Supersymmetry Via EDM (Electric Dipole Moment)

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Abstract

The article begins by mentioning the accepted correlation between Albert Einstein's relativistic equations, as well as James Clerk Maxwell's electromagnetic waves, with the Prandtl-Glauert equations for fluid flow. This equation-free mention nevertheless ends with 180° ΔO = + => - (180 Degree Change in Orientation Equals Positive Becomes Negative). Of course, it also means negative can become positive: 180° ΔO = - => +. Using this article's new equations, the Electric Dipole Moment is introduced and the charges of the quarks composing a neutron are transformed. EDM's undetectability is explained from the perspective of a hypothetical someone who doesn't accept the Big Bang but believes the universe is literally infinite and eternal. Then quantum spin of matter particles is discussed, and extended to astronomy's black holes, in terms of photons and gravitons not being elementary force-carrying particles but being in possession of EDM. The photon-graviton interaction producing quantum spin is proposed as electromagnetic and gravitational vectors in a figure that might be called "Vector-Tensor-Scalar Geometry", as well as being related to quaternions plus the Higgs boson and field. Then the article returns to black holes, showing how the inability of light to escape them leads to a 4-dimensional space-time: via binary digits or base 2 mathematics, Mobius bands, figure-8 Klein bottles, and Wick rotation. The electric potential of photons and gravitons is then interpreted not strictly as a neutron-identical Electric Dipole Moment but as a vast array of pulses sharing similarities with modern computers and electronics – the binary digits of the previous sentence. As a consequence of the electric force-carriers bringing them into existence, particles of matter and antimatter are symmetrical with bosons in the sense that every boson or fermion is, at its most fundamental level, composed of binary digits. Imaginary numbers are essential to quantum mechanics, and this article connects the imaginary numbers of Wick rotation to the nature of time. Therefore, the words here are not painting a classical picture of space-time. The 1's and 0's of binary digits are compatible with quantum mechanics and may be referred to as the Hidden Variables which Einstein advocated to complete quantum physics, and to give its calculations an exactness which would bring a hidden order to its chaotic randomness and superficial uncertainty. If the universe can be quantized and viewed as comprised of infinitesimal ones and zeros, how could it not obey quantum physics? And if those ones and zeros are all ultimately connected by Quantum Gravity, waves and particles could never be separated but wave-particle duality would rule. To finish, many thanks to Albert Einstein for laying the foundations of this article 105 years ago when he published a paper titled "Do gravitational fields play an essential role in the structure of elementary particles?" Immediately before submission for publication, a few topics were added to this article - dark matter, precession, the Hodge conjecture, and the Riemann hypothesis.

Keywords: electric dipole moment, quantum spin, mass, symmetry, black holes, vector-tensor-scalar geometry, photon-graviton interaction, 4-dimensional space-time, BITS, binary digits, topology, Mobius band, figure-8 Klein bottle, Wick rotation, imaginary numbers, hidden variables, quaternions, dark matter, precession, Hodge conjecture, Riemann hypothesis.

Neutron EDM

There is an important correlation between Einstein's relativistic equations and the Prandtl-Glauert equations for fluid flow, which can be seen through their pressure coefficients. Mathematically, this shows the equivalence between Einstein's relativistic equation and the Prandtl-Glauert equation. Maxwell had already established a powerful correlation between electromagnetic waves and fluid dynamics. By building on this foundation, we can further investigate the relationship between gravitational pressure and electromagnetism, potentially uncovering new insights into the underlying physics. [1] It's well known that solutions refract electromagnetic waves of light passing through them. Similarly, the gravitational and electromagnetic (GEM) waves resulting from particles suspended in solution (the photons and gravitons of fluid space-time) would be bent around massive objects in space or gravitationally lensed and this refraction alters orientation of Fig. 1's magnetic and electric fields. When the gravitational and electromagnetic waves enter the solution and are lensed, changing orientation by, say, 45 degrees; the electric fields no longer possess up-down motion but have a tendency to vibrate left to right. If the orientation change continues to 90 degrees, the left-right tendency becomes a certainty. The doubling from 45 to 90 is important. If the angle of incidence of the GEM waves is 90 degrees, the potential exists for the electric fields to be inverted 180 degrees.

Let's apply this to the electric charges of subatomic particles. Imagine a mobile particle on the line of propagation which, upon encountering the force of an advancing positive-period wave (above Fig. 1's line of propagation), remains on the propagation line. It isn't pushed aside but must ascend to the crest of the wave. After reaching this highest point, it moves in the opposite direction and descends to the trough of the wave's following negative-period (below the line). Inversion from "down-up" motion to "up-down" (movement in the opposite direction) can be viewed as electrical attraction of particles becoming repulsion i.e. as the positive charge of, say, a proton switching to the negative charge of an antiproton and no longer attracting – but now repelling – an electron. ^ The previous typing can be summed up with the equation

180° ΔO = + => -

(180 Degree Change in Orientation Equals Positive Becomes Negative). Of course, it also means negative can become positive**:** 180° ΔO = - => +

Applied to the magnetic fields of particles, North and South poles can be interchanged – as occurs with Earth's magnetic-field reversals.

^ An experiment at Oxford University in England found similarly charged particles suspended in a solution can actually

attract each other over long distances. [2] The level of attraction is closely linked to the solution's pH. The pH scale used to specify the acidity of solutions indicates the activity of hydrogen ions. This activity of electrical charges could, when acting over a relatively long distance and time, affect the motion of particles and the orientation of their electric fields. The experiment had no effect on positively charged particles in water.

The neutral neutron is made up of three charged particles called quarks – two down quarks (each with a charge of -1/3) and one up quark (charge +2/3). Part of the neutron should be charged positively and another portion negatively (it should possess an Electric Dipole Moment). Many attempts to measure the distance between charged regions have found it is too small to be detected. Physicists Roberto Peccei, Helen Quinn, Frank Wilczek, and Steven Weinberg suggested the variable is not zero but a dynamical quantity that slowly lost its charge, evolving to zero, after the Big Bang. Their work on the problem led to the concept of axions, hypothetical particles that could "clear up" the neutron EDM problem. Axions are now considered one of the favourite candidates for dark matter, constituting about 85% of the matter in the universe. [3][4]

How could the electric dipole moment's undetectability be explained by someone who doesn't accept the Big Bang, or axions? Every particle is constantly in motion, thus permitting the possibility of positive & negative transforming. Taking the quark description of a neutron gives us (-1/3) + (-1/3) + (+2/3) which, in the words of Peccei, Quinn, Wilczek and Weinberg, evolves to zero.

When minus numbers become plus and plus nos. become minus, the equation is (1/3) + (1/3) + (-2/3) which, in this case, represents undetectability.
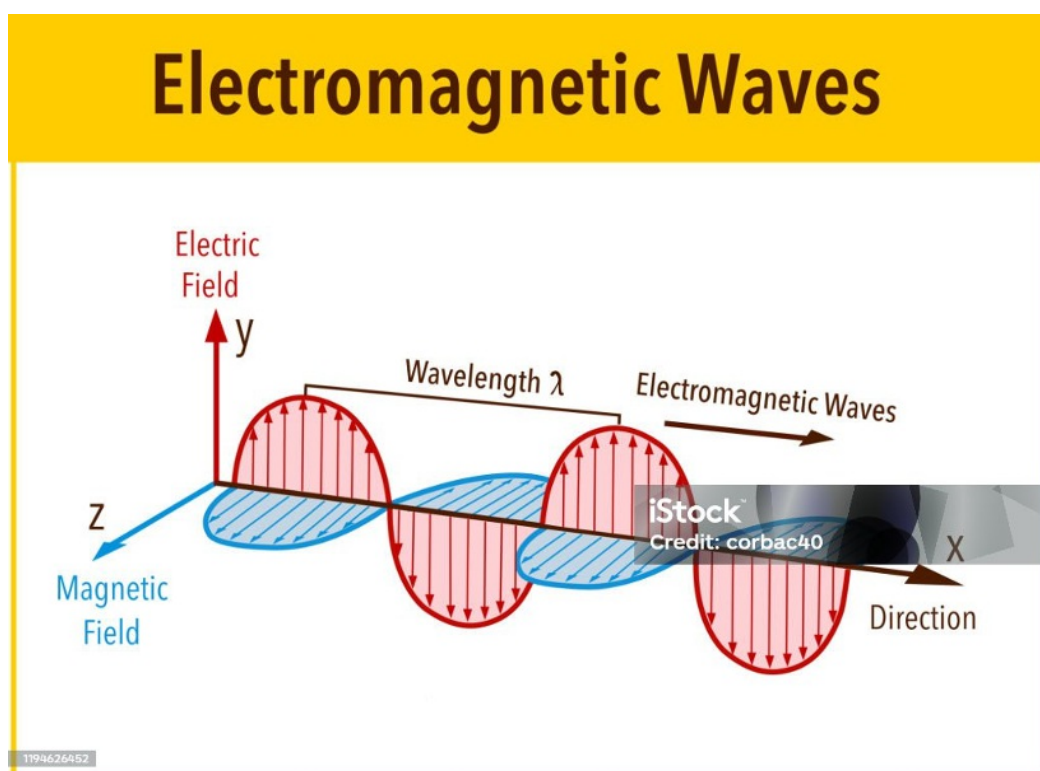

Figure 1. Electromagnetic Wave — Showing the Perpendicular Magnetic and Electric Fields, Plus the Wavelength Denoted by Greek Letter Lambda λ (the Black Arrow Indicates the Direction of Propagation) (figure from https://www.istockphoto.com/vector/electromagnetic-wave-structure-and-parameters-vector-illustration-

diagram-with-gm1194626452-340233881)

Riemann Hypothesis, Wick Rotation, And Mercury's Precession

On the subject of axions and dark matter, these can be linked with the Riemann hypothesis as well as the x- and y- axes of Wick rotation (see Figure 4). The Riemann hypothesis is concerned with the locations of "nontrivial zeros" on the "critical line". It says these zeros must lie on the vertical line of the complex number plane i.e. on the y-axis in Wick rotation. In the Riemann zeta function, there may be infinitely many zeros on the critical line. This suggests the y-axis is literally infinite. To truly be infinite, the gravitational and electromagnetic vectors that will be shown to produce mass – see the paragraphs before and after Figure 3 - cannot be restricted to the vertical direction but must include all directions. That means they create matter in the x-axis of known space-time and another form of mass called dark matter in the y-axis of imaginary space-time.

At the start of the 20th century, physicist Max Planck assumed that electromagnetic radiation can only be emitted or absorbed in discrete packets, called quanta. He thought of his discovery as nothing more than a math device … a kind of trickery). Einstein developed his explanation of the photoelectric effect from this "mathematical convenience". So it appears entirely possible that another supposed mathematical trickery (imaginary time and the y-axis) will find practical application in the future.

The Riemann hypothesis is not limited to prime numbers but can also apply to the fundamental structure of the mathematical universe's space-time. Vector-Tensor-Scalar geometry (see Figure 2) unites the fermions composing the planet Mercury with the bosons filling space-time. Thus, the hypothesis also applies to the body of Mercury itself. The planet's link to Wick Rotation means Mercury's orbit rotates. The Riemann hypothesis is the cause of precession, which doesn't only exist close to the Sun but throughout astronomical space-time (possibly replacing the gravitational effects in the Kuiper Belt of hypothetical Planet 9) as well as the quantum scale. Besides addressing the spatial phenomenon of precession, the Riemann hypothesis addresses the temporal phenomenon of time travel. In forwards time travel, the waves composing mass in the x-axis and y-axis rotate in the counter-clockwise direction. Compare Wick rotation to a DVD that has no end. The future destination is reached by a computer using tensor calculus to change the present coordinates to ones in the future. To use a simple example confined to two dimensions: -1,+ i becomes +1, -i. This is interdimensional travel since it incorporates both the time and space elements of the time-space unity i.e. Wick rotation residing in the Mobius strips and doublets composing space and mass. Backwards travel in time is identical to forward trips except for the coordinates being different and belonging to points in the past.

SPIN – Quantum Versus Classical

An object with an electric dipole moment is subject to a torque (rotation) when placed in an external electric field. This brings up images of spinning tops but the property known to physics as quantum spin is very different. In 1925, two Dutch

postgrads, Samuel Goudsmit and George Uhlenbeck, originated the word "spin" but it was an unfortunate choice of name because any comparison of a spinning electron to a spinning top is a poor aid. The quantum spin of a particle cannot be explained in terms of classical rotation since it can only have certain values that are equal to either a whole number or half a whole number multiplied by Planck's constant h divided by 2π (a quantity called h-bar: symbol ħ). [5]

This quantum spin requires a different form of electrical force than one producing classical rotation. This could be a NATURAL version of the on/off or one/zero pulses used by manmade electronics and called BITS or binary digits.

As a thought experiment, visualize the photon and graviton not as indivisible elementary particles but, like the neutron, as possessing an EDM. It's known that the photon and graviton have quantum spins of, respectively, 1 and 2. Photon-graviton interaction can, using William Rowan Hamilton's 1843 definition of quaternions as the quotient of two vectors, [6] produce 1/2 which is the quantum spin of all particles of matter. Photon spin is vector 1, graviton spin is vector 2, and their interaction can also produce 2/1 which is the quantum spin of the graviton. An assembly of countless gravitons might form the intense gravity of a stellar or supermassive black hole. The photons interacting with gravitons could be confined within the black hole by twisting the valence-conduction bands of conductors, semiconductors, and insulators. Then light could not escape black holes which, as Stephen Hawking wrote, "ain't so black". [7]

4-Dimensional Geometry and Topology

The two vectors can be pictured as adjacent sides of a parallelogram. Tensor calculus converts the coordinates of the sides into those of a diagonal representing the interaction of the sides' vectors. The sides' coordinates can also be changed into a point on the diagonal. A position on a line that only has magnitude is called a scalar variable and this scalar is associated with particles of spin zero. [8] Since the Higgs boson is scalar, the point on the diagonal represents the Higgs boson which is obviously related to the graviton. The Higgs field is therefore intimately related to the gravitational and electromagnetic fields. The Higgs field may be regarded as a unification of the gravitational and electromagnetic fields.
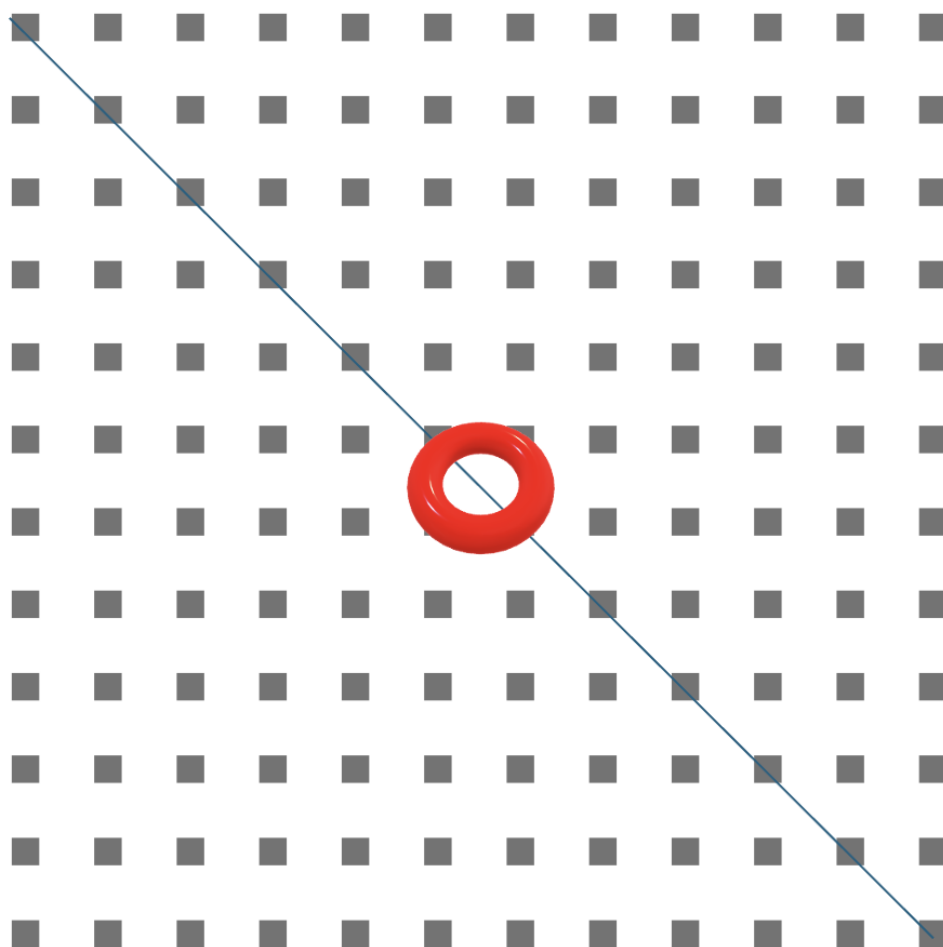
Figure 2. Vector-Tensor-Scalar Geometry: Parallelogram With Diagonal and Central Higgs Boson (Horizontal Direction = Graviton Vector; Vertical = Photon Vector). The deep link between geometry and topology (the Hodge Conjecture) is about vector-tensor-scalar geometry plus the topological Mobius band and figure-8 Klein bottle (with addition of Wick rotation and binary digits). (Figure drawn by author)

Speaking of 1/2, 2/1, and twisting of valence/conduction bands –

The twisting can be caused by the electric pulses of the BITS encoding two-dimensional (2D) Mobius bands instead of the untwisted Strings of String Theory (also, binary digits may be thought of as strings of 1's and 0's). A Mobius band, with its undulations and single surface, must be travelled around twice to reach the starting point. This raises the possibility that billions or trillions of Mobius strips compose every particle of matter ^ since such particles must be turned 720 degrees (completely rotated twice) to look the same. [9] If photons and gravitons share EDM with neutrons, it's reasonable to conclude the symmetry means photons and gravitons are composed of Mobius loops. Electromagnetism and gravitation aren't identical, so a photon might be simply constructed from billions of Mobius bands while a more complex graviton might be based on a pair of Mobius strips uniting into a figure-8 Klein bottle. [10] Billions, or more, of these "Mobius

Doublets" form a graviton. Photon-graviton momentum and interaction would not only produce a matter particle's quantum spin but a pressure that's equivalent to what we call mass or solidity. Any particle's mass, including the Higgs boson's or that of the bosons belonging to the nuclear forces, would be created this way. Possessing an electric dipole moment, every massive or force-carrying particle would have both positive and negative charge – capable of cancelling to produce neutrality.

^ A science paper from 2017 says all of the information in the universe is contained in two-dimensional packages trillions of times smaller than an atom (in this case, the 2D package is the Mobius Strip) [11]
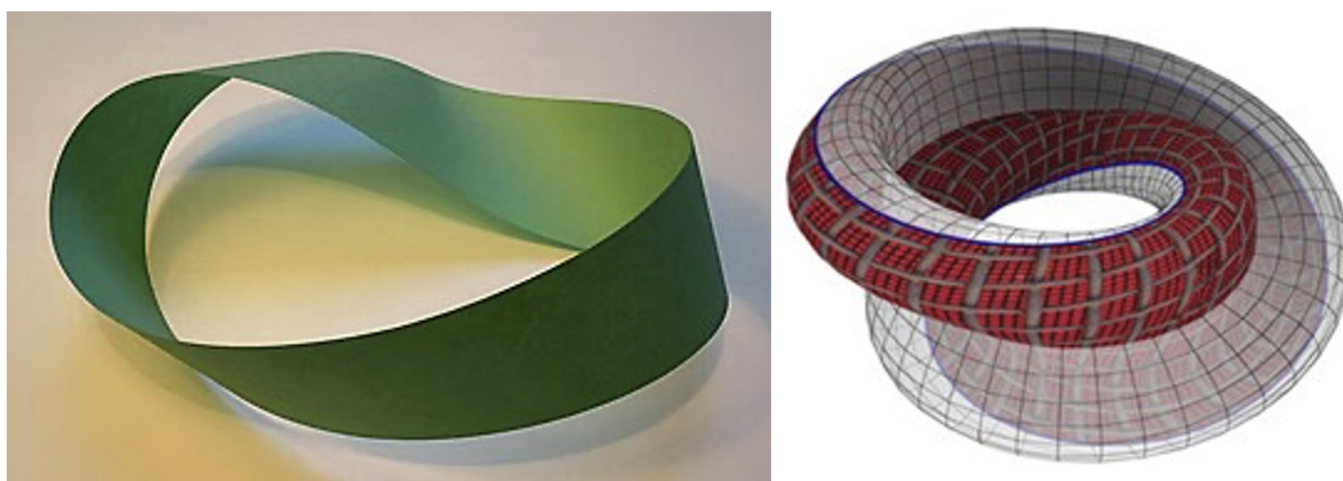

Figure 3. Mobius Band (left) and figure-8 Klein Bottle or Mobius Doublet (right) (Mobius figure from https://upload.wikimedia.org/wikipedia/commons/thumb/7/79/M%C3%B6bius_Strip.jpg/320px-M%C3%B6bius_Strip.jpg Klein figure from http://plus.maths.org/content/os/issue26/features/mathart/index)

As a consequence of the photons and gravitons bringing them into existence, neutrons etc. wouldn't only be made of 2D Mobius bands and figure-8 Klein bottles that are immersed in 3D (the bottles can be regarded as projection of the info contained in the Mobius, similar to the human body being a projection of DNA's information). So-called imaginary numbers like $i^2 = -1$ are essential to quantum mechanics. [12] Therefore, the 4th dimension of time could well be established by the real- plus imaginary- number combination of Wick rotation existing within the structure of the Mobius.
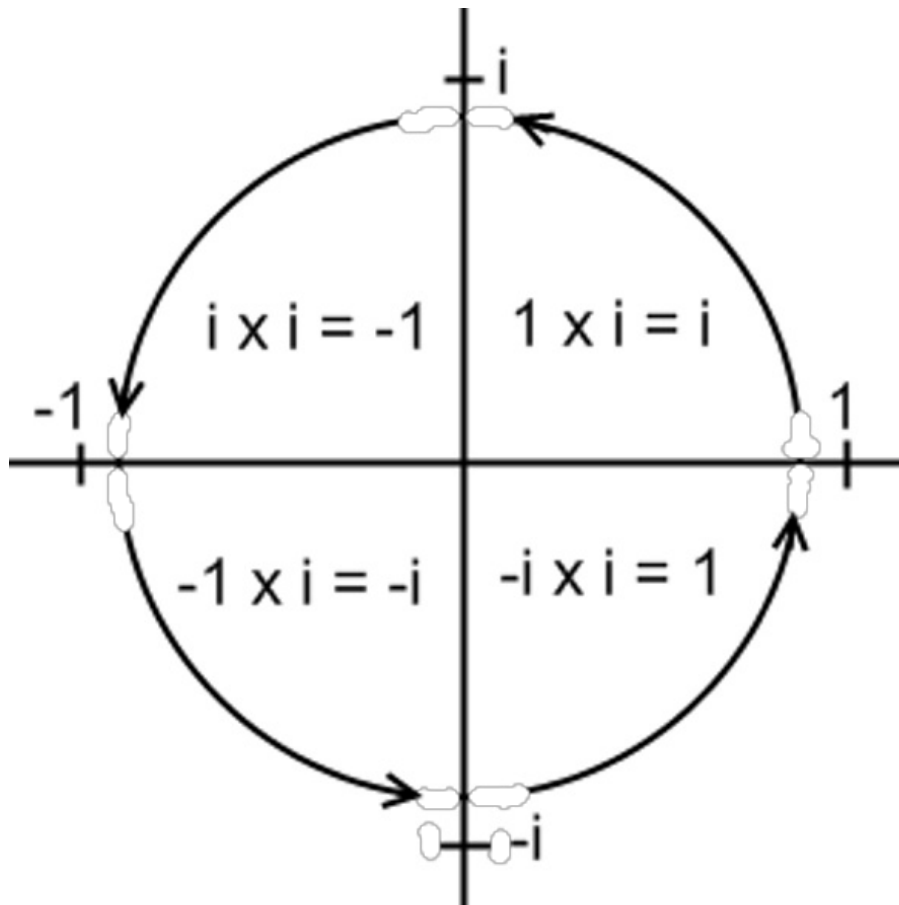
Figure 4. WICK ROTATION : "The complex plane reveals i's special relationship with cycles via the circle of i, also known as Wick rotation. Whenever a point on the complex plane is multiplied by i, it moves a quarter rotation around the origin or center of the plane." [Figure and quote from [13]]

To finish, many thanks to Albert Einstein for laying the foundations of this article 105 years ago when he published a paper titled "Do gravitational fields play an essential role in the structure of elementary particles?" [14]

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