What LIGO experiment actually detected?

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Spacetime distortion by matter is a purely abstract concept. Consequently, spacetime elusive ripples are unlikely to have been detected in the natural world.
In a proposed gravitational model, it is assumed that a net linear momentum is constantly generated in the direction of each nucleon's spin due to an asymmetric vibration of the quarks and gluons. The atomic nucleus is a kinetic dipole and a neutrino transceiver. Nucleons generate the whole package contributing to the phenomenon of gravity: the self-propelling force through the kinetic dipole and the information on their instant position in space through neutrinos carrying it. Gravitational lensing could be just a neutrino-photon interaction. Instead of gravitational waves, the LIGO experiment may have detected a form of gravitational lensing due to an increased flux of high energy neutrinos produced by the alleged gravitational event.

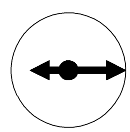
Looking for the explanation of gravity outside matter itself is unusual in scientific thinking, more particularly in conceptual physics. All other known forces affecting matter are stemming from matter's inner structure and properties. Why gravity would be different?
General relativity is a beautiful theoretical construction which failed to explain inertia but remarkably predicted gravitational lensing. However, describing gravity as a distortion of spacetime equates to explaining it through means outside matter. We can observe matter, we can observe the effects of gravity over matter, but we cannot observe spacetime distortion by matter which lays only in our imagination. Physics, as a natural science, is supposed to be based on observation and experiment in the natural world. For a hundred years we are stuck with a speculation which cannot be reconciled with quantum physics - the most successful description of matter based on observation and experiment.
We should take a second look at quantum physics and find the explanation of gravity inside matter. At the Planck's length scale, spacetime breaks down anyway.

What we know is that nucleons are 99% made of kinetic energy. They also have an orbital angular momentum [1]. Protons and neutrons are composite entities. The proton comprises two up quarks and one down quark whose rest masses make 1% of the proton's mass. Most of the proton's mass is due to the kinetic energy of the quarks and the strong force mediated by gluons that bind the quarks together. The neutron consists of one up quark and two down quarks also bound by gluons. A stable nucleus may have at least one proton. Stabilizing neutrons are necessary when the nucleus contains more than one proton in order to keep the protons together which otherwise repel each other due to Coulomb forces that are stronger than the nuclear force, from a certain distance.

In the proposed gravitational model, it is assumed that a net linear momentum is constantly generated in the direction of each nucleon's spin due to an asymmetric vibration of the quarks and gluons. We may call it Nucleon Kinetic Dipole (NKD).
If the spin of most or all nucleons in a nucleus are aligned such that individual NKDs are aligned head-to-tail, it follows that the whole nucleus generates a total net linear momentum. Thus, the atomic nucleus becomes a kinetic dipole.

A graphic symbol of a kinetic dipole is shown in Fig.1. Unlike the electric and magnetic dipoles, the kinetic dipole's asymmetry is conventionally illustrated by a head and a tail, the head showing the direction of push and the circle suggesting that it can rotate in any direction. The uneven arrows show an asymmetric vibration.

Tail



Head

Fig.1

The kinetic dipole can be described as an asymmetric stretch quantum oscillator (ASQO) discussed in [2] and the inertial propulsion experiment [3] can give an intuitive understanding of a kinetic dipole in action, through analogy. The random and spontaneous movement of gas molecules described in the kinetic theory of gases and the Brownian motion are supporting the idea that kinetic dipoles are natural occurrences.

A body in free space could have its kinetic dipoles evenly oriented in all directions, as shown in Fig. 2. As a result, such a body would be at rest in a reference system S void of any other matter, the push of all kinetic dipoles cancelling each other in all directions.

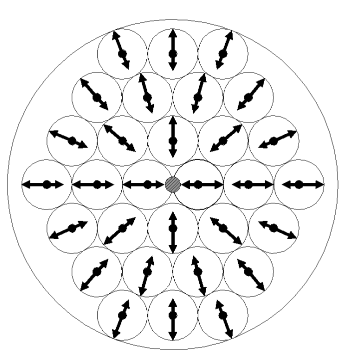


Fig. 2

The direction of the nucleus' linear momentum can be changed without affecting the overall energy of the nucleus, under certain circumstances. We call this process polarization. One case of polarization of kinetic dipoles is the gravitization, described in [4], as a case of orientation of the kinetic dipoles in a body in the direction of the center of mass of another body, as shown in Fig. 3. The left and the right body are pushing themselves towards each other dragged by the internal kinetic dipoles.

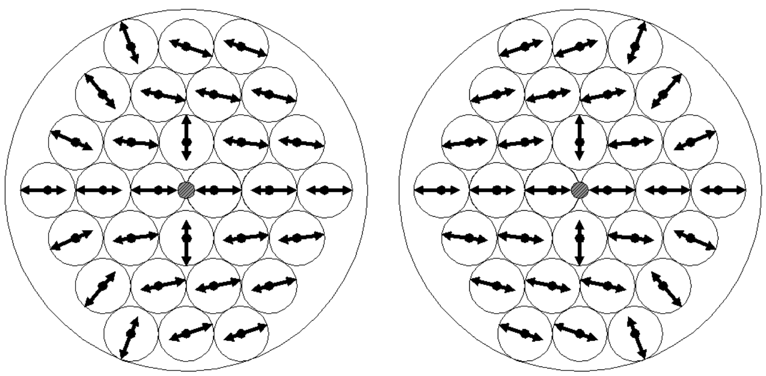


Fig. 3

Atoms are pushed towards each other by the kinetic dipoles of their nuclei until they reach a positional dynamic equilibrium due to the electrostatic repulsion of their electron shells and other molecular forces that may be involved. In solids, after the atoms are locked in a crystalline or other type of structure, the NKDs are free to rotate in any direction, individually or in groups, similar to the magnetic domains. Their instant orientation also stresses the molecular forces up to dragging a whole body in one direction or another. They also have a crucial role in dilation, phase change and crystallization which are kinetic processes, as discussed in [2].

Therefore, the so-called gravitational pull is actually a gravitational push from within matter. Each body is self-propelled by the sum of kinetic dipoles oriented to surrounding bodies. The gravitational field could be just an action at a distance between atomic nuclei acting as kinetic dipoles. Newton's anecdotal apple fell on the ground not because it was attracted by the Earth but because it was self-propelled by its kinetic dipoles oriented to the center of the Earth.

However, this description of gravity would not be complete without answering the big question of what makes the kinetic dipoles in a body to be headed to surrounding bodies.

The information on the position of surrounding bodies seems to be transmitted through space, undisturbed, at astronomical distances, probably at the speed of light. If we are looking for a particle capable to carry this information, the best candidate seems to be the neutrino in all its flavors and energies, including antineutrinos. Not coincidently, stars are huge generators of high energy neutrinos. Very likely, planets, moons and all other celestial bodies and structures are also emitting neutrinos, possibly with energies well below the sensitivity of our neutrino detectors or in flavors which are still to be discovered. Any atomic nucleus, in any energy state, should spontaneously emit neutrinos and/or antineutrinos of some sort, working like a transceiver transmitting and receiving positional information in the same time.

The fact that neutrinos and antineutrinos are the byproducts of the transformation of neutrons into positrons and vice versa [5], as shown in equations (1) and (2), may complete the above picture.

$$\nu_e + n \Leftrightarrow p + e^- \tag{1}$$

$$\overline{\nu}_e + p \Leftrightarrow n + e^+ \tag{2}$$

Nucleons generate the whole package contributing to the phenomenon of gravity: the self-propelling force and the information on their instant position in space.

This picture also infers that gravity is a very complex and dynamic quantum phenomenon due to the continuous change in direction of the nuclear kinetic dipoles inside matter and because each atomic species has a specific gravitational signature. For these reasons I suggested big G is not a true universal constant [4]. This further implies that the Planck's length is not constant either, being proportional with $G^{1/2}$ [6].

What comes out from the assumption that neutrinos are carrying the information of matter's position in space may also offer an alternative explanation for the gravitational lensing.

We could consider that a photon also carries the information of the direction of propagation in a straight line originating from its source. Even if the photon has a relativistic momentum, the conservation of linear momentum cannot be applied to explain light propagation in a straight line in free space since the photon has no rest mass, hence no linear momentum. Therefore, this information is considered to be embedded in the photon itself and may be altered by the information carried by neutrinos coming its way. It is reasonable to infer that this can happen if both particles carry similar information, i.e. positional information of their sources. Passing by a massive object, the photon is temporarily "losing its compass" while exchanging said information with the neutrinos generated by the object, bending its trajectory around the object. For a moment, the neutrino's source becomes the photon's source, altering the photon's trajectory.

It follows that more sensitive neutrino detectors could be interferometers measuring a laser beam deflection due to expected neutrinos. Also, the elusive gravitational waves could be nothing more than fluctuations of neutrino flows generated by cosmic gravitational events instead of ripples of spacetime.

If we would be able to do neutrino astronomy with instruments capable to imaging neutrinos, probably we could also observe a neutrino-gravitational lensing similar to the optical one. We could also see the dark matter as huge neutrino emitters which do not emit light and could be even transparent to light.

The assumption that photons may carry the above mentioned information related to their direction of propagation is not so far-stretched. Photons' quantum entanglement is also explained by assuming they carry some other information.

If gravitational lensing cannot be explained through the above assumed exchange of information between photons and neutrinos, other forms of photon-neutrino interaction can be envisaged, according to [7], [8] and [9].

On 11 February 2016, the LIGO Scientific Collaboration announced [10] the successful detection of gravitational waves originating from the merging of two black holes, event which was measured on 14 September 2015. However, I think that instead of gravitational waves, the LIGO experiment detected an increased flux of neutrinos produced by the alleged gravitational event which caused a form of gravitational lensing. Those neutrinos could interact with LIGO's laser photons, generating the claimed interference pattern. The same neutrinos could have also induced a motion of the test masses of 40 kg each in the orthogonal arms of the detector through gravitational polarization of their kinetic dipoles, as explained above.

It is not clear though what was the exact position of the black holes relative to the LIGO detector at the time of the GW150914 transient detection in a reference system with the origin in the center of one of the LIGO detectors.
With only two detectors, LIGO can't pinpoint the source's exact location or host galaxy - it could come from anywhere within about 600 square degrees of sky, somewhere near the Large Magellanic Cloud in the Southern Hemisphere sky [11].

It also has to be noted that the gravitational event was not directly observed with any kind of telescope since apparently no electromagnetic radiation was emitted. Otherwise, a simultaneous optical observation would bring more confidence to the measurement.

It would be worth checking a possible coincidence of the timing of GW150914 transient detection with possible detection of neutrino bursts performed with neutrino observatories such as SNO, Super-K, LVD and AMANDA. Interestingly, three neutrino detectors (Kamiokande II, IMB and Baksan) simultaneously detected on 23 February 1987 a burst of neutrinos released by a supernova explosion in the Large Magellanic Cloud, the same region of the sky claimed by the LIGO Scientific Collaboration as being the source of GW150914.

If spacetime distortion by matter is just a thought, then ripples of spacetime, aka gravitational waves, are also no more than a product of our imagination. However, the impressive technological achievement which is the advanced LIGO interferometer could have detected something which supports the gravitational model proposed in this paper.

References

[1] Christine A. Aidala, Steven D. Bass, Delia Hasch, and Gerhard K. Mallot : "The Spin Structure of the Nucleon" - Cornell University Library, Rev. Mod. Phys. 85, 655 – Published 12 April 2013 - DOI**:** 10.1103/RevModPhys.85.655, arXiv:1209.2803

[2] Mihai Grumazescu: " A quantum oscillator that could explain gravity" - 01 November 2014, DOI: 10.13140/2.1.1604.3201
https://www.researchgate.net/publication/267980237_A_quantum_oscillator_that_could_explain_gravity

[3] Mihai Grumazescu: Inertial Propulsion Demo mpeg1video, December 2014
DOI: 10.13140/RG.2.1.1287.6968
https://www.dropbox.com/sc/ul5jkpvkip5zc8z/AACiL0nu1z1NKPUADo9JLMYLa

[4] Mihai Grumazescu: " Why big G is not constant. The kinetic dipole" - 17 August, 2015 DOI: 10.13140/RG.2.1.2153.1366
http://vixra.org/pdf/1508.0169v1.pdf

[5] G. C. McLaughlin, J. M. Fetter, A. B. Balantekin, and G. M. Fuller: "An Active-Sterile Neutrino Transformation Solution for r-Process Nucleosynthesis" - Phys. Rev. C 59, 2873 –1 May 1999 - DOI: http://dx.doi.org/10.1103/PhysRevC.59.287
http://arxiv.org/pdf/astro-ph/9902106.pdf

[6] B.G. Sidharth: " Planck Scale Phenomena" - 11 August 2002
http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=A9C58168B2E0FB88C80CF923C0B62EDD?doi=10.1.1.262.6117&rep=rep1&type=pdf

[7] Duane A. Dicus, Wayne W. Repko: "Photon-neutrino interactions" - DOE-ER-40757-093, UTEXAS-HEP-97-2, MSUHEP-70205
https://cds.cern.ch/record/321504/files/9703210.pdf

[8] Amol V. Patwardhan: "Neutrino-photon interactions in vacuum and material media"
http://physics.ucsd.edu/~mcgreevy/s13/final-papers/2013S-215C-Patwardhan-Amol.pdf

[9] Valeri V. Dvoeglazov: "Speculations on the Neutrino Theory of Light" - 05 July 1998
http://arxiv.org/abs/physics/9807013

[10] B.P. Abbott et al: "Observation of Gravitational Waves from a Binary Black Hole Merger" - Physical Review Letters, PRL 116, 061102 (2016), 11 February 2016.
https://upload.wikimedia.org/wikipedia/commons/d/d4/PhysRevLett.116.061102.pdf

[11] Robert Naeye: "Gravitational Wave Detection Heralds New Era" - Sky & Telescope, 11 February 2016.
http://www.skyandtelescope.com/astronomy-news/gravitational-wave-detection-heralds-new-era-of-science-0211201644/