

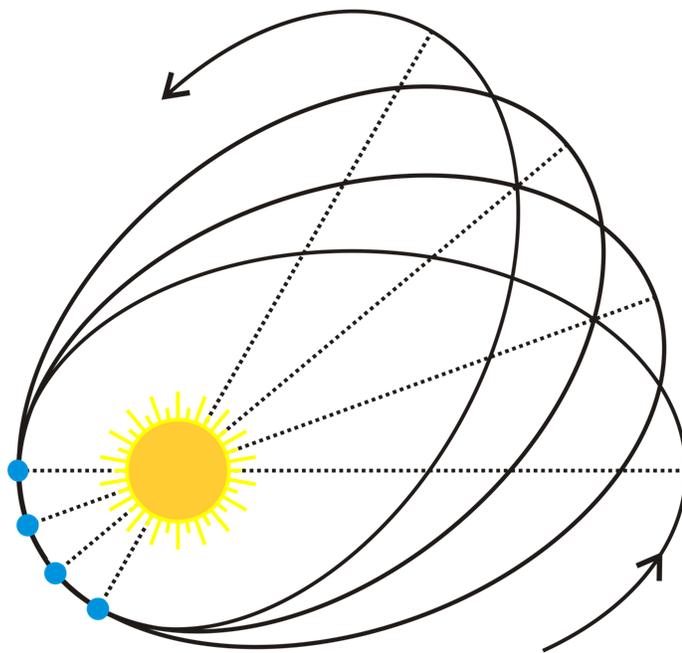
# ***Mercury's Precession Goes Beyond General Relativity – To Quantum Spin, Earth's Orbit, Unified Field, And Planet 9's Nonexistence***

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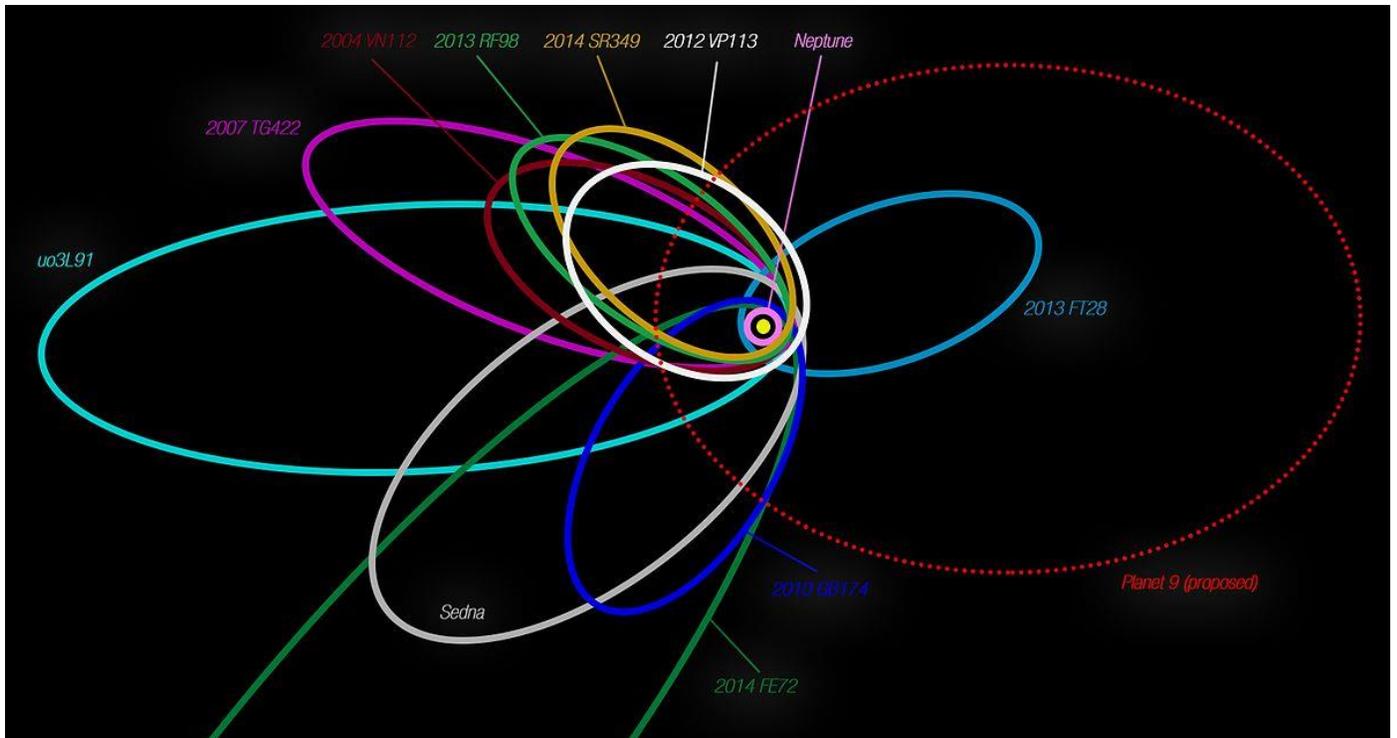
Abstract -

Precession of Mercury's orbit resembles orbits of Sedna and companions. Orbits of Sedna etc may not be caused by Planet 9 but their orbits may be viewed as "precession" that is quantum instead of classical. To explain, we start with an explanation for quantum spin which is not simple rotation but is of a gravitational nature. This unites the quantum and classical by manifesting on an astronomical scale, with gravitational waves forming Earth's orbit. The quantum-gravity approach could also indicate Mercury's ellipse is not only classically representing a number of stages in the orbit of an isolated planet, but is also representing the quantum view of "astro-entanglement" and the unified gravitational field. The similar orbits of Sedna and its companions may likewise be an indication of astro-entanglement, leaving Planet 9 just as mythical as the planet Vulcan which was once thought to orbit closer to the Sun than Mercury. Or as nonexistent as the planet that was supposed to orbit between Mars and Jupiter, before it was destroyed to form the asteroid belt.

Article -



**Precession of Orbit (solid black lines) of the Planet Mercury (blue dot) around the Sun (yellow)**



**Proposed path of Planet 9 around the sun (path in red dots) with Neptune and several notable TNOs for reference**

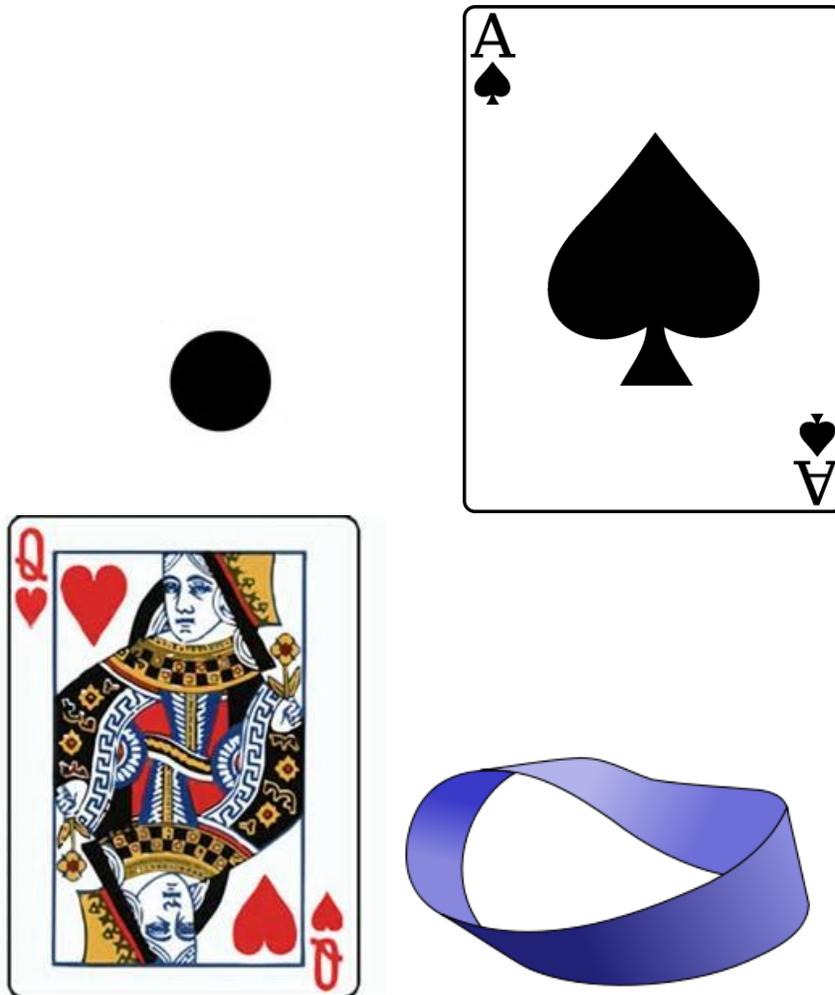
**(TNO = Trans Neptunian Object e.g. Sedna)**

## QUANTUM SPIN

There are 2 forms of spin - classical (e.g. a rotating top) and quantum. The latter can't be explained classically but may possibly 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 particles, thus giving them quantum spin. The best explanation of spin I've found comes from [1] -

"One way of thinking of spin is to imagine the particles as little tops spinning about an axis. However, this can be misleading, because quantum mechanics tells us that the particles do not have any well-defined axis. What the spin of a particle really tells us is what the particle looks like from different directions. A particle of spin 0 is like a dot: it looks the same from every direction ... a particle of spin 1 looks different from different directions ... A particle of spin 2 looks the same if one turns it round half a revolution (180 degrees) ... there are particles that (must be turned) through two complete

revolutions (to look the same). Such particles are said to have spin  $\frac{1}{2}$ . Particles of spin  $\frac{1}{2}$  make up the matter in the universe and particles of spin 0, 1, and 2 give rise to forces."



The dot = spin 0 and looks the same from every direction.

The Ace of Spades = spin 1 and looks different from different directions.

Queen of Hearts = spin 2 and looks the same if one turns it round half a revolution.

Möbius Strip may = spin  $\frac{1}{2}$  since you must travel around a Strip twice to reach your starting point (=turning particles through two complete revolutions to look the same)

Curvature implies this quantum spin could be continuous. Since it's known this type of spin can only have discrete values, these values (and space's curves) must be determined by discrete pulses of energy (the on/off or increased-energy/decreased-energy pulses of the virtual particles<sup>^</sup> filling space-time could produce the discrete

values of binary digits' 1's and 0's). Space's curves influencing particles is consistent with [2]. Space has gravitational qualities, while particles have electric and magnetic properties. Just as interference between light waves makes a hologram; interference between electromagnetic and gravitational waves might make mass and particles and forces, and thus Einstein's version of modern science's holographic universe (he believed electromagnetism and gravitation were related).

^ These "particles" are actually quantum fluctuations/energy pulses.

The Mobius strips, which are only two-dimensional, then follow the rules of maths and pair up to combine into four-dimensional Klein bottles[3] long before reaching the scale of subatomic particles. This produces the 3 spatial dimensions/1 temporal dimension known to us. One theory scientists have for the universe's shape says it is a doughnut. From that, I conclude the type of Klein bottle that Mobius Strips combine into is the figure-8 Klein bottle (because this somewhat resembles the doughnut). "Some scientists believe that large warm and cool spots in the Cosmic Microwave Background could actually be evidence for this kind of ... (doughnut/figure-8 Klein bottle) ... topology". [4]

So, without filling a computer screen or notepad or blackboard full of equations, quantum spin has been reduced to mathematics in the forms of topology's Mobius Strips and electronics' binary digits (base 2 maths or binary arithmetic).

## **EARTH'S ORBIT**

General Relativity (GR) treats gravity as a manifestation of spacetime, and was published in 1915. Einstein published "Do gravitational fields play an essential role in the structure of elementary particles?" in 1919. So if GR had waited a handful of years, it might have also treated matter and the Sun as manifestations of space-time: a product of gravitation, like everything else in the universe. Even black holes could be manifestations of space-time (gravity) because their fantastic mass, besides forming from core-collapse supernovas, could be the focus of gravitational waves (ripples of space-time) from many regions of space and thus possess tremendous gravitation – see the last sentence in "Earth's Orbit". The Sun could, as explained below, radiate gravitational waves.

When Einstein penned  $E=mc^2$ , he used  $c$  ( $c^2$ ) to convert between energy units and mass units. The conversion number is 90,000,000,000 (light's velocity of 300,000 km/s x

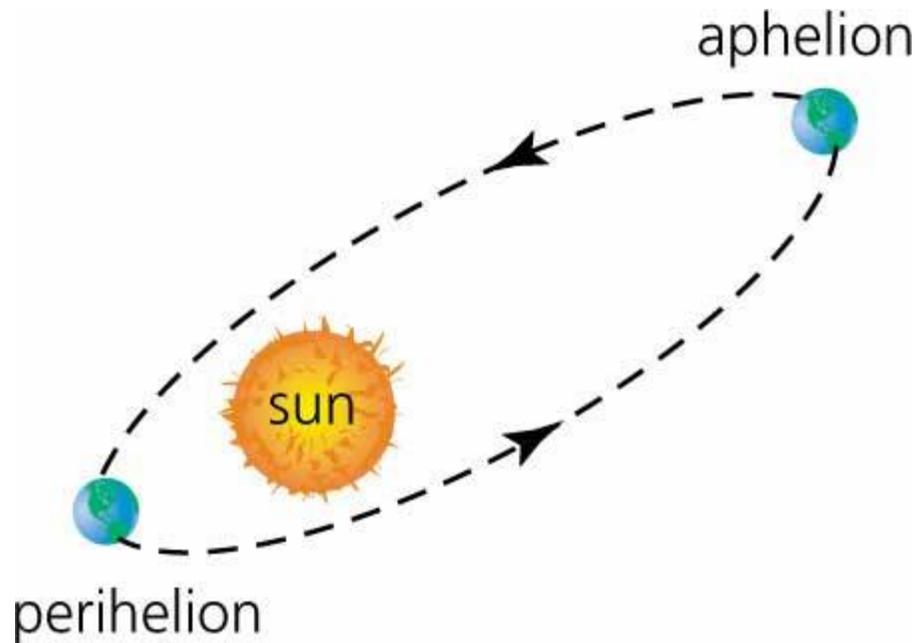
300,000 km/s) which approx. equals  $10^{11}$ . First,  $10^{25}$  – a strength achieved through quantum gravitational lensing and associated with the weak nuclear force\* – is attained. Then waves are further magnified by the matter's density - multiplied by Einstein's conversion factor of  $10^{11}$  - to achieve electromagnetism's strength ( $10^{36}$  times gravity's strength). This gives the illusion of the existence of electric and magnetic fields that are not a product of gravitation.

\* Remember, this is only one example: the so-called weak force's "strength isn't constant" and varies with distances [5].

After absorption by atoms, the depleted remnant of the gravity waves is re-radiated from stars, interstellar gas and dust, etc. Having used up most of its energy forming particles and forces, the magnified gravity returns to its familiar strength and is radiated as a Gravity Wave Background, challenging the idea that Cosmic Inflation was necessary to generate gravitational waves. If gravity can produce electromagnetism,\*\* it's also radiated as low-energy electromagnetic waves – possibly an infrared background whose heat output exceeds that of the stars alone, in addition to a microwave background. The latter challenges the idea that existence of the cosmic microwave background proves the universe began with a Big Bang.

\*\*This could account for the Fermi Space Telescope detecting a burst of gamma rays just 0.4 seconds after the first detection of gravitational waves on September 14, 2015 - from the same general area of the sky. G interacting with EM also means there would be an imprint of gravitational waves in the Cosmic Microwave Background. On 17 March 2014, astrophysicists of the cosmic microwave background (CMB) experiment called BICEP2 (2<sup>nd</sup> phase in the Background Imaging of Cosmic Extragalactic Polarization) announced such a detection.

“Precession is the tendency of a gyroscope – basically a spinning wheel mounted in a moveable frame - to move at right angles to the direction of any force applied against it. Precession makes a bicycle turn a corner when you lean to one side. You also use precession to guide a rolling hoop. When you roll the hoop, it will not fall down if you push from the side against the top – it merely will turn a corner. The hoop precesses, or turns at right angles to the force you have applied against it.” [6] All the planets precess (though the effect is greatest at Mercury because it's the closest planet to the Sun's gravitational force).



Academy Artworks

(The difference between perihelion and aphelion is only approx. 3% in reality – it's greatly exaggerated in this illustration. Perihelion [closest point to Sun] is about 147.1 million kilometres [91.4 million miles] in early January – aphelion is about 152.1 million kilometres [94.5 million miles] in early July.)

When Earth is at the position of the lower arrow, the gravitational waves pushing it cause it to move at right angles to the direction of the force applied against it and obey the law that all the planets precess. If continued, the waves would propel it in a straight line further and further from the Sun. But other gravitational waves - precessing waves of solar origin plus waves from deep space - push against it and cause it to turn a corner, as if it were a bicycle whose rider had leaned to one side. It's now in the aphelion location (its farthest spot from the Sun). Throughout its orbit, Earth is pushed by different gravitational waves and keeps turning corners until it arrives approximately back where it started. The orbit it traces out is always more-or-less centred on the Sun because all the relevant gravitational waves from deep space are being refracted towards the massive Sun's centre (just as some of the waves passing an island are refracted toward the shore by the island's mass).

## **MERCURY'S QUANTUM PRECESSION AND THE UNIFIED FIELD**

According to a website by the University of California, Riverside [7], "As seen from Earth the precession of Mercury's orbit is measured to be 5600 seconds of arc per century (one second of arc=1/3600 of a degree). Isaac Newton's equations, taking into account

all the effects from the other planets as well as a very slight deformation of the sun due to its rotation (most of Newton's effect is due to pull from the other planets) predicts a precession of 5557 seconds of arc per century. There is a discrepancy of 43 seconds of arc per century. This discrepancy cannot be accounted for using Newton's formalism. Many ad-hoc fixes were devised (such as assuming there was a certain amount of dust between the Sun and Mercury) but none were consistent with other observations (for example, no evidence of dust was found when the region between Mercury and the Sun was carefully scrutinized). In contrast, Albert Einstein was able to predict, without any adjustments whatsoever, that the orbit of Mercury should precess by an extra 43 seconds of arc per century should the General Theory of Relativity be correct". (To be exact, Relativity's prediction is 42.98 seconds per century, plus or minus 0.04 of a second [8])

Now visualize the following illustration in your mind - a planet precessing, so that it always returns to the same point on one side of its star, while the planet is several degrees higher each time its orbit takes it to the star's opposite side. The knowledge that two kinds of spin exist (classical and quantum) allows us to look at this illustration in two ways. It's accurate to interpret it classically, as representing one planet with several examples of its precessed orbit. However, believing in interaction of particles and their forces with space-time/gravity allows a quantum interpretation of this astronomical event. Space-time/gravity may not only make subatomic particles but also planets. So we can view the illustration as one "planetary field" incorporating the matter of the planet, forces and several pathways of space-time curvature (hypothetically achievable by modelling the distribution of the universe's fundamental energy pulses on the twisting Mobius strip).

This means precession is not only classical (with a planet's orbit being affected by other planets), but is also quantum. The quantum view of a planet's affecting, and being affected by, other planets can be viewed as entanglement on astronomical rather than subatomic scales. Such "astro-entanglement" may extend infinitely – the planet and its precession are affected by other planets and the Sun, these gravitationally interact with still more distant bodies, those with still others, and on and on forever. Ultimately, the entire infinite universe is quantum/astro-entangled into a unified field. The "astro" part of the entanglement results from gravitational waves; while the "quantum" part results from the waves being composed of binary digits, Mobius strips and presently hypothetical gravitons. Time is so bound up with space (to form what we call space-time) that it may merely be the motions of particles in space (according to this letter, particles and space aren't distinct). The entire past and present and future would inevitably be parts of this cosmic entanglement - the entire past, the present, and the whole future all exist right now as an "eternal present". Forward and backward time travel are both possible, with our limited perspective at any point being analogous to the limited sights and sounds

available on any one point of a DVD.

The suggestion of matter being composed of space-time answers a 50-year-old objection to Einstein's Unified Field Theory which was put forth by Professors Newman and Penrose [9]. In the 19th century, Scottish mathematician and physicist James Clerk Maxwell unified electricity and magnetism into electromagnetism. Albert Einstein's equations say that in a universe possessing only gravitation and electromagnetism\*, the gravitational fields carry enough information about electromagnetism to allow the equations of Maxwell to be restated in terms of these gravitational fields. This was discovered by the mathematical physicist George Yuri Rainich (1886 -1968). The objection by Newman and Penrose was that the gravitational fields, if known everywhere but only for a limited time, do not contain enough information about their electromagnetism to allow the future to be determined, so Einstein's unified theory fails.

\* Modern science adds the nuclear weak and strong interactions, for a total of 4 fundamental forces. However, it's proposed here that these are no more than byproducts of gravitational-electromagnetic interaction. The proposal is that photons (whether virtual or detectable) and gravitons are ultimately composed of the binary digits of 1 and 0 encoding  $\pi$ ,  $e$ ,  $\sqrt{2}$  etc.; and matter particles [and even bosons like the Higgs, W and Z particles] are given mass by virtual photons interacting with gravitons (they'd all be virtual) in "wave packets", a term from quantum mechanics. Today, science cannot detect virtual photons and can only detect gravitational waves from events like colliding black holes. But in several decades, it might routinely detect gravitational waves from, say, a moving hand ... as well as all virtual particles.

If time (referred to as "motion of particles in space") is unified with the gravitational and electromagnetic fields which this comment proposes to be the creators of particles, the gravitational fields are not known for only a limited time but do contain enough information. And Einstein succeeded, just as John Wheeler and Charles Misner claimed [10].

## **PLANET 9**

Pluto used to be the 9<sup>th</sup> planet in our solar system, until it got demoted to the status of "dwarf planet" in 2006. In 2014, astronomers Chad Trujillo and Scott Sheppard proposed the possible existence of a massive trans-Neptunian planet from similarities in the orbits of two trans-Neptunian objects. In January 2016, Michael Brown and

Konstantin Batygin advanced this proposal by explaining how a massive outer planet would be the likeliest explanation for the similarities in orbits of six TNOs, and they proposed specific orbits. The predicted "Planet 9" could have an estimated mass of 10 Earths, a diameter twice to four times that of Earth, and a highly elliptical orbit with a period of 10,000–20,000 years.

The similar orbits of Sedna and its companions may likewise be an indication of astro-entanglement in a unified field, leaving Planet 9 just as mythical as the planet Vulcan which was once thought to orbit closer to the Sun than Mercury. Or as nonexistent as the planet that was supposed to orbit between Mars and Jupiter, before it was destroyed to form the asteroid belt. The similarity of Mercury's precession to the orbits of Sedna etc is apparent by looking at the first two diagrams in this article. But like quantum spin being reduced to Mobius strips and binary digits, the presence of mathematics adds a level of faith to the conclusion of similarity. Illustrations of the similarity depend on electromagnetic waves (in this case, in the form of visible light).

"The motion of a set of test particles under the influence of a plane gravitational wave differs considerably from the electromagnetic case. Yet, there are similarities: not only do both have two independent polarization states, but when one includes the longitudinal motion, the surface associated with the motion of a charged particle responding to an elliptically polarized wave is similar to the constant phase surfaces of a set of particles driven by a plane gravitational wave; in both cases the latter surfaces derive their longitudinal motion from trigonometric double angle functions." [11]

The electromagnetism associated with far-from-complex diagrams can trigger the brain to find associations involving the gravitation that has similarities to electromagnetism. Those associations include quantum spin, Earth's orbit, the Unified Field, and the possible nonexistence of Planet 9.

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