Quantum Gravity Waves

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Abstract

Quantum Gravity Waves have emerged into the realm of possibly being detected. Modeled "quantum gravity waves" are the cousins of longer "geometric wave" frequencies from dual black-hole collisions, as detected by LIGO. Unlike modeled spacetime geometric waves, quantum waves are associated with the push/shadow gravity quanta (streaming yin/yang particles and their strings) that could reveal themselves even from slight irregularities in the nearly spherical shape of rapidly spinning young neutron stars.

Astrophysics can be exciting when measurements apparently confirm theory. Just six years ago two LIGO detectors separated by about two thousand miles were able to clearly record and nearly locate two distant merging black holes. Long baselines of each L-shaped detector were required to capture and locate long waves reaching Earth. (LIGO is the acronym that stands for Laser Interferometer Gravitational-Wave Observatory.)

Quantum gravity waves, in comparison, arrive from different sources. Because they have higher frequencies with tiny wave heights, tiny receptors are required. The radical size difference between LIGO and quantum detectors is roughly similar to the difference between a large, early C-band satellite TV dish, and a highway radar detector's tiny K-band diameter.

Recent experimental data indicate that quantum gravity waves MAY be real and, if so, could constitute a new window into what is really going on toward extremely small and extremely large size dimensions. This essay will examine where experimental science is in 2021 regarding both LIGO and quantum wave detectors.

LIGO Gravity Waves

One of experimental science's greatest achievements happened in 2015 when so-called cosmic spacetime gravity waves resulting from the merger of two massive (not supermassive) black holes were captured AND then generally located in our celestial skies. The main paper had over 3,500 co-authors, an absurd number, yet understandable from the publish-or-perish perspective.

Media accounts went on and on about how this new result once again confirmed Einstein's General Relativity model of geometric spacetime gravity. Or did it?

Shortly after the initial papers I wrote a generally ignored thesis explaining clearly how De Broglie-Bohm pilot wave theory provides a more elegant causal explanation, without resorting to geometric GR sheets that fit neither quantum theories nor the Standard Model.

Even though the original two LIGO laboratories have been augmented with additional laboratories in distant countries, primarily a similar one in Italy, their original long cosmic waves discovery stands on its own. If you are curious about *real* gravity waves, geometric and quantum, it is imperative that you read my original LIGO essay now.

Quantum Gravity Waves

(1) Some necessary perspectives

Experimental physics is very good at designing and executing confined experiments to test general theories within accessible size dimensions. Physics-relevant logarithmic size dimensions range from below Planck, up to realms far more massive than our local visible universe.

Not being able to carry out traditional experiments over all physics-relevant scales leaves our science paradigms open to doubt as to the level of their congruence with the one causative reality behind it all. Probability (not just possibility) demands knowledge of fractional denominators, not just numerators.

My hypotheses have been criticized by experimentalists for also envisioning regions of physical reality beyond human verification. Sometimes it seems that finding proof inside remote size zones is analogous to detailing proof of divinity. My multiple dissections of strong claims within current physics challenges the experimental mind, but are still necessary. Experimental science needs to come down from its positivistic castles in the sky to appreciate what we can also plausibly perceive, if not yet fully verify.

Very recently a brilliant attempt was made to experimentally look into smaller realms of gravity waves, focusing on quanta, not giant imaginary waves within floppy spacetime fabric. It is also important to note that what has been loosely called quanta for the last century are more properly yin/yang electromagnetic spheres and primary combinations, including beaded strings.

Quantum physics speaks of "quantum foam" – which is really just the omnipresence of extremely tiny yin/yang particles and their beaded strings in fabulous numbers with fairly stable amorphous configurations. Nature abhors a pure vacuum.

Simultaneously, more primal units could be zipping around in huge numbers within the multiverse, generating components of baryonic matter that we can observe, and providing the key to 21st-century push/shadow gravity. I have several times written on these yin/yang sub-Planck units – including gravity inside black holes; and this essay which explains real gravitons.

Yin/yang electromagnetic particles have both relative kinetic and rest mass. Mutually resting populations constitute clouds of *Dark Matter*. Mutually kinetic y/y particle streams penetrating "dark" clouds also influence proximal baryonic matter. Therefore, the small yin/yang sub-Planck dimensions are responsible both for push/shadow gravity AND for providing much of the visible universe's so-called "dark" mass.

The other key missing piece is mislabeled *Dark Energy*, and is primarily a phenomenon of inter-universal *push/shadow gravity* within the *mutiversal perspective*. It is therefore easy to see how yin/yang beaded particle strings would be at the very core of any elegant multiversal *Theory of Everything (TOE).*

The quantum waves experimental design in 2021 allows us to also consider gravity waves that have much higher frequencies and smaller wave heights. LIGO has helped us capture low-frequency long waves. Different observing devices are needed for energy congruence with higher-frequency short waves.

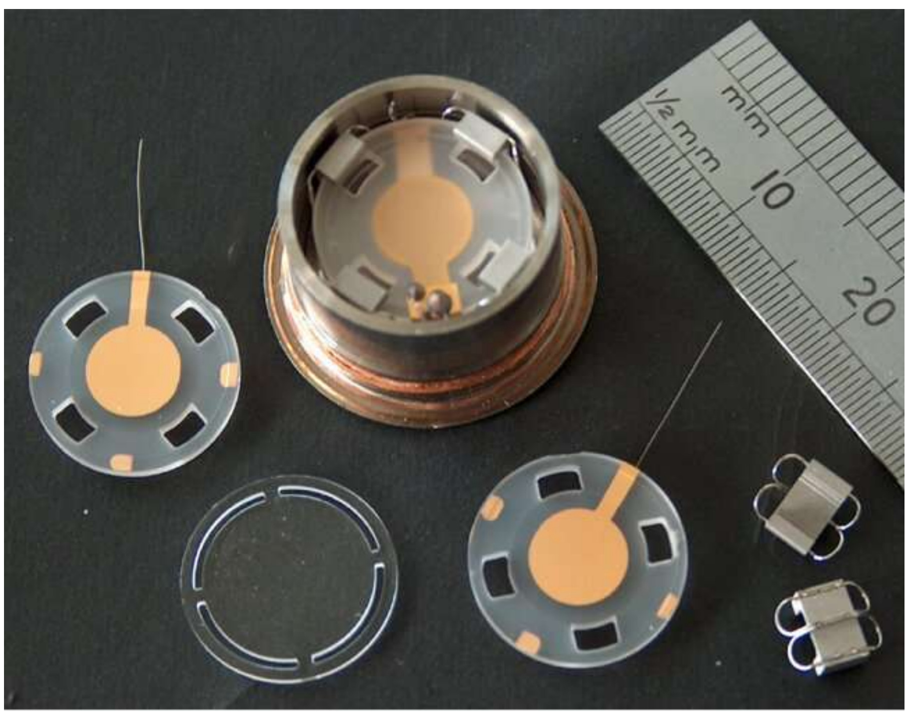
The general force theory is the same for all waves. The idea of universal quantum gravity waves reinforces my original pilot wave paradigm – and the quasi-quantum element is there within waves of all energy levels, sizes, and frequencies, even within so-called cosmic spacetime waves. All we need to grasp and comprehend the many energy frequencies are different base lines, along with triangulation for verification and object location.

(2) The Discovery of Neutron Star Quantum Waves?

In 2021 Australian and European scientists specializing in dark matter searches constructed what may be the first "quartz crystal bulk acoustic wave resonator." Their original report is here.

Here below is the photo from a phys.org article describing what they used to possibly find "bulk" gravity acoustic waves. Note the radical size difference between this tiny research apparatus and the four-kilometer-long LIGO arms, all required by their very different wave sources.

This photo's *phys.org* article explains the operation of their resonator assembly:



"The new detector designed by the research team at the CDM to pick up high frequency gravitational waves

> is built around a quartz crystal bulk acoustic wave resonator (BAW). At the heart of this device is a quartz crystal disk that can vibrate at high frequencies due to acoustic waves traveling through its thickness. These waves then induce electric charge across the device, which can be detected by placing conducting plates on the outer surfaces of the quartz disk.
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> "The BAW device was connected to a superconducting quantum interference device, known as SQUID, which acts as an extremely sensitive amplifier for the low voltage signal from the quartz BAW. This assembly was placed in multiple radiation shields to protect it from stray electromagnetic fields and cooled to a low temperature to allow low energy acoustic vibrations of the quartz crystal to be detected as large voltages with the help of the SQUID amplifier."

It is understood that this experimental design detected something very interesting, such as high frequencies possibly associated with bulk "quantum" gravity flows over extremely small irregular surface features of young, post-supernova, rotating neutron stars. Unlike the original LIGO study design, the Australian team was relying more on theory than specific-object reception. Also, the detected very short "gravity waves" could be from different phenomena, which the researchers clearly admit. Nevertheless, they feel that the very tough challenge of short quantum gravity waves may now have an initial means of measurement.

The advantage of LIGO technology has been their three widely dispersed and linked linear detectors. Computer comparisons of virtually simultaneous global detections can yield triangulated data that one L-shaped detector anywhere simply cannot secure. Furthermore, several similar detectors allow for repeated data observations with increasing precision.

By comparison, similar global triangulation helped separate scientists resolve the supermassive black-hole event horizon in Virgo's M87, using more conventional radio telescopes. See my essay on what was really found in M87. Note the very important collateral discovery about wormholes that was hardly considered.

Now back to the tiny BAW research instrument: Even though this unit looks small, the bulk waves it detects (or not) are still huge relative to the spinning waves that individual short yin/yang strings have. Even though this unit cannot measure sub-Planck waves and wiggles, it can help inferentially point the *"data arrow"* toward them as part of the physics continuum that includes large De Broglie-Bohm waves generated in quantum seas surrounding the merger of two black holes, or the merger of one black hole and one neutron star. In other words, two distal data points give a "data arrow direction"; but one data point is only interesting.

Gravity waves from two merging black-holes are radiating particulate harmonic waves within surrounding, fairly static, "yin/yang quantum seas." Omnidirectional and equipotent, EM-neutral yin/yang streams flow among relatively static "oceanic" particle cousins. The presence of "neutral" primary electromagnetism in these particle streams keeps everything from adhering to all else.

Directional flows, when distorted and partially blocked by baryonic or dark masses, including extremely dense black holes and naked neutron stars, yield waves of different frequencies and wave heights within the particulate sea. This kinetic vector model is somewhat similar to how H_2O molecules atop oceans and lakes move with gravitational energy waves. As with all ocean waves, imaginary spacetime gravity sheets are irrelevant.

This simple kinetic paradigm may at first seem strangely dense and complex. Nevertheless, it is easy to envision how all sorts of quantum-like waves can be modeled as belonging to one basic push/shadow continuum, as refined in this century.

It is therefore not necessary to employ merely correlating math spacetime sheets to describe energy/mass flows around spinning young neutron stars lacking perfect sphericity; and from more slowly pulsating black hole mergers. Any viable coherent Theory of Everything will demand an elegant causal continuum, not just clever math correlation.

A causal TOE gravity and EM model will extend inside black hole event horizons, which are equally part of everything. There is only one physics paradigm that clearly explains what is going on therein, and it neatly conforms with the elegant model I have presented herein.