The Intersection of Advanced Waves and Geometric Structures in Measuring Astronomical Distances

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Abstract -

Most people think science is exclusively about things like experiments, observations, and measurement. But to quote Professor of Mathematics Holmes Boynton who wrote World Book Encyclopedia's "Geometry" article,

"(Geometry) is important (later in the paragraph the quote is from, he uses the words "simple and easy to picture") … because it shows students how to develop ideas by logical reasoning, rather than by observation, description, and measurement."

Therefore, it's reasonable to use a simple geometry to help show that physics has uncovered a flaw with the results of all kinds of radioactive dating. Four years after publishing General Relativity (ie in 1919), Albert Einstein published a paper that asked "Do gravitational fields play an essential role in the structure of elementary particles?" (1) That paper was published in an attempt to clarify the inner workings of the atom. But it might well apply in the present paper. Central to radiometric dating's overestimates are two things**:** a) mathematics' vector-tensor-scalar geometry (a simple geometry conceived by the author) which, answering "yes" to Einstein's 1919 paper, shows that gravitational and electromagnetic waves compose particles of matter**;** and b) the conclusion supported by last century's physics that these waves contain "advanced" and "retarded" components travelling backwards and forwards in time (this is not science fiction but will be reconciled here with quantum entanglement as well as Einstein's Relativity). Astronomers study gravitational and electromagnetic waves - it's natural to wonder if, for example, distances to astronomical objects have also been overestimated. Intriguingly, neutralizing the advanced waves should dramatically increase the health and lifespan of humans and all other species if it doesn't adversely affect anatomy and physiology ie if the retarded waves alone are sufficient for normal structure and function. This work relates waves to the Complex Number Plane and Wick rotation - different phases rotate from the x-axis to the so-called "imaginary" y-axis where they can produce the extra mass of another large-scale dimension (so-called Dark Matter) as well as the Dark Energy which the mass possesses.

Keywords -

Radiometric dating; Geometry; Relativity; Gravitational waves; Electromagnetic waves; Wick rotation; Astronomy; $E=mc^2$; Inverse-square law; Geon; Dark matter; Dark energy

Article -

SECTION 1:

VECTOR-TENSOR-SCALAR GEOMETRY

Two adjoining sides of a parallelogram (see Fig. 1) represent the vectors of the photon's spin 1 and the graviton's spin 2. The resultant diagonal represents the interaction of the sides/vectors (1÷2 = the spin ½ of every matter particle). Tensor calculus changes the coordinates of the sides and diagonal into the coordinates of a position on a line (a single point on the diagonal). This scalar point is associated with particles of spin 0. If the mass produced previously happens to be 125 GeV/c^2, its union with spin 0 produces the Higgs boson. 125 GeV/c^2 united with spin 0 means the central scalar point of the Higgs boson is related to the vector of the graviton's spin 2, and the Higgs field is therefore united with the supposedly unrelated gravitational field (together with the latter's constant interaction with the electromagnetic field).

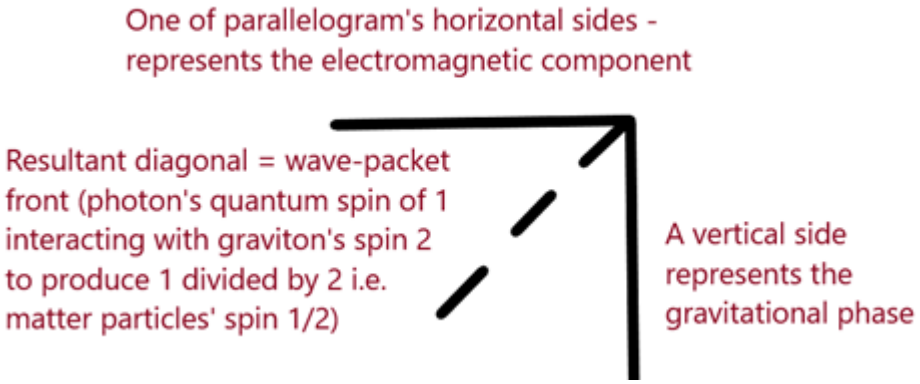

FIGURE 1: WAVE-PACKET FRONT AS QUANTUM SPIN

It must be remembered that referring to space alone is incomplete. Living in space-time, it's necessary to add some sentences about the time factor. The photon must interact with the graviton to produce the mass of the mass of the weak nuclear force's W and Z bosons. To produce their quantum spin, the photon's spin 1 needs to react with the

graviton's spin 2. That is, the photon's turning through one complete revolution needs to be combined with the graviton's being turned through two half-revolutions.^ Incorporating the time factor as a reversal of time in the middle of the interaction**:** a gravitonic half revolution is subtracted from the photonic full revolution then the graviton's time-reversal adds a half revolution (1-½+½ = the spin 1 of W and Z bosons). The strong nuclear force's gluon's quantum spin of 1 could arise in the same way as the spin 1 of weak-force bosons.

^ Professor Hawking writes,

"What the spin of a particle really tells us is what the particle looks like from different directions." (2)

Spin 1 is like an arrow-tip pointing, say, up. A photon has to be turned round a full revolution of 360 degrees to look the same.

Spin 2 is like an arrow with 2 tips - 1 pointing up, 1 down. A graviton has to be turned half a revolution (180 degrees) to look the same.

Spin 0 is like a ball of arrows having no spaces. A Higgs boson looks like a dot: the same from every direction.

Spin ½ is like a Mobius strip. A particle of matter has to be turned through two complete revolutions to look the same, and you must travel around a Mobius strip twice to reach the starting point.

Referring to the diagonal in Fig. 1**:** since mass (and the nuclear forces associated with matter) are a product of gravitation, the gravitational waves do not simply penetrate matter but - like a biological enzyme - must pause to react with it. The matter absorbs and re-radiates the gravitational waves so rapidly that they appear to merely pass through the matter unimpeded.

SECTION 2:

ADVANCED WAVES – FROM SCIENCE FICTION TO SCIENCE OF RELATIVITY

The beginning of the solution proposed here is with 19th-century scientist Michael Faraday's experiments with electricity and magnetism (which, later that century, James Clerk Maxwell mathematically unified into a theory of electromagnetism that includes light). The existence of both advanced waves (which travel backwards in time) and retarded waves (which travel forwards in time) as admissible solutions to Maxwell's equations was explored in the Wheeler–Feynman absorber theory of last century. Also,

the transactional interpretation of quantum mechanics (TIQM) says waves are both retarded and advanced. The waves are seen as physically real, rather than a mere mathematical device (see Fig. 2's text).

And Michio Kaku writes, "When we solve Maxwell's equations for light, we find not one but two solutions: a 'retarded' wave, which represents the standard motion of light from one point to another; but also an 'advanced' wave, where the light beam goes backward in time. Engineers have simply dismissed the advanced wave as a mathematical curiosity since the retarded waves so accurately predicted the behavior of radio, microwaves, TV, radar, and X-rays. But for physicists, the advanced wave has been a nagging problem for the past century." (3)

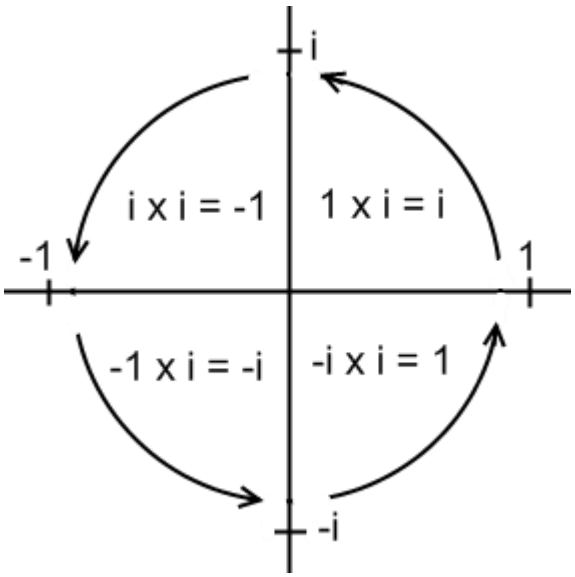

Figure 2 – WICK ROTATION: "The complex plane reveals i's special relationship with cycles via the circle of i, also known as Wick rotation. Whenever a point on the complex plane is multiplied by i, it moves a quarter rotation around the origin or center of the plane." (4)

This submission claims Mobius strips compose energy particles as well as matter particles (see "Spin ½ is like a Mobius strip", p. 3) and the Wick rotation inherent in the strips is adaptive. There are vastly increased numbers of gravitational energy's gravitons near black holes, and there is increased effect on electromagnetic energy's photons when speed-of-light travel includes vast numbers of photons in the traveller's sphere of influence. These enlarged quantities boost the probability of Wick rotations

cancelling to produce quantum entanglement. “Advanced” waves travel back in time (to the left of Fig. 2’s origin or centre). “Retarded” waves go forwards in time (to the right of Fig. 2’s centre). Imagine the wave below as a retarded wave originating at the red dot on the far left. As it rotates around the origin in Fig. 2's clockwise direction to occupy coordinates proceeding to the left of the origin, its crests become troughs and troughs become crests (the other red dots mark the straight lines of the axes). In this way, the crests and troughs cancel each other and cancellation produces quantum mechanics’ entanglement. In other words, a wave interferes with itself (and a particle - whether boson or fermion - formed from gravitational and electromagnetic waves interacts with itself). This is demonstrated by the Mach-Zehnder interferometer, and discussed in (5).

Figure 3 – Standing Wave (Public domain image from https://en.wikipedia.org/wiki/Wave#/media/File:Standing_wave.gif)

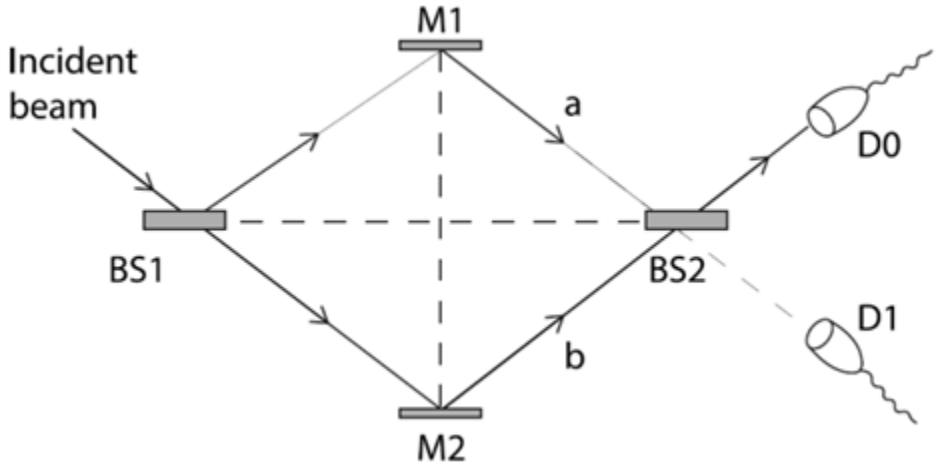

Figure 4 - Mach-Zehnder interferometer

We have two beam splitters (BS1 and BS2) and two perfect mirrors (M1 and M2). An incident beam coming from the left is split at BS1 and recombines at BS2, which sends two outgoing beams to the photon detectors D0 and D1. The interferometer can be set

up to produce a precise interference effect which ensures all the light goes into D0, as shown above. Alternatively, the setup may be altered to ensure all the light goes into D1.

(Source of figure and figure's text - "Reading Feynman" by Jean Louis Van Belle: https://readingfeynman.org/tag/interference-of-a-photon-with-itself/ whose reference for the illustration is MIT edX Course 8.04.1*x* (Quantum Physics), Lecture Notes, Chapter 1, Section 4 (*Quantum Superpositions*).

As well, an effect of gravitational and electromagnetic waves following Wick rotation is to cause cancelling crests and troughs to produce Special Relativity's time dilation (slowing and eventual stoppage) near the intense gravity of black holes, and near light speed. They also move the idea of waves travelling back in time into accepted science.

According to the geometry in Section 1, both matter and dark matter can be formed by the interaction of gravitation and electromagnetism. The only difference between them would be that dark matter is, to use Wick rotation, rotated 90 degrees from ordinary matter's horizontal x-axis to the vertical, "imaginary" y-axis. It's rotated into another dimension. Since this rotation twists the electromagnetic spectrum perpendicular to our perceptions and instruments, the dark matter is only detectable gravitationally (because it still resides in space-time and General Relativity says gravity is the curvature of space-time; therefore, gravity is space-time). Though unified with this dimension, it may be visualized as existing "above" and "below" ordinary space-time**:** in "hyperspace" and "subspace". **Following Einstein's $E=mc^2$, the relation between Dark Matter (DM) and its associated Dark Energy (DE) would be $DE=DMc^2$.** In conclusion**;** if the gravitons and photons are entangled, so are the figure-8 Klein bottles and Mobius strips and Wick rotations that compose the particles.

Gravitational waves journeying through time might even be captured by archeologists and historians in future centuries, then converted into frequencies such as visible light. This would allow them to take photographs, or make videos and holograms, of events that (from our point of view) have long passed into history and prehistory, or haven't yet occurred. Advanced waves also cause living creatures to age faster than they would without those waves, by extending the creatures' reach into the past (this is equivalent to having lived longer). Neutralizing the advanced waves should dramatically increase the health and lifespan of humans and all other species if it doesn't adversely affect anatomy and physiology ie if the "retarded" waves which go forward in time are sufficient for normal structure and function.

Albert Einstein's equations in the theory of General Relativity say gravitational fields carry enough information about electromagnetism to allow Maxwell's equations to be restated in terms of these gravitational fields. This was discovered by the mathematical physicist George Yuri Rainich. (6) When a dinosaur dies, the advanced gravitational and electromagnetic waves composing its particles would continue traveling back in time. By the time its bones or fossilized remains, or the surrounding rocks, were subjected to modern science's dating methods; those advanced waves might have gone so far back in time that the dating method says the dinosaur died 100 million years ago or more. Radioactive dating is thus a form of (advanced) gravitational-wave detection, just as LIGO - the Laser Interferometer Gravitational-wave Observatory (7) - picks up (retarded) gravitational waves. Technology based on the way noise-cancelling headphones work (8) might provide a more accurate reading of when the dinosaur lived. The headphones increase the signal-to-noise ratio by incorporating a microphone that measures ambient sound (noise), generating a waveform that is the exact negative of the ambient sound, and mixing it with any audio signal the listener desires. Generating a waveform that's the exact opposite of the advanced waves emitted by the deceased dinosaur should, at least partially, neutralize the advanced waves and restrict measurement to the retarded waves associated with the animal’s decay.

SECTION 3:

ASTRONOMY AND ADVANCED WAVES: COMBINING $E=MC^2$ AND THE INVERSE SQUARE

In the abstract, it was stated - "Astronomers study gravitational and electromagnetic waves - it's natural to wonder if, for example, distances to astronomical objects have also been overestimated." E=mc^2 supports this idea of deleting distance – the formula is, of course, Albert Einstein’s famous equation relating energy, mass and the speed of light. (9) Let's represent the masslessness of photons by 0 (zero), and also the masslessness of the theoretical gravitons by zero. Should theories developed from Einstein's 1919 paper regarding mass be proven correct one day ie that mass results from photon-graviton interaction, we can replace the m with zero. This results in E=0*c^2 ie outside familiar circumstances (in black holes), it is possible for E to equal 0. Having reduced the equation to nothing but E, m=0 and c^2=0 which means m=c^2. At first glance, m=c^2 seems to be saying mass exists at light speed. But the absence of E (energy) refers to there being no interaction of light energy and gravitational energy, and therefore no mass. If mass cannot be produced, mass-producing space-time/gravity must be described by zero. The zero-ness of space-time/gravity does not mean they don’t exist … they obviously do. It means we can relocate matter and information

superluminally, or travel into the past and future, because distance equals zero and can be eliminated from space and time.

In this way, $E=mc^2$ supports the conclusion in Fig. 2's text of clockwise plus counterclockwise Wick rotations cancelling to produce quantum entanglement. The retarded *+x* function of wave components thus combines with the advanced *-x* function to not merely reduce, but to completely delete, distances in time and space. Distance is thus transformed to zero, and the inverse-square law states that the force between two particles becomes infinite if the distance of separation between them goes to zero. Using the example of gravitational force, gravitation becomes infinite. It is not merely exterior to matter and mass, who would cause space-time to curve. It also permeates the matter/mass, as it must if they are gravity's product. General Relativity says gravity is the curvature of space-time. Therefore - if gravitation is infinite, space-time could have no beginning in a Big Bang and no end. Using the example of electromagnetic force, electromagnetism becomes infinite. What is called an electromagnetic wave (a finite entity) would actually consist of a finite travelling shock wave from a disturbance in space-time, plus an infinite array of pre-existing photons that fill space-time and masses. The shock wave causes successive excitations of the photons, covering 186 282 miles every second.

Gluons, whose quantum spin equals 1, are restricted in their travel through space-time (particle physics uses the word “confined”) and are relatively fixed. The same relative fixation applies to the short-range weak-force bosons of spin 1 as well as the supposedly long-range electromagnetic photons of spin 1. A “gravitational wave” would be a disturbance in space-time that causes excitations of gravitons, similarly traveling at what is called “the speed of light” (this is a new interpretation of John Wheeler's geon or "gravitational electromagnetic entity", an electromagnetic or gravitational wave which is held together in a confined region by its own nature). (10)

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