LIGO Legacy

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Introduction

This book is about LIGO and its legacy with modern physics. LIGO claims to be a new mechanism for observing the universe, by measuring a theoretical gravitational wave.

LIGO also claims to detect a black hole, a neutron star, and a ripple in space-time. LIGO also claims to confirm Einstein's theory of relativity (both special and general). LIGO's data and conclusions are the basis of a new branch of science, gravitational physics.

LIGO claims to have detected many gravitational waves coming from distant astrophysical sources. All aspects of this story are described, including terms and methods.

The history of LIGO's claims is presented enabling the reader to make their own conclusions on LIGO's legacy, based on the real data.

This is a brief summary of the 14 sections:

1) Introduction briefly describes the book.

2) Relativity and gravity describes some of the background before LIGO;

this includes comparing space-time to gravity.

3) Earth tides are a mechanism affecting the Earth's crust. Just as the Moon and Sun cause tides in the Earth's oceans, they also cause tides in the Earth's crust.

4) The black hole is the first of the two massive objects assumed to participate in the mergers being measured by LIGO. This entity is described.

5) The neutron star is the second of two massive objects assumed to participate in the mergers being measured by LIGO. This entity is described.

6) Gravitational waves are detected only indirectly. The history of this concept is described, including LIGO's "inspiral" scenario.

7) LIGO claims to have detected many gravitational waves coming from distant astrophysical sources. All aspects of this story are described, including terms and methods

8) Notable Detections describes the pivotal detections, the first in 2015 and the one in 2017 earning LIGO the 2017 Nobel Prize in Physics.

9) In early 2019, I noticed a correlation among the LIGO detection dates. The LIGO data set at the time was recorded, and is presented here.

10) On November 10, 2019, I gave LIGO predictions for GW detections in 3 separate 5-day spans. The prediction and results are described.

11) Sometime around early 2021, the history of LIGO was changed; Facebook posts from late 2019 were deleted; detections dated earlier in runs O1 and O2 were added; and detections from late 2019 were given the Retracted status.

12) The history of the LIGO GW detections (as of April 2021) is presented.

13) Final Conclusion describes a conclusion based on the preceding sections.

14) All external references in the book have links available as directed here.

2 Relativity and Gravity

This section describes the transition from Newton's real force of gravity to space-time, which is part of Einstein's relativity. Space-time is a newly defined context of a special, moving observer, where new rules can be applied, like the velocity of a mass is limited to the velocity of light.

Relativity enabled the definition of a black hole. A black hole was described by both Einstein and Hawking, and is claimed by many as being observed.

2.1 Introduction to Relativity

Some advocates of relativity believe in the adage: “Spacetime tells matter how to move; matter tells spacetime how to curve.”

For someone to believe that adage, they do not understand a) coordinate systems and b) physics, the science describing motion.

Space-time is just a 4-dimensional coordinate system. A coordinate system is defined by an observer to measure positions in their field of view.

Only a force can cause motion. This is rudimentary physics.

Isaac Newton defined his laws of motion and several equations, including one for the force of gravity between 2 masses.

James Clerk Maxwell and others defined equations for electromagnetism, including one for the electric force between 2 charges.

No matter how someone distorts a coordinate system, it is not a force and cannot affect motion.

2.2 Story of Space-time and gravity.

When physicists adopted Einstein's defined behaviors of a special observer as important to the science of physics, then they broke the foundation of classical or Newtonian physics.

Excerpts from Wikipedia:

"According to Newton, absolute time exists independently of any perceiver and progresses at a consistent pace throughout the universe.

Absolute space, in its own nature, without regard to anything external, remains always similar and immovable. Relative space is some movable dimension or measure of the absolute spaces; which our senses determine by its position to bodies: and which is vulgarly taken for immovable space ... Absolute motion is the translation of a body from one absolute place into another: and relative motion, the translation from one relative place into another ...

— Isaac Newton

(Excerpt end)

In my words, absolute space is the background, has no features, and remains always immovable.

In my words, the universe has no defined limits and it has much stuff in this space.

After Newton, physicists understood absolute time and absolute space. They exist independently of any observer.

We can measure the location of any object or event and the time of each measurement to calculate its distance, velocity, acceleration.
Before space-time, physicists understood gravity. Newton defined it as a mutual force between 2 masses. The force required no time for its action, so it was instantaneous and simultaneous. This understanding of the force of gravity enabled the discovery of the planet Neptune in 1846, using only Newton's equations, following many measurements of planet positions over time.

Einstein derailed this understanding by developing the limited context of his special, moving observer.

Excerpt from Wikipedia, where its Minkowski Space topic explains the transition:

The views of space and time which I wish to lay before you have sprung from the soil of experimental physics, and therein lies their strength. They are radical. Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality.

— Hermann Minkowski, 1908, 1909

Though Minkowski took an important step for physics, Albert Einstein saw its limitation:

At a time when Minkowski was giving the geometrical interpretation of special relativity by extending the Euclidean three-space to a quasi-Euclidean four-space that included time, Einstein was already aware that this is not valid, because it excludes the phenomenon of gravitation.

(Excerpt end)

Observation:

Einstein integrated gravitation into the quasi-Euclidean four-space.
Another excerpt from Wikipedia, where its topic of History of special relativity describes the transition:

Some scientists and philosophers of science were critical of Newton's definitions of absolute space and time. Ernst Mach (1883) argued that absolute time and space are essentially metaphysical concepts and thus scientifically meaningless, and suggested that only relative motion between material bodies is a useful concept in physics. Mach argued that even effects that according to Newton depend on accelerated motion with respect to absolute space, such as rotation, could be described purely with reference to material bodies, and that the inertial effects cited by Newton in support of absolute space might instead be related purely to acceleration with respect to the fixed stars.

In 1907 Minkowski named four predecessors who contributed to the formulation of the relativity principle: Lorentz, Einstein, Poincaré and Planck. And in his famous lecture Space and Time (1908) he mentioned Voigt, Lorentz and Einstein. Minkowski himself considered Einstein's theory as a generalization of Lorentz's and credited Einstein for completely stating the relativity of time.

Einstein (1908) tried – as a preliminary in the framework of special relativity – also to include accelerated frames within the relativity principle. In the course of this attempt he recognized that for any single moment of acceleration of a body one can define an inertial reference frame in which the accelerated body is temporarily at rest. It follows that in accelerated frames defined in this way, the application of the constancy of the speed of light to define simultaneity is restricted to small localities. However, the equivalence principle that was used by Einstein in the course of that investigation, which expresses the equality of inertial and gravitational mass and the equivalence of accelerated frames and homogeneous gravitational fields, transcended the limits of special relativity and resulted in the formulation of general relativity.

Eventually, Einstein (1912) recognized the importance of Minkowski's geometric spacetime model and used it as the basis for his work on the foundations of general relativity.

Acceptance of special relativity

Planck, in 1909, compared the implications of the modern relativity principle — he particularly referred to the relativity of time – with the revolution by the Copernican system. An important factor in the adoption of special relativity by physicists was its development by Minkowski into a spacetime theory. Consequently, by about 1911, most theoretical physicists accepted special relativity.

(Excerpt end)

My observations:

First:
Physicists at the time were determined to get relative time, to replace Newton's absolute time, which cannot be affected by the observer.
The phrase "simultaneity is restricted to small localities" reveals another concern with time.
Both the electric force and the gravity force are simultaneous between the 2 participants but each force decreases by the inverse square of the distance between them. In reality, they cannot be restricted to a "small locality."

Second:
One must note Einstein's work with the "equivalence of accelerated frames and homogeneous gravitational fields" brought with it "a new treatment of gravity, replacing the understanding of the force at that time (1912)."

This "new treatment" is simply wrong. The replacement of our "understanding of the force" was a mistake.

The unstated goal of some physicists "at that time (1912)" was replacing Newtonian physics with the possible flexibility of relative space and time.

There was no evidence space-time was better than Newton’s force. The dubious evidence was provided from Eddington, by photographs taken during a total solar eclipse in 1919.
That was sufficient for the 4-dimensions of space-time becoming a fundamental concept of physics.

The perceived "homogenous field" can arise only in the combination of a number of tiny masses near a much larger mass, like the drop of a feather and iron ball in a vacuum. This free-fall acceleration behavior was famously demonstrated on Earth and on the Moon.

Free-fall acceleration is a very limited context of gravity. The much larger mass has only the illusion of no motion. Perhaps Einstein accepted the illusion because space-time curvature cannot affect the other mass. For example, all the planets in the solar system are not in free fall acceleration in the gravitational fields of all other planets. It is a mistake basing a replacement of the real force of gravity on this context of a particular behavior.

An observer having any mass, must interact with any other mass by inverse square of distance, as explained by Newton, and as widely accepted, before space-time, like when predicting Neptune.

Space-time enables the special observer to never interact with another mass. This is simply violating Newton's force and replacing it with an incorrect interpretation.

I will take liberties here when putting relativity into simpler terms.

The special observer is moving, so in relativity their motion is described by the combination of 4 variables at each instant, in this "quasi-Euclidean four-space" The 4 are: dx, dy, dz, dct, which "d" represents the "delta" or change in coordinate in that Euclidean dimension.

The math requires the same units among all the participants; km is the standard for a linear dimension value. Since the units for time are unlike the spatial dimensions, the time value is multiplied by the constant c, to get km as units. This product is shown as ct, and its value in the set of 4 is dct.

This observer can measure the direction to another mass to get a vector to the source of that object's gravitational field.

Relativity is background independent, so no coordinates in real, physical, or absolute space are available, for the observer or for any object they observe.

Every distance or location measurement is relative to the moving observer's current position.

Space-time is simply the mechanism for the application of the tensor equations affecting the path of the special, moving observer by using this set of changes in 4 coordinates per unit of time.

Space-time has no application other than supporting the equations of relativity.

This is the only context where this "union of the two [space and time] will preserve an independent reality."

My observation:

This phrase has an add choice of words. Newton defined absolute space and time as independent of the observer. Space-time defined the special moving observer as having no effect on any other mass or charge, during the motion. Since space-time does not identify an effect between the observer's and another's charge, space-time implicitly ignores any mutual interaction between the observer and the rest of the universe which will have mass and could have a charge.
Of course, other masses must react to the moving observer but relativity identifies none. An ocean tide changing with phases of the Moon is strictly a behavior from the force of gravity. That behavior cannot be explained by space-time.

This independent reality" is useless, beyond a game of an odd alternate reality, where literally nothing happens to whatever you pass during your motion.

This a wrong form of independence for physics, where any motion is always driven by forces. The forces from mass or charge are always mutual, though reduced by inverse-square of distance. Thus, any body in motion must affect others, though it could be too weak to measure.

Space-time is wrong; Newton's force of gravity is correct. I wrote a book titled Redefining Gravity which describes in detail why gravity must be redefined as Newton's force while removing the mistake of space-time as a replacement for gravity.

I must make a comment about absolute and relative time.

If an observer ever questions their relative time, like for possible time dilation, they can always “look out the window” to check the correct absolute time.

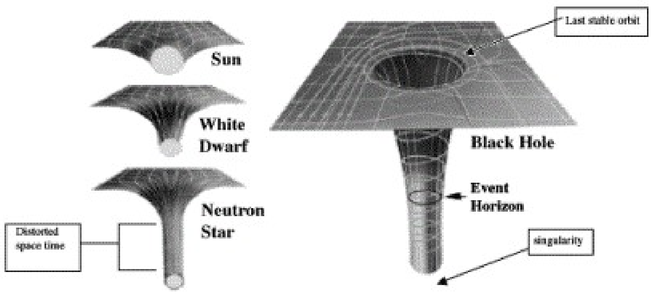
This “window” reference is from Einstein’s famous thought experiment on a hypothetical train. I heard this phrase from someone else, long ago, but it resonates with me. Our version of Newton’s absolute time is driven by an atomic clock and cannot be affected by anyone, certainly not by someone in a train using a light clock.

Space-time prevents “looking out the window” when restricted to a time value which can be manipulated during the special observer’s motion. Newton could not envision someone altering the normal progression of time’s increments, so it was simply called absolute time.

2.2 Space-time in Graphics

Graphical representations of space-time curvature are an intentional deception.

This unedited image from NASA will help explain this deception.



In relativity, when the observer is moving near an object with a gravitational field their path in a 4-dimensional coordinate system will be curved toward the source of the gravitational field
This curvature affects only the path of the moving observer, but no one else is affected.

Einstein's first postulate is "The laws of physics take the same form in all inertial frames of reference."

The left column in the image illustrates how the special observer's path in space-time is curved when they are passing by the Sun, a white dwarf, or a neutron star.

For all other observers, the Sun, the white dwarf, or the neutron star, are observed using classical physics, such as electromagnetic radiation.

The image is deceptive because there is no distinction between the observer moving past these objects and all other observers.

One could present an edited image to represent the view for all other observers by simply removing those curved graphics for the observer's space-time. At the lower left is the legend "distorted space time" explicitly noting the specific context for this image. That edited image removes the deception by showing the real universe, in which all observers can observe and measure, and which is not affected by the special observer's motion past a particular body in physical space.

The right column in the image has the most blatant deception.

The single arrow pointing to "Singularity" (at bottom right) is actually pointing to 2 entities.

1) The physical mass at that location in physical space,

This mass is not shown here, though each mass was shown in the left column.

The image could be edited as suggested to remove the graphs from the respective columns; then the mass should be shown here, consistent with the others, to help fix the deception for all observers other than the one moving (i.,e., non-inertial).

2) A point in the observer's reference frame or coordinate system.

The point is not in the image simply because a point has no size.

In basic terms of geometry, the center of an object, regardless of its shape, is described as a point. A point is also a specific coordinate in the coordinate system; a simple example of a point in 3-D is X1,Y2, Z3.

In the mathematical exercise of space-time curvature for an extreme mass, the path of the observer must terminate at the center of the mass, or a point. This point in geometry is called the singularity in physics.

This singularity is called a black hole though technically it is a black point. There is no hole in anything; it is just a point in a coordinate system.

The deceptive graphic hides this mistake in physics with two simultaneous conflicting entities where one entity is a concept, just a point in a coordinate system, while the other is a physical mass.

For all other observers, the mass remains and can be observed and measured and, as a mass, it is still subject to the force of gravity from other bodies. It is a violation of physics to claim this mass simply disappears.

It is also a violation of physics to claim the mass remains intact, still generating its gravitational field, while compressed within a geometric point, or the claimed singularity.

Physicists chose to combine these two conflicting entities from geometry and physics, resulting in something physically impossible.

There should be another arrow in the image next to that of Singularity and pointing to the same point but with the legend "Impossible"

There is no such thing as a black hole. This will be explained further in its section.

Probably, if graphical representations of space-time curvature were not deceptive then impossible entities like black holes would go away.

Also, the mistaken claim of remote gravitational lensing should also go away having no justification for a remote curvature.

To present the correct consequences of a proposed black hole, the image for most observers (except for the special observer) who have no distorted space-time, the bottom right should have this note inserted using the Sun's graphic icon (instead of O):

Note:
Milky Way SMBH has O x 4.1 million visible to all other observers.

(End of note)

That simple change to the figure clearly unveils the deception because there is NO real mass of that size, being observed at that location claimed for that super massive black hole.

Space-time is not an acceptable replacement for Newton’s force of gravity.

3 Gravitational Wave

This section describes the concept of a gravitational wave, proposed by Einstein's relativity.

3.1 Introduction to a Gravitational Wave

Detecting a gravitational wave (GW) must be done indirectly because the GW has no real definition enabling a direct measurement.

LIGO is the Laser Interferometer Gravitational-Wave Observatory which was designed to detect these theoretical gravitational waves.

LIGO claims each GW detection, announced to the public, is from an astrophysical source, describing a binary of large masses (either is a black hole or neutron star) which spiral, collide, merge, and finally form only one black hole at the end.

LIGO will be described to explain its method of detection.

3.2 Gravitational wave origin

The origin of the theoretical gravitational wave might be trivia but here is its short story.

Excerpt from Wikipedia:

In 1905, Henri Poincaré proposed gravitational waves, emanating from a body and propagating at the speed of light, as being required by the Lorentz transformations and suggested that, in analogy to an accelerating electrical charge producing electromagnetic waves, accelerated masses in a relativistic field theory of gravity should produce gravitational waves. When Einstein published his general theory of relativity in 1915, he was skeptical of Poincaré's idea since the theory implied there were no "gravitational dipoles".
Nonetheless, he still pursued the idea and based on various approximations came to the conclusion there must, in fact, be three types of gravitational waves (dubbed longitudinal-longitudinal, transverse-longitudinal, and transverse-transverse by Hermann Weyl).

However, the nature of Einstein's approximations led many (including Einstein himself) to doubt the result.
In 1922, Arthur Eddington showed that two of Einstein's types of waves were artifacts of the coordinate system he used, and could be made to propagate at any speed by choosing appropriate coordinates, leading Eddington to jest that they "propagate at the speed of thought". This also cast doubt on the physicality of the third (transverse-transverse) type that Eddington showed always propagate at the speed of light regardless of coordinate system.
In 1936, Einstein and Nathan Rosen submitted a paper to Physical Review in which they claimed gravitational waves could not exist in the full general theory of relativity because any such solution of the field equations would have a singularity. The journal sent their manuscript to be reviewed by Howard P. Robertson, who anonymously reported that the singularities in question were simply the harmless coordinate singularities of the employed cylindrical coordinates.
Einstein, who was unfamiliar with the concept of peer review, angrily withdrew the manuscript, never to publish in Physical Review again.

Nonetheless, his assistant Leopold Infeld, who had been in contact with Robertson, convinced Einstein that the criticism was correct, and the paper was rewritten with the opposite conclusion and published elsewhere.
In 1956, Felix Pirani remedied the confusion caused by the use of various coordinate systems by rephrasing the gravitational waves in terms of the manifestly observable Riemann curvature tensor. At the time this work was mostly ignored because the community was focused on a different question: whether gravitational waves could transmit energy. This matter was settled by a thought experiment proposed by Richard Feynman during the first "GR" conference at Chapel Hill in 1957. In short, his argument known as the "sticky bead argument" notes that if one takes a rod with beads then the effect of a passing gravitational wave would be to move the beads along the rod; friction would then produce heat, implying that the passing wave had done work. Shortly after, Hermann Bondi, a former gravitational wave skeptic, published a detailed version of the "sticky bead argument".

(Excerpt end)

Observation:

From the beginning in 1922, gravitational waves were in doubt. Einstein himself tried to publish a paper denying them but withdrew that paper after being convinced his conclusion was wrong.
The account is not clear whether Einstein or Infeld wrote the final paper bringing the gravitational wave back to relativity.

3.3 Gravitational wave definition

Gravitational waves have a poor definition in terms of classical physics.

An excerpt from “NASA Space Place" which is simple but other public sites offer little or nothing in useful terms:

Gravitational waves are invisible. However, they are incredibly fast. They travel at the speed of light (186,000 miles per second).

Gravitational waves squeeze and stretch anything in their path as they pass by.

(Excerpt end)

Excerpt from the LIGO answer to "What are Gravitational Waves"

Gravitational waves are 'ripples' in space-time caused by some of the most violent and energetic processes in the Universe.
Albert Einstein predicted the existence of gravitational waves in 1916 in his general theory of relativity.
Einstein's mathematics showed that massive accelerating objects (such as neutron stars or black holes orbiting each other) would disrupt space-time in such a way that 'waves' of distorted space would radiate from the source (like the movement of waves away from a stone thrown into a pond).

Furthermore, these ripples would travel at the speed of light through the Universe, carrying with them information about their cataclysmic origins, as well as clues to the nature of gravity itself.

(Excerpt end)

Observation to the LIGO definition:

The definition by LIGO has no details to enable the construction of a device for a direct detection and measurement of this gravitational wave. This deviates from classical physics where gravity is a measurable force between 2 known masses.

LIGO claims “these ripples [are] carrying with them information about their cataclysmic origins” but there is no definition of how any such information can be carried in a wave defined only by a velocity.

Instead of extracting information from a wave, LIGO must make many assumptions having no evidence to justify the origin of their details.

The wave definition does not define:

a) the mechanism of its propagation, such as either longitudinal or transverse; it is certainly not electromagnetic radiation, or

b) The medium for this wave’s propagation, or

c) The velocity of propagation (just assumed to be c with no justification).

Space-time is only a 4-dimensional coordinate system defined by relativity for the special, moving observer and cannot be a medium for an undefined wave. There is no evidence for a supposed fabric of space, and a coordinate system can never be a physical thing.

LIGO built a system to detect an undefined wave having no defined medium for its propagation. LIGO expects this wave will squeeze and stretch the Earth, affecting the globe at multiple locations.
The multiple LIGO locations allow a triangulation of the source based on this minimal wave definition of only ‘squeeze and stretch’ and an assumed velocity.

LIGO is designed to detect a gravitational wave by monitoring Earth's crust for a disturbance which is analyzed and compared to computer generated templates assumed to match the expected results for this theoretical gravitational wave passing through the rigid crust of the Earth.

Just one test with an actual merger of two known bodies would have confirmed the system is working as designed, to the extent the result of the analysis was acceptable. This test was never executed. Without that crucial test and verification, LIGO had no basis for its operations. The first detection was a test, having no basis to grade its performance. LIGO had no apparent independent review of its performance, so all claims were accepted without question.
With no verification by an independent observation, any LIGO detection could have been a different wave like coming from a terrestrial source.

LIGO has never tested this system with a known gravitational wave to verify any of the assumptions.

Every GW detection by LIGO has no independent confirmation, to verify the details of the GW claim by LIGO.

3.2 Gravitational wave types

LIGO proposes several types of a Gravitational wave.

Excerpt from the LIGO site article Sources and Types of Gravitational Waves:

Continuous gravitational waves are thought to be produced by a single spinning massive object like a neutron star.

The next class of gravitational waves LIGO is hunting for is Compact Binary Inspiral gravitational waves. So far, all of the objects LIGO has detected fall into this category. Compact binary inspiral gravitational waves are produced by orbiting pairs of massive and dense ("compact") objects like white dwarf stars, black holes, and neutron stars. There are three subclasses of "compact binary" systems in this category of gravitational-wave generators:

- Binary Neutron Star (BNS)
- Binary Black Hole (BBH)
- Neutron Star-Black Hole Binary (NSBH)

Each binary pair creates a unique pattern of gravitational waves, but the mechanism of wave-generation is the same across all three. It is called "inspiral".
Inspiral occurs over millions of years as pairs of dense compact objects revolve around each other. As they orbit, they emit gravitational waves that carry away some of the system's orbital energy. As a result, over eons, the objects orbit closer and closer together. Unfortunately, moving closer causes them to orbit each other faster, which causes them to emit stronger gravitational waves, which causes them to lose more orbital energy, inch ever closer, orbit faster, lose more energy, move closer, orbit faster... etc. The objects are doomed, inescapably locked in a runaway accelerating spiraling embrace.

(Excerpt end)

LIGO also describes Stochastic Gravitational Waves and Burst Gravitational Waves.

Observation:

The inspiral type is the assumed source of the waves being detected by LIGO.

The inspiral scenario does not conform with Kepler's laws of planetary motion, which conform with Newton's force of gravity. When the two masses meet, in Kepler's context, the result will be a mutual pivot around the center of gravity of the pair. Planets do not spiral into their star, but will always take an elliptical orbit around the system's center of gravity. This behavior, consistent with Kepler, is also observed among the exoplanets.

There are numerous combinations of stars as a pair, called a binary. Alpha Centauri is a well-known triple, with a binary and the third orbiting around the binary. This system is stable, with none of them spiraling into others. The combination of frequent binary stars, and with a collision of 2 stars never being observed, should have prevented the inspiral scenario.

LIGO has no justification expecting their claimed pair of neutron stars, will do this proposed inspiral behavior. The most likely result is a binary, just like normal stars.

Perhaps the inspiral scenario arose when ignoring the real force of gravity, which affects both partners mutually. Space-time ignored the real force and tried to apply only the single active participant version, which uses only free-fall acceleration. Maybe in that distortion of gravity, the two will just accelerate into each other, as LIGO requires. The formation of a binary would not generate gravitational waves.

Since every LIGO description of a detection requires the wave originated in this inspiral behavior, LIGO is proposing a cause not justified by the well accepted Kepler's laws.

Again, LIGO must provide evidence for every claim they make, especially when not conforming to accepted physics, like Kepler's laws.

4 Earth tide

An earth tide is like an ocean tide, but in Earth's crust. A tide inn an ocean or in the crust cannot be explained by space-time. Only the force of gravity, as defined by Isaac Newton, can explain a tide.

Excerpt from Wikipedia:

Earth tide is the displacement of the solid earth's surface caused by the gravity of the Moon and Sun.
Its main component has meter-level amplitude at periods of about 12 hours and longer.

(Excerpt end)

There are 5 types of earth tide events in the LIGO history as the coincidental terrestrial source: Full Moon, New Moon, PeriGee, PeriHelion, and Moon-Jupiter alignment.
These 5 events will be referenced by a two-letter abbreviation:
FM, NM, PG, PH, MJ.

The Moon-Jupiter alignment event was a unique close celestial alignment with them and the Earth (in the solar system space they were far apart) on April 23, 2017.

The other 4 earth tide event types are well known to astronomers, needing no description here.

Though the MJ event happened only once, it is associated with several gravitational wave detections by LIGO, so MJ is in this list.

There is a frequent correlation between LIGO gravitational wave detections and the earth tide waves

A chart is provided later, plotting the differences between their respective dates.

This correlation will be noticeable in the historical data section. That observation alone is not sufficient for claims of causality.

5 Black Hole

A very large mass results in a very large curvature in the moving observer's space-time. With an extreme mass the curvature collapses to a single point in the space-time coordinate system.

The black hole is a corruption between geometry and physics. When the special, moving observer of relativity moves to a very massive body, their path is curved to the center of that body. The center of a body, no matter its shape, is described in geometry as a point. To all other observers, the mass remains at its position in space.

The black hole proposes the mass is somehow contained within a point, which is only a concept in geometry. Since a point is not a measurable entity in physics, the point must have zero size. Putting mass into a zero volume must have infinite density. Putting amass into a geometric point while maintaining its force of gravity is another violation of physics with a black hole. Claiming the entire mass simply disappears for all other observers is also impossible.

Black holes don't exist. They are needed to explain X-ray point sources. Cosmologists ignore the work of plasma physicists, like Winston Bostwick who discovered the plasmoid in the 1950's. A plasmoid can be the source of synchrotron radiation to X-ray energies.

The torus imaged at the center of the M87 galaxy was a plasmoid, not a black hole as claimed.
A black hole having an accretion disk is an impossible combination to achieve thermal radiation to the energy of X-rays.

The most common use for a black hole is an X-ray source with no visible object.
Nearly every galaxy is assigned one but nearly all galactic cores are congested with dust, gas, and numerous stars so the source is usually obscured.
In this case, a black hole with an extremely hot accretion disk is proposed because with a gravity only cosmology plasma phenomenon are ignored,
There is one verified mechanism for generating X-rays: a synchrotron.

Excerpt from the European Synchrotron Radiation Facility site:

Synchrotron radiation was seen for the first time at General Electric in the United States in 1947 in a different type of particle accelerator (synchrotron). It was first considered a nuisance because it caused the particles to lose energy, but it was then recognised in the 1960s as light with exceptional properties that overcame the shortcomings of X-ray tubes.

In the mid- to late 1970s, scientists began to discuss ideas for using synchrotrons to produce extremely bright X-rays.

The entire world of synchrotron science depends on one physical phenomenon: When a moving electron changes direction, it emits energy. When the electron is moving fast enough, the emitted energy is at X-ray wavelength.

(Excerpt end)

This simply defined mechanism for X-rays has been known for roughly 50 years.

Modern cosmology ignores this known physics and instead proposes a new mechanism never duplicated.

The mechanism is a black hole (an unverified theory) can cause a surrounding disk of material to heat to such an extreme temperature that its thermal radiation extends to X-ray wavelengths.
This mechanism has never been duplicated.

Excerpt from a post at the University Of Cambridge Institute Of Astronomy, about thermal emission:

To be hot enough for the peak of emission to be in the X-ray range the material would have a temperature of around 300,000-300,000,000K.

(Excerpt end)

This proposal is absolutely unbelievable due to 1) the accretion disk must be fully compressed because only condensed matter can emit thermal radiation,
2) with no external energy source, the conservation of energy in thermodynamics is violated. Some external energy must be added to the disk with its conversion to thermal energy.

In April 2020, an infamous image was taken of the black hole at the center of the M87 galaxy.

However that donut-shaped object was a plasmoid, not a black hole. This torus of plasma generates synchrotron radiation extending to X-ray wavelengths.
Plasmoids were first observed in a laboratory by Winston Bostick in the 1950's when he coined its name.

A clear explanation of the M87 plasmoid is in a YouTube video titled "Wal Thornhill: Black Hole or Plasmoid? | Space News"

There is no evidence for a black hole. LIGO certainly never detected one.

Nearly every galaxy has an AGN bright in X-ray.
When the known plasmoid cannot be used in the gravity-only cosmology, a black hole is claimed to be there.

A cosmologist must assign a mass to this black hole. In practice, the mass is usually more than the number of stars assumed to be in that galaxy.

This is probably due to the barycenter expectation of a galaxy. The mass at the center must balance all the mass around it.
No black hole in the universe had its mass actually measured. We are just told what is, in some number of solar masses, with no evidence for the claim.

One possible method is finding a black hole in a binary with a star. If the 2 move in an elliptical orbit around the barycenter then a mass could be calculated parameters based on the orbital parameters.

Astronomers keep looking for a star in orbit around the Milky Way black hole. This is nearly impossible. The simple rule with an ellipse is the period increases with the orbital radius.

Astronomers claimed to find a star with a period of 17 years but that period is in the range of our planets. That relatively small number of AU needed for that period cannot be resolved. As the radius approaches 1000 AU then the period is hundreds of years or more.

So far, each combination of a measured radius and period is not a valid ellipse.

Every black hole is assigned a value of a number of solar masses but with no evidence for the claim.

No black hole in the universe has had its claimed mass actually measured to verify the claim.

6 Neutron Star

Neutron stars are needed wherever there is a high frequency pulsar. In a gravity only cosmology, a plasma phenomenon is ignored.

The neutron star proposal requires a multitude of neutrons to be compressed into a tiny sphere which rotates very fast and, despite having no electrical charge; it impossibly radiates X-rays like a light-house beacon.

Also, neutrons decay in a few minutes, into a proton and electron pair, when outside a nucleus.

The proposal that any number of only neutrons can remain intact, spin very rapidly, radiate X-rays, and not decay or shatter, even after a span of years, has never been demonstrated. This is fantasy, not physics.

The likely explanation is a pulse like from an electrical capacitor which alternately charges for a time then the abrupt discharge.

This explanation is available in a YouTube video titled: "Neutron Star" Shatters Theory | Space News”

7 LIGO

LIGO is the Laser Interferometer Gravitational-wave Observatory. There are several facilities, intentionally located around the world.

Excerpt from Wikipedia:

The LIGO concept built upon early work by many scientists to test a component of Albert Einstein's theory of general relativity, the existence of gravitational waves. Starting in the 1960s, American scientists including Joseph Weber, as well as Soviet scientists Mikhail Gertsenshtein and Vladislav Pustovoit, conceived of basic ideas and prototypes of laser interferometry, and in 1967 Rainer Weiss of MIT published an analysis of interferometer use and initiated the construction of a prototype with military funding, but it was terminated before it could become operational. Starting in 1968, Kip Thorne initiated theoretical efforts on gravitational waves and their sources at Caltech, and was convinced that gravitational wave detection would eventually succeed.

(Excerpt end)

7.1 LIGO Design Critique

LIGO has a design using a sophisticated hardware having extreme sensitivity for a very weak signal, with the expectation all data collected can be passed through complex software algorithms to find and declare the desired result. Its design is to capture all possible signals before looking for only the signal of interest. The alternative is a design for a specific signal; that was not the selection.

The software is the pivotal component. The LIGO system's achievement is the claimed signal detection coming from the analysis of the data.

I see these steps in the LIGO design sequence. Quotes are usually from ligo.org site.

1. Define its objective.

From LIGO:

General Relativity predicts that a change in gravitational field will travel through the universe at the speed of light. It is exactly these changes in gravitational field that are gravitational waves.

My interpretation:

A change in a gravitational field occurs whenever a body's mass changes either through addition, like a merger, or through subtraction, like a fission or collision.
This event could occur anywhere in the universe, without the wave explicitly providing the many details of the wave's source, such as the types of the 2 participants in a claimed merger event, the mass of the fragments before or after the event.

2. Design an instrument that can detect that undefined wave. Only an event is described, but not how the event causes an undefined wave. T

he one certainty is the wave cannot be an electromagnetic wave because a black hole has no electric or magnetic fields to enable the propagation of such a wave.

From LIGO site:

LIGO's sensitivity and makes it capable of detecting changes in arm-length thousands of times smaller than a proton.
In a telescope, these [background] vibrations are unwelcome, but LIGO is designed to feel them.
LIGO's arms can readily magnify the smallest conceivable vibrations enough that they are measurable.

My interpretation:

Make the instruments so sensitive they can detect the smallest conceivable vibration or literally anything and everything.

3. Define how to find a wave.

From LIGO:

LIGO has been analyzing data since 2002 in an effort to detect and measure cosmic gravitational waves. LIGO's L-shaped detectors uses laser beams and mirrors in hopes of detecting changes in distance between its test masses as small as one-hundred-millionth of the diameter of a hydrogen atom. That change would indicate a wave's presence.

Gravitational waves have a finite speed and are expected to travel at the speed of light. This will induce a detection delay (up to about 10 milliseconds) between the two LIGO detectors. Using this delay and the delay between LIGO and its international partners will help pinpoint the sky location of the gravitational wave source. Multiple detectors also help sort out candidate gravitational wave events that are caused by local sources, like trees falling in the woods or even a technician dropping a hammer on site.

These events are clearly not gravitational waves but they might look like a gravitational wave in the collected data. If a candidate gravitational wave is observed at one detector but not the other within the light travel time between detectors, the candidate event is discarded.

(Excerpt end)

4. Define how to find the wave details in the data.

From LIGO:

Searches for gravitational-wave signals from the merger of compact binary systems were carried out by two independent search algorithms, named "PyCBC" and "GstLAL", that compare the observed data with the theoretical signal predicted by General Relativity using a technique called "matched filtering". In addition, another generic search algorithm, named "cWB", that does not assume a specific, theoretical model for the gravitational-wave signal, was also used. Improvements in these search algorithms and an extension of the search, in terms of the properties of the astrophysical objects being searched for, motivated the reanalysis of data from O1. Similarly, the application of a "data cleaning" procedure, to remove some of the detector noise and improve the sensitivity, has also motivated re-analysis of the O2 data.

Each search method produces a list of candidate events which are ranked in terms of their signal strength with respect to the detector's noise — a quantity called the "signal-to-noise-ratio" (SNR) — and their statistical significance, quantified by the false alarm rate (FAR), i.e. the rate at which one might expect such a candidate event to have occurred by chance, due simply to the noise characteristics of the detector data mimicking an actual gravitational-wave detection. By setting a FAR threshold of less than 1 per 30 days (about 12.2 per year) in at least one of the two matched-filter analysis algorithms, we restricted the list of candidate events and eliminated many candidate signals that are very likely to have been simply artefacts of the detector noise: within these candidates we found 11 events with a probability larger than 50% of having an astrophysical origin, rather than being instrumental noise. These candidates are labeled with the prefix 'GW' followed by the date of the detection (i.e. GW150914). The other candidates are considered as 'marginal' events, unlikely to be of astrophysical origin.

My interpretation:

Having designed instruments to record everything including background vibrations or noise, the signal to noise ratio is critical.

From Wikipedia:

In signal processing, a matched filter is obtained by correlating a known delayed signal, or template, with an unknown signal to detect the presence of the template in the unknown signal.

My interpretation:

Their analysis will inevitably find their "known" signal in this recorded noisy data, after adjusting templates and the algorithms using them.

The crucial aspect for LIGO is whether the evidence matches the claim, with absolute certainty. Any doubt requires thorough verification of this system relying on an indirect measurement. LIGO’s detection of a hypothetical wave is akin to Russell’s teapot scenario.

LIGO has a great responsibility to verify its incredible declaration.

They had to develop a “list of candidate events” for a reference. Detected events which are not passing all the tests were considered "marginal."

This analysis is complicated by having no experience with the reaction of Earth’s crust to the hypothetical wave. The transition from hypothetical to a physical surface could cause many changes in a wave, including amplitude and wave length, after an unknown transition delay between the two velocities: 1) the assumed, original propagation velocity of c while through an undefined medium, to 2) an unknown propagation velocity as a transverse wave through the solid crust.

Several LIGO personnel were interviewed about their experience with the first detection. YouTube had several videos, and some people were in more than one.

One reason why I believe no earlier detections occurred is the interviews never mentioned how this first detection to earn such publicity compared to any earlier detection, which was not valid for whatever reasons.

One stated something like: the number of days which will pass before the first wave is not known. That was honest and almost correct because there are no gravitational waves. The first detection would be the system responding to something else. The time before that first mistaken detection of the LIGO system was certainly unpredictable at the time when no signal had yet passed through all the components to result in a conclusion.

The first detection was on Monday September 14, 2015.
The description of the day implied the system had been off, suggesting it was not capturing data over the week end.

The first wave detection was very few minutes after the start. For such a complex system, it is highly improbable everything works the very first time that the system is exercised.

LIGO site mentions no successes and failures during testing, before its initial success in 2015. They mention only equipment upgrades.

Perhaps the pressure for results would have been terribly oppressive to announce the system and all components have been thoroughly tested and verified.

Such a public announcement was done for the Hubble Space Telescope (which required an upgrade by astronauts, soon after its startup)), but I recall no initial fan-fare for LIGO.

The initial celebrated event detections involved claimed mergers of 2 black holes.

Immediate success under these conditions should have been unlikely.

The very first detection should have required extensive efforts at confirmation.
For example, for the first detection, it would be impossible for LIGO to distinguish among the 4 defined binary pairs, which one the 4 was the first 1. Since the wave carries no information, the only method to gain that knowledge is comparing the waves from known sources. LIGO should have known this limitation. Rather than ONLY after testing with a known binary merger could LIGO check if the entire system, from detection, through analysis, to wave source description, performs correctly.

Until detecting multiple sources of these undefined waves, there were no data to compare. The combinations begin a necessary knowledge database.

Unless I missed it, LIGO was not honest about the learning process required at the start of their accumulation of unique events.

When having no accumulation of unique events, the first detection by this unique system had no basis for a conclusion, so the claimed description could not be based on actual data or experience.

In 2019, YouTube had several videos with LIGO personnel talking about GW150914, but in April, 2021, they could not be found.

LIGO Scientific Collaboration published a document online titled:
GW150914 - THE FIRST DIRECT DETECTION OF GRAVITATIONAL WAVES

The document does not indicate its date of publication. The header of the document:

On February 11, 2016, the LIGO Scientific Collaboration and Virgo Collaboration announced the first confirmed observation of gravitational waves from colliding black holes. The gravitational wave signals were observed by the LIGO's twin observatories on September 14, 2015. This confirms a key prediction of Einstein's theory of general relativity and provides the first direct evidence that black holes merge.
Below the 3:35 video is this paragraph:

On September 14, 2015, LIGO observed ripples in the fabric of spacetime. This video narrative tells the story of the science behind that important detection. (Credit: Caltech)

In the video, someone clearly (and proudly) states this was the first merger of 2 black holes.

That honesty means they had never detected another to compare and improve their analysis.
One must question whether they really could detect what they claim, for all the initial detections. A history of data enables a better understanding.

LIGO was proud of their claims of firsts. Unfortunately, those claims required evidence to support every detail of their source of the waves being described.

If I proudly claimed my app, running on my cell phone with a special attachment, had detected a gravitational wave in M31 galaxy, of course everyone SHOULD immediately demand that I prove it.

LIGO has never provided evidence for any black hole mergers. Conveniently, they claim such a merger emits nothing detectable.

Every LIGO claim should have a clear disiclaimer, like:

No evidence is available, so all claims cannot be confirmed.

Without such a disclaimer everyone reading the LIGO claims cannot appreciate LIGO’s responsibility. Perhaps for the LIGO black hole merger, additional lines are appropriate, after the required lines above:

This type of merger leaves nothing measurable as evidence.

The description of the wave's source is uncertain, but based on the history of wave detections.

Something like those disclaimers would keep physicists honest in their interactions with the public. Instead, eventually the truth will be revealed and the repercussions will be severe and aggravated by the span of the deception.

7.2 LIGO Detection Details

A wave having a clear definition is the best scenario because so any claims of its detection should capable of an independent confirmation.
When having no history of detections with a verified source, it is impossible for LIGO to extract the many details of a claimed binary merger, from an undefined wave. LIGO has severe limitations on what it ca legitimately claim when lacking evidence

LIGO relies on this signal analysis, but this analysis has never been tested and verified with an event similar to that being described. A history enables differentiation among the scenarios. One must remember LIGO is the first making these claims, so every claim has no history to improve its accuracy..

The infamous chirp described by LIGO is often mentioned by LIGO personnel giving personal interviews. This chirp is NOT part of the detected wave or from the wave's source.

LIGO's design magnifies any disturbance many times. LIGO is proud of the extreme sensitivity in its interferometers.

Excerpt from LIGO:

The longer the arms of an interferometer, the smaller the measurements they can make. And having to measure a change in distance 10,000 times smaller than a proton means that LIGO has to be larger and more sensitive than any interferometer ever before constructed.

(Excerpt end)

The highest probability for this unverified system is if LIGO can really identify a 'chirp' with any earth tide wave, that ringing is from the LIGO design, not from the wave affecting the instruments. Any ringing claimed by LIGO from a wave detection is the edge of this surface wave's transitions at the detectors being extremely amplified by the system's design.

The other justification for knowing the chirp is from LIGO and not the gravitational wave is the coincidence between earth tide events and LIGO claiming detections.

For example, a perigee consistently causes a number of detections. The approach of the Moon with the rotation of the Earth cannot cause a ringing in the crust. The crust might jerk during its tidal pull, but it is unlikely an expanse of Earth's crust can sustain the ringing which is claimed.
Later, the entire set of LIGO detections will be presented.

LIGO must explain how every detection occurred during Earth's rotation while the crust was subject to a tidal pull. The tidal pull is substantially stronger than the weak signal LIGO is seeking.
The earth tide does not have to mimic any aspect of the theoretical gravitational wave. The earth tide must only trigger the LIGO analysis which reacts to a disturbance. The only possible result from the LIGO analysis is a GW, The subsequent step reviews the signal in some manner. If the template against the noise somehow matched whatever came from the Earth tide pull on the crust then the LIGO team can freely create its elaborate description for the event. The word chirp makes media interactions congenial.

Until LIGO presents evidence, every believer of LIGO's claims is deliberately kept unaware of the inherent uncertainty in the LIGO system and all its claims.

Nothing in the LIGO process has ever been verified. Each earth tide event triggers the LIGO analysis by software and results in an unverified merger description, lacking evidence to justify any assumptions driving the analysis is provided.

Until LIGO actually verifies the details of any detection all those details are invalid, including the chirp.

It is very difficult to grasp how the complexity of using tiny ripples detected at several widely spaced detectors can result in the very detailed conclusion from LIGO:

1) the type of each body, either black hole or neutron star,
2) the precise mass of each body,
3) a roughly described coordinate in the sky (the margin of error is undefined),
4) a roughly described distance to the event (the margin of error is undefined)
5) the remaining mass after the merger,
6) the spin of this remaining mass.

This is truly a major accomplishment (awarded the 2017 Nobel Prize in Physics) when the entire system (hardware and software) was never tested with even one such merger to verify whether any of the many details were correct.

Using the word incredulous for the widespread acceptance of LIGO’s claims by the community of astrophysicists, without question, is just an emotional reaction.

When LIGO’s claims affect astrophysics so deeply, scrutiny is certainly required.

8 Notable Detections

The 2 notable detections are the first, in 2015, and one in 2017, which earned LIGO a Nobel Prize, also in 2017.

8.1 Doubts of LIGO claims 1

Page from April 11, 2018 titled:

“Danish Group's Doubts That LIGO Discovered Gravitational Waves Resurface”

Excerpt:

A group of physicists in Denmark, which doubted last year whether American experiments to detect gravitational waves had actually confused noise for signal, has reared its head once more. The *New Scientist* reported earlier this week that the group, from the Niels Bohr Institute in Copenhagen, independently analysed the experimental data and found the results to be an “illusion” instead of the actual thing.

8.2 Doubts of LIGO claims 2

Physicist Sabine Hossenfelder mentioned LIGO in her 'backreaction” blog again, in another post over a year later.
Her blog entry on September 4, 2019 was titled: 'What’s up with LIGO?'

Her post included a link to a .de web page for its news story.

My web browser did a translation to English for this web page in Deutsch:

Its title in English: “Fake news from the universe”
You can either use this translation, read the original page using the link in the blog entry, to use your browser if you need a translation, or by another way.
Otherwise, the reader must decide whether the news story is an acceptable source.
The lack of an appropriate reaction by LIGO suggests LIGO has no grounds to debate the story.

Excerpt from my browser's translation:

For two months now this new "window to the universe" is in operation and finds - nothing. Although there were not a few alerts from LIGO / VIRGO, but not a single signal that could have confirmed the large terrestrial or space telescopes. The astronomers are already slightly annoyed about the wasted observation time and ask questions. What's happening?

This surprising result should be a reason to take a closer look at the publications on gravitational wave observation over the last three years.

The statistical disturbances caused by random vibrations of the 3000 km distant LIGO laboratories had inexplicable correlations. Only the gravitational wave itself should be visible in both laboratories - with a corresponding delay due to the light propagation time. After ignoring the results of the Danish working group for a while, a group of eight scientists traveled to Copenhagen in August 2017 to discuss data analysis with their critics.

The gravitational wave researchers had to admit some mistakes, among other things, that the central figure in the journal Physical Review Letters was not created with the original data, but prepared for "illustrative purposes" - embarrassing for an article that was downloaded a hundred thousand times and was the basis of the Nobel Prize 2017, At the meeting in Copenhagen the photo of the blackboard was created. One of the leading LIGO scientists, Duncan Brown, promised to work with his colleagues for the correction - which has not happened to this day.

Meanwhile, Jackson's group has even proved that a so-called template, a theoretically calculated signal used for analysis, was subsequently replaced.

It is extremely remarkable that with this unprejudiced method none of the more than twenty detected gravitational wave signals could be reliably detected - except for the first signal GW150914 in September 2015. Now one could argue that this first signal provided proof and danger banned that the following signals were caused by arbitrary filtering of random noise.

Of course, this is still no evidence of manipulation, but it would be given the quite existing internal doubts certainly appropriate that LIGO makes its own investigations to more transparent.

However one evaluates these events, it remains the fact that after three more years of operation and meanwhile triple sensitivity of detectors GW150914 is still the strongest signal of all. A coincidence that gets stranger every day.

For many, therefore, the strongest evidence for gravitational waves is based on the August 2017 GW170817 signal discovered by LIGO and then confirmed by the Fermi (NASA) and Integral (ESA) gamma-ray / gamma-ray telescopes , but with very weak signal. at any rate, it was presented at the press conference.

In truth, it was the other way round: Fermi had sent the notification email first, and LIGO needed four hours to "predict" the sky position - which was consistent with the coordinates already known. The false impression that LIGO was the first one arose simply from the fact that after an explicit request by LIGO the subject line of the alert mail had been modified (see picture).

In addition to these inconsistencies, well-known experts contradict the interpretation that the signal comes from merging neutron stars. According to an author collet from nine renowned institutes, this is only possible through "extreme models" of the corresponding galaxies, while an Italian working group assigns the gamma-ray signal (or the afterglow) to a fusion of white dwarfs. But they can not send gravitational waves.

So there remain considerable doubts as to whether GW170817 was really confirmed by other telescopes or whether it was even a gravitational wave.

(End of excerpt from the translation)

Observation:

If this story is accurate, then it is truly a sensational revelation.

According to Sabine’s posts, LIGO has not responded to these questions being asked of their claims.

Perhaps, the reader will agree with this disturbing conclusion: This behavior involving such a widely proclaimed discovery is not proper science, which requires properly verified evidence for confirming a test’s results, and so LIGO has no credibility.

A comment about the unedited translation:

I suspect the words “danger banned” came from translating a word meaning “warning.”

8.3 Doubts of LIGO claims 3

Sabine Hossenfelder, a theoretical physicist at the Frankfurt Institute for Advanced Studies, wrote in her blog on November 2, 2019:
Have we really measured gravitational waves?

… the issue for me was that the collaboration didn’t make an effort helping others to reproduce their analysis. They also did not put out an official response, indeed have not done so until today. I thought then – and still think – this is entirely inappropriate of a scientific collaboration. It has not improved my opinion that whenever I raised the issue LIGO folks would tell me they have better things to do.

(Excerpt end)

Observation:

LIGO does not reply to concerns outside its group, even from this well-known physicist.

9 Correlation in 2019

Sometime in early 2019, I read an article describing LIGO was just detecting noise. That is certainly not a worthwhile dismissal of LIGO. There must be a legitimate explanation for its claims because the count is accumulating, even if the cause is not what LIGO claims.

By May 2019, the number of detections was less than 20.

On May 8, 2019, I posted to a Facebook group, content below this title: LIGO events and the Moon Position
These were all the events in the LIGO history at the time of the post:

GW150914 NM-15-09-13 diff is +1 = 1 day after NM
GW151012 NM-15-10-12 diff is 0= same day as NM
GW151226 FM-15-12-25 diff is -1=1 day before FM
GW170104 PH170104 diff is 0 = same day as Perihelion
GW170608 FM-17-06-09 diff is -1= 1 day before FM
GW170729 NM-17-07-23 diff is +6= 6 days after FM
GW170809 FM-17-08-07 diff is +2= 2 days after FM
GW170814 PG-17-08-18 diff is -4= 4 days before Perigee
GW170817 PG-17-08-18 diff is -1= 1 day before Perigee
GW170818 PG-17-08-18 diff is 0= same day as Perigee
GW170823 NM-17-08-21 diff is +2= 2 days after NM
S190408 NM-19-04-05 diff is +3= 3 days after NM
S190412 PG-19-04-16 diff is -4 = 4 days before Perigee
S190421 FM-19-04-19 diff is +2= 2 days after FM
S190425 MJ-19-04-23 diff is +2 = 2 days after Moon+Jupiter conjunction
and is also 4 days after FM
S190503 NM-19-05-04 diff is -1= 1 day before NM

Clearly, these 17 GW detections in the early years of LIGO were closely associated with the earth tide events.

10 GW Predictions

The correlation between all LIGO gravitational wave detections and a terrestrial source might not be convincing evidence when presented alone.
However, predicting a future GW detection is a confirmation of causality. The astrophysical source should be random in the universe. A prediction can be made based on this known, predictable terrestrial source. Having that prediction confirmed by a LIGO gravitational wave detection while the earth tide was present confirms the causality. This random merger event is between 2 unusual bodies. Neither has been directly observed as noted in Section 4 (other concerns).

The gravitational waves are claimed to originate at great distances in the universe. They should not be predictable.

10.1 Predicting GW detections

a) Hypothesis Development

Historically LIGO reports detections within 2 days of an earth tide for more than half of the detections.
In observing run O3 there are usually additional detections outside of this narrower range.
In O1 and O2 9 of 11 were within 2 days; the other 2 were at 4 days.
In O3 with the increased sensitivity a small number of detections can be up to 7 or 8 days from that earth tide. In O3, 21 of the 41 merger detections were within 2 days.

The analysis reveals every earth tide event will always result in 1 or more LIGO wave detections.

More than half detections are within 2 days and there are usually a few more detections in the range of 3 to 5 days.

The simple hypothesis: LIGO will report a gravitational wave detection for the ripple in Earth’s crust from an earth tide event.

In observing run O3, the sequence of one earth tide event triggering more than one detection is observed multiple times.

The peak of each earth tide is known and predictable and the Earth rotates once per day so the influence is not present only at the moment of the peak alignment.
The alignment of Earth, Moon, and Sun for a full moon or a new moon takes a number of days for its effect to begin and end.
O3 exhibits a wider range than O1 and O2 for the span of days around the peak of earth tide events.
The Earth’s crust is solid so the earth tide is different at the surface than on an ocean.
The ripple in the crust from an earth tide is not precisely predictable to a specific date for the LIGO detectors.
However one should expect its ripple to span beyond just the date of its peak.

b) Prediction Development

Because of LIGO's inherent inconsistency which is increasing in the course of O3, the prediction could not be limited to only an exact date so a range is required. A range should be restricted enough to provide a valid prediction for a valid test.

On November 9, I noticed a full moon coming on November 12 so I gave my prediction to LIGO on the morning of November 10.

On November 9, LIGO Scientific Collaboration public Facebook page had a post about their new November 9 detection.
I selected this post for my prediction in a comment. No posts by the public are allowed in this Facebook group.

The LIGO Facebook page allows comments from the public but not posts.

I intentionally made the prediction for several explicit ranges of dates to prevent the easy dismissal of a '"One-time lucky guess."

At the moment I made the prediction the last O3 detection was on November 9.

c) Prediction

The prediction was given to LIGO Scientific Collaboration at 10 am my time or 16:xx UTC:

(Begin of text)

Predictions:
There will be LIGO detections between November 10 and 14, between November 21 and 25, between November 24 and 28.
There will be several other detections before and after these narrow ranges.
I was late with this prediction but detections were already reported on November 5 and 9.

Since LIGO began reporting detections it reports them in clumps with more in each clump in the O3 run (less in O1/O2).
For example in 2017 August 14, 17, 18 had detections.

(End of text)

d) Test Results

These are the gravitational wave detections by LIGO after the prediction.
The format for each line:

LIGO detection ID, with a brief comment

S191110x, at 18:09:05 UTC or 2 hours after prediction

S191110af, at 23:10:59 or 7 hours after prediction

S191117j, or 3 days after the first range

S191120a, 1 day before the second range of dates in the prediction

S191120at, also for the second range

S191124be, also for the second range

S191129u, or 1 day after the start of the third range of dates in the prediction

e) Summary of Results

There were 2 detections within 7 hours of the prediction's first range of dates.

Another detection followed 7 days later.

The other two ranges were later in the month and also part of the prediction. Those 2 ranges of dates also had detections (4 of them) as predicted.
The prediction defined 3 ranges of dates for detections and all 3 predicted ranges had detections where 3 detections of the 6 were within 2 days which is the observed range for over half the detections.

Here is a comparison of the deviations between LIGO detections to the earth tides:

These 7 detections had these deviations in days from the triggering earth tide:
-2, -2, +5, -3, -3, +1, +3.

Each range had its clump of detections as expected in the prediction.

f) Conclusion from the Test Results

The prediction of wave detections within specific dates was confirmed by these LIGO detections and the hypothesis was validated by this simple test. Therefore:

LIGO declares gravitational wave detection for the ripple of an earth tide wave, making it possible to predict the wave detections.

The LIGO algorithm is not consistent with its detections in its history as demonstrated by 2 detections on a single day being reported twice in this small sample of only 7 detections. This sample is not a random distribution, but it contains the same behavior as found in the history of GW detections. There is no evidence for LIGO correctly counting its claimed astrophysical sources. One could suspect 2 detections on the same day is a software defect.

The distribution of LIGO detections is driven by the periodic earth tides.

10.2 Interaction with NSF

The National Science Foundation (NSF) provides resources to LIGO.

It is impossible to know the relationship between NSF and LIGO, especially regarding how LIGO publishes its GW detections (like: how is NSF informed? With which quality checks?).

10.2.1 Interaction with NSF - First

On November 23, 2019, I sent this email to the NSF, to their transparency office.

(Email begin)

Hi,
I am a retired electrical engineer who is concerned about the accountability of the LIGO project to NSF,

On November 10 I made a prediction LIGO would report several detections around the span of November 10 to 14 and also during two other 5 day spans later in November.

As of today 11/23 LIGO has 3 detections after my prediction for the first span and 2 detections for the second span.

I made my prediction in a comment to a post in the LIGO Facebook page.

Before I entered the comment, I verified GraceDB site had no events after November 9. The last event was S191109d on November 9 at 01:07:46 UTC

Here is the post in LIGO Scientific Collaboration facebook group (posted November 9 at 1 pm):

So November has been quite a month already for @LIGO @ego_virgo and #GravitationalWaves - and we're only 9 days in so far!!.... What's still to come in the next 3 weeks? Watch this space(-time)! (And don't forget you can follow our #GravitationalWaves alerts on #Chirp)

my comment to LIGO SC was dated on November 10 at 10 am:

Predictions:
There will be LIGO detections between November 10 and 14, between November 21 and 25, between November 24 and 28.
There will be several other detections before and after these narrow ranges. I was late with this prediction but detections were already reported on November 5 and 9.

Since LIGO began reporting detections it reports them in clumps with more in each clump in the O3 run (less in O1/O2).
For example in 2017 August 14, 17, 18 had detections.

end predictions

My prediction results:

This is what happened after I presented my prediction to LIGO.

GraceDB reported the following events:

S191110x on November 10 at 18:09:05 UTC - about 2 hours after my prediction at about 16:xx:xx UTC.
S191110af on November 10 at 23:10:59 UTC - about 7 hours after my prediction.

I expected LIGO to get multiple detections centered on the date November 12 simply because there was a full moon on that date!

The 2 detections on November 10 were enough to confirm the prediction for Nov 10 to 14.

On November 10 I had the confidence to predict LIGO detections in 3 different spans of 5 days each.
My prediction included two other 5-day spans later in November.
The first subsequent range is for the perigee on November 23 and the other range is for the new moon on November 26.

I expect those predictions to be confirmed as well.
As of today 11/23, LIGO reported S191117j which was expected for the 11-14 range.
LIGO also reported S191120aj and S19120at; both were expected for the Nov 21-25 range.

The following statistics were my simple basis for a prediction by using the distribution of days for all previous LIGO detections to recognize the pattern.

=== stats
There are the 5 celestial events which LIGO detects: Full Moon, New Moon, Perigee, Perihelion, and a unique Moon-Jupiter conjunction.
As the Earth rotates these events cause a wave in Earth's crust, called an earth tide.

All wave detections by LIGO are analyzed to determine the two bodies involved in the merger causing the wave and the approximate location in the sky for this merger. Probabilities are assigned to the possible combinations. The 2 candidates are a black hole or neutron star. The merger will be one of the 4 combinations of the 2 candidates. In some cases the probabilities are not high enough to be considered 'robust' but some events meet the robust criteria set by LIGO.

A wave detection on August 17, 2017 was robust and apparently confirmed so LIGO was awarded the 2017 Nobel Prize in Physics for this achievement.

However all LIGO detections are associated with these 5 celestial events.
The following includes statistics of the events.

When one of these 5 events resulted in a wave detection by LIGO in the range of 2 days before to 2 days after that result will be counted as DW2 (detection within 2 days).

When one of these 5 events resulted in a wave detection by LIGO in the range of 7 days before to 2 days after that result will be counted as DW7 (detection within 7 days).

When one of these 5 events resulted in a gravitational wave detection with an assigned merger source that result will be counted as DGW (detection of Gravitational Wave).

These are the distributions of LIGO wave detections, with and without an identified merger source.
GraceDB lists all the O3 wave detections while Wikipedia list all the gravitational wave detections (with an assigned source) since 2015.

Each terrestrial source is listed with its counts.

Full Moon =10x
DW2 = 13x
DW7 = 21x
DGW = 15x

New Moon = 11x
DW2 = 15x
DW7 = 20x
DGW = 19x

Perigee = 5x
DW2 = 6x
DW7 = 6x
DGW = 6x

(note: there were more perigee events than 5 but others coincided with a FM or NM so the overlap detections were counted with the FM or NM).

Perihelion = 1x
DW2 = 1x
DW7 = 1x
DGW = 1x

Moon-Jupiter conjunction = 1x
DW2 = 1x
DW7 = 2x
DGW = 2x

Conclusions:
a) Each perihelion, or Moon-Jupiter conjunction has resulted in a claim of a GW with an assigned merger as the distant source.
b) Each perigee has resulted in 1 or 2 claims of a GW with an assigned merger as the distant source.

c) Each full moon or new moon has resulted in 1 or more claims of a GW with an assigned merger as the distant source.

=== stats end

These are not just coincidences.
LIGO is detecting the wave from a terrestrial source and not from a distant astrophysical source as claimed.

They must verify their claimed distant source.
On November 10 I predicted a gravitational wave detection based on a full moon and 2 detections followed in the next 7 hours, confirming a wave from a moon event is detected as a gravitational wave by LIGO.
The above statistics indicate an incredible coincidence if another source is claimed.

The above list includes all LIGO detections. There are no detections without an associated earth tide event.
It should be clear to everyone these are not random coincidences.
LIGO reports detections during an earth tide's ripple in the crust while the Earth continues its rotation. Because of this rotation the detections are rarely limited to the date of the peak of the earth tide.
My prediction's expectation:
I expected any combination of 0, +/- 1, +/- 2 (Nov 10-14) around this full moon as well as others outside the 5-day range.

The observed results after my prediction:

There were 2 detections in the predicted span from Nov 10 to 14 (inclusive),
and also there were other detections slightly outside this span (on Nov 5, 9, 17).

There were 5 detections in this predicted clump (the word in my prediction) around a defined 5-day span.

The basis for my confidence is LIGO triggers its detections on a predictable terrestrial source. These sets of dates in the prediction were selected based on the assumption LIGO will continue to report detections consistent with its history. The distribution for each earth tide is not consistent.
It is impossible to make precise predictions for specific dates because the LIGO design uses software to find a template in the signal from an extremely sensitive system. The software's conclusion that this signal has the template is not predictable but over a number of days of Earth's rotation usually one or more detections are reported. The terrestrial source does not have to mimic a gravitational wave; it must only trigger the analysis. The earth tide wave is only a trigger to invoke the software. LIGO does no direct measurement but relies on software for analysis. When triggered the only possible conclusion is an inspiral even if an earth tide was the trigger.
LIGO is not detecting gravitational waves when triggered by a terrestrial source.
It is impossible to predict an event from a anywhere in the universe within a specific span of only a few days. My goal was more than one detection in this clump and that was achieved. One is easily assigned to chance but multiple detections (2 on the same day and within the specified span) in a defined 5-day range are more awkward for only chance. There are two later spans in the prediction for November.
I expect an argument stating my prediction is well within statistical probabilities. My counter is I have an identified source for the predicted detection while LIGO has no independent confirmation to validate their detection claim. I must point out LIGO detections should have a random distribution but clearly it is not random when there are readily observed patterns (which I have documented) in the dates. If someone claims my prediction with a valid source is explained by probabilities then LIGO must explain why its unconfirmed detections are incredibly not random.

These claims are not questioned though they must be.

This prediction demonstrates LIGO is not detecting what it claims. It should have been impossible to predict detections within any specified range of dates. I was successful with a 5-day range.

LIGO is not detecting gravitational waves.

I consider my prediction for a clump of detections for the first span of Nov 10-14, and for the second span, confirmed.

I predicted the detections on November 10 would result from the full moon on November 12.
Now LIGO should provide evidence for the claimed merger. I have confirmed evidence for my claim.

NSF has funded LIGO but they must confirm they are detecting real gravitational waves.

By my prediction of gravitational waves being confirmed within 7 hours, I verified my hypothesis LIGO expects only gravitational waves can be detected with their system.

They did not expect a wave in the crust caused by a full moon and Earth's rotation could pass their filter match algorithm. It does pass.

I believe only NSF can request LIGO to confirm their claims of wave detections.
I posted all the above statistics to the LIGO S.C. page with no response.
This expected because they are not accountable to me.
Perhaps NSF will hold LIGO accountable.

Thank you for considering this issue,

David Michalets

(Email end)

10.2.2 Interaction with NSF - Second

On November 24, 2019, I sent this email to the NSF

(Email start)
Hi,

Yesterday November 23 I sent an email with the historical data of LIGO detections.
This email is a follow up, so the first was not too large.

On November 10 I made a prediction LIGO would report several detections around the span of November 10 to 14 and also during two other 5 day spans later in November.

As of today 11/24 LIGO had 3 detections after my prediction for the first span and 3 detections for the second span.

I made my prediction in a comment to a post in the LIGO Facebook page. I followed with a comment my prediction was confirmed - verifying I can make predictions for LIGO based on lunar events.

The reason for this second email:
NSF should know I am not alone with concerns about LIGO.

Rather than including links which can be rejected as spam, I will include searches for the references.

The popular physicist Sabine Hossenfelder has brought LIGO to the attention of the international community.

Web search: "'What’s up with LIGO?"
gets her BackReaction blog post on September 4, 2019

In her post she included a link to a .de web page.

Google Chrome does a translation for me, for this Deutsch web page.
Its title in English: 'Fake news from the universe'

Here are excerpts in English.

From my browser's translation: ===
'
For two months now this new "window to the universe" is in operation and finds - nothing. Although there were not a few alerts from LIGO / VIRGO, but not a single signal that could have confirmed the large terrestrial or space telescopes. The astronomers are already slightly annoyed about the wasted observation time and ask questions. What's happening?

This surprising result should be a reason to take a closer look at the publications on gravitational wave observation over the last three years.

The statistical disturbances caused by random vibrations of the 3000 km distant LIGO laboratories had inexplicable correlations. Only the gravitational wave itself should be visible in both laboratories - with a corresponding delay due to the light propagation time. After ignoring the results of the Danish working group for a while, a group of eight scientists traveled to Copenhagen in August 2017 to discuss data analysis with their critics.

The gravitational wave researchers had to admit some mistakes, among other things, that the central figure in the journal Physical Review Letters was not created with the original data, but prepared for "illustrative purposes" - embarrassing for an article that was downloaded a hundred thousand times and was the basis of the Nobel Prize 2017, At the meeting in Copenhagen the photo of the blackboard was created. One of the leading LIGO scientists, Duncan Brown, promised to work with his colleagues for the correction - which has not happened to this day.

Meanwhile, Jackson's group has even proved that a so-called template, a theoretically calculated signal used for analysis, was subsequently replaced.

It is extremely remarkable that with this unprejudiced method none of the more than twenty detected gravitational wave signals could be reliably detected - except for the first signal GW150914 in September 2015. Now one could argue that this first signal provided proof and danger banned that the following signals were caused by arbitrary filtering of random noise.

Of course, this is still no evidence of manipulation, but it would be given the quite existing internal doubts certainly appropriate that LIGO makes its own investigations to more transparent.

However one evaluates these events, it remains the fact that after three more years of operation and meanwhile triple sensitivity of detectors GW150914 is still the strongest signal of all. A coincidence that gets stranger every day.

For many, therefore, the strongest evidence for gravitational waves is based on the August 2017 GW170817 signal discovered by LIGO and then confirmed by the Fermi (NASA) and Integral (ESA) gamma-ray / gamma-ray telescopes , but with very weak signal. at any rate, it was presented at the press conference.

In truth, it was the other way round: Fermi had sent the notification email first, and LIGO needed four hours to "predict" the sky position - which was consistent with the coordinates already known. The false impression that LIGO was the first one arose simply from the fact that after an explicit request by LIGO the subject line of the alert mail had been modified (see picture).

In addition to these inconsistencies, well-known experts contradict the interpretation that the signal comes from merging neutron stars. According to an author collet from nine renowned institutes, this is only possible through "extreme models" of the corresponding galaxies, while an Italian working group assigns the gamma-ray signal (or the afterglow) to a fusion of white dwarfs. But they can not send gravitational waves.

So there remain considerable doubts as to whether GW170817 was really confirmed by other telescopes or whether it was even a gravitational wave.

=== End of my excerpts from my browser's translation

This event GW170817 and its claimed confirmation were the basis for LIGO getting the 2017 Nobel Prize in Physics.
This apparent data manipulation is not proper science.

Since my confirmed prediction was done using the LIGO facebook page, I am suspicious data manipulation continues.

Based on the LIGO history there should have been a number gravitational wave (GW) detections, with assigned binaries, associated with the dates in my prediction. There have been no GW detections with identified binaries since November 9, the day before my prediction. I consider this "suspicious."
With a confirmed prediction LIGO could be avoiding a problem discussing the validity of any claimed GW detections.

Youtube search: "Have we really measured gravitational waves?"

This video about LIGO is from physicist Sabine Hossenfelder.
I believe only NSF can request LIGO to confirm their claims of wave detections.
I posted the predictions and statistics to the LIGO S.C. page with no response.
This is expected because LIGO is not accountable to me.
Perhaps NSF will hold LIGO accountable for its claims.

Thank you for considering this issue,

David Michalets

(Email end)

10.2.3 Interaction with NSF - Third

On December 9, 2019, I received this brief email from the NSF Office of Inspector General:

(Email start)

Mr. Michalets,

Please consider this an acknowledgment of your request.

National Science Foundation
Office of Inspector General

(Email end)

10.2.4 Interaction with NSF - Fourth

On December 16, 2019, I received an email from the Program Director for Gravitational Physics

It began with:

Dear Mr. David Michalets

Thank you for your interest in NSF's Gravitational Physics programs and, in particular, LIGO.

The email continued the claims of 2015 and 2017 detections.

That generic stuff is not relevant here.

10.2.5 Interaction with NSF - Finish

I am glad NSF OIG had the courtesy to acknowledge my request.

The NSF probably has little incentive to intervene in LIGO operations.

Over 16 months later, in April, 2021, I noticed the items described in section Actions 2021. I cannot confirm this, but I suspect some of those actions taken by LIGO were in response to my request to NSF OIG.

11 Actions in 2021

Sometime around early 2021, the history of LIGO was changed.

a) Detections dated earlier in runs O1 and O2 were added,

b) Detections in late 2019 were given the Retracted status.

c) LIGO SC Facebook posts in November and December of 2019 were deleted.

The deleted posts had contained my comments including my predictions, and the retracted events were some of those predicted before reported.

12 LIGO GW History

A table will presents the historical data for a convenient reference. Some background is provided to establish the context for the data set.

All of the LIGO gravitational wave detections are listed through March 2021, along with their associated earth tide events. This lisy uses the Wikipedia data as of May 8, 2021.

The LIGO GW detections can begin 1 or more days before the peak of the earth tide event because:

a) The Earth is rotating with no hesitation,
b) Earth's crust is rigid but is being disturbed by a change in the distance to the Moon and/or to the Sun.
c) Any change in distance takes many days to complete,
d) Any change in a celestial alignment takes many days to complete.

The Moon takes roughly 29 days to complete 1 orbit. During each orbit, there will be 1 full Moon, 1 New Moon, and 1 perigee. The number of days between these events varies during each orbit, due to the elliptical path.

The dates of the Moon phases are noted in UTC date/time, not a local time, because LIGO reports its events using UTC.

Roughly by April 2019 at the start of observing run O3, LIGO had significantly increased the sensitivity of the system.

The claim by LIGO was this upgrade increased the range of possible distances to the events.

The history reveals more events were being recoded for a similar triggering real event.

Even through LIGO upgrades, all detections follow the timing of the earth tides.

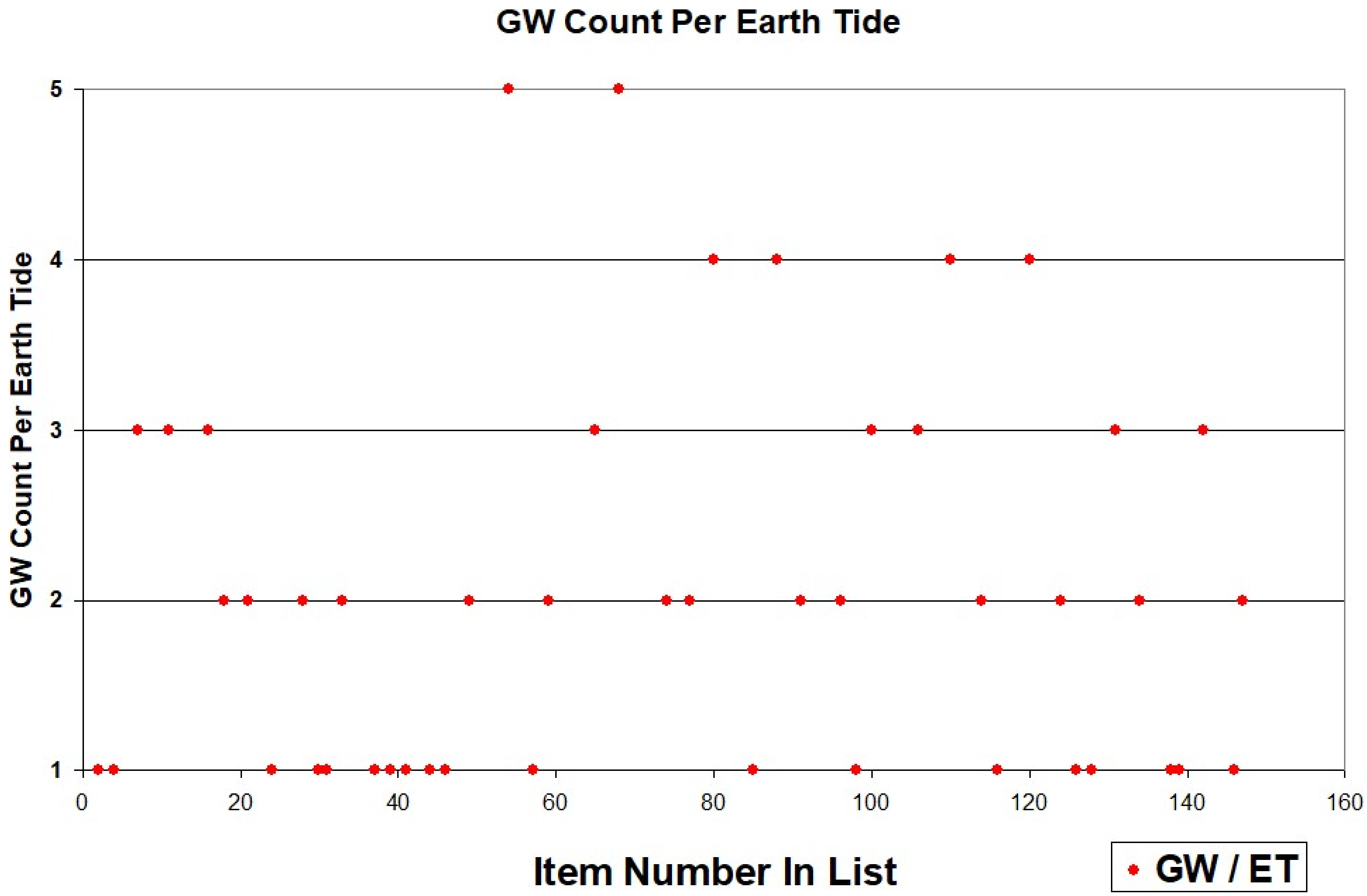
All the date entries use the same 6-digit date format of YYMMDD (where YY is from the year as 20YY), where the detection will have one or two letters before the date and rarely more letters after the date. The earth tide dates have two letters before the date.
2.2.
For example, NM150913 means New Moon on 2015, September 13.

To distinguish between the 3 observing runs: 2015 was O1; 2017 was O2, and 2019 was in O3; 2020 has continued as part of O3.

LIGO's design magnifies any disturbance many times; LIGO is proud of this sensitivity. If LIGO can really identify a `chirp' with any full moon or new moon passing overhead, that ringing is from the LIGO design not from the earth tide wave. LIGO using unverified software claims it found the chirp but with no independent observational evidence as verification of the actual merger event.

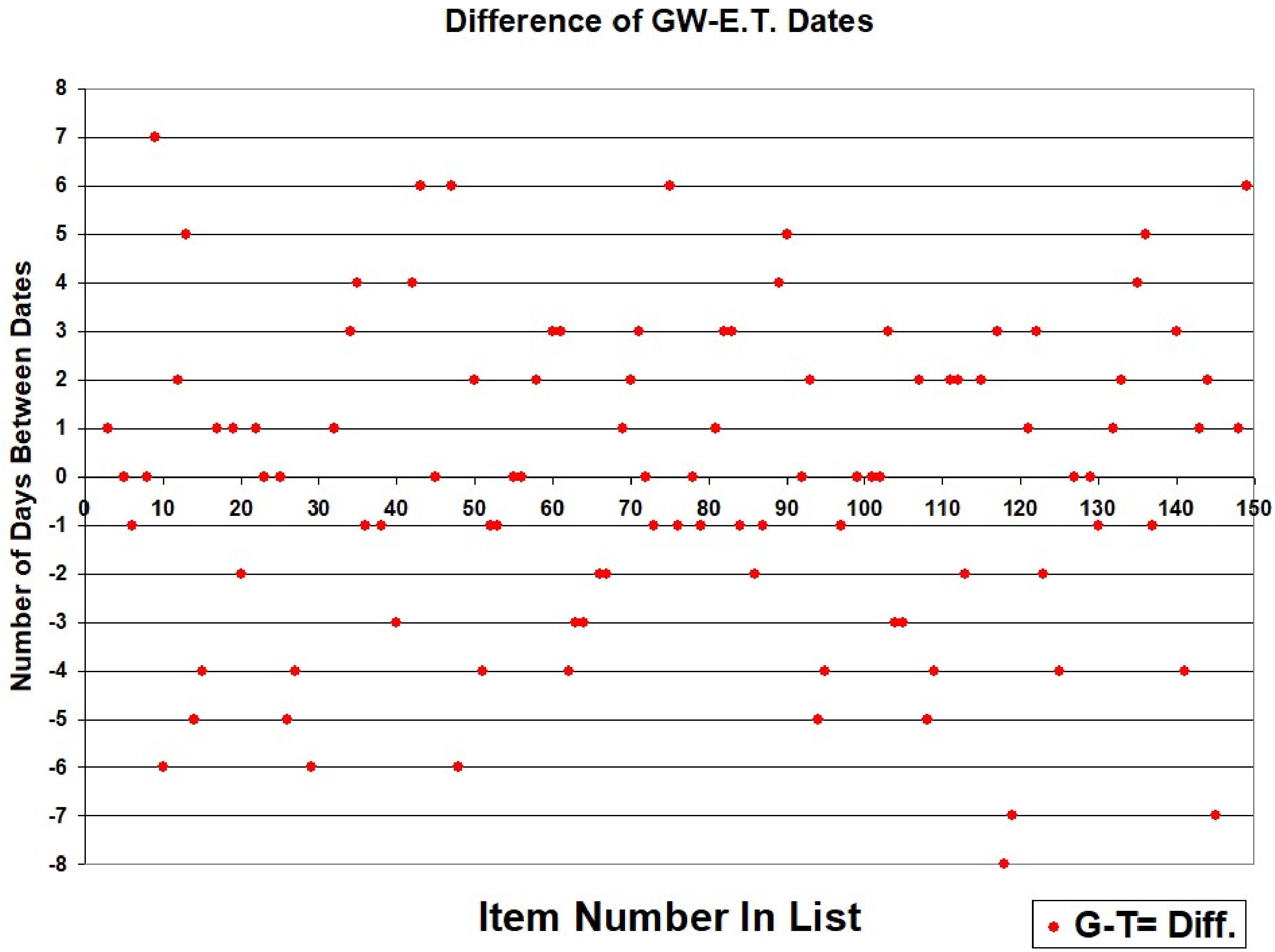
12.1 GW Detections per Earth Tide event

The number of GW detections reported for each earth tide event associated with them is plotted in the following chart.



12.2 GW Differences in days between a detection and its associated Earth Tide event

The number of GW detections reported for each earth tide event associated with them is plotted in the following chart.



12.3 LIGO History of its GW detections and the binary pair claimed as its astrophysical source.
The date of an associated Earth Tide event is mixed

This table is in chronological order.

The start of each line is the date of the event.

After the 6-character date, the event is identified by either ET= for an Earth Tide event (the date is its peak), or GW= for a Gravitational Wave detection event.

A blank line is between the associations.

(Start of history)

Date Event
150913 ET= New Moon, 1x GW
150914 GW= GW150914, 1 day after NM; BH+BH

150928 ET= Perigee, 1x GW
150928 GW= 150928, same day as PG; NS+NS

151011 GW= 151011 1 day before NM; BH+BH
151012 ET= New Moon, 3x GW
151012 GW= GW151012. same day as NM; BH+BH
151019 GW= 151019, 7 days after NM

151205 GW= 151205, 6 days before NM; BH+BH
151211 ET= New Moon, 4x GW
151213 GW= 151213, 2 days after NM; BH+BH
151216 GW= 151216A, 5 days after NM; BH+BH
151216 GW= 151216B, 5 days before PG; BH+BH
151217 GW= 151217, 4 days before PG; BH+BH
151221 ET= Perigee, 2x GW
151222 GW= 151222, 4 days before FM; BH+BH
151225 ET= Full Moon, 1x GW
151226 GW= GW151226, 1 day after FM; BH+BH

151231 GW= 151231, 2 days before PH; no pair
160102 ET= Perihelion, 2x GW
160103 GW= 160103, 1 day after PH; BH+BH

170104 ET=Perihelion; 1x GW
170104 GW= GW170104, same day as PH; BH+BH

170201 GW= 170201, 5 days before PG; BH+BH
170202 GW= 170202, 4 days before PG; BH+BH
170206 ET= Perigee, 3x GW

170220 GW= 170220, 6 days before NM; BH+BH
170226 ET= New Moon, 1x GW
170303 ET= Perigee, 1x GW
170304 GW= 170304, 1 day after PG; BH+BH
170330 ET= Perigee, 2x GW
170402 GW= 170402, 3 days after PG; BH+BH
170403 GW= 170403, 4 days after PG; BH+BH

170425 GW= 170425, 1 day before NM; BH+BH
170426 ET= New Moon, 1x GW

170608 GW= GW170608, 1 day before FM; BH+BH
170609 ET= Full Moon, 1x GW

170620 GW= 170620, 3 days before Perigee; BH+BH
170623 ET = Perigee, 3x GW
170627 GW= 170627, 4 days after Perigee; BH+BH

170629 GW= 170629, 6 days after Perigee; BH+BH
170721 ET= Perigee, 1x GW
170721 GW= 170721, same day as Perigee; BH+BH

170723 ET= Full Moon, 1x GW
170729 GW= GW170729, 6 days after Full Moon; BH+BH

17801 GW= 170801, 6 days before Full Moon; BH+BH
17807 ET= Full Moon, 3x GW
170809 GW= GW170809, 2 days after Full Moon; BH+BH

170814 GW= GW170814, 4 days before Perigee; BH+BH
170817 GW= GW170817, 1 day before Perigee; BH+BH
170817 GW= 170817A, 1 day before Perigee; BH+BH
170818 ET= Perigee,3x GW
170818 GW= GW170818, same day as Perigee; BH+BH
170818 GW= 170818, same day as Perigee; BH+BH

170821 ET= New Moon, 1x GW
170823 GW= GW170823, 2 days after New Moon; BH+BH

190405 ET= New Moon, 2x GW
190408 GW= GW190408ar, 3 days after New Moon; BH+BH
190408 GW= GW190408_ 181802, 3 days after New Moon; BH+BH

190412 GW= GW190412, 4 days before Perigee; BH+BH
190413 GW= GW190413_ 052954, 3 days before Perigee; BH+BH
190413 GW= GW190413_ 134308, 3 days before Perigee; BH+BH
190416 ET= Perigee, 3x GW

190421 GW= GW190421_ 213856, 2 days before Moon+Jupiter; BH+BH
190421 GW= S190421ar, 2 days before Moon+Jupiter; BH+BH
190423 ET= Moon+Jupiter, 5x GW
190424 GW= S190424_ 180648, 1 day after Moon+Jupiter; BH+BH
190425 GW= GW190425, 2 days after Moon+Jupiter; BH+BH
190426 GW= S190426c, 3 days after Moon+Jupiter; BH+BH

190503 GW= S190503bf, 1 day before New Moon; BH+BH
190504 ET= New Moon, 2x GW
190510 GW= S190510g, 6 days after New Moon; BH+BH

190512 GW= S190512at, 1 day before Perigee; BH+BH
190513 ET= Perigee, 2x GW
190513 GW= S190513bm, same day as Perigee; BH+BH

190517 GW= S190517h, 1 day before Full Moon; BH+BH
190518 ET= Full Moon, 4x GW
190519 GW= S190519bj, 1 day after Full Moon; BH+BH
190520 GW= S190521g, 3 days after Full Moon; BH+BH
190521 GW= S190521r, 3 days after Full Moon; BH+BH

190602 GW= S190602aq, 1 day before New Moon; BH+BH
190603 ET= New Moon, 1x GW

190630 GW= S190630ag, 2 days before Full Moon; BH+BH
190701 GW= S190701ah, 1 day before Full Moon; BH+BH
190702 ET= Full Moon, 4x GW
190706 GW= S190706ai, 4 days after Full Moon; BH+BH
190707 GW= S190707q, 5 days after Full Moon; BH+BH

190718 ET = Full Moon, 2x GW
190718 GW= S190718y, same day as Full Moon; BH+BH
190720 GW= S190720a, 2 days after Full Moon; BH+BH

190727 GW= S190727h, 5 days before New Moon; BH+BH
190728 GW= S190728q, 4 days before New Moon; BH+BH
190801 ET= New Moon, 2x GW
170802 ET= Perigee, 0x GW (1 day after NM)

190814 GW= S190814bv, 1 day before Full Moon; BH+BH
190815 ET= Full Moon, 1x GW

190828 GW= S190828j, 2 days before Perigee; BH+BH
190828 GW= S190828l, 2 days before Perigee; BH+BH
190830 ET= Perigee, 3x GW
190901 GW= S190901ap, 1 day after Perigee; BH+BH

190910 GW= S190910d, 3 days before Full Moon; BH+BH
190910 GW= S191910h, 3 days before Full Moon; BH+BH
190913 ET= Full Moon, 3x GW
190915 GW= S190915ak, 2 days after Full Moon; BH+BH

190923 GW= S190923y, 5 days before Perigee; BH+BH
190924 GW= S190924h, 4 days before Perigee; BH+BH
190928, ET= Perigee, 3x GW
190930 GW= S190930s, 2 days after Perigee; BH+BH
190930 GW= S190930t, 2 days after Perigee; BH+BH

191105 GW= S191105e, 2 days before Perigee; BH+BH
191107, ET= Perigee, 2x GW
191109 GW= S191109d, 2 days after Perigee; BH+BH

191126   ET= New Moon, 1x GW
191129 GW= S191129u, 3 days after New Moon; BH+BH

191204 GW= S191204r, 8 days before Full Moon; BH+BH
191205 GW= S191205ah, 7 days before Full Moon; BH+BH
191212 ET= Full Moon, 4x GW
191213 GW= S191213g, 1 day after Full Moon; BH+BH
191215 GW= S191215w, 3 days after Full Moon; BH+BH

191216 GW= S191216ap, 2 days before Perigee; BH+BH
191218 ET= Perigee, 1x GW

191222 GW= S191222n, 4 days before Full Moon; BH+BH
191226 ET= Full Moon, 1x GW

200105 ET= Perihelion, 1x GW
200105 GW= S200105ae, same day as Perihelion; BH+BH

200112 GW= S200112r, 1 day before Perigee; BH+BH
200113   ET= Perigee, 3x GW
200114 GW= S200114f, 1 day after Perigee; BH+BH
200115 GW= S200115j, 2 days after Perigee; BH+BH

220124 ET= New Moon, 4x GW
200128 GW= S200128d, 4 days after New Moon; BH+BH
200129 GW= S200129m, 5 days after New Moon; BH+BH

200208 GW= S200208q, 1 day before Full Moon; BH+BH
200209 ET= Full Moon, 1x GW

200210 ET= Perigee, 1x GW
200213 GW= S200213t, 3 days after Perigee; BH+BH

200219 GW= S200219ac, 4 days before New Moon; BH+BH
200223 ET= New Moon, 3x GW
200224 GW= S200224ca, 1 day after New Moon; BH+BH
200225 GW= S200225q, 2 days after New Moon; BH+BH

200302 GW= S200302c, 7 days before Full Moon; BH+BH
200309 ET= Full Moon, 1x GW

200310 ET= Perigee, 2x GW
200311 GW= S200311bg, 1 day after Perigee; BH+BH
200316 GW= S200316bj, 6 days after Perigee; BH+BH

(End of history)

12.4 Summary of LIGO history

Of the 97 detections through March 2021, these were the distribution of the days from an earth tide peak date:

0 days = 9 GW,
1d= 26,
2d = 21,
3d = 13,
4d = 11,
5d = 6,
6d = 7,
7d = 3,
8d = 1
This shows 69 out of 97 were within 3 days of an earth tide date.

Clearly, there is a coincidence between the claimed astrophysical events and the predictable terrestrial events. However, LIGO is very sensitive, so its detections are inconsistent in their distribution. Many of the detections having a larger difference in dates were one of several for the same earth tide event.

There were 47 earth tide events triggering 97 GW detections in this history.

One perigee (on 170802) was 1 day after a New Moon, so the New Moon was given credit for the 2 detections reported before the New Moon. Though this perigee was assigned no GW, it remains in the list, because the perigee should be noted in the sequence. Those 2 events were more than 4 days early but the timing of the imminent perigee would have increased the tidal effect of the New Moon.

Here is the count of the respective earth tide events in this data set:

Full Moon = 19,
New Moon = 24,
Perigee = 19,
Perihelion = 3,
Moon+Jupiter alignment = 1.

Here is the distribution of GW detections to their earth tide trigger:

Full Moon = 19,
New Moon = 24,
Perigee = 38,
Perihelion = 4,
Moon+Jupiter alignment = 5.

Though there is only 1 perigee with the FM and NM in each lunar cycle, the perigee appears to affect Earth's crust more than the other earth tides.

The following observation compares the deviation spread in the history of GW detections over the 3 observing runs.

Observing runs O1 and O2 had no GW beyond 4 days of an earth tide peak, among the original events. (In 2021 several weak events were added and they have a wider difference.)Only one perigee, on 170623, resulted in 3 detections. After the upgrade in 2019 beginning run O3, the spread within a cluster became wider. Detections on consecutive days became more frequent. These changes in distribution are easily explained by the terrestrial source association. With an unpredictable astrophysical source, the distribution should remain random. This non-randomness should be an alert of a problem in the system, but the LIGO results are never questioned, despite no evidence.
With run O3, LIGO was not detecting more of the distant mergers as claimed but LIGO actually detected more gravitational waves from the same earth tide as the terrestrial source spanning more than one day.

For clarity, all LIGO detections from Wikipedia are listed. Beginning with run O3 in 2019, LIGO posted many (all?) of their detections to their GRACEDB site, including those whose analysis failed to obtain the merger pair. As a result, some wave events recorded in GRACEDB are not posted in Wikipedia where probabilities are assigned to the various merger combinations. This analysis covers all LIGO GW detections from Wikipedia, not from other sources.

Perhaps the binary pair was unnecessary, at the end of the line, for each GW detection in the history listed above.

However, the pair serves a reminder that this line identifies the 2 possible sources for every LIGO detection event:

1) The number of days from the earth tide peak is shown.
2) The binary in the merger claimed by LIGO is also shown.

LIGO is required to provide evidence for all the details of their claimed detections of a gravitational wave and its source.

When LIGO offers no evidence for their source of the 97 detections, this history clearly demonstrates LIGO consistently declares an astrophysical source, by mistake, when its detectors are affected by a terrestrial source.

12.5 Data Set

My Excel spreadsheet with all the LIGO and earth tide events can be located via References at the end,

The zip file is LIGO-events-2021-LL.zip

The zip has the xls of that name and a pdf of that name; the pdf is a print of the worksheet, in 7 pages, for those having no spreadsheet software.

My spreadsheet also includes the list of events from GRACEDB, which presumably has fewer events removed by various filters. However, in 2021, LIGO redacted several events in GRACEDB, making its inclusion in this analysis problematic.

13 Final Conclusion

LIGO was an effort to confirm multiple important assumptions of modern cosmology:

a) Einstein's prediction of gravitational waves,

b) Existence of massive black holes,

c) Existence of massive neutron stars,

The combination of a+b is also relativity and space-time.

LIGO's achievements were heralded as confirmation of Einstein and relativity.

When searching the web for articles about gravitational waves, they consistently celebrate LIGO's accomplishments.

Perhaps, someday LIGO will provide the evidence for all their claims.

Until that time, this document presents all the relevant evidence available.

LIGO's mistakes should be heralded as the unfortunate result of an effort determined to confirm a failing cosmology. This effort required claims of detecting non-existent theoretical entities, including waves and massive bodies. Had anyone firmly required evidence from LIGO starting with the first GW, the debacle would have been avoided. With LIGO, evidence is not required when the result matches the requirement of the exercise.
Many cosmologists remain committed to the current course, regardless of opposing views providing evidence for their attempt to deflect that wrong course.
I have self-published 7 books pointing out a number of apparent mistakes in physics. I can only put them into the public record for reference.

LIGO claimed to be confirming 2 very important cosmological entities, a black hole and neutron star. Both arose because modern cosmology ignores plasma physics, and both violate principles of physics.

LIGO provided an illusion of confirmation. Until LIGO is discredited, this illusion persists and the other mistakes in physics remain, unaffected.

One can only remark: changing the path of a science, when outside its core group, is impossible.

14 References

The references in the book are available as clickable links from a page in the author's web site.

1. Start web browser
2. Go to this site: www.cosmologyview.com
3. Make sure the browser is on the correct home page:

Cosmology Views

4. Scroll to near the middle.
5. Select: **Books by the author**

This page presents information for each book.

Locate the columns for this book.

6. Locate: **LIGO Legacy**
7. Below it, locate the date of this book's edition:

05/12/2021 References

8. Select: **References** after the correct date.

The selected page will list the references in the book by page number, with a link to that reference.

Each link indicates whether it is to a pdf, a YouTube video, or a URL link to a web page. The user is aware of what the browser will do with the link.