Mercury’s perihelion and the gravitational deflection of light were two of the most basic and important experimental verifications for general relativity, Einstein's gravity theory of curved space-time was rejected from the experiments. The gravitational waves predicted by general relativity was out of the question too.

4. General relativity used curved space-time to represent gravity, the idea itself was a big problem. Physics only observed an object moving along a curve in a gravitational field, never observed the curvature of time and space. Using the curvature of space-time to describe gravity not only completely contradicted basic human knowledge, but also caused endless problems [17].

5. General relativity assumed the existence of singular black hole, which was actually a space-time singularity surrounded by an event horizon without the structure of matter. As we all knew, singularity was a morbid thing and meaningless in mathematics and physics [18,19,20]. In fact, such space-time singularities had never been observed in astronomy, they could not exist in nature.

However, LIGO's theory 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 was very absurd. How could two singularities without volumes collided and merged?

6. Let's simply calculate how much gravitational potential energy was released during the collision and merger of two singularity black holes. According to LIGO’s data, two black holes had 29 and 36 solar masses respectively at beginning. Three solar masses of matter, roughly with 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 was 350 kilometers, and the initial gravitational potential energy was $8.0\times10^{47}J$. After the collision, if two singularities merge and form a single singularity, the distance between them was zero, and the gravitational potential energy released in the process would be infinite, and the whole universe would be destroyed!

According to LIGO’s claiming of experimental accuracy, if the distance between two singular black holes was 10^{-18} m after collision and merger, the potential energy of gravity which translated into gravitational waves and released into space was $2.8\times10^{89}J$, which was 10^{42} times more than the energy translated from three solar masses . Based on LIGO's calculations, the merger process lasts about one second. The gravitational wave energy flow density on the earth, 1.3 billion light years away from the source of the burst, was $1.5\times10^{34}J/s\cdot m^2$.

However, as we knew that the average energy current density of the solar radiation accepted on the earth's surface was $1.4\times10^{3}J/s\cdot m^2$. The energy flow density of gravitational wave produced by the collision of two black holes was 10^{31} times greater than the energy flow density of the solar radiation. In this case, 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 lacked the most basic calculation of the transformation of gravitational potential energy for singular black hole merger.

7. The formula used in general relativity to calculate the length change caused by gravitational waves dealt with two free particles in vacuum in fact. LIGO’s interferometers were fixed on the ground using steel tubes which were subject to electromagnetic interactions, rather than free particles in vacuum. The electromagnetic force was 10^{40} times larger than gravity, so gravity wave could not overcome electromagnetic force and changed the length of steel pipe. This was equivalent to that a knife made of tofu could not cut glass. In fact, on the earth's surface, all the formulas of general relativity for gravity waves were ineffective due to the existence of electromagnetic interactions [21].

8. In July 2022, Mei Xiaochun, Huang Zhixun, Policarpo Ulianov Yu Ping published an paper pointing out that two important factors were ignored in LIGO’s experiment [22]. 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 was impossible to observe gravity waves by using Michelson laser interferometer.

In fact, Michelson used Michelson interferometers, tried to find the absolute motion of the earth, but got zero results, the reason was that the phase of light wave was a constant. The basic principle of LIGO experiment was the same as that of Michelson's experiment. The Michelson interference experiment yielded zero results, which doomed that LIGO’s experiment could not find gravitational waves, even if gravitational waves existed really.

6. CONCLUSIONS

Einstein's equations of gravitational field were highly nonlinear ones. Mei Xiaochun proved rigorously that it had no linear wave solutions even under weak field conditions. General relativity could not predict the existence of gravitational waves. LIGO’s experiments were based on general relativity, so it was impossible to detect gravitational waves, let alone proving the validity of general relativity through so-called gravitational wave discovery.

It was pointed out in this paper that the essence of LIGO experiments was to take noises as gravitational waves, which frequently appeared on LIGO's laser interferometer. LIGO simply took some noises with similar waveforms and time-dependent on both laser interferences, embellished them and claimed to have discovered gravitational waves.

LIGO’s team claimed to be able to detect the length changes of 10^{-18} m for the gravity wave interferometer’s arms, but this was completely impossible based on the current measurement techniques. The basic principle of quantum physics limited such measurements. In fact, LIGO had no independent experiments to prove that it could achieve this kind of measurement accuracy and detected gravitational waves.

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 was 10^{40} times larger than gravity. Gravitational waves could 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 could not be used, and all the key data of LIGO experiment were false.

Therefore, the conclusion of this paper was that LIGO experiments had not found gravitational waves. The LIOG’s so-called gravitational wave detection had no theoretical basis and technically impossible. They were essentially the computer simulations and graphics-matching games that had nothing to do with actual astronomical and astrophysical processes.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Abbott BP, et al. Observation of Gravitational Waves from a Binary Black Hole Merger, Physical Review Letters. 2016;116:061102.
2. Abbott BP, et al. Physical Review Letters. 2016;116:241103 1-14.
3. Abbott BP, Abbott R, Abbott TD, 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 BP, Abbott R, Abbott TD, 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]. Available: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. 2022;4(2):26-48. Available: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. Abbott BP, 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. 2017; 119:141101.

8. Abbott BP, et al. (LIGO Scientific Collaboration and Virgo Collaboration), GW170817: Observation of Gravitational Waves from a Binary Neutron Star Inspiral, Phys. Rev. Lett. 2017;119:161101.
9. Engelhardt WW. Open Letter to the Nobel Committee for Physics; 2016. Available:https://www.researchgate.net/publication/304581873
10. Mei Xiaochun. The Precise Calculations of the Constant teams in the Equations of Motions of Planets and Photons of General Relativity, Physics Essays. 2021;34:2. Available: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-teams.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; 7(2). Available:http://dio.org/10.54647/physics14418, https://www.scirea.org/journal/PaperInformation?PaperID=7180.
12. Dyson FW, Eddington AS, Davidson C. A determination o f the deflection of light by the Sun’s gravitational field from observations made at the total eclipse of May 29, 1919. Available:https://royalsocietypublishing.org/doi/10.1098/rsta.1920.00093
13. Burton F. Jones. Gravitational deflection of light: solar eclipse of 30 June 1973 II. Plate Reductions, The Astronomical Journal. 1976;81(6).
14. Ryle FM. A measurment of the gravitational deflection of radio waves by the sun during 1972. October, Mon. Not. R., Atr. Soc. 1973;161, Short Communication.
15. Mei Xiaochun, Huang Zhixun. The Measurements of Light Gravity Deflection of General Relativity were invialed, International Astronomy and Astrophysics Research Journal. 2021;3(3):7-26. Available:https://www.journaliaarj.com/index.php/IAARJ/article/view/44.
16. 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;7(1). Available:https://doi:10.54647/14417, https://www.scirea.org/journal/PaperInformation?PaperID=7180
17. Wang Linjun. Centennial Review of General Relativity. 2016;6(4). Available:http://dx.doi.org/10.12677/MP.2016.64011 https://www.hanspub.org/journal/PaperInformation.aspx?paperID=18101
18. 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.
19. 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.
20. 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.
21. 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, Available:https://www.scirp.org/journal/paperinformation.aspx?paperid=67485.
22. 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. Available:http://dx.doi.org/10.4236/jmp.2016.713157.

© 2022 Xiaochun et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/87136