GRAVITY WAVES AND MERCURY REVISE GEODYNAMO

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ABSTRACT -

Most people have a rough idea of the cause of Earth's magnetic field, don't they? It's the geodynamo, also called the magnetic dynamo theory. The heat from the solid inner core puts the liquid outer core in motion, and the movements of the outer core's electrically conducting fluids (such as molten iron) generate the planet's magnetic field. Electrically conducting fluids occur in the Sun, other stars and most planets – and are the scientifically accepted mechanism for magnetic fields. However, the planet Mercury suggests this process is wrong. Is it possible to propose a plausible alternative? The proposal here has both Earthly and Space components - it is still linked to the nature of, and motions in, the core plus it refers to the phenomenon of zero electrical resistance known as superconductivity as well as the recent discovery of gravitational waves. It also refers to the Moon's attraction on Earth's oceans, binary stars, the Sun's coronal heating and mass ejections, sunspots and mini ice ages, and black holes.

A proposal that has support from only one or two sources may indeed prove to be correct. But surely support from several additional sources must greatly improve that proposal's chances of success. It's the goal of this article to be comprehensive in presenting its approach to the geodynamo. It's important to properly understand our planet's magnetic field because it protects us from the charged particles of the solar wind and cosmic rays. Without this protection from the magnetosphere, Earth would be stripped of its ozone layer that keeps excess ultraviolet radiation from harming life. And no magnetic field also means no atmospheric light displays called auroras, as well as no direction-finding compasses.

OCEAN TIDES

When ocean waves pass an island, some enter shallow water and are refracted by friction with the seabed. They change direction and head towards the island, breaking onto its beaches. Similarly, gravitational waves from deep space are refracted and focus on the center of a mass eg the Sun. Exerting a repelling force on that center (a push) in

partnership with the 10^36-times-more-powerful electromagnetic waves, the gravitation might build up more mass concentrically with the center to create a subatomic particle or a planet [0]. Newton's mathematics describes the gravitational force very well even though he describes gravitation as an attractive pull. Einstein says it's a push. To quote from [1]:

"(Bodies) merely follow the line of least resistance through the hills and valleys of the curved space that surrounds other bodies. Objects that fall to the earth, for example, are not "pulled" by the earth. The curvature of space time around the earth forces the objects to take the direction on toward the earth. The objects are pushed toward the earth by the gravitational field rather than pulled by the earth."

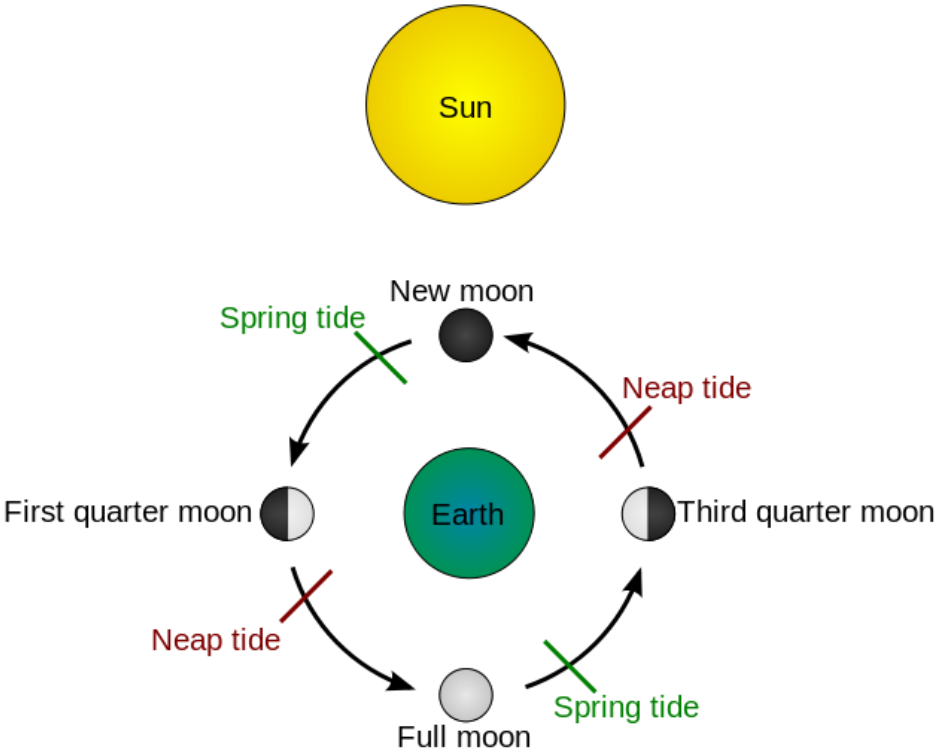
How, then, can repelling or pushing gravity account for the apparent attraction of ocean tides towards the Moon? I believe such an idea of gravity requires the idea of 17th-century scientists Isaac Newton and Johannes Kepler that the moon causes the tides, to be joined with Galileo's idea that the Earth's movements slosh its water.

"If a barge (carrying a cargo of freshwater) suddenly ground to a halt on a sandbar, for instance, the water pushed up towards the bow then bounced back toward the stern, doing this several times with ever decreasing agitation until it returned to a level state. Galileo realized that the Earth's dual motion—its daily one around its axis and its annual one around the sun—might have the same effect on oceans and other great bodies of water as the barge had on its freshwater cargo." [2]

Gravity's apparent attraction can be summarized by the following - gravitation is absorbed into wave packets and the inertia of the theoretical gravitons (united with far more energetic photons) carries objects towards Earth's center at 9.8 m/s or 32 ft/s. The mass of the oceans on Earth is estimated at nearly 1.5 billion cubic kilometers. All this water is being pushed towards Earth's center at 32 feet per second every second. But the seafloor prevents its descent. So there is a recoil, noticeable offshore (it is only where oceans and continents meet that tides are great enough to be noticed). This recoil is larger during the spring tides seen at full and new moon because sun, Earth and moon are aligned at these times.

The previous paragraph's alignment of Sun, Earth and moon therefore refers to their being lined up where the gravitational current is greatest (in the plane where planets and moons are created) - and to more of the gravitational waves travelling from the outer solar system being captured by solar and lunar wave packets, and less of them being available on Earth to suppress oceanic recoil (there are still enough to maintain

the falling-bodies rate of 32 feet per second per second). At the neap tides of 1st and 3rd quarter; the sun, earth and moon aren't lined up but form a right angle and our planet has access to more gravity waves, which suppress oceanic recoil to a greater degree. We can imagine the sun and moon pulling earth's water in different directions at neap tide. If variables like wind/atmospheric pressure/storms are deleted, this greater suppression causes neap tides which are much lower than spring tides.



(figure number 1 - This "tide schematic" is a public domain image from https://en.wikipedia.org/wiki/File:Tide_schematic.svg)

BINARY STARS PLUS CORONAL MASS EJECTIONS

One sentence in particular transfixed me when I read the article "Astrophysics: Illuminating brown dwarfs" by Adam P. Showman - Nature 533, 330–331 (19 May 2016) - "The gravity from the white dwarf distorts the shape of the brown dwarf and leads to a trickle of mass from the companion, which slowly accretes onto the white dwarf." Now for gravitational interaction between the white and brown dwarfs:

Recalling the interactions regarding Earth's ocean tides, both dwarf stars (and their centers) could be the destination of incoming gravitational waves from deep space. Their surfaces would recoil from their denser cores. The greater the mass, the more gravitational waves are diverted to that mass. The recoil from the more massive white dwarf's core is suppressed by the far greater wave activity reaching it, and is unnoticeable. The brown dwarf receives far fewer suppressing waves and recoil causes part of it to fly into space (actually, space-time). Because (to quote "Illuminating brown dwarfs") "the objects are so close that they orbit each other every 78 minutes", a "trickle of mass from (it) slowly accretes onto the white dwarf." So Newton's statements that gravity depends on the masses of objects and the distance between them is conserved.

Part of the brown dwarf flying into space-time and a trickle of mass from it accreting onto the white dwarf is reminiscent of a coronal mass ejection (CME), a large release of plasma (ionized gas) from the Sun. CMEs often originate from active regions on the Sun's surface, such as groupings of sunspots. Recent research has shown that magnetic reconnection (the sudden rearrangement of magnetic field lines when two magnetic fields are brought together) is closely associated with CMEs – see American Physical Society. "Coronal mass ejections: Scientists unlock the secrets of exploding plasma clouds on the Sun." ScienceDaily. ScienceDaily, 14 November 2010. <www.sciencedaily.com/releases/2010/11/101108071925.htm>. Reconnection releases energy stored in the magnetic fields.

SUNSPOTS AND MINI ICE AGES

"Sunspots form because the sun's equator rotates more quickly than its poles. Being “frozen” into its gases, the magnetic field lines of the sun stretch, twist, are drawn out into loops and erupt through the sun's surface, forming sunspots. Recent observations from the Solar and Heliospheric Observatory [SOHO] using sound waves traveling below the Sun's photosphere [local helioseismology] have been used to develop a three-dimensional image of the internal structure below sunspots. These observations show that there is a powerful downdraft underneath each sunspot, forming a rotating vortex that concentrates the magnetic field and creates intense, heat-trapping magnetism. The distorted magnetic loops don't have to break through the sun's surface or photosphere but can remain within, forming the rotating vortex. (The Maunder Minimum, and other mini ice ages, could be due to the heat-trapping magnetic field lines of the sun not erupting through the sun's surface, and not forming sunspots.)

CORONAL HEATING, CMEs AND PLANETARY MAGNETIC FIELDS

In the photoelectric effect, the energy of photons of light shone on a metal causes electrons to be emitted from the metal's surface. The corresponding quantum particles of incoming gravitational waves (gravitons, which are presently theoretical) could substitute for magnetic reconnection caused by bringing two magnetic fields together … and release electromagnetic energy stored in the Sun's magnetic fields and sunspots. Travelling along magnetic field lines, this energy is converted into coronal heating. Or it can be converted into CMEs and gas streaming between binary stars via E=mc^2 solved for mass ie m=E/c^2. Physically, the latter process is described as the gravitational-electromagnetic reaction (from incoming waves interacting with magnetic fields in sunspots) producing matter. The metals in Earth's core are associated with plenty of electromagnetic energy eg infrared waves associated with the core's heat. The gravitational waves involved in production of the core's mass compress the electric components in these waves, causing nearly all the magnetic components to be expelled (like superconductivity's Meissner effect – see **SUPERCONDUCTIVITY**) and form our planet's magnetic field. This process links the field to the nature of, and motions in, the core.

An objection to this alternative to the magnetic dynamo is this sentence: High temperature superconductors are known for not displaying the Meissner effect. There are 3 plausible paths to loopholes concerning the objection –

1) "Para-meissner effect in high-temperature superconductors" by Keshav N. Shrivastava ("Solid State Communications" - Volume 90, Issue 9, June 1994, Pages 589-594), and

2) According to the article "superconductivity" in "Penguin Encyclopedia Edited by David Crystal" (Penguin Reference Library, 2006): "Both effects (zero electrical resistance and the Meissner effect) must be present for true superconductivity."

3)"All about superconductivity" (http://supraconductivite.fr/en/index.php?p=supra-levitation-meissner-more) states, "The superconducting state is characterized by two properties: no electric resistance (R = 0) and no magnetic field (B = 0). Those are two independent properties: neither is the consequence of the other."

Since both of the independent zero-resistance and Meissner properties need to be present for true superconductivity to exist, Earth's core can generate a magnetic field via the Meissner effect (technically, a high temperature para-meissner field) without being a superconductor.

BLACK HOLES

The unknown multidimensional orientation of black holes^ may avoid siphoning or leakage of their magnetic, electrical or gravitational properties into places like imaginary time. At least one of their qualities stays in known space-time, making them incredible concentrations of gravity. Electromagnetism bestows the property of charge on black holes, and combining electromagnetism with gravity might be responsible for their mass. The Meissner effect of superconductivity plus the gravitational waves – or, electromagnetism plus gravitation – is proposed in this article to be important for the generation of mass.

^ Possibly, this orientation is related to quantum spin, which might plausibly be explained by particles and space mutually affecting each other. According to General Relativity, matter causes a gravity field by its mass creating depressions in space that can be pictured as a flexible rubber sheet. Space could affect particles through its curvature (gravity) infiltrating and helping to form particles. If orientation depends on the warping or distortion of the waves composing particles, black holes composed entirely of gravitational and electromagnetic waves would not be composed of particles of matter. Their particles would be gravitons and photons.

SUPERCONDUCTIVITY

According to the article "superconductivity" in "Penguin Encyclopedia Edited by David Crystal" (Penguin Reference Library, 2006): this is "the property of zero electrical resistance, accompanied by the expulsion of magnetic fields (the Meissner effect), exhibited by certain metals, alloys, and compounds when cooled to below some critical temperature, typically less than –260 degrees C. Both effects must be present for true superconductivity."

Regarding zero electrical resistance: An electromagnetic wave can have its electrical part compressed, through eg introduction of copper-and-oxygen compounds called cuprates or use of hydrogen sulfide (speaking of molecules as well as waves refers to quantum mechanics' wave-particle duality). If compression is sufficient; the electric component no longer follows a long, curved path in Euclidean geometry. Its path is now linear and follows the shortest distance between two points. In other words, a superconductor that operates at room temperature and normal atmospheric pressure has been manufactured. Any resistance would, like a rock in a stream causing water to flow around it, lengthen the distance and mean the compound is not a perfect superconductor.

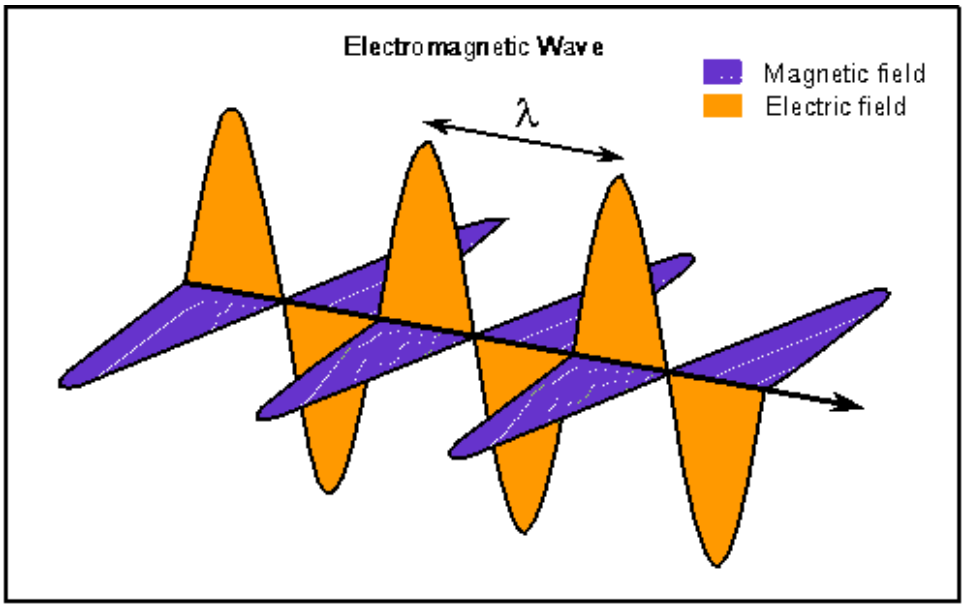


figure number 2 - an electromagnetic wave showing electric and magnetic fields, and the wavelength (λ) which is the distance between crests of a wave. Courtesy of nrao.edu

Regarding the Meissner effect: Think of the electromagnetic wave relativistically. In General Relativity, the simple analogy of space-time being regarded as a rubber sheet is commonly used. Instead of resorting to complex and lengthy relativistic mathematics, we can simply picture an electromagnetic wave as made of rubber. Compressing the electric component will force the magnetic component to bulge outwards ie there will be no magnetic field within the superconductor, only an external magnetic field. An externally-applied magnetic field also conforms to the bulging outwards and is expelled from within the superconductor.

CONCLUSION

"Magnetic Fields" (http://www.astronomynotes.com/solarsys/s7.htm) says, "Mercury's situation was a major challenge to the magnetic dynamo theory. In true scientific fashion, the theory made a testable prediction: Mercury should have no magnetic field or one even less than Mars' one because its core should be solid. Observation, the final judge of scientific truth, contradicted the prediction. Should we have thrown out the magnetic dynamo theory then? Astronomers were reluctant to totally disregard the theory because of its success in explaining the situation on the other planets and the lack of any other plausible theory. Is their reluctance a violation of the objectivity required in science? Perhaps, but past experience has taught that when confronted with

such a contradiction, nature is telling you that you forgot to take something into account or you overlooked a crucial process."

Perhaps this article will supply a plausible alternative to the magnetic dynamo theory and not overlook a crucial process. What does this alternative say about magnetic-field reversals? As motions in planetary cores vary, the polarity of fields can vary because gravity waves compress relocated portions and change orientation of the expelled magnetism.

REFERENCES NOT INCLUDED IN TEXT

[0] Albert Einstein's “Spielen Gravitationfelder in Aufbau der Elementarteilchen eine Wesentliche Rolle?” (Do gravitational fields play an essential role in the structure of elementary particles?), Sitzungsberichte der Preussischen Akademie der Wissenschaften, (Math. Phys.), 349-356 (1919) Berlin].

[1] "Gravitation" by Robert F. Paton, MS PhD in "The World Book Encyclopedia" (Field Enterprises Educational Corporation, 1967)

[2] “Galileo's Big Mistake” by Peter Tyson - Posted 10.29.02 (http://www.pbs.org/wgbh/nova/earth/galileo-big-mistake.html)