xxix
Analysis of GW150914

Version 2 - Jonathan Ainsley Bain - 11 March 2017 - www.flight-light-and-spin.com

The purpose of this article is to determine
the velocity at which the force of gravity is propagated.

This is a computational analysis *of* the claims made by the LIGO gravitational-wave experiment: GW150914. The primary reference used for the empirical data is the article: *PhysRevLett.116.061102* (available at www.ligo.org) hereafter referred to simply by its first listed author: Abbot.

The essential method is logical positivist underpinned by the rigors of evolutionary computer software. The algorithm ***orbit-gravity-sim-11.exe*** (OGS11) designed for this analysis can be freely downloaded on the website:

www.flight-light-and-spin.com *more specifically at this link:*
www.flight-light-and-spin.com/LIGO/download.htm

The theoretical conclusions of this analysis are discussed in these sections:

1) ***Velocity of gravity according to LIGO observations***
2) ***The source of gravitational energy***
3) ***The shape of the observed wave-form***
4) ***The cause of the in-spiral***
5) ***Affect of gravity-velocity on binary orbits***
6) ***Affect of gravity velocity on a white-dwarf binary pair***
7) ***Conclusions and beginnings***
8) ***Simulator physics of orbit-gravity-sim-11.exe***
9) ***What is gw150914 actually?***

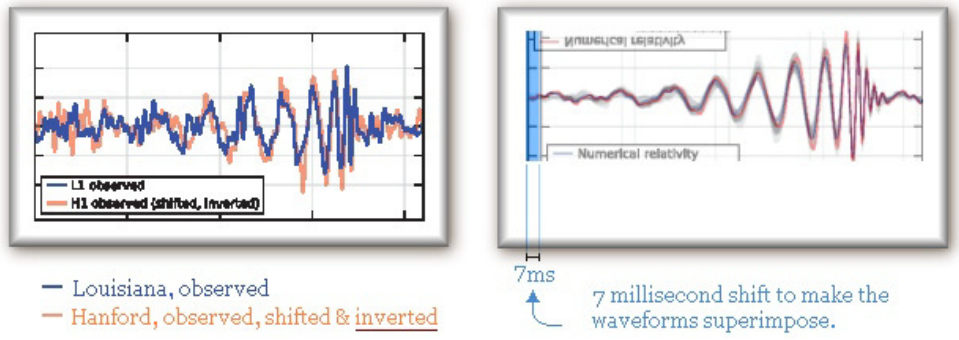
1
VELOCITY OF GRAVITY ACCORDING TO LIGO OBSERAVTIONS:

A Summary of why the LIGO group concludes that gravitational-waves are said to propagate at the velocity of light.

The LIGO experiments of 2015 September 14 (GW150914) consist of two highly sensitive detection devices 3000km apart which are engineered to detect fluctuations in gravity by distant super-massive celestial objects. The GW150914 phenomenon appears to have measured a binary-pair of super-massive bodies spiraling into one another with their last few orbits taking a fraction of a second before merging into a single body – termed 'Ringdown'.

The two objects were said to be 29 and 36 times more massive than the Sun. They were also super-dense, about 85km and 105km in diameter (minimum) shortly before they spiraled into one another. This minimum radius is calculated using the Schwarzschild formula which is roughly about 3km radius per solar mass.

The two wave-forms in the diagrams to follow are oscillations in the strain on the detection device. Because the Hanford detector measured the wave-form 7 milliseconds after the Louisiana detector, it was concluded that it was the same wave-form from the same source, delayed (or shifted) due to the velocity of gravity moving at the velocity of light. After shifting the Hanford graph of the wave-form 7 milliseconds, the two graphs appear to correspond. These graphs represent about 200 milliseconds in total.



The graph on left is the observed; the one on the right is the 'cleaned-up' data. On the right I have super-imposed the two sets of data myself showing the 7 millisecond difference. Be careful to note that for some unexplained reason, one of the two sets of graph-data is upside-down (inverted) in Abbot's original article. So if you super-impose the two observational graphs without inverting one of them, the graphs will not line up.

It is not a massive amount of data, and it is not openly expressed just *how* it is decided what the odds are that such data could be coincidental only once in 203 000 years. A single phenomenon, with a just a pair of observations is not ideal. Still, I shall take it at face value for the purposes of this analysis. So we can conclude that the gravitational '*wave-form*' could have traveled at the velocity of light according to these observations. Here is the original context of those graphs:

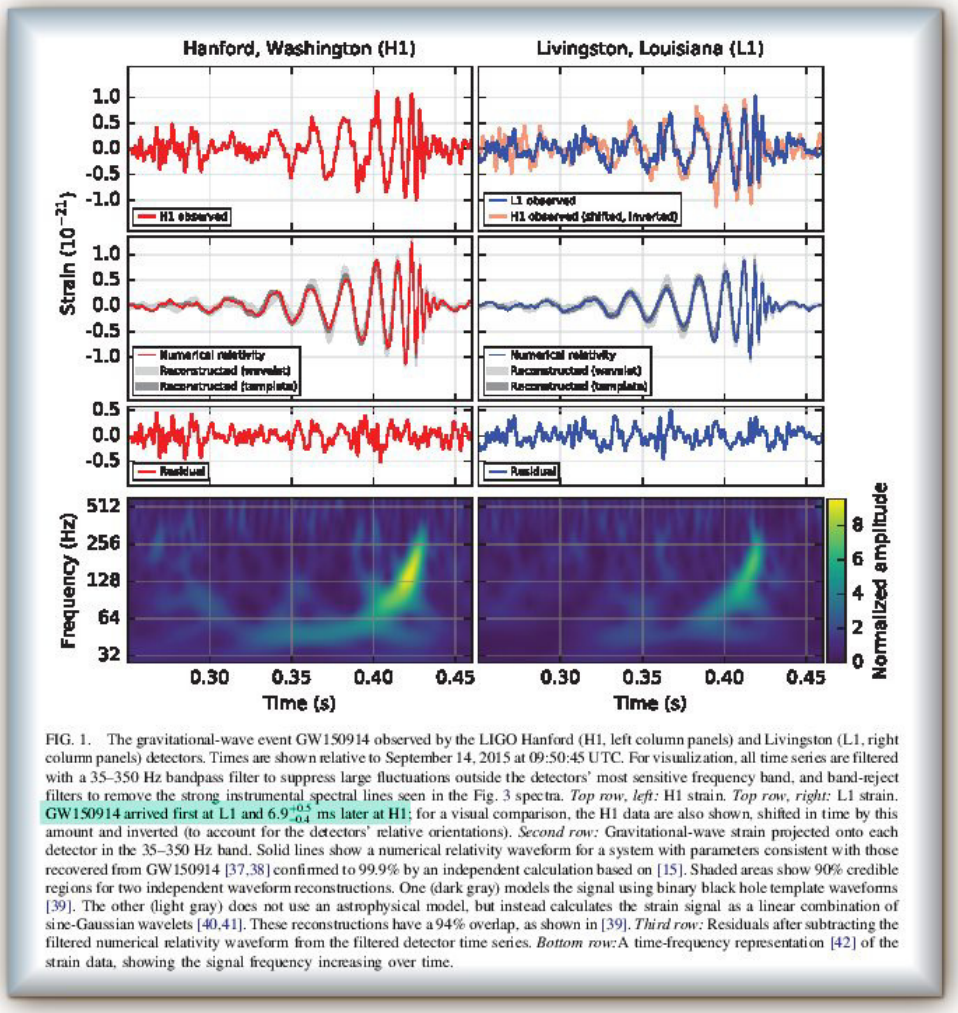
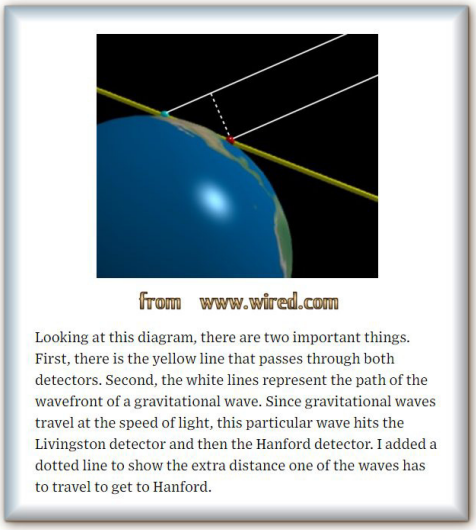


FIG. 1. The gravitational-wave event GW150914 observed by the LIGO Hanford (H1, left column panels) and Livingston (L1, right column panels) detectors. Times are shown relative to September 14, 2015 at 09:50:45 UTC. For visualization, all time series are filtered with a 35–350 Hz bandpass filter to suppress large fluctuations outside the detectors' most sensitive frequency band, and band-reject filters to remove the strong instrumental spectral lines seen in the Fig. 3 spectra. *Top row, left:* H1 strain. *Top row, right:* L1 strain. GW150914 arrived first at L1 and $6.9^{+0.5}_{-0.4}$ ms later at H1; for a visual comparison, the H1 data are also shown, shifted in time by this amount and inverted (to account for the detectors' relative orientations). *Second row:* Gravitational-wave strain projected onto each detector in the 35–350 Hz band. Solid lines show a numerical relativity waveform for a system with parameters consistent with those recovered from GW150914 [37,38] confirmed to 99.9% by an independent calculation based on [15]. Shaded areas show 90% credible regions for two independent waveform reconstructions. One (dark gray) models the signal using binary black hole template waveforms [39]. The other (light gray) does not use an astrophysical model, but instead calculates the strain signal as a linear combination of sine-Gaussian wavelets [40,41]. These reconstructions have a 94% overlap, as shown in [39]. *Third row:* Residuals after subtracting the filtered numerical relativity waveform from the filtered detector time series. *Bottom row:* A time-frequency representation [42] of the strain data, showing the signal frequency increasing over time.

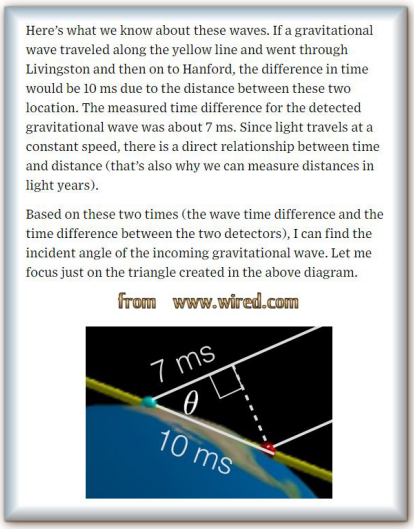
So why was there a 7 millisecond difference?

The website wired.com explains this with easy to see graphics. (Note however that the colors of L1 & H1 at wired.com do not correspond to the colors in the LIGO graphs).



from www.wired.com

Looking at this diagram, there are two important things. First, there is the yellow line that passes through both detectors. Second, the white lines represent the path of the wavefront of a gravitational wave. Since gravitational waves travel at the speed of light, this particular wave hits the Livingston detector and then the Hanford detector. I added a dotted line to show the extra distance one of the waves has to travel to get to Hanford.



Here's what we know about these waves. If a gravitational wave traveled along the yellow line and went through Livingston and then on to Hanford, the difference in time would be 10 ms due to the distance between these two location. The measured time difference for the detected gravitational wave was about 7 ms. Since light travels at a constant speed, there is a direct relationship between time and distance (that's also why we can measure distances in light years).

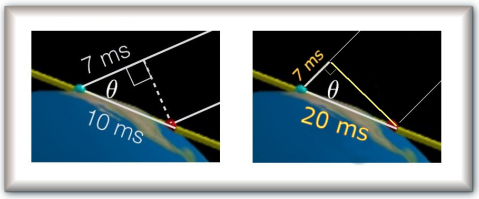
Based on these two times (the wave time difference and the time difference between the two detectors), I can find the incident angle of the incoming gravitational wave. Let me focus just on the triangle created in the above diagram.

from www.wired.com

The LIGO scientists also noticed a burst of gamma waves at the same time coming from the Magellan clouds. They assumed that this was the source of their measurements, which is why they predicted that the *gravitational-waves* would arrive at the angle described in the diagrams above.

However, with the system consisting of only two observatories, there are still other logical analyses that fit the data. The angle in the previous diagrams is calculated with the assumption of gravity propagating at the velocity of light.

The same 7 millisecond difference could result from gravity moving at half the velocity of light, with the angle (theta) at about 67 degrees instead of 46 degrees:



Of course there is no theory with gravity propagated at half the velocity of light. But it is vital to realize that with only two measurements, certain aspects of the claims are calculated based on the assumption that the gravitational-wave theory is true. The 7 millisecond difference and the wave-form seem to be positivist observations, whereas the connection between them and the rest of the claims are entirely theoretical assumptions.

So if the velocity of gravity is hypothetically half of the velocity of light it would take 20 milliseconds to traverse in a straight line between the observatories. It might also be concluded from this data that the velocity of gravity could be no more than 1.4 times that of light. In this hypothetical case it would take 7 milliseconds to move in a straight line between the observatories.

2

THE SOURCE OF GRAVITATIONAL ENERGY:

Is it velocity or is it mass that supplies the energy source for gravitational-waves?

There is a serious discrepancy between Abbot's article and Stephen Hawking as to the source energy of gravitational-waves. So let us first observe Hawking's definition of gravitational-waves:

Hawking, p. 94

> General relativity predicts that heavy objects that are moving will cause the emission of gravitational waves, ripples in the curvature of space that travel at the speed of light. These are similar to light waves, which are ripples of the electromagnetic field, but they are much harder to detect. Like light, they carry energy away from the objects that emit them. One would therefore expect a system of massive objects to settle down eventually to a stationary state, because the energy in any movement would be carried away by the emission of gravitational waves. (It is rather like dropp

So the source energy for the gravitational-waves is supposedly the velocity of the objects. That is why they are said to in-spiral as they lose velocity. It would therefore be quite a surprise if someone were to claim that the source for the energy of the gravitational-waves is not the velocity, but the mass of the object. And yet, that is what Abbot is claiming:

> In the source frame, the initial black hole masses are $36^{+5}_{-4}M_{\odot}$ and $29^{+4}_{-4}M_{\odot}$, and the final black hole mass is $62^{+4}_{-4}M_{\odot}$, with $3.0^{+0.5}_{-0.5}M_{\odot}c^2$ radiated in gravitational waves. All uncertainties define 90% credible intervals.

Source: DOI: 10.1103/PhysRevLett.116.061102 **(PhysRevLett.116.061102.pdf)**

No less than the amount of mass of 3 suns is supposedly radiated as gravitational-wave energy for the interaction of 65 suns' worth. However the amount of energy supposedly emitted by the Earth as a result of its interaction with the Sun is said by Hawking to be:

Hawking p.94

> ate. The rate of energy loss in the case of the earth and the sun is very low—about enough to run a small electric heater. This means it will take about a thousand million million million million years for the earth to run into the sun, s

Now the amount of energy that is allegedly lost by the Earth is claimed by Hawking to be one electric heater for the movement of the Earth. But if we are (hypothetically) trying to calculate a planet with *double the mass of the Earth*, then the amount of energy lost would also *double* in order to correspond to the mass being double.

But the time it takes for a *double-Earth* to run into the Sun will be the same as a single Earth. This is because a body with twice the mass of the Earth also requires twice the energy to slow it down (p=mv). If we double the mass (m), and double the loss in energy or momentum (p), then the velocity change (v) remains constant.

This amounts to an average in-spiral of 1mm in a period many times longer than the age of the entire universe – regardless of the mass of the body. Let me label this as the ***'steady in-spiral principle'*** so I can refer to it again later.

There is also an unacknowledged difference between two completely different affects of the gravitational-wave theory on the shape of the orbit. The loss in velocity, as mentioned above, is one affect. The other affect on the orbit is caused the actual *delay* in the force of gravity itself due to the force of gravity moving at the velocity of light.

In the case of the Earth-Sun pair, the Sun's tiny wobble due to the *Earth's gravity* must be delayed by a fraction of a fraction. This miniscule amount may not seem important enough for Hawking to mention, but it is vital to account for such a delay when the mass of the pair are more or less the same – in a binary system.

I wish to return to this point a bit later, so I will term this ***'binary-orbit gravity-velocity'*** (BOGV). What this is in brief is that both bodies in the binary must have their orbital shape affected by the delay in gravity. It is vastly different from the singular system in how the actual delay of gravity affects the shape of the orbits.

Specifically the delay of the force of gravity has a much bigger impact on the shape of the binary system because both are moving significantly. But in the singular system the shape of the Earth's orbit is *only* said to be affected by loss in velocity for source energy. Details of this come a bit later.

To return to the velocity loss due to the energy source of gravitational-waves: If the Earth is losing the energy of an electric heater, then the pair of black-holes in GW150914 would account for about 20 million electric heaters worth of energy. This is about as much energy as the usage of an ordinary city. So how does a city's worth of energy compare with the amount of energy contained in all the mass of three suns multiplied by the velocity of light squared?

Wikipedia (*October 2016*) had this to say:

> The energy released by the binary as it spiralled together and merged was immense, with the energy of $3.0\ ^{+0.5}_{-0.5}\ c^2$ solar masses ($5.3\ ^{+0.9}_{-0.8} \times 10^{47}$ joules) in total radiated as gravitational waves, reaching a peak emission rate of about $3.6\ ^{+0.5}_{-0.4} \times 10^{49}$ watts – a level greater than the combined power of all light radiated by all the stars in the observable universe.[2][3][11][12][note 4]

Source:
https://en.wikipedia.org/wiki/First_observation_of_gravitational_waves

And yet the energy of a city is nowhere near the amount of light of all the stars in the universe. Now it may be countered that an increase in gravitational-waves is not the same as an increase in the force of gravity. So I return to Hawking:

> out. In the quantum mechanical way of looking at the gravitational field, the force between two matter particles is pictured as being carried by a particle of spin 2 called the graviton.
>
> **Hawking p. 74-75**
>
> ffect—they make the earth orbit the sun! Real gravitons make up what classical physicists would call gravitational waves, which are very weak—and so difficult to detect that they have never yet been observed.

So the force of gravity is indeed supposed to be carried by the graviton, also called the gravitational-wave. The source energy of gravity is clearly not the same as the actual force of the gravity itself. The energy of a city is obviously not equal to the gravity of 65 suns. So the source energy required to radiate the gravity is not the force with which the actual graviton/gravitational-waves pulls with.

So now we have 4 potential affects of gravitational-waves:
1) The in-spiral due to loss in energy measured in electrical heaters,
2) The shape of the orbit due to the delay in gravity (BOGV)
3) Mass converting into gravitational-waves
4) The actual pull of gravity

Despite these various affects, excuse me if I feel somewhat perplexed as to how gravitational-waves are supposed to function. Is the source energy for their emission the motion of the body; or is it the mass of the body? Recent online articles suggest both, (www.einstein-online.info).

But it looks to this philosopher as if there is a terrible historical inconsistency in claiming that GW150914 proves correct gravitational-waves in General Relativity. Perhaps Hawking simply left out the conversion of mass into gravitational-waves. Perhaps he did not feel it important that entire suns worth just de-materialize?

Despite numerous online articles claiming otherwise, prior to GW140915 I had no idea that Einstein could have predicted that three solar masses worth of gravitational-waves could have been emitted from the merger of two black-holes. This seems to show Hawking's classic paperback 'Brief History of Time' to be at odds with almost all the online articles. At least Hawking makes no mention of loss of mass as the source of gravitational-waves. *For Hawking the energy source of the gravitational-waves is the motion of the body itself, not the mass.* Regardless of the logic or empirical/logical validity of the theory itself, one must first be accurate as to what the theory actually claims.

In the previous chapter (XXVIII) it was demonstrated that using motion as the energy-source for the emission of gravity – results in numerous counter-logical and unempirical conclusions. And if we now decide that the energy-source is the mass, does each particle lose atomic mass? *Surely not.* This would be counter to the laws of chemistry (again). All particles of the same isotope have consistent mass in chemistry regardless of their history.

So it seems to me that the LIGO neo-relativists may be suggesting that the loss in mass only occurs at the merger and not at the in-spiral; in which case whole particles are destroyed and turned into energy in a *similar* manner to atomic fusion. The merger would be the equivalent of two super-atoms, fusing into one mega-atom. But that would not result in three suns worth of energy being emitted as gravitational-waves; that energy would be emitted as velocity, heat, light and radiation. Moreover, if Abbot et al suggest that Einstein's Relativity is the correct paradigm, then the excessive velocities which are comparable to the velocity of light should actually result in a significant *increase* in mass, (as per Special Relativity), and not a loss in mass.

Any alleged loss in mass due to gravitational-waves being emitted at the merger of black-holes seem to me to have nothing to do with Hawking's account of Einstein's theories. Historical discrepancy aside; where could all that mass *actually* have gone?

If that amount of energy had arrived at the detectors as I would expect it to (as electromagnetic waves) then we should all have noticed this. That is, if we could even survive such an event after being toasted to the crispiest shade of black imaginable (or at least received a bit of sunburn).

It seems to me that the laws of General Relativity were 'tweaked'. So instead of something like atomic fusion at the merger, and gravitational-waves emitted with *velocity* as a source for their energy – instead we were given 'mass converting into gravitational-waves'!

I would still like to know which neo-relativist came up with the idea of the mass converting into gravitational-waves, as all the online sources falsely claim that the idea originates with poor old Albert. Of course professor Hawking may simply have left that bit out by mistake. And, more than a million copies with numerous reprints and editions later, nobody really noticed…

So we are left with an astonishing chasm of information. On the one side we have:

The most famous astrophysics book written by the most famous contemporary astrophysicist quoting the legacy of Einstein as claiming the source of gravitational energy originates from the motion of the bodies …

… and on the other side …

… almost every website involved with the topic claiming that 3 solar masses worth had somehow been converted into gravitational-waves.

This will be picked up again in *section 4* ***'The cause of the in-spiral'***. But before this can be done, the nature of the shape of the wave-form first must be addressed.

3

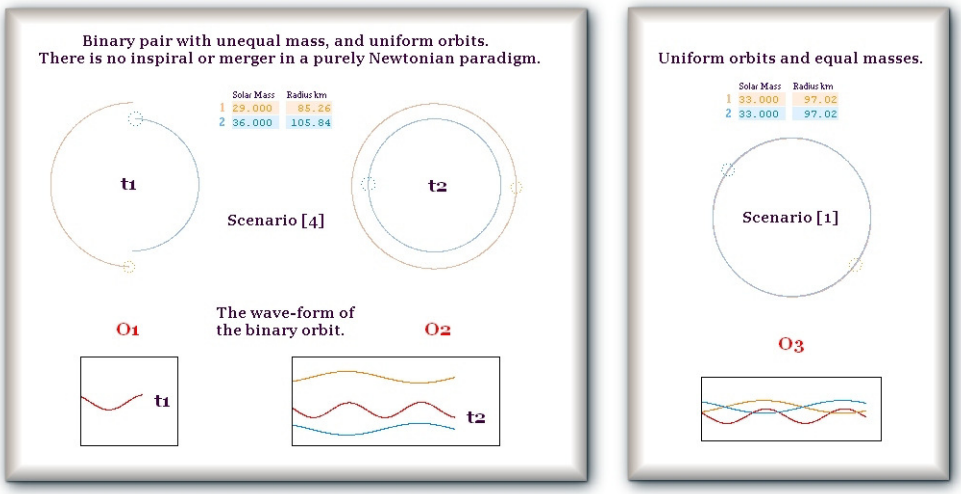
THE SHAPE OF THE WAVE-FORM:

'Gravitational-wave' is not the same as 'gravity wave-form of the orbit'

I deliberately make a sharp semantic distinction between the terminology from Einstein of 'gravitational-wave', and the terminology 'gravity wave-form of the orbit'. These are utterly different aspects of the theoretical physics and the math.

To explain further why this distinction is so vital to this analysis, I first need to describe the 'gravity wave-form of the orbit' (*not* gravitational-wave) for much simpler purely Newtonian examples. The software *orbit-gravity-sim-11.exe* (OGS11) demonstrates the relationship between the orbital frequency and the gravity wave-form of the orbit in real-time.

The Newtonian gravity wave-form for the orbit of a binary pair can be observed in real-time in the evolutionary algorithm OGS11 by selecting scenarios [4] and [1]. As the pair orbit one another anti-clockwise, their combined gravity pulls down towards an observer at the bottom of the screen. In the graphs to follow the wave-forms at the bottom thus move from left to right:



Scenario [4] depicts a binary pair with *unequal masses.* It still produces an even shaped gravity wave-form of the orbit. Whereas in scenario [1], the *masses are equal* yet they also

produce the same wave-form. The red graph-line at the bottom is the sum total of the gravity of the binary pair pulling downwards *towards* the respective observers at **O1**, **O2** and **O3**.

In Scenario [4] it can be seen that at the time **t2** where the pair are horizontal, the pull is weaker than at the time **t1** where the pair are vertical. At **t2** the pull is less towards the observer **O2** whereas at **t1** the observer **O1** experiences more gravity by comparison. So when the pair rotates, the graph oscillates with the pull of gravity in a regular wave-shape as viewed by the observers.

In the graphs above, the individual pulls of each of the binary pair have also been computed in blue and orange graph-lines. There is no way that these individual pulls can be observed in reality because there is no known way of separating the two forces of gravity from one another. All that can be observed empirically is the combined force of both of them which is the red graph-line. Of course there is no empirical way of separating the combination of both these from all the other forces in the universe. The only way of doing this is mathematical – based on theory as to what each individual force is supposed to be doing.

It is also vital to realize that the red graph-line is not just a simple sum of the other two because gravity is not just a function of distance, but a function of the inverted square of the distance. (Until you have computed this in an evolutionary algorithm it may be tricky to realize.)

Clearly*, when one of the objects is closest, the combined pull is strongest.* To envision this consider an observer very close to the nearest point of the orbit – almost touching the body. The pull of this one body is strongest by far.

Nonetheless, this is all purely to demonstrate that the gravity wave-form of the orbit for the binary pair is quite different to the theory of gravitational-waves. It would be very easy to mistakenly conflate the observed data of the 'gravity wave-form of the orbit' of the binary pair with the concept of 'gravitational-wave' because of semantic similarities in terminology. We still have a gravity wave-form for the Newtonian orbit.

The wave-form in the observed LIGO data, still only represents the shape that is the result of the combined pull of gravity by the binary pair in orbit around each other. That shape is not the actual 'gravitational-wave' from General Relativity. The graphs previously are of course Newtonian, and are not directly related to General Relativity or gravitational-waves.

This is a fundamental problem that Abbot (et al) seems not to appreciate when it is said:

> To reach an orbital frequency of 75 Hz (half the gravitational-wave frequency) the objects must have been very close

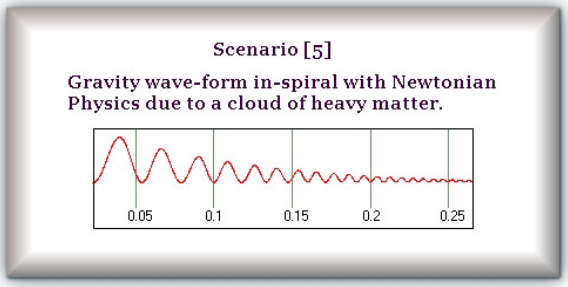
PhysRevLett.116.061102, page 3

This is a fatal error simply because ***gravitational-waves are not the orbital frequency***.

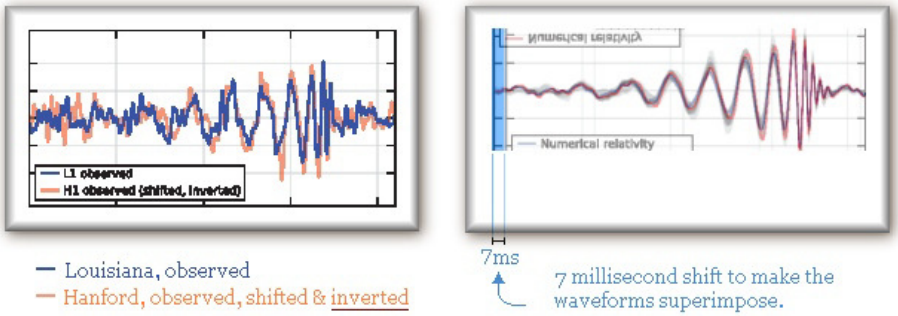
(This 'halving' process is because the graph peaks with the first body closest to the observer. Then it peaks again *half* an orbit later when the second body is closest to the observer.)

The orbital frequency has everything to do with the system being a binary. There would be no orbital frequency if it was a single object. Yet a single object is still supposed to emit gravitational-waves according to Hawking/Einstein where it replaces Newton's instant gravity. It is appalling philosophy to confuse the orbital frequency of a binary system with a theory on the velocity of gravity.

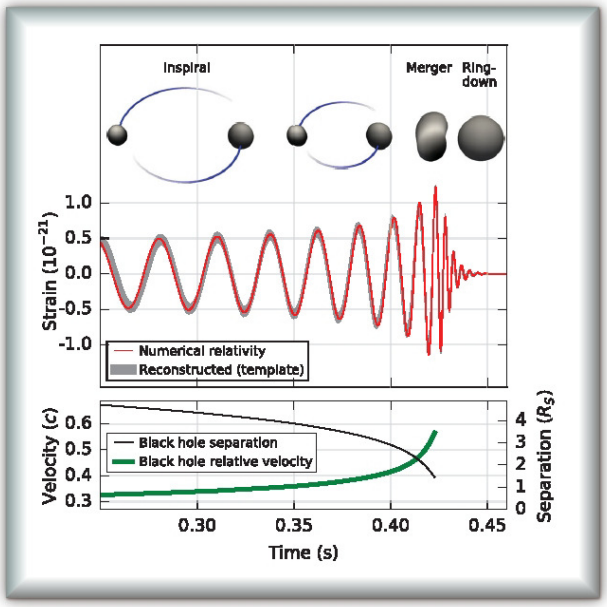
Nevertheless we can compute a Newtonian gravity wave-form of the orbit and then cause an in-spiral due to the pair slowing down because they come into contact with a heavy cloud of matter. In the following examples – OGS11 scenarios [5]& [6] the wave-form looks like this:



As the pair get nearer to one another the wave-form flattens as their combined pull becomes constant. But the observed data of the wave-form in GW150914 causes quite a different shape to Scenario [5].



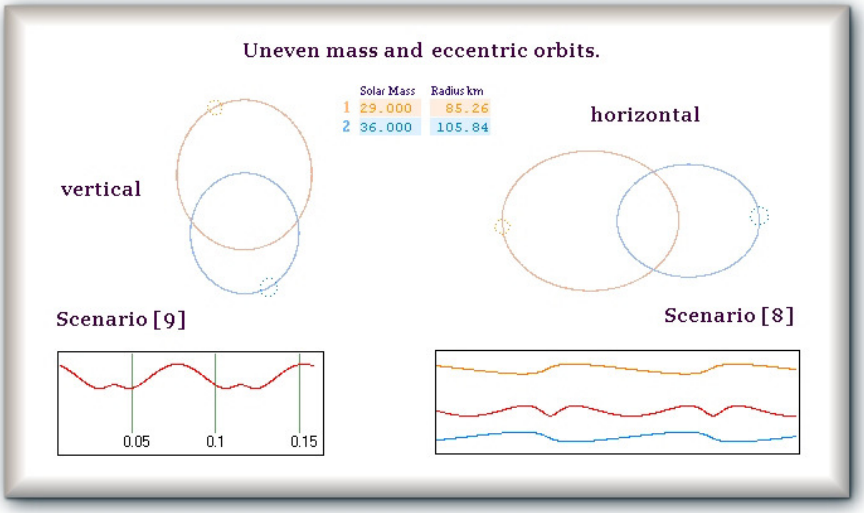
So obviously there is something quite different to scenario [5] happening with the LIGO observation. Abbot also demonstrates the theory of the merger process like this:



The above diagram shows that the wave-form is a result of the orbits of the binary system. The faster the pair moves, the closer they are to each other, the more oscillations in the wave-form. So we can clearly see that it appears as though a purely Newtonian dynamic is insufficient to describe the in-spiral and Ringdown. Curiously, a Newtonian in-spiral

appears to ***decrease*** the amplitude of the wave-form, whereas in the observed data we have an ***increase*** in amplitude *before* it flattens.

So how does eccentricity affect the orbital wave-form of a binary pair? The next graph demonstrates scenarios [9] & [8] respectively; detailing the graphs for orbits that are eccentric on the horizontal and vertical dimensions.



These graphs are Newtonian, and have included neither the in-spiral, nor the merger.

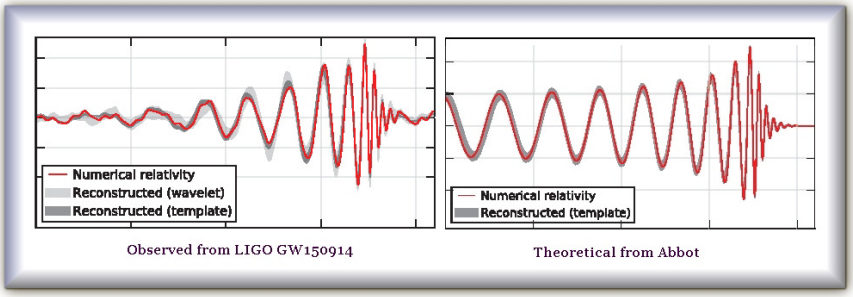
When the heaviest body is closest to the bottom, then the combined pull (downwards) peaks highest and the red graph-line moves upwards. When the pair aligns on the horizontal axis, then their combined pull is weakest towards an observer beneath them (downwards). This also demonstrates the correlation between the graphic of the wave-form and the shape of the orbits; as well as the orbital frequency. *Once more*: The gravity wave-form of a binary orbit is quite simply NOT a gravitational-wave – the *gravitational-wave* is simply the thesis from Einstein for gravity moving at the velocity of light. They are different concepts *entirely*.

So when Abbot (et al) says:

> There is no evidence for eccentricity in the orbital dynamics of GW150914, but eccentricities of $\lesssim$0.1 would not be detectable for this event (Abbott et al. 2016f). In any

I have to point out that this quote must assume that the wave-form is a result of the orbits or orbital dynamics, because the only affect that a binary pair can have on a detector is a fluctuation in the force of gravity. If there was a larger eccentricity in the orbital shape then the graph would look similar to the graphs in scenarios [8] and [9] pictured previously.

But also note the discrepancy in the two official LIGO wave-forms from Abbott. Their second graph (theoretical) begins with amplitudes far higher than the first graph. The first graph (observed) is far flatter to begin with. This is quite a marked difference which shows that Abbot's theoretical account for the observation does not quite fit the data…



Yet a cloud of gas causing the in-spiral does not seem to fit the data either. This cloud of un-seen matter must still be considered a possibility as a cause for an in-spiral, however unlikely. The amount of matter required to slow down the pair with a cloud of gas seems perhaps to be far too much matter just floating around in space to be the cause of an in-spiral. At least it demonstrates what an in-spiral would look like in purely Newtonian paradigm. So this leads to the next section:

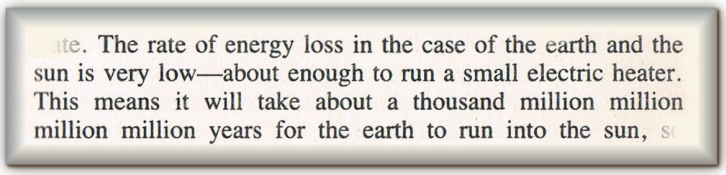
4

THE CAUSE OF THE IN-SPIRAL:

Why does the binary pair spiral into one another?

An interesting feature of the original article by Abbot is that no mention is made of Special Relativity, only General Relativity is mentioned. Now I have already shown in section 2 of this chapter that the interpretation of General Relativity made by Abbot is at best *neo-Einstein* due to the source energy of the gravitational-wave being originally described by Hawking/Einstein as stemming from loss of motion – and not a loss of mass as Abbot would have it. Of course loss of motion as a source for gravitational-waves may cause *some* in-spiral.

Hawking p.94


ate. The rate of energy loss in the case of the earth and the sun is very low—about enough to run a small electric heater. This means it will take about a thousand million million million million years for the earth to run into the sun, s

So if we try and conceptualize the cause of an in-spiral being due to loss in velocity as Hawking describes gravitational-waves, then the amount is too small by a factor expressed like this:

1 thousand million million million million years divided by 1 Age of the Universe (U-Age)[μ] = 70 000 million million U-Ages for the Earth to spiral into the Sun.
or
500[Σ] U-Age for just 1 mm of in-spiral from the Earth to the Sun.

Remember the ***'steady in-spiral principle'*** from earlier? Regardless of the mass of the body, it spirals inwards at a steady rate.

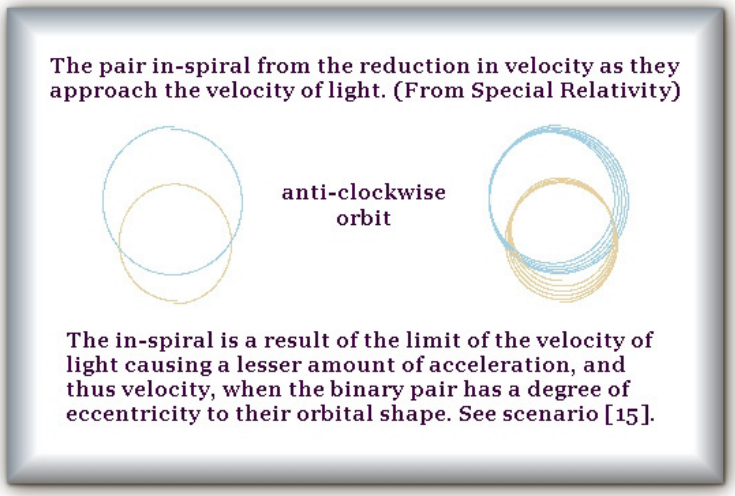
μ U-Age is Universe-Age or about 14 billion years

Σ 70 000 million million U-Ages ÷ 150 million million *millimeters* = 500 U-Age per 1 mm of in-spiral on average. The LIGO binary is 500 000 times closer together than the distance from the Earth the Sun, so the energy value of the orbit is half a million times less. The energy value of each orbit is indirectly proportional to the diameter of the orbit (Ohanian, p. 318). This means that the amount of distance that the orbit spirals inwards from equal loss in energy becomes less as the orbit gets smaller. ***So the energy of an average city will never be enough to cause 60 solar masses to move towards each other at over 3000km per second when a few hundred km apart.*** Even the vaguest intuition should serve to be in agreement with this.

Yet the GW150914 data requires 350km of in-spiral in a fraction of a second.

So the in-spiral estimate of Hawking/Einstein does not even remotely approach the amount of in-spiral required by the LIGO data.♠ Regardless of what the theory says, and what others claim it says; the data still shows a wave-form of two objects spiraling into one another. That is a claim that is quite separate to the underlying theoretical cause of the in-spiral.

So when I constructed ***orbit-gravity-sim-11.exe*** (OGS11) it was in order to see what affect the various formulae of Special Relativity and General Relativity have on the evolution of a system such as GW150914. It just so happens that when we reduce velocity as an object approaches the velocity of light as Special Relativity asks us to, we *do* actually get an in-spiral which is reasonably close to the required amount.



Scenario [15] of OGS11 demonstrates this in-spiral with eccentricity to the orbits. But if you select the Newtonian scenarios [1] or [4] and then click *'Limit Velocity < C'* from the *'Physical Cosmology'*♦ on the top right of the screen you will notice how much less in-spiral occurs when the orbits are more circular.

However it is *curious* that Abbot makes no mention of the in-spiral from the limit on the velocity of light. Special Relativity is not mentioned by Abbott as part of the GW150914 phenomenon at all.♣

The LIGO group claims that the system loses 3 solar masses. This they claim causes excessive 'gravitational waves'. But it seems blatantly clear that if our Sun had to somehow lose mass, then this would cause the Earth to spiral outwards due to less force pulling on it. Only an increase in mass could cause an in-spiral, not a decrease in mass. A decrease in mass can only result in an outwards spiral!

But it *also* struck me that the affects of gravity must be *delayed if the force of gravity is propagated at the velocity of light.* This delay in the time it takes for the gravity to reach the

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♠ Moreover, the expansion rate of the universe is said to be 14 billion light-years over the age of the universe. So any in-spiral from the Hawking/Einstein estimate would be completely over-powered by the expansion of the universe.

♦ Clearly, an in-spiral of over 500 U-Ages for 1 millimeter of in-spiral would fall far outside any rounding error in the algorithm, so it would be pointless including an option for such a small amount in the software.

♣ If you want to see why I ignore time dilation, length contraction and mass increase from Special Relativity, then you need to study *Chapter 27: Light and Spin.*

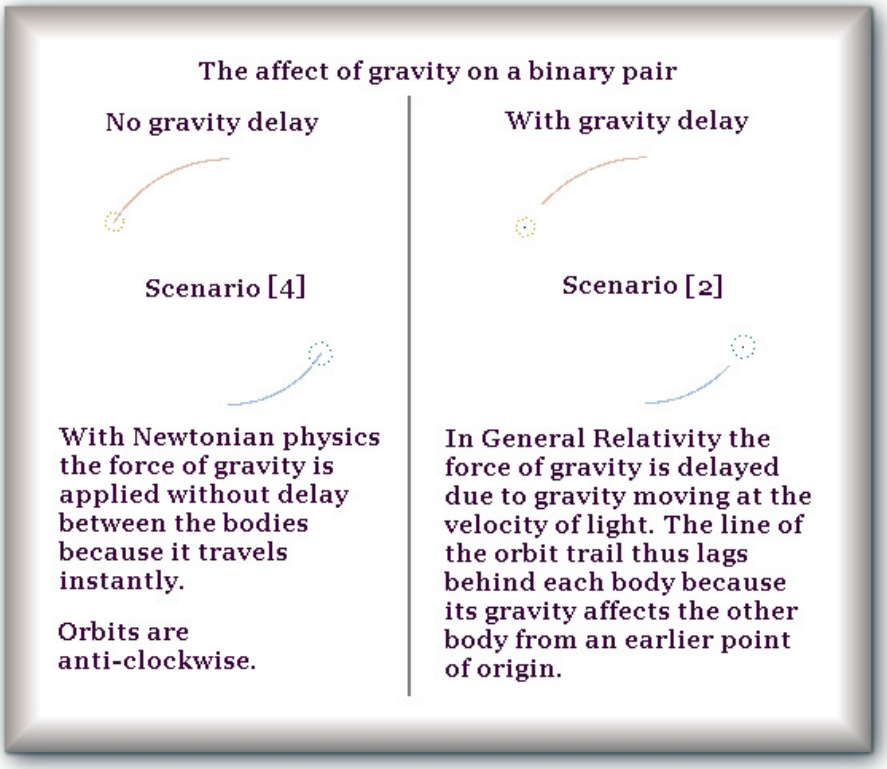
opposing body will also affect the *shape* of their orbits. Earlier I called this '***binary-orbit gravity-velocity***' (BOGV). This leads to the next question…

5

AFFECT OF GRAVITY-VELOCITY ON BINARY ORBITS:

A singular orbit is affected differently to a binary pair's orbit by gravity having velocity

Both objects in the binary pair travel at a significant velocity when compared to one another (unlike a singular system with only one body having significantly affected velocity). So when we take into account the *force of gravity itself having velocity* then we must realize that the *origin of the pull of gravity cannot be at the same position as the original body at the time when the gravity reaches the opposing body.*

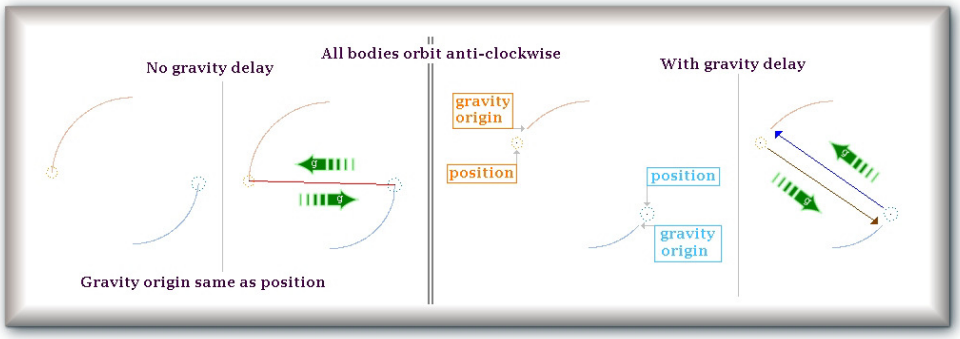


In light of this, just using your imagination, take a moment to try and figure out a rough idea of how the shape of the orbit in scenario [2] above must change with the gravity having velocity.

To envision how the origin of the gravity is not the same as the position of the body, consider a *binary pair of bodies about the same mass as each other* orbiting at a distance the same as that from the Earth to the Sun. (Any equal masses will do for this example.)

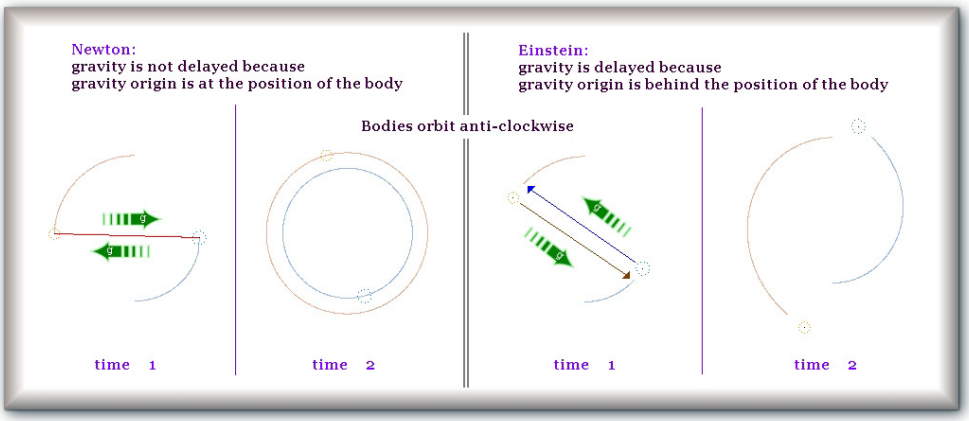
We all know that light from the Sun takes about 8 minutes to reach the Earth. Now each of *this pair* pulls to a point where the other was 8 minutes before the gravity reaches it. So clearly the shape of the orbit will be different than it would be if the pair pulls to the exact position of the opposing body as Newton would have it.

These graphics are not just schematic representations. They evolved strictly according to the math principles of the various theories on gravity.



In the Newtonian paradigm the pair pulls at an angle perpendicular to one another. This is the red line in the diagram above second from left. This line goes through the barycenter (midpoint). However, with gravity having a velocity (on the right), and with the pull of the force of gravity ***not*** going through the barycenter, there can be only one result.

And this result that the computer demonstrates as a consequence of the principle of gravity-velocity – I am utterly amazed to say – is not the result that the other theorists tell us to expect…



In the graphics above, each of the systems evolves differently according to the two theories on the *velocity-of-gravity* at two different *non-specified* times (time 1 and time 2). The Newtonian orbits return to their origin due to them pulling perpendicular to the movement of the body.

However, with parameters similar to the LIGO pair including a *delay in gravity caused by the velocity of gravity being the same as the velocity of light*; the pair out-spirals so quickly that it is easy to observe the real-time evolution in scenario [2]. Even if the pair starts at much less momentum in scenario [17], they move inwards briefly, but then still spiral outwards even more prodigiously than before.

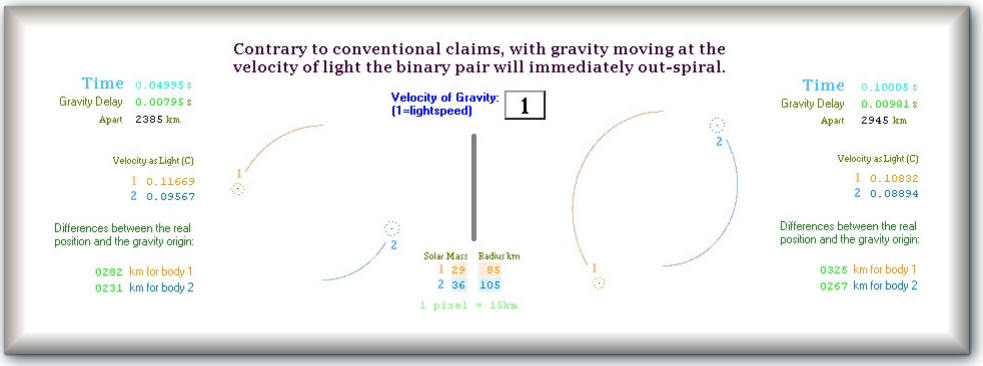
Of course according to Special Relativity the reduction in velocity as the body approaches the velocity of light should also be added. This causes an in-spiral (from Section 4 of this chapter a bit earlier). However that in-spiral has already been included in these examples. But it plays a minor role. ***The spiral outwards of the binary pair caused by gravity-velocity completely over-powers the spiral inwards from the velocity-limit of Special Relativity.***

When the distance between them is about 600km, even if we increase the velocity of gravity to ***6 times*** *the velocity of light* in order to try and decrease the out-spiral; then the in-spiral from Special Relativity is still not over-powered, and an out-spiral occurs anyway. This is demonstrated in OGS11 with the scenario [20] generating a small outwards spiral. The user can increase the velocity of gravity to try and make the pair spiral inwards. Decrease the velocity of gravity to generate a greater outwards spiral.

The slower the force of gravity, the more out-spiral occurs because the distance between the body and the gravity origin becomes greater. The faster gravity moves, the less the pair spiral outwards.

But it gets worse. The further the distance between the pair, the faster gravity needs to travel to try and get the pair to in-spiral. At 2400km apart, even if gravity is at ***50 times*** *the velocity of light* the outwards spiral from a velocity for gravity still overpowers the in-spiral from the limit on velocity from Special Relativity (scenario [21]).

As you can see below; in scenario [2], after 0.05 seconds the pair *seems* to be in a balanced binary orbit. But after 0.1 seconds, the out-spiraling is visibly clear.



This needs to be explained with a simplified approximation:

At about 2500km apart, a binary pair of equal mass, (both 33 solar masses) travels at roughly one-tenth the velocity of light. So the delay in gravity causes a divergence between the *gravity origin* and the *body itself* of about one-tenth the distance between them. There is thus a gap of about 250 km between where the body actually is and where it was when it generated the gravity that eventually reaches the opposing body.

Because the bodies travel at 1/10th the velocity of light, the gap between the body and the gravity origin is about 1/10 of the distance between the pair of bodies.

That is a very big gap, proportionally speaking. And it is easy to verify the computation with simple arithmetic. The gap is demonstrated in the graphic above by the gap between the body and the orbit line (at the numbers 2 & 1). Whilst it may be easy to overlook such a dynamic having never considered it before; geometrically and retrospectively, it is very simple to explain.

There are many conclusions that can be attained from this. Not the least of which is that the LIGO group have not solved the many-body-problem which is the engine driving the OGS11 computer models. In retrospect it is astonishing that nobody else seems to have realized that the pair will spiral outwards. But it has taken me all year to reach this point. Hindsight surely is 20/20 – and somebody has to see it first.

Now when we compare the LIGO binary to the Earth-Sun system we can see how the oversight occurred. Because the Sun's wobble from the *gravity of the Earth* is so tiny, it was never considered worthwhile to contemplate how that tiny wobble will be delayed by the 8 minutes that it takes for the tiny *gravity of the Earth to reach the Sun*. Because the Sun is hardly moving when compared to the Earth, that delay would have almost no affect on the position of either of them.

But when considering a binary pair about the same mass as each other, that tiny delayed wobble becomes an enormous delayed pull of gravity – because both have comparatively similar velocity and gravity. So I need to amend *BOGV*, and call it:

BOGVOS – Binary-Orbit, Gravity-Velocity, Out-Spiral

Now you are correct in feeling confused, bemused and outright baffled at this point. ***BOGVOS*** is in *direct contradiction* to that 7 millisecond measurement in the differences between the LIGO observatories. It is also in stark contrast to the very notion of an in-spiral.

On the one hand we have a single observation of 7 milliseconds suggesting a gravity-velocity: LIGO GW150914. But on the other hand, the nature of the velocity of gravity cannot result in the pair spiraling inwards because with gravity having velocity, a binary pair will spiral outwards. Many non-programmers will thus easily assume that this makes my model wrong. That itself would be a gross error. The OGS11 model simply depicts the logic of the given theories in an evolutionary algorithm.

I'll call this the ***LIGO-BOGVOS Contradiction***, and offer several potential ways to reconcile this as a paradox a bit later. But for now there is another more pressing implication which cannot be ignored. How would BOGVOS affect a more normal binary pair of stars?

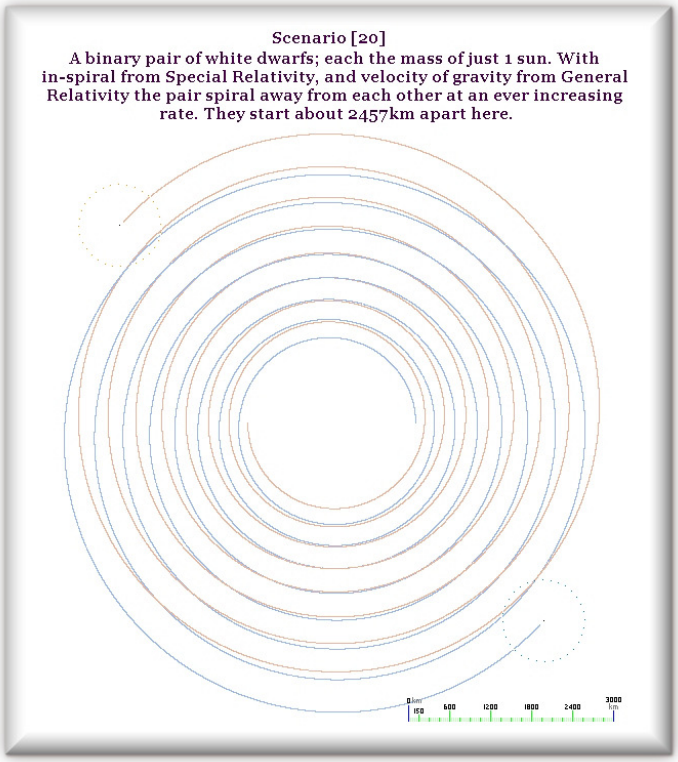
6

AFFECT OF GRAVITY VELOCITY ON A WHITE DWARF BINARY PAIR

How will the orbits change if the pair have 1 solar mass each and gravity has velocity?

The scale of OGS11 is pre-set to the LIGO data; so BOGVOS has not been explored on a more typical stellar scale. Scenarios [23]-[25] were constructed which use 1-solar-mass white-dwarf stars; to see if this lesser mass (and corresponding lesser velocity/gravity) would affect BOGVOS.

Due to their lower velocity, the white-dwarfs therefore have a much smaller difference between the gravity origin and the position of the bodies; only a 40 km difference as opposed to about 240km for the LIGO pair at about 2300km apart. And yet, the white dwarfs spiral outwards anyway. However, they did out-spiral to a lesser degree than the LIGO pair.



Scenario [20]:
The white-dwarfs start 2457km apart. At each orbit the maximum distance from each other increases by an amount that is itself increasing. Conservatively: The outwards spiral increases the rate of separation by over 50km for each and every orbit.

So after ***1000 orbits***, this rate of increase is at least 50 000km more for each orbit. So the average increase in the rate of separation is half of that: 25 000km increase per orbit. So after 1000 orbits they are over 25 million km apart.

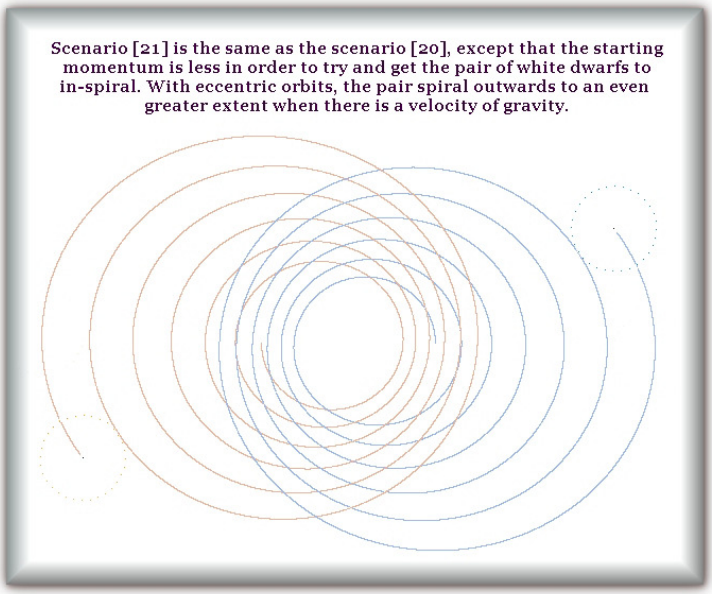
Now let us run this approximation for ***20 000 orbits***. After 20 000 they are increasing their rate of separation by a million km per orbit (20 000 x 50km). So that is an average of half a million km increase per orbit for the 20 000 orbits. So at this point they are separated by a distance several times that of the Sun to Pluto.

I see every reason, *inductively speaking*, that this amount should continue to increase if the pair had an orbital year the same as the Alpha Centauri binary of 80 Earth-years. Using these rough conservative approximations please try and appreciate how this would be contradictory to normal binary pairs having a life-span of more than a very small amount in astronomical terms – *if gravity travels at the velocity of light*.

My *rough estimate* is that perhaps after 10 thousand years to 100 thousand years, all stellar binaries would no longer have significant gravitational force to hold together as a pair due to BOGVOS – ***if and only if*** – gravity traveled at the velocity of light as Einstein's Theory of General Relativity would have us accept. The Newtonian paradigm results in no such problems.

Observed estimates of the number of binary pairs vary upwards from half the known stars in the Galaxy. It is ridiculous to conclude that they all split in half in comparatively recent *observed times* of thousands of years. So I feel reasonably certain, (simply on the basis of these rough estimates) that gravity operating at the velocity of light is inconsistent with the Universe as we find it. But this conclusion is based on estimates in advance of the full computation. In OGS12 I will be able to give more accurate numbers regarding the time it takes for a binary pair to reach the same distance apart as the Alpha Centauri binary – *if* gravity operates at the velocity of light.

We also need to consider starting the white-dwarf pair with much less momentum. The graphic following is for scenario [21]. Starting with less momentum did not lessen the rate of out-spiraling. In fact, the rate of rate-increase is itself increasing here.



Just based on observing the graph above, it seems that the more eccentric the orbit, the greater the outwards spiral. The eccentricity is the result of less starting momentum. So the earlier estimates for the previous example have not taken into account that *the rate of rate-increase is itself increasing*. You can see for yourself by observing scenario [21] and then gauge some estimates for the life-span of the highly eccentric Alpha Centauri binary pair – *if* we have velocity to gravity.

Surely the Alpha Centauri pair should out-spiral due to the gravity origin being behind the position of the body? For now the question reduces to one of scale however, so I make no outright predictions until OGS12 has been constructed and tested thoroughly. The white-dwarfs in these graphics are still on the scale of the LIGO data. They are only a few thousand kilometers apart at most – with each orbit taking just seconds.

7

CONCLUSIONS AND BEGINNINGS:

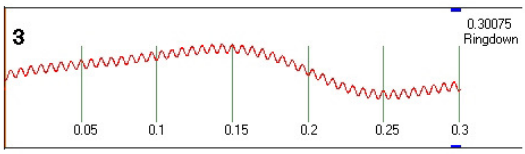
Every good answer yields more questions.

So as regards binary star-systems, it seems almost certain that if gravity moves at the velocity of light, then the binary will spiral outwards and cease to exist. The life-span will vary depending on starting distance and mass of the pair, but in astronomical time-frames binary star-systems should be a brief and rare anomaly, unless gravity is instant. The algorithmic geometry in the previous section makes this almost perfectly clear.

But how has it never been noticed, that in singular star-systems the orbit should in-spiral from the limit at the velocity of light? It can only be that before this, Relativistic theory has comprised of much guesswork and the assumption that such guesswork had actually comprised of rigorous geometry.

The contradiction between LIGO and BOGVOS remains another terrific surprise. I did not anticipate that a delay in gravity would have such an overwhelming out-spiral on a binary orbit. The conclusion to this chapter is not just an outright contradiction, but more than a dozen *computationally necessary disagreements* with the Abbot article, General Relativity itself, and much of the last 100 years of Astrophysics as well. This is hardly ideal, and yet enthralling all the same.

But if we accept that the in-spiral should occur in singular star-systems, due to a loss in velocity from Special Relativity, we get an entirely different wave-form to the LIGO data. This is because with the limit at the velocity of light, the pair drifts forwards and backwards with a much greater net oscillation than that which occurs from the orbits themselves. Scenario [3] demonstrates this phenomenon. More than 30 orbits give a single major oscillation in the wave-form due to the pair drifting around the screen because of Special Relativity's limit on the velocity of light. The smaller more subtle orbits are reflected in the wave-form.



Scenario [3]

This scenario shows the LIGO wave-form estimated as the best computation within the theoretical framework from Abbott and the LIGO scientists. The result is not the expected wave-form. The limit of the velocity of light from Special Relativity causes the pair to drift back and forth.

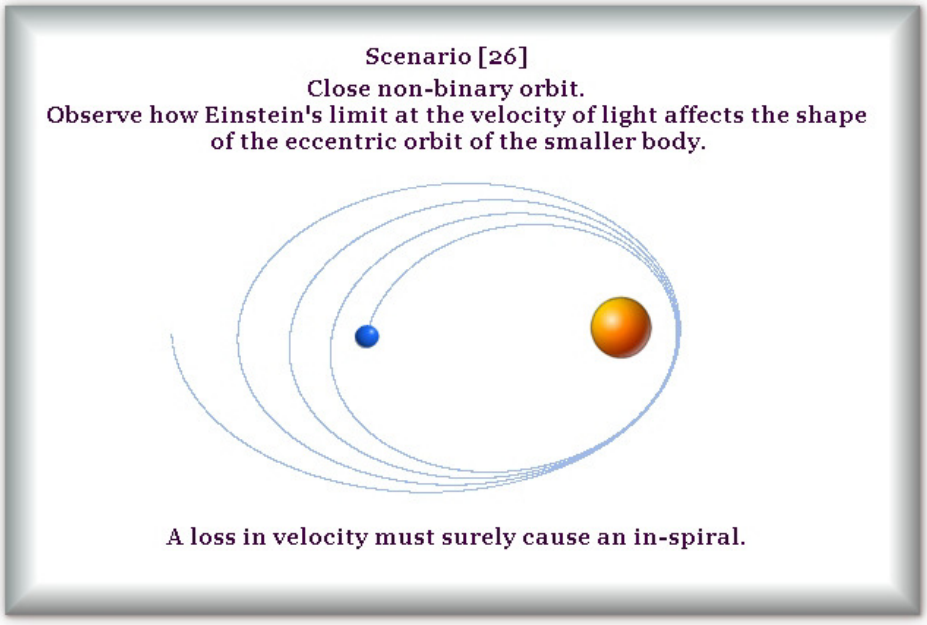
The OGS11 model requires eccentricity when the in-spiral is taken to be the result of the limit at the velocity of light from Special Relativity. Without eccentricity and Special Relativity, the only way for the in-spiral to occur is from the cloud of dark matter like in scenarios [18], [16], [5] & [6].

However, seeing that the limit on the velocity of light from Special Relativity causes an in-spiral; shouldn't the eccentric orbits, of Mars, Mercury & the Moon be in a state of in-spiraling? Why are comet orbits not in-spiraling? *Is it because there actually is no limit on the velocity of light? Or is it perhaps that Einstein's formula is just a very crude approximation?* Or are the life-spans of the comets and planets too short to be affected by this yet? Or is it just a matter of scale and degree? Perhaps other forces or emergent properties are in affect to counter the expected in-spiral from Special Relativity?

In chapter XX on quantum gravity the affect of Einstein's theory on the orbit of Mercury was inconclusively discussed. But as was pointed out earlier in this chapter: Einstein's theory on the limit at the velocity of light *will cause a reduction in expected velocity* when compared with the Newtonian laws. Surely a reduction in velocity can only cause an in-spiral in a single star system?

After observing how the limit at the velocity of light causes the binary pair to in-spiral, it was fairly easy to generate a scenario with a major body of 10 solar masses and a much smaller body in orbit around it with 0.01 solar masses. The scale in OGS11 is preset to the parameters of the LIGO observation so at the nearest the bodies are 600km apart; and 4600 km at furthest. The Newtonian orbit on this scale takes about 0.75 seconds. But what happens when we apply Einstein's limit at the velocity of light to this example?

Scenario [26] reveals an astonishing piece of geometry:



This anti-clockwise orbit clearly demonstrates an in-spiral. Logically this must be expected to occur because Einstein's law on the limit at the velocity of light necessitates a loss in velocity. Yet nowhere do we see eccentric orbits like that of Mercury or Mars spiraling inwards. *In fact the Moon has apparently been observed to be spiraling outwards.*

Because the OGS11 example is fixed to the LIGO scale of super-dense objects at very high velocity it will not tell us by what amount Einstein's theory predicts these other orbits *should* in-spiral. (Future versions with these details are under construction.) Of course the real solar system is a many-body-problem with many interacting gravity fields. And it has already been determined (in Chapter VII) that the gravity of the Sun will cause the Moon to

out-spiral from the Earth; and the expansion of the universe will also have a similar resultant out-spiral.

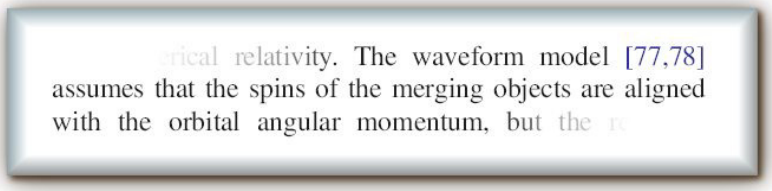
However, Einstein's prediction of the *orbit of Mercury undergoing perihelion precession* seems inconsistent with a loss in velocity. As the graphic above demonstrates, a loss in velocity does perhaps cause a small precession of the orbit of Mercury yes; but it should *also* result in Mercury spiraling into the Sun. Yet never have I heard this theorized; even though, in retrospect it seems fairly clear.

I see no evidence to suggest that these avenues have been *satisfactorily* explored before now within evolutionary algorithms. So the reader who happens to also be a computer-programmer with some experience in evolutionary algorithms may wish to be inspired to find these answers. BOGVOS for Alpha Centauri may require quite a few months before I can get back to the *Mars, Mercury & Moon mystery*. The more questions this unearths, the murkier the horizon gets; and I'm not sure where this inquisition will lead to.

Bernard Burchell from www.alternativephysics.org is the most recent attempt to unravel the mystery of Mercury's orbit that I have seen. But he found no correlation between fluctuations in Mercury's orbit and the theories of Relativity.* There are of course many claims to the contrary. None of the claims I have seen meets the requirements of computational logical positivism.

Of course it still needs to be mapped precisely in an algorithm for a typical planetary singular system with a more exact scale of distances much larger than the LIGO scale. So while it may be inferred inductively that scenario [26] suggests that Mercury should be more easily observed to be spiraling into the Sun than it should be observed to be undergoing precession, this can only be claimed assertively with OGS12; which will include the features of sliding scales for time and distance. One might guess *that* endeavor to simply be a case of multiplying a few variables by another couple of variables (for the scaling of time and space). Intuitively, I should suggest this is not nearly as easy as it sounds. OGS11 has enough complexity anyhow; so these examples remain on the scale of LIGO for time and space… for now.

One of the more intriguing inductive assumptions that Abbot makes is this gem:



And this situation can only arise if the binary pair formed from a single object that itself split in half due to excessive spin. Most celestial objects follow this form, and yet only ***Sum Theory*** explains why it is so: *Axial rotation, the equator and the ecliptic are aligned because they had the same common spinning origin.*

The odds are almost impossible for all binary pairs to form with both equators aligning with the ecliptic plane, as well as no noticeable eccentricity to the orbital shape – if their origin was random collisions from the debris of a Big-Bang type of explosion. Such perfect symmetry can only unravel from the ***Big Unwind***.

The Big Unwind aside (that's chapter XXII), it may appear that I disagree with the LIGO group in many areas. However the disagreement is actually based on a largely implicit agreement in the core questions! So I still think that the experiment GW150914 has been a great success, mostly because it has provoked OGS11.

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* In previous chapters other explanations are addressed unsuccessfully, including that of Ohanian.

Nonetheless, hopefully you can now see why the LIGO detector needs a binary pair orbiting very quickly to detect variations in gravity. And also why such a merger is an ideal event as it is so massive and rare enough to be detectable simply through how it pulls on a laser from a *galactical* distance away.

The oscillation is so rapid that it becomes noticeable even though every other body in all the local galaxies also pulls on the laser. But all these other bodies are hardly oscillating (frequency of orbit) at all by comparison. That is why theoretical phenomena like the LIGO pair GW150914 stand out by contrast as such important events.

The vibrations in the laser are projected 4km away so that they are amplified. From what I can ascertain they are further magnified by bouncing the light back and forth using mirrors, until the oscillation becomes noticeable. No matter how small the oscillation, it can be magnified like this virtually infinitely. A truly magnificent piece of engineering with such mediocre theorizing about it, there has never been before.

Those who have read Chapter XXVIII of this book will realize that I had previously resorted to mere computational reasoning to try and determine if there was a mathematical proof as to what the velocity of gravity might *have* to be. This now becomes immanent with future versions of the orbit-gravity simulation software being conceptualized in order to measure the required out-spiral of the Alpha Centauri system – *if* gravity has velocity. The previous section is enough to convince me that it is most likely that gravity is instant. But I've done enough computation to know that 'most likely' is not certainty.

So before construction on the next simulator begins, I don't want to leave the *LIGO-BOGVOS contradiction* completely unresolved for the reader either. I thus offer a few potential theories to attempt resolution for LIGO-BOGVOS being a paradox. These I may explore further later on, but here are the brief summaries for now:

1) The 203 000 year coincidence.
Easiest to understand is the tiny possibility that the detectors unluckily happened to collect similar data 7 milliseconds apart out of sheer bad luck. This could have made it look like there is a gravity-velocity.

However, this coincidence may occur less or more often than once per 203 000 years as the LIGO group suggests. I do not see how *that* amount itself can be accurate to 1.5% *(why not simply 200 000 years?)* especially when so many errors have already been uncovered in the LIGO analysis. Surely a margin of error is always a rough estimate based on *previous data*?

2) An error in the LIGO timing.
The 7 millisecond difference may be an error in measurement. This seems quite unlikely but are the odds worse than 1 in 200 000? After all the LIGO experimenters have not calculated BOGVOS. Nor have they calculated the in-spiral from the velocity limit of light. Nobody is immune to oversight.

Thus, I simply must question the authenticity of that 7 millisecond delay because *a delay in gravity will cause a binary pair to spiral outwards*, and not inwards. This is true in terms of the purest computational *analytical a priori.*

3) Atomic physics of super-massive bodies
What are the properties of atoms with atomic masses so big that I shudder to even estimate them? Perhaps there is an instant attraction between the pair that has nothing to do with gravity?[3]

[3] Those familiar with my previous algorithms or earlier chapters may also note that altering the gravity exponent will not cause in-spiral nor out-spiral. (In g=m/r^2 the gravity exponent is the '2')

Could it be that atomic forces apply instantly over such short distances with actual *atoms* the mass of 30 Suns? If so, then gravity itself may be an insignificant cause of their orbits even though we can only detect the gravity wave-form of their orbital frequency.

4) Velocity of gravity varies

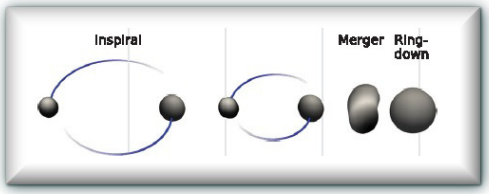
Perhaps the velocity of gravity normally operates minimally at the velocity of light, but in the vicinity of very large gravity fields it actually starts to increase? I like this option because it suggests validating all the LIGO data and also validating the OGS11 algorithm.

However an orbit-gravity simulator which more accurately maps the Alpha Centauri binary system should still prove that gravity cannot travel as slowly as the velocity of light on *that* scale! If binary pairs are to be as dominant as they are observed to be; then their in-spiral or out-spiral would have to be so insignificant as to yield a lifespan that is more comparable to the estimated age of the universe – measured in billions of years and not mere thousands.

5) An error in OGS11

I have taken every precaution to avoid this, but I am human and could have erred. However BOGVOS is something so clear that it can be explained with simple arithmetic: If the two bodies are traveling at $1/15^{th}$ the velocity of light and are 5000km apart then the gravity reaches across that space from a point behind the objects $1/15^{th}$ of the distance between them: a 330km delay. That is a very big difference in direction for gravity to pull from. An angle of 7-8 degrees is visibly noticeable in one single orbit.

In retrospect it *is amusing* that nobody has noticed BOGVOS before now. I do not know why I did not notice it for the last year or two of inquiry. I *do know* that I only noticed it because I was compelled to do so by the rigor of the computer algorithm – and obsessive checking, re-checking, and double-checking the triple-checks (Hopefully you get the idea). I also see no evidence that Abbot and the other LIGO scientists could have used such algorithms because the best image they offer looks like a fairly schematic approximation rather than a computed evolutionary algorithm:



The shape of that orbit (above) is just too squashed to be accurate. The LIGO group have already claimed that the eccentricity is <0.1 whereas that representation (above) has an eccentricity of about 0.25; which means the orbit in the diagram is about 25% wider than it is high. Compare this image to those orbits generated by OGS11 which demonstrate a negligible eccentricity. If Abbot had actually used such an algorithm similar to OGS11, then they would have used graphics from it rather than the inaccurate schematic diagram above which does not fit their claim of <0.1 eccentricity.

6) Deliberate false data

The LIGO experiments do actually use deliberate false data in order to test their processes. Human mischief cannot be ruled out. I am a private individual not reliant on external funding. My only motivation is Divine curiosity. Perhaps the entire GW150914 experiment is nothing more than an elaborate test by the LIGO group directed towards the broader the scientific community!? There are so many basic problems with the Abbott article, that it is quite likely that it is all a *conspiracy* to see who bows to the emperor's holey underwear and who is bold and clinical enough to disagree.

7) Experimenter bias

It is likely that the 7 millisecond difference was a construct that was fabricated as a result of the theory of General Relativity. It could easily have been concluded that there *must* be such a delay because the famous theory is assumed as a foundational premise.

8) Electro-magnetic processes

Perhaps the LIGO data is not actually only measuring the force of gravity. If one takes it as a certain empirical premise that the 7 milliseconds difference between the LIGO readings is correct; then combine that with the certain logical premise that gravity cannot propagate as slowly as light because of BOGVOS; then a rational conclusion could be that the observed oscillation is not gravity, but instead an electromagnetic pull!

Now the LIGO group seem to claim that this possibility cannot be true, but if they have excluded all electromagnetic activity from their detector, then it has to be noted that the Earth itself is made up of large amounts of iron, so if the detector is unmoved, and the entire Earth is wobbled by an electromagnetic pull, then the net result will be an oscillation of the detector! They cannot insulate the entire Earth! I will continue with this most intriguing possibility at the end of the chapter.

So…

… at different times I favor any of the above options. The possibility that I made a mistake remains a structural necessity in being rigorous. Even though I see no error, I never assume this means that there is no error. *That would be dogma.*

But I have to reiterate the point from the previous chapter, that 'black-holes' can not exist. Instead such super-dense bodies could be termed 'Chandrasekhar Stars', or C-stars. The term 'black-hole' is so loaded with contradictions that its only usage should be in the historical context. It has no place in any study which upholds the integrity of logic as a foundational fundamental premise of knowledge.

The establishment has for the better part of the last century failed to realize that gravity as curved space from General Relativity is entirely contrary to black-holes. If gravity curves space such that nothing traveling at the velocity of light could escape this curved space, then the black-hole would give off zero gravity. The gravitational-wave itself is supposedly traveling at the velocity of light, and so it could not escape the hole that it itself has generated! This is such an overwhelming oversight by the establishment, that I feel totally confident that *this-here* analysis is a vast improvement; albeit imperfect itself.

Nor has anyone else (that I know of) noted that black-hole theories are self-contradictory for another reason. If the scientists had not realized that gravitational-waves cannot get past the event horizon due to time stopping at the event horizon, then every other potential error is also quite likely.

But also because there is another more obvious problem with the neo-Relativistic paradigm in the context of the LIGO claims regarding GW150914. You see, at the event horizon of a black hole *time itself is said to stop* due to excessive gravity according to General Relativity. Thus there is no way that the event horizons of two 'black-holes' could merge.

An orbit requires time to be moving, whereas for a 'black-hole' time has to come to a standstill. A 'black-hole' could not spin for this very same reason. Neither could those two event horizons orbit one another, as this would also require time to be moving. So as the two event horizons moved closer together, they would be perceived to slow down as time is altered according to standard theories on black-holes. And yet the LIGO data claims the entirely contradictory conclusion that they accelerated just before the merger, whilst being said to be in keeping with standard interpretations of General Relativity.

After all the existence of the event horizon of the black-hole is based on the premise of General Relativity; so to hypothesize that the gravitational information could jump across that gulf would violate General Relativity. And if this occurs, then there is no need for the foundational premise which gives us the event horizon in the first place! Theory without philosophical syllogism just yields endless contradictions.

A further contradiction in contemporary astrophysics now becomes apparent. If the singularity at the start of the Universe consisted of all the mass in the Universe in a super-dense origin, then time would have slowed to a standstill as a result of time dilation from General Relativity (due to all the mass of the Universe being within that singularity). Then there would be no moving time for the singularity to expand/explode/inflate. The entire universe would in affect be still-born if General Relativity was a correct ontology. The Big Bang would never have moving time in which to actually go bang.

Natural Philosophy and computational logical positivism are a more acute epistemology than theoretical science it seems. But science that rejects philosophy is hardly able to contextualize itself as a method anyhow. Un-philosophical science is mere dogma. And the method of pure logic has to be credited to Kant's notion of the *analytical a priori*: That by simply using original principles of pure logic we can often answer questions that circumvent the vagaries of esoteric empirical experiment.

So the conclusion to this analysis is simply that Einstein's Relativistic adjustments regarding gravity are quite contrary to ordinary empirical observation. The only valid adjustment to Newtonian gravity is that of quantum time from Planck. Gravity is either an instantaneous force, or it is propagated so many times faster than the velocity of light as to be considered virtually instantaneous.

Even the limit at the velocity of light is at best a crude approximation. But certainly, binary orbits will fall apart with gravity-velocity, and the LIGO data could never be a pair of black-holes spiraling inwards due to General Relativity.

8

SIMULATOR PHYSICS OF orbit-gravity-sim-11.exe (OGS11)

Various physics formulae can be switched on or altered in the software by the user.

The computer algorithm OGS11 was built out of OG8 which was a study on binary orbits in a simpler Newtonian-Planck paradigm. OG8 could be a good place to start if you wish to demonstrate this to less-experienced learners. OG8 is quite easy to use and understand by comparison. It is also more fun as anyone can easily observe the way in which other smaller random bodies interact with the main binary pair. The nature of OG8 is such that the users may even observe orbital structures never seen before.

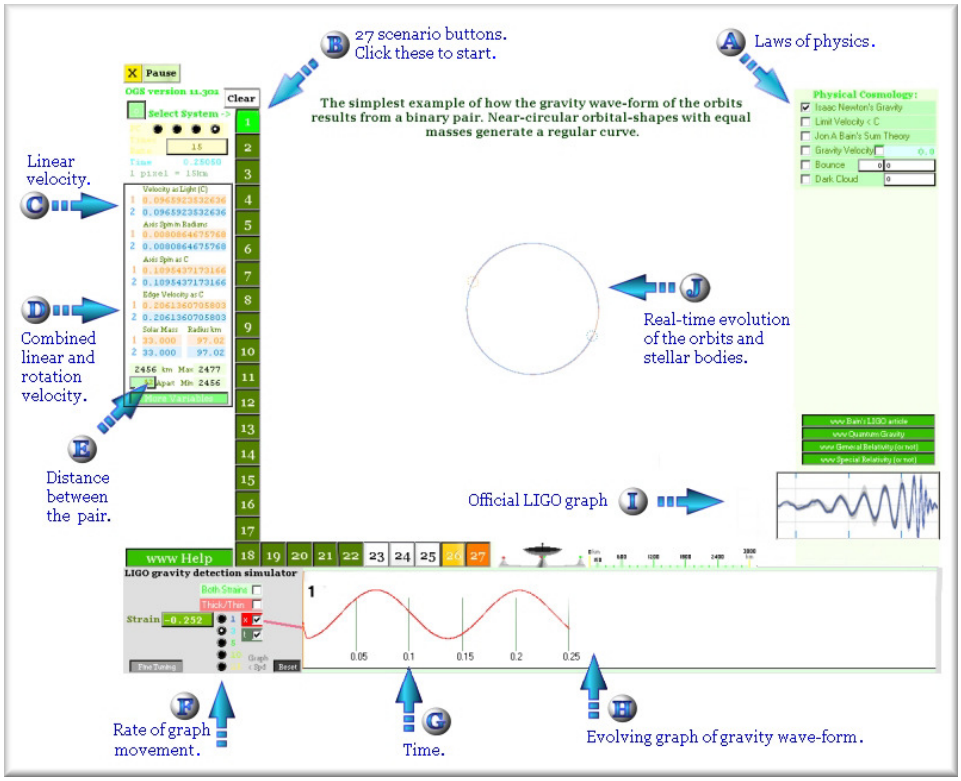
Some may question why I feel it is worthwhile to explore this process with tools that iterate far slower than super-computers. And the reason is quite paradoxical: Slower computation is faster. Whilst a super-computer may perhaps compute a million times faster than OGS11 and vb6, it is the development process that is much faster using business software designed specifically for fastest programming.

OGS11 takes 100 seconds to complete a scenario, and a super-computer takes 1/10000th of a second to compute the same scenario. OGS11 took 8 months to program, but I have still not seen a supercomputer replicate BOGVOS, nor the in-spiral from Special Relativity. Perhaps such development will come about in 8 years time? Perhaps it will take longer; seeing as though the supercomputer programmers have still not realized that the gravity of the Sun is tugging the Moon away from the Earth. Neither have they realized that the only way for a solar system with all planets orbiting in the same direction to form, is from one of a binary pair going nova. (Some of those answers go back to 2008). The physicists have also missed the many other conclusions evident in this thesis. Perhaps it is not the size of the tool that matters, but how you use it that counts.

OGS11 differs from the previous software simulations constructed because it goes beyond the Newtonian-Planck paradigm. It allows the user to switch the various physics theories on and off so that the affect of each can be visibly demonstrated. Primarily it was designed to investigate the LIGO data of GW150914, so it is scaled for two objects of high mass and extreme density orbiting hundreds of kilometers apart within a fraction of a second. Previous simulators would typically scale the time with 1 real-time second the equivalent of

1 virtual year. However in OGS11, 1 real-time second will map to a virtual time of just 1/100th of a second. Previous simulators speed up time, OGS11 slows down time. This is so that the user can observe the evolution most effectively. But slowing down time also improves the accuracy.

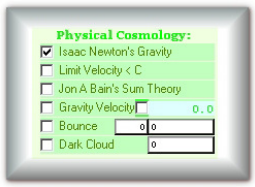
The user can get *'tool-tips'* from the software whilst it is running, by simply hovering the mouse over the various buttons and boxes. For example: hover the mouse over the distance between the pair ('E' in the screenshot below) to see the exact (un-rounded) maximum and minimum distance between them. The following screenshot (colors inverted to save ink) outlines some of the features of the software, with a few explanations:



Use the 'pause' button; then move the binary pair around the screen if you want; change the amount of gravity (mass) of each; as well as alter the momentum. This demonstrates that the model is dynamically accurate to conventional physics properties, and is not just a video simulation.

Physical Cosmology:

Label 'A' points to the most vital feature. The frame on the top right of the screen allows various physical laws to be ticked on/off and variables altered.



Each scenario uses these differently, but you can also alter them whilst the scenario is busy evolving. It may be ideal to start the scenario; press the pause button; then alter the physics; and then un-pause. Otherwise the pair may bind before you can have time to alter the physics. But it works either way.

Before you start any of the [27] scenarios (label 'B' in diagram previously), you may want to click through the *Physics Cosmology* options, some of which give descriptions. Hovering

over each of them also gives brief descriptions as 'tool-tips'. Here are more details of the physical cosmology options:

Isaac Newton's Gravity: This is the essential starting point, and cannot be turned off. This option does differ slightly from Newton's original theory because computational evolutionary algorithms necessitate quantum time whilst Newton theorized that time could be infinitely divided. This is discussed in more detail in previous chapters, but remains the essence of my theory on *quantum gravity*. So this is essentially Newtonian-Planck gravity in affect.

Limit Velocity < C: This setting approximates some of Einstein's Special Relativity. Preserved here is the reduction in velocity as the object accelerates towards the velocity of light. This causes an in-spiral (although the LIGO group officially disagrees with me).

The reduction in velocity as the object accelerates towards the velocity of light is not easily transferred from a one-dimensional linear equation to a two dimensional equation with X and Y axes. Moreover seeing as though the angle of the starting velocity and the angle of the added velocity can vary, it starts to become quite a complex process using Einstein's famous formula:

$$v_x = \frac{v'_x + V}{1 + v'_x V}$$

We need to be able to transfer the vector sum to an X and Y process for sake of computation because the computer only calculates in terms of X and Y. It is important to realize that this formula is designed to work only with velocity values as a proportion of the velocity of light. Thus V and v' cannot be >1. I conceive of ***4 methods*** of applying this formula to the X and Y axes. The first ***3 methods*** are incorrect, but it is vital to not make these mistakes so I demonstrate them anyway.

#1) One cannot simply impose this formula separately to the X and Y axes and then hope that the combination of these two is the same as if we were to apply the formula to a single velocity vector. Here we would get an entirely different final velocity depending on the angle of the velocity vectors. Clearly ***method #1*** is self-contradictory because it is not neutral of any arbitrary choice of X and Y axes as is required by vector theory. (Feynman p.11)

Here is an example of why ***method #1*** fails: An object moving at 0.7C undergoes a further acceleration of 0.7C. The Newtonian result would be 1.4C, but according to Einstein the result is now about 0.94 C. But if this is at a 45 degree angle and we apply the formula to the X and Y axes separately we get an error.

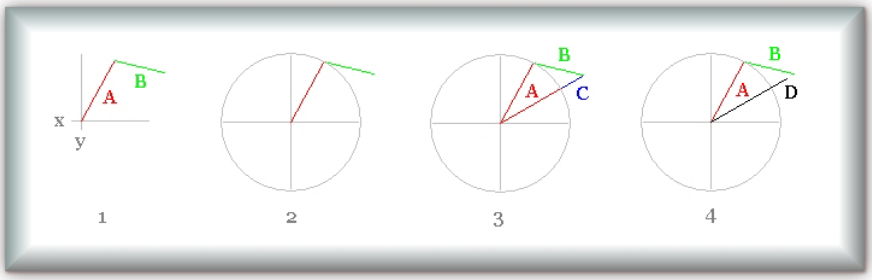
0.7C at a 45 degree angle has both an X and Y value of roughly 0.5C. So if we add 0.5C to 0.5C using Einstein's formula from a bit earlier we get 0.8C for each of the X and Y axes.

Now using Pythagoras' triangle, the square root of (0.8^2 + 0.8^2) would give a resulting vector of about 1.13C which is not correct at all. This method fails regardless of any actual change in direction – and that is a further problem.

#2) It may be tempting to consider entirely reversing the process for a deceleration. Here a net result of an *increase* in expected velocity with *deceleration* would be the hypothetical result (as opposed to the conventional *decrease* in expected velocity with *increased* acceleration). This would ***not*** be in keeping with Relativistic Theory, especially note Feynman's objection to this on p.88 of Six Not-so-Easy Pieces. So ***method #2*** fails because of conservation of momentum. I seem to recall that Miles Mathis takes a similar route to this in opposition to convention.

#3) We could ignore the angles and just apply the formula. We would then have a result that operates as if a deceleration away from the velocity of light would also contain a *relativistic loss in velocity*. This would also be contrary to Feynman's (p.88) conception of the conservation of momentum; but is not itself an entirely contradictory computation. The problem here is that we get an in-spiral even when an orbit is completely circular. This is not in-keeping with convention, which is why Einstein used the eccentric orbit of Mercury as an example to work with.

#4) So the obvious best solution is to determine the final Newtonian vector sum. And then subtract from that vector the starting velocity in order to get a new 'added velocity' which would implicitly contain within it any angles. This new 'added velocity' is 'C' in the following diagram:



So here we are adding the vectors 'A' and 'B' such that the final Newtonian vector is A + C. According to Newtonian calculations A + B = A + C. But in the Relativistic addition we must first reduce the addition to A + C in order to eliminate the problems caused by angles we identified earlier in ***methods #1*** & ***#2***, & ***#3***.

Now we can apply the Relativistic formula for addition of velocities to A + C that Einstein insists on and get '**D**' which is therefore less than A + C, and also at the correct angle. After this we then get a proportion (P) of the old to the new vector: P = **D** / (A+C).

Now we can multiply that proportion: P into the X and Y axes separately. So these new X and Y axes give the same vector of '**D**'. By doing this we simplify the process and avoid any error from different axes or problematic complexity caused by angles.

Using ***method #4*** the in-spiral is greatest when the orbit is most eccentric. A circular orbit will have no in-spiral using ***#4*** as it contains no real velocity change. But if we use ***method #3*** there is an in-spiral regardless of the shape of the orbit. OGS11 uses ***#4***. Also note that Feynman does not even attempt to solve this problem and is content to only use the formula for a single axis.

But take careful note of this: *Regardless of the method, the result of Einstein's formula is an in-spiral in an eccentric orbit for the very simple reason that it involves a reduction in velocity when compared to the Newtonian paradigm.*

Much of the other 'exact' adjustments for the Relativities remain entirely contradictory. To resolve them, time dilation and space contraction have to be considered as inherent within the velocity reduction, and thus tautological *and* redundant. (More details of this are discussed in chapter XXVII).

Jon Bain's Sum Theory: Although this does not at all affect the graphic of the gravity wave-form of the orbit in the model, it describes what happens as the edge velocity of the object reaches the velocity of light. Spin accrues at the edge, and mass is lost to the body as particles spin-off as a result. It is theoretically necessary because without it there is no conservation of energy and no conservation of atomic mass for each particle when limiting the velocity of the body to the velocity of light. In OGS11 this option will have no affect without also selecting the reduction in velocity from Einstein's Relativity (the previous option on the list). Sum Theory also describes why all celestial bodies rotate on their axes.

So if there is any loss in expected velocity for whatever reason or formula, it is my thesis that such a loss must accrue as an increase in spin for reasons of conservation of momentum and conservation of energy, and conservation mass when fusion and fission are not evident.

Gravity Velocity: The number in green next to this option measures the time taken for gravity to move between the objects. It is proportional to the distance between them defaulted to the velocity of light. The second Ticked box for this option displays further parameters for the velocity of gravity: Specifically the timer delay; which shows how many iterations the computer looks back in time to find the source of the gravity. This would of course depend on the distance between the pair. The lower the number of iterations, the larger the rounding error will be. The Velocity of gravity can also be adjusted.

Bounce: This option describes the physics of the contact between the bodies. If switched off, then the pair merges fluidly.

This unfortunately is only accurate if the pair consists of equal masses and equal velocities. The software calculates only a perfectly symmetrical bounce. Future versions may improve on this. A potential algorithm is that the increase in amplitude in the given LIGO wave-form may be caused by the way in which the pair actually merges, and not their orbits. Scenario [7] seems to disprove this idea however – but only for equal masses. This study has revealed so many divergent theoretical options that it was just not feasible to program them all. I do not know if I will be able to get back to this particular aspect, so other theorists may want to explore the possibility of the given wave-form being a result of the merger itself. Seeing as though the entire theoretical framework of how the pair in-spiral is not at all in keeping with the official claims (from a computational perspective) it seemed a bridge too far to spend too much time on the merger itself.

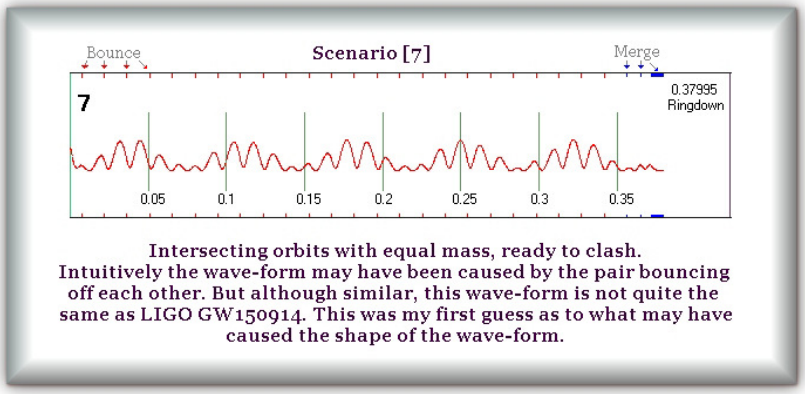
The numerical box on the far right of ***bounce*** is the ***Spin Yield***. This is the minimum combined spin before the bodies coalesce. If the combined spin of the pair is more than this amount then they will ***bounce*** as solids. If less than this they combine as fluids. If the amount in this box is very low then it takes longer for the pair to merge into one another.

Dark Cloud: This theoretical option is perhaps not part of the best solution. It is just a construct to show that if the pair moves through a cloud of matter, this could cause an in-spiral as they slow down due to friction. My first instinct was to suggest that the merger could happen for purely Newtonian reasons. Seeing as this is the easiest to program it became the first theoretical option. It seems clear to me, that if much of the universe consists of dark matter, then a binary pair could easily be swamped by a 'Dark Cloud'.

Dark matter is normal matter that cannot be seen, but only detected by its gravitational affect. But this option does not quite give the same graph as the LIGO GW150914 wave-form. The 'Dark Cloud' option also does not counteract an outwards spiral from the delay in gravity. (BOGVOS). See Scenario [16].

A list and summary of the various scenarios:
[1] The simplest example of how the gravity wave-form of the orbits results from a binary pair. Near-circular orbital-shapes with equal masses generate a regular curve.
[2] This demonstrates the problem: Binary-Orbit, Gravity-Velocity, Out-Spiral (BOGVOS).
[3] This scenario shows the LIGO wave-form estimated as the best computation within the theoretical framework from Abbott and the LIGO scientists. The result is NOT the expected wave-form. The limit of the velocity of light from Special Relativity causes the pair to drift back and forth as well as spiral inwards. This is reflected in the computed gravity wave-form. To remove the smaller wave-form of the orbits: Start the scenario; then pause it. Click 'Fine Tuning' and change the 'Stiffness' variable from 0.9999 to 0.8 to. Then click un-pause to continue the scenario.
[4] Binary pair with unequal mass and uniform orbits. There is no in-spiral or merger in a purely Newtonian paradigm. The wave-form oscillates evenly with the circular orbits in Newtonian physics even when the pair has unequal masses.

[5] Instead of in-spiral from Special Relativity, it is possible that the in-spiral could occur due to collisions with a cloud of matter. This shows that the in-spiral results in a decrease in amplitude.
[6] The gravity wave-form of the orbit with a pair of equal masses merging. With an in-spiral caused by a cloud of matter, this scenario fails to show an increase in amplitude of the wave-form due to the contact and merging process.
[7] This option is a preliminary intuition which served two purposes. Firstly it is a test case to ensure that the angle of incidence is correct when the pair collide with a glancing blow. Secondly it was an intuition that the wave-form may have occurred due to the pair enduring a series of glancing blows before they merge. This did not quite give the correct wave-form, but it was a close guess.



Intersecting orbits with equal mass, ready to clash.
Intuitively the wave-form may have been caused by the pair bouncing off each other. But although similar, this wave-form is not quite the same as LIGO GW150914. This was my first guess as to what may have caused the shape of the wave-form.

It is worth observing how this gravity wave-form of the orbit evolves in real-time by downloading ***orbit-gravity-sim-11.exe*** and selecting scenario [7].
[8] Unequal mass and horizontal eccentric orbits according to the Newtonian paradigm.
[9] Unequal mass and vertical eccentric orbits according to the Newtonian paradigm.
[10] Vertical eccentric orbits with equal masses according to the Newtonian paradigm.
[11] Horizontal eccentric orbits with equal masses according to the Newtonian paradigm.
[12] Tests how the spin affects the orbit at collision.
[13] Newtonian scaling test. Distance of 350km yields 75Hz for combined 66 solar masses. OGS11 is in agreement with the Newtonian estimates of the LIGO group.
[14] Sum Theory demonstrates that mass is lost when the edges of the bodies approach the velocity of light. Velocity turns into spin as an object approaches the velocity of light.
[15] Observe how the limit of velocity at the velocity of light results in the in-spiral. Just the orbit-lines are here depicted (see 'Horizon' option). The closer to circular the orbits are, the less in-spiral occurs. Compare this scenario with scenario [4] by enabling *'Limit Velocity < C'* in that scenario to see comparatively almost no in-spiral.
[16] If gravity propagates at the velocity of light, the pair spiral outwards. This also includes the much smaller spiral inwards from the limit on velocity from Special Relativity, as well as the in-spiral from the cloud of dark matter. The result is still an outward spiral.
[17] Gravity is at the velocity of light from General Relativity. A loss in velocity from Special Relativity tries to cause an in-spiral. Momentum is much less to try and cause an in-spiral, but they still out-spiral.
[18] With the pair starting at a large distance apart, and the in-spiral caused by a cloud of dark matter.
[19] Binary pair with unequal mass – at large distance. Gravity delay and limit as object approaches the velocity of light included (General and Special Relativity).
[20] With the pair about 600km apart and gravity propagated at 6x the velocity of light there is still no equilibrium between in-spiral and out-spiral. Decrease the velocity of gravity to increase the outwards spiral. Take special note of the 'timer delay'. If this number gets too low (less than 3) then the computer speed causes a large rounding-off error. This can only be improved upon with a faster computer process. But it does not affect the principle of the matter.
[21] This uses the Special Relativity velocity-limit for the pair at the velocity of light, but now starts the algorithm with the pair over 2300km apart. Even with gravity propagated at

50 times the velocity of light, the outwards spiral is still more than the in-spiral from the limit at the velocity of light.
[22] At a distance of over 5750 km between the pair, if the velocity of gravity is about 99 times the velocity of light, there is still out-spiral. If the velocity for gravity is higher than this, the timer delay goes beyond the margin of error at this scale.
[23] A binary pair of white dwarfs; each the mass of just 1 sun. (NOT super-dense 'black holes'). Less mass requires less velocity, the result is that they are larger and orbit more slowly than the 'black holes'. This example is Newtonian.
[24] A binary pair of white dwarfs; each the mass of just 1 sun. With in-spiral from Special Relativity, and velocity of gravity from General Relativity the pair spiral away from each other at an ever increasing rate. They start about 2457km apart here.
[25] This is the same as the scenario [24], except that the starting momentum is less in order to try and get the pair to in-spiral. Either way, they out-spiral due to the delay in gravity.
[26] Close non-binary orbit. Observe how Einstein's limit at the velocity of light affects the shape of the eccentric orbit of the smaller body. This represents a fascinating result. This is not at all in-keeping with claims of how the orbit of Mercury is supposed to precede. Mercury should actually be spiraling into the Sun if Einstein's limit on the velocity of light is valid. A loss in velocity must surely cause an in-spiral.
[27] Seeing as though there is no known physics of gravity that results in the energy of the system increasing both the amplitude and the frequency of the signal; and gravity must be instantaneous; the only conclusion is that the wave-form is an artificial electromagnetic construct. Read more about this vital intrigue at the end of the chapter.

More Variables:
Directly to the left of the option [12] on the screen is a button for 'more variables'. This includes options for excess friction on the surface or internally. An amount of '1' is frictionless. '0.999' is small friction, '0.8' is large friction. 'Merge' and 'g2' are both options for the rate of merging of the pair when in a fluid state; after they have yielded.

Fine Tuning:
At the extreme bottom left, is a button which reveals fine tuning in the LIGO detection simulator. Fine tunings are required so that the wave-form stays on the visible graph. Altering the 'Fine' moves the graph up or down. 'Tuning' magnifies the wave-form. If the graph goes off the chart, the software will automatically attempt to bring it back into the visible range (it will erratically oscillate for a while). In doing so, the magnification tuning might be decreased too much. Amend it manually.

Drawbacks:
Methodologically, I cannot emphasize enough just how vital it is to openly declare drawbacks. From a purely psychological point of view it helps one to see everything clearly by being openly self-critical. This is the psychological mechanism I have found which best thwarts any subconscious experimenter bias.

Some drawbacks of the OGS11 model are:
I could have simply fudged the graph to fit the data. Instead I would rather that the graph was generated by the proposed physical laws; however this may produce differences with the Abbot article.

Reality will always contain more detail than any computer can number-crunch. A computer-model will always contain more detail than any person can fully understand. A theorist's understanding will always contain more detail than can be explained. Explainable detail will always contain more information than there is time to explain.

I have not been able to ascertain just why the LIGO group concludes that the mass of the pair diminishes by 3 solar masses at the merger. If this loss of mass were evident in the wave-form, then the graph should move downwards to reflect this.

The merger is somewhat incomplete, as the bounce is only true as regards objects of equal mass and equal velocity. There are just too many other possibilities to complete this part of the algorithm.

The simulator is designed to work anti-clockwise. I have not tested it extensively if the rotations are clockwise.

The model is two-dimensional, but seeing as all bodies are situated on the ecliptic this is unimportant. At the last few iterations of the merger, the two bodies are super-imposed on top of one another. This mimics 3-d depth.

I have not had chance to figure out the units of measurement for many of the parameters that can be altered by the user. However, these are inherent within the algorithm.

Although the graphic display is in pixels which represent 15km each, the variables represented by the pixels themselves are far more accurate. Each measurement of space is precise to a million millionths of a meter. It is the rate of computation in the timer that represents a greater margin of error.

The gravity delay caused by gravity-velocity is the worst approximation in the model with about a 2% margin of error. The gravity origin has to be approximated. Whenever the approximation jumps an extra iteration it appears as though the distance between the body and the gravity origin jumps a few kilometers. Nevertheless BOGVOS is unaffected by this *in principle*.

When the binary is 1000km apart the pair travels at $1/7^{th}$ the velocity of light. The difference between the position and the gravity origin is either 140km or 143km. ($1/7^{th}$ the difference between them). Regardless of this 2% discrepancy, the difference between the position and the gravity origin is so large that a prodigious outwards spiral occurs. This minor inaccuracy could be improved upon with a faster computer/language, but I may improve upon this using a better technique in OGS12.

A major drawback is that my results are in direct disagreement to Abbot and the LIGO group which lists about 1000 authors. So it's a disagreement of 1 against 1000. But I am also disagreeing with the findings of the entire scientific establishment for the better part of the last century. However logic is not a popularity contest, nor is it a democracy. Every time a breakthrough is made in any field, one person has to contest against the entire existing community of theorists; contemporary and throughout all of history.

There is some sleight decay in the orbital graphic when the horizon of the body overwrites the graphic of the orbit-line. This allows the software to run faster. This affect is purely cosmetic. There is a dark green button with an 'o' on it near the top left corner which can repair the orbit-line. Alternatively deselect the 'Horizon' option to display only the orbit-line and not the horizon of the body.

There is a small delay before the affect of the gravity-velocity kicks in. This is because the algorithm cannot reference previous orbital points until they have actually occurred in the *run-time*. This is called the *gravity-velocity buffer*. It has limited storage in OGS11, and resets after 90 seconds of run-time. This causes a small inaccuracy (0.2%) for the *velocity of gravity* option. The buffer may have a longer duration in future versions.

The simulator detects the pull of the forces by the binary pair. This was rather tricky to replicate. In order to get an oscillation, of the nature of GW150914 it seems there would need to be firstly the pull upwards on the detector; followed by the pull back downwards by the structure of the detector itself. *Of course when the graph moves downwards, it is not being repelled by a force*, but by the tension of the detector. It seems to me that this is not entirely dissimilar to a tuning fork. This was troublesome to simulate, so some of the graphs may appear to show too much upwards pull, not compensated by enough pull back downwards. But in actuality the force is not the same as the wave-form. The force itself should have a base line of the least amount, and all increases should vary upwards from this. But it is the tension in the detection device that must convert this into an oscillation.

It is just not humanly achievable to get every detail perfect. There are so many possibilities that wherever feasible the user is allowed to alter variables and options to see the affects of these variations. Most of the variables affect one another so it would take considerable time to observe all their affects on each other. In all likelihood the user may be exploring interacting aspects of the software that the programmer has simply not looked at yet.

9

WHAT IS GW150914 ACTUALLY?

What to do when logic contradicts observation and orthodoxy?

A curious factoid is that the source-code for the OGS11 physics simulator is about double the word-count for this chapter. If any part of the source-code is illogical, then the entire program crashes. It is thus incrementally more complex to write in a computer language than it is to explain in a human language. OGS11 was started with every intention of proving correct the given theoretical foundation from LIGO, Abbot, & Einstein. Where the physics-simulator deviates from those conventions, it is because there is no other logical choice. It is very easy to claim that a paradigm forms a single logical structure using normal words, images and stand-alone hand-written mathematics. It is quite another endeavor to put such a group of logical premises into a single *non-contradictory formulaic visually evolutionary computer program*. The outwards spiral of BOGVOS a clear case in point.

Resolving the LIGO-BOGVOS contradiction

So the algorithm dictates an *outwards* spiral for a binary pair if gravity has velocity.
And the 7 millisecond delay in the LIGO data suggests a velocity for gravity.
But the wave-form itself necessitates an *in-spiral*.
(Read those last 3 sentences closely).

Resolving this paradox will require some innovation. Any further theoretical analysis of GW150914 must start by resolving this problem. There is clearly a missing piece of logic here. But let me speculate on some earlier ideas for a finale to this chapter.

Option 4: The *velocity of gravity varies* looks a good idea. But after completing OGS12, it may be ruled out due to BOGVOS necessitating that all binary pairs fall apart after a few thousand orbits (Most specifically the Alpha Centauri binary). This would leave the possibility of option 3: *Atomic physics of super-massive bodies*. The likelihood of unknown properties of physics laws is intriguing, but also the most difficult to fathom. But until recently I had not realized that there could be a simple computational proof against the velocity of gravity. BOGVOS leaves all questions wide open. ***At this point I am 93% certain that gravity is instant.***

At the least, the reader can feel rest-assured that I am not trying to make my results fit with anything more than pure logic. If the algorithm contradicts the official finding, then that is what I will publish, regardless of the verbal backlash of the emperor's entourage.

So I have to reluctantly conclude that Option 8 is the most likely reason for the LIGO-BOGVOS contradiction. ***If gravity is instant, but the signal traveled at the velocity of light, then the GW150914 signal must be electromagnetic.***

So I had to ask the question: What is that signal? Can the LIGO group be certain that it is not a submarine from North-Korea using radio navigation somewhere in the Southern Hemisphere? What of some strange celestial magnetic phenomenon? I felt compelled to develop a structure that would generate a pull by an electromagnetic force so that the OGS11 LIGO *detector simulator* would be able to 'detect' the desired wave-form from it.

The really *strange* nature of the signal now became apparent an entire year after the GW150914 experiment was announced and my analysis began. As should be clear, a pair spiraling *inwards* certainly increases in frequency; but they decrease their amplitude as the difference in the forces diminishes. However, a pair spiraling *outwards* increases amplitude, but normally should decrease frequency if the pair are in a gravitational orbit.

So the pair had to be spiraling outwards whilst increasing their rate of rotation; then reach a point of maximum distance from one another before spiraling inwards far more rapidly than they *were* spiraling outwards. Moreover, the rate of rotation required some astonishing variables. To start; a variable with angular velocity required another variable with angular acceleration. But the acceleration required a variable which increased the rate of acceleration. And the rate of acceleration itself required another variable which itself was accelerating. And there was even a fourth and a fifth degree of rate of acceleration. If that wasn't enough, when the construct reached its maximum distance apart and started spiraling inwards, then the entire angular velocity needed to be multiplied yet again, by roughly another 2 times in order to replicate the GW150914 signal closely.

So the amount of energy going into the system had 5 separate degrees of accumulating acceleration; and then a final fixed rate of increase in rotation as the pair collapsed together again. Scenario [27] demonstrates this construct in real-time. It should be observed to use a fixed scale only for time because it could be any distance away. The further away it is, the stronger the pull.

Now this is where it gets totally spooky. Almost a decade ago when building the first gravity simulator, I had speculated about a device that can only be called an *Astrosling*. It was designed to eliminate the problem of spacecraft needing to carry fuel.[∞]

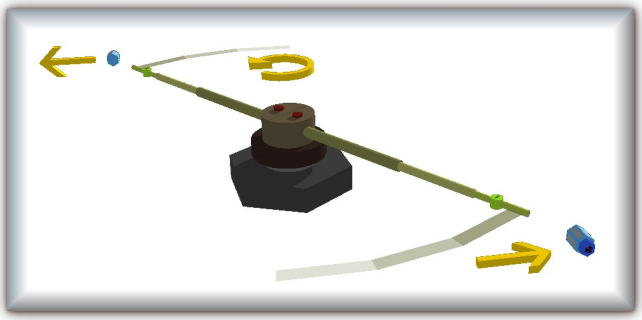
A satellite with two rotating arms would be attached to a fixed engine. It would build up momentum by spinning the arms at ever-increasing angular velocity. It could be fuelled by atomic energy or even ordinary sunlight if in orbit near a star. Once enough rotational velocity is acquired, two probes are jettisoned/released outwards from each of the arms of the spinning satellite. In this way the fuel is not carried with the spacecraft, and even mirrored sunlight will not wane with distance.

The arms extend as rotational velocity increases. The electromagnetic signal of the spinning satellite also then increases. The electromagnetic wave-form will thus increase amplitude and frequency as the Astrosling reaches its zenith. Not only is this the best type of space-probe I can imagine because it does not waste fuel by carrying its own fuel, but it fits the LIGO data perfectly.

So there you have it. GW150914 is an ***Astrosling****.*
I believe that GW150914 is the first sign of intelligence life outside of Humanity.

:–!

Like I did not have enough bloody wild geese to chase. Still if someone else could suggest other reasons, either natural or artificial, for the dynamics replicated in scenario [27] I would certainly like to hear them.



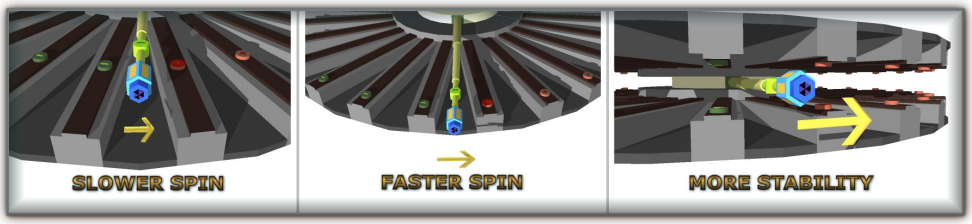
[∞] Incidentally, I also postulated the idea of using giant mirrors on the Earth to fuel spacecraft with the same purpose in mind. They would reflect sunlight onto a solar-sail or solar panels. Much cheaper than lasers, I reckon. There is also therefore no need for the Mars Rover to suffer from too little sunlight on its panels.

The LIGO detectors are located 3000km apart and the intensities of the signals received are similar to one another. This means that the source of scenario [27] must be at least 30000km away if we consider a 10% margin of error in the intensities of the signals received. So their origin is likely from beyond Earth which itself only has a diameter of less than 13000km.

It is important to realize that with all manner of radio-telescopes and other such detection equipment, we really *should* be observing signs of other civilizations by about now. So for those who wonder why we have not detected any electromagnetic alien activity. Here it is. Perhaps electromagnetic communication technology is for the most part not used. It would be egocentric to assume that other beings would discover what we have discovered. And if it exists, such would be encoded, and not an obvious signal. Who could guess what types of communication methods alien life could use that are less noticeable than that of our noisy society?

It could be that the reason the Astrosling spirals inwards so quickly after it reaches its maximum width is because of stealth – this way it leaves the smallest signature. There are a few reasons why it needs to expand, rather than simply increase power[⊗] in order to increase its spin. Firstly at an expanded diameter it is more accurate as regards the destination of the probes because timing the exact release point of the probes seems the biggest conceptual challenge.

Secondly the mechanism may not necessarily be a classical electromagnetic engine. A series of timed electric charges with *pole-switches* on *nodes* seems a more intuitive way to use electricity in order to make the rotor spin. In the next diagram, the green (negative) charge on the rotor is attracted to the red (positive) nodes to cause rotation.



As the rotor passes the oppositely charged node that it is heading towards, that node momentarily goes neutral before going negative and repelling the rotor away as it passes over. As the arms extend, the poles are made to increase power, and the rotation quickens.

In this way any limits caused by electromagnetic engines are negated with the rate of change in the *nodes* pre-determined to reach speeds *perhaps* even faster than the velocity of light. It could use non-contact bearings consisting of magnets, making it a virtually frictionless mechanism in a near-vacuum.

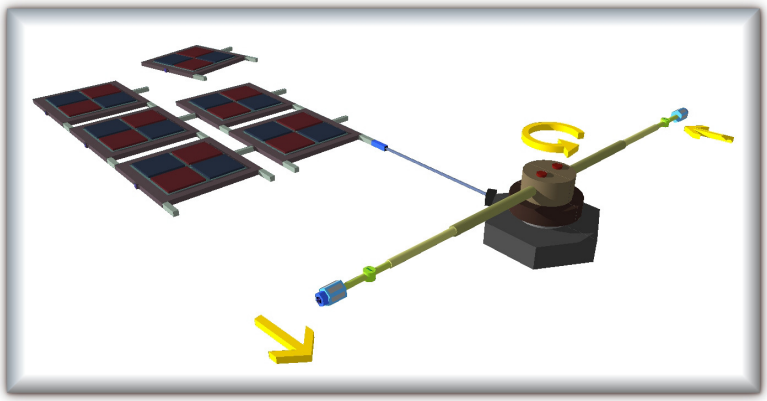
A simpler mechanism could consist of a non-polarized rotor with the nodes simply being charged or not charged. This may be how the Alien Astrosling could operate. Of course electromagnetic signals and gravity both follow the inverse of the square law with distance.[◊] So there was no need to alter the principles used by the LIGO simulator in OGS11.

What a pity that LIGO consists of only two detectors and not three or more. Triangulating the origin with just two detectors requires guesswork. Also consider that if the oscillation is perpendicular to us then we would not be able to detect it, and thus it must be spinning reasonably close to the ecliptic. So if GW150914 is an Astrosling sending out any number of probes, then one of those probes is likely heading this way as we are located on *its* ecliptic plane.

[⊗] Both simple power increase and an expanding rotor would give the same LIGO detector reading.

[◊] The reason for this is clearly outlined in Chapter XIV – Stephen Hawking's Dog

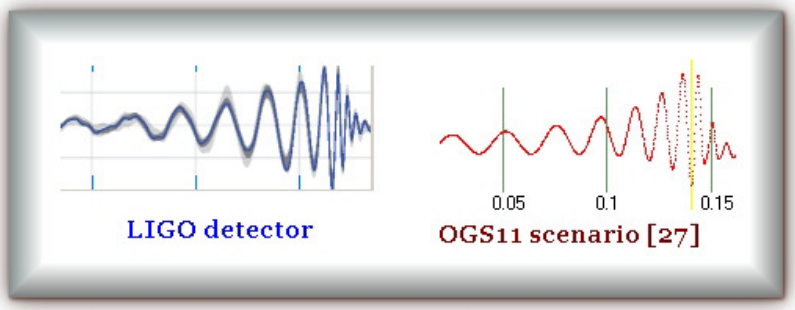
The Astrosling still seems to me the best way of sending out probes at highest possible velocity because they do not have their acceleration slowed down by carrying onboard fuel. Should humanity decide to construct such a device the simplest way would be to drive it with solar-power.



A more powerful method would be to first build a space-elevator so that it could be safely energized with nuclear fuel from the Earth. Normal electrical power would then be conducted up the space-elevator without risking nuclear fallout in the upper atmosphere. Because of the way in which angular momentum accumulates, it could take any amount of time to power-up and reach velocities comparable to the velocity of light. But all that is required is for the probes on the outer edge of the Astrosling to accelerate at just 1G for 1 year in order to reach the velocity of light. It could perhaps even hold a passenger.

The reader really should download OGS11 to see in real-time just how scenario [27] generates a wave-form with increasing amplitude and increasing frequency similar to the LIGO wave-form.

Now this chapter has taken a year to construct, and I could easily have taken longer in order to make some of my results more accurate. But as a Philosopher it is my duty only to be logical according to principle. So the next graph only needs to demonstrate an increase in amplitude and frequency; and then observe this purely as a result of the combined forces pulling on the detector.



To summarize:
The method of this analysis can be best described as Computational Logical Positivism. My central aim is always to try and preserve every observation (even unverified ones) and combine them into a single logical theory that has no contradictions in an evolutionary computational algorithm. Where more than one possibility presents itself, I express all such possibilities. This is ideal in a computer algorithm that allows the user to alter variables.

The problem being: that I cannot be certain that the LIGO data is what it actually claims to be. Being unverifiable to me, it cannot by definition be scientific to me; whereas; the computational logic is verifiable to me. (*Personal certainty rather than the status of the*

opinions of 'experts', is the essence of logical positivism). If you have read the previous chapters you will see that there are so many errors in Einstein's theories, that we *must* take nothing for granted. Likewise, I must also suspect errors in my own processes. So let me highlight the main reasons that I believe my own analysis:

1) *BOGVOS* subverts the entire concept of gravity having velocity. Binary pairs should spiral outwards if gravity has velocity.

2) The *limit of the velocity of light* from Special Relativity was never noticed as causing an in-spiral.

3) There is a blatant *conflation* of terminology between the theory of gravitational-waves; and the gravity wave-form produced by the orbital frequency of a binary pair. This shows a gross lack of understanding as to what the various theories on gravity stipulate.

4) The *energy source* for the theory on gravitational-waves is supposed to be velocity and not mass. There is no given historical reason for mass to become 'gravitational-waves'.

5) The *amount of in-spiral* Hawking claims is the source of gravitational-waves is nowhere near the amount required by the GW150914 pair.

6) If *space is curved* by gravity so that the *escape velocity* of the black-hole is greater than the velocity of light, then the gravitational-wave traveling at the velocity of light would not be able to depart the black-hole. The black-hole would give off zero gravity.

7) If nothing can escape the event horizon due to time stopping at the event horizon, then gravity emitted at the velocity of light would also not escape the event horizon. Again, the black-hole would give off zero gravity.

8) Abbot depicts a binary pair with orbital *eccentricity* of 0.25, and yet they also claim this is <0.1; this demonstrates there is no accurate computational mapping of the rotation of the GW150914 pair.

9) There is no acknowledged solution to the *many-body-problem*, yet it operates within my algorithms.

10) There is no acknowledged solution to quantum gravity. My given solution in previous chapters describes in principle the reason for the well-known gravity assist. (Whiplash or slingshot affect).

11) The *Alpha Centauri* binary as well as other binary systems should have life-spans of less than a million years (ultra-conservatively) if gravity moves at the velocity of light. Gravity must therefore be instantaneous. Thus the LIGO experiment cannot be detecting gravity, but instead electromagnetic activity.

12) All the reasons in the *previous chapters 27 & 28* disproving most of General and Special Relativity.

13) Beyond LIGO; the Astrosling is a design superior to any other for accelerating spacecraft towards the velocity of light; because it does not need to carry its own fuel. It is more than coincidence that the Astrosling design also fits the LIGO data.

14) OGS11 graphics *evolve* using all the various theoretical laws of gravity, demonstrating all their affects visually. Add to this all the rest of this thesis, consisting of 26 other chapters (including the resolution of Rubin's problem) just for good measure.

Whereas in opposition to these ***14*** reasons, there seems to be only *one* single pair of recordings which suggest a potential 7 millisecond delay between the two recordings. The *central contradiction* being that if gravity does travel at the velocity of light, then the pair will out-spiral due to BOGVOS. Thus the ratio of 14:1 means that I have to conclude *behind*

a blind veil of objectivity, that there is a 93% chance that gravity is instantaneous; or virtually instantaneous. I only allow for the outside possibility that the Alpha Centauri pair may not have such an extreme out-spiral as the OGS11 algorithm suggests it should. The priority of OGS12 will be a question of scale for the Alpha Centauri pair. Thus; it is prudent to back-off from LIGO and explore future versions of this algorithm.

This software is the result of the efforts of one individual. Please feel inspired to improve on it; because I do not claim it to be perfect by any means. But until you have (at least) actually built software which represents an evolutionary solution to the many-body-problem in a Newtonian-gravity paradigm it would be wise to withhold your judgment. Most specifically, to claim that Einstein's Relativities are logical when you cannot configure 3 (much simpler) Newtonian gravity fields in the same computational evolutionary paradigm is sheer dogmatic parroting.

So while I may seem a bit smug, I have to admit that I was wrong in assuming in the previous chapter that I did not have enough data to answer the question of whether gravity moved at the velocity of light, or is instantaneous as BOGVOS demonstrates. So credit certainly is owed to the LIGO group for provoking this analysis. Without LIGO I would not have been persuaded to compute the question within the scale of a binary pair of Chandrasekhar bodies just a few hundred km apart.

The greatest difficulty in this analysis has not been mathematical or computational, but instead psychological. To seriously entertain the notion that astrophysics for the last 100 years is built on *many* fatal flaws has tested my faith more than my ability as a programmer. To then reach the conclusion that GW150914 is the first known sign of alien intelligent life-forms, has made me delay publication for another entire month due to excessive introspection.

So according to the role of Philosopher that I have assumed; it really should be up to the Physicists and Mathematicians to complete the precise details of this analysis. The Philosopher is supposed to provide the general logical-positivist framework only. But seeing as though the physicists *believe* in the sophistry of Einstein's Relativity, and it is the philosopher who has solved the many-body-problem computationally, it would thus be more accurate to consider this body of work to fall into the category of *natural philosophy* than physics.

It seems as if *science as an institution* has fallen foul of all the worst forms of sophistry and dogma that led Descartes to break away from philosophy and give birth to *Science as a method;* some four centuries ago. And *that* is about as ironic as the Earth's core.

I see every reason to suggest that gravity is instant, or else binary star-systems would spiral outwards, and in affect they would be non-existent. The limit on the velocity of light would result in eccentric singular orbits spiraling *inwards* and they would also therefore not exist. Or at least such in-spiral would be more easily detected than the *supposed* precession of the orbit of Mercury. Nobody else has realized that a loss in velocity should cause an inwards spiral? ***Really?***

In light of this analysis I see no reason to believe that there is any limit at the velocity of light. It is only the limits we place on our own minds which prevents us from flying through space faster than light, due to spin. *Orbit-gravity-sim-12.exe* will be developed at some time or other, so watch this space…