

Hypothesis

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Posted Date: 24 March 2025

doi: 10.20944/preprints202502.1585.v4

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*Hypothesis*

# Icy Stars Connect the Mathematics and Quanta of this Universe to the Dark Universe, the Time-like Multiverse, and a Future Utopian Earth

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**Abstract:** The goal of this article is to show that there will be almost unbelievable changes to society in future decades and centuries. This world could become a Utopia with no hunger, no poverty, no disease, and world peace. As stepping stones to this Heaven on Earth, great alterations in the way people think are proposed in the form of likely developments in the sciences (physics, mathematics, astronomy, etc.) The paradigm shift should inevitably boost education, conservation, and information through technologies such as computing, quantum entanglement being used as fuel, and warping or travelling in space-time. Icy balls that may be a new kind of star with the contradictory characteristic of possessing abundant ice plus infrared emission were discovered. The contradiction could be resolved using vector-tensor-scalar geometry, based on a paper by Einstein. This geometry presents new ways of looking at spatial objects and the Higgs boson/field. A Cosmological Entanglement based on the Holographic Principle and not dependent on temperatures near absolute zero is introduced. "Topological propulsion" and emission-free "topological manufacturing/transportation" are proposed as developments from quantum entanglement being fuel for engines, fusion reactors, and stars. Describing phenomena with either advanced/retarded waves or Complex numbers is presented. Chaos theory states there's order in apparent disorder, changing the way Brownian motion and quantum mechanics are viewed, possibly giving rise to quantum certainty. Penultimately, the article regards a) dark matter/energy as related processes divorced from universal expansion/contraction, b) space-time and precession in light of the Riemann hypothesis, and c) coding waves. Then, thoughts on the wavefunction of the multiverse/universe, life's origin, Wheeler's participatory universe, quantum and imaginary computers. Epilogue applies the above to entanglement being a localised phenomenon - followed by a paragraph each about AI, the cosmological constant problem, and the cosmic microwave background's Hemispherical Power Asymmetry. After "Epilogue to Science Portion of Article" comes "Heaven on Earth - Science Paradigm Shift Produces Utopian Earth".

**Keywords:** Higgs boson/field; quantum entanglement as a fuel for cars and fusion; quantum certainty; dark matter/energy; Riemann hypothesis; entanglement as local event; artificial intelligence; science paradigm shift produces utopian earth

## 1. Introduction

This work is appropriate for the Conferences on both education and information technologies as well as social sciences and humanities because it speaks of potential advances in science, mathematics, and engineering that will lead to this world becoming a literal Paradise. There are many mysteries in science at present - dark matter, dark energy, universal entropy, the cosmological constant, hemispherical power asymmetry, the nature of space-time's building blocks, artificial intelligence, and so on. The submitted 9,000 words seek to explain all these things, and much more. The aim is to provide an overall outline that will contribute to rescuing science from its present confusion while at the same time, pointing out possible benefits to technology in the form of spacetime-exploring topological propulsion, emission-free topological manufacturing and transport,

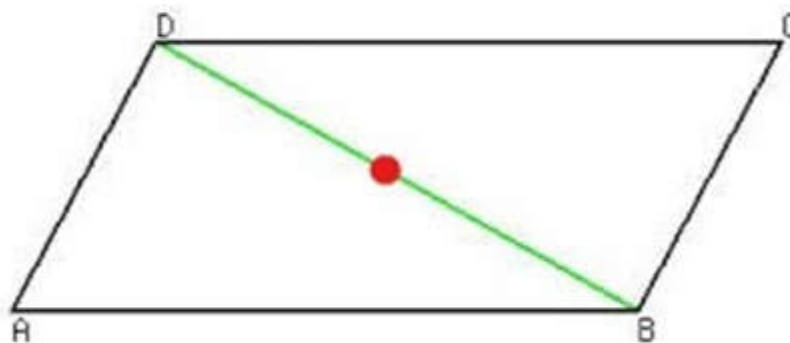
quantum and “imaginary” computers, and quantum entanglement that’s based on the holographic principle and is independent of temperature or laboratories. The aim is not to go into minute detail requiring equations but to go into sufficient detail to show scientists that this article contains ideas worth pursuing.

## 2. Introduction to Vector-Tensor-Scalar (VTS) Geometry

The following method of building planets is preferred to collisions between rocks and dust in the disk because most planetary systems seem to outweigh the protoplanetary disks in which they formed, leaving astronomers to re-evaluate planet-formation theories [1].

The graviton vector and photon vector 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. It’s known that photons and gravitons interact because General Relativity says a light ray sent from a star and passing by the Sun is deflected 1.75 arcseconds from its original path by the Sun’s gravity. 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 [2]. 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 its associated electromagnetic) field. The Higgs field may be regarded as a unification of the gravitational and electromagnetic fields. The pressure generated by photon-graviton interaction may be identified as mass, just as electromagnetic forces between your hand and the object you’re touching are interpreted as the object’s solidity. Photon-graviton interaction can, using William Rowan Hamilton’s 1843 definition of quaternions as the quotient of two vectors, [3]. produce  $1/2$  which is the quantum spin of all particles of matter. Photon spin is 1, graviton spin is 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, intermediate-mass, or supermassive black hole. Examples of quantum spin -

- 1) Photon divided by graviton = spin  $1/2$  of all matter particles.
- 2) Graviton divided by photon = spin  $2/1$  which may be responsible for the intense gravity of black holes.
- 3) Using time reversal in case of graviton:  $1+2-2$  = spin of nuclear-force bosons. It also equals photon spin - establishing a link between gravitation’s spin 2, electromagnetism, and the nuclear forces.
- 4) Speaking of the Higgs which resides on the diagonal in Figure 1 and has spin 0: zero can be arrived at through  $(1 - 2) + 1$  which uses the experimental data of a photon existing in two places simultaneously (it uses the graviton’s spin 2 being taken away from the photon’s spin 1, and the spin motion of 1 being in more than one place at the same time). (Paragraph from 4)



**Figure 1. 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) may be about vector-tensor-scalar geometry plus the topological Mobius band and figure-8 Klein bottle (with addition of Wick rotation and the binary digits). (Figure drawn by author using Paint program on laptop).

### 3. Applying VTS Geometry to Icy Balls and Solar/Stellar Formation

The introduction to VTS geometry builds on Albert Einstein's paper "Do gravitational fields play an essential role in the structure of elementary particles?" [5]. A common objection to the accuracy of this paper is that it makes no mention of the strong and weak nuclear forces discovered in the 1930s. Einstein could only speak of the relation between gravitation and electromagnetism since they were the only known forces when he wrote his paper in 1919. However, he was correct to not be worried about the omission because, as noted in the introduction, the photon-graviton interaction of VTS geometry is capable of producing the mass and quantum spin of the nuclear bosons.

The strong force's massless gluon could be produced by describing the boson with imaginary numbers (where the square of numbers produces negatives). In other words, the other nuclear bosons are created by addition of the photonic and gravitonic momenta but the gluon might form from subtraction of their momenta i.e., positive momentum of one photon minus the positive momentum of  $10^{36}$  gravitons (gravity is incredibly weak) equals a massless gluon when the quantum spin equals 1.

Since it's possible to describe experimental observations without quarks, VTS geometry will use wave-particle duality in a different way from normal by not using quarks (the particle component of duality) but by emphasizing the wave portion of gravitational and electromagnetic waves. Figure 1 can be used to generate each of the particles composing the icy ball/ new kind of star - carbon monoxide, silicon monoxide, hydrogen, ice (which could be made of water, nitrogen, ammonia, methane ...). In this article, up- and down-quarks will be bypassed in favour of going directly to neutrons and protons.

To form water, Figure 1 might produce H<sub>2</sub>O by generating an electron orbiting a proton, repeating that process once, then bonding them to an atom that has eight electrons orbiting a nucleus of eight protons and eight neutrons. If the Figures are sequential, only a chain of particles extending in a straight line would be produced. To allow orbits or a multi-particle nucleus, the figures need to form a 3rd dimension and may therefore be layered. The icy ball/new kind of star seems to have the contradictory characteristic of being cold enough to have abundant ice but also possessing infrared emission like a star. VTS Geometry is not necessarily temperature-dependent, therefore the geometry appears to be capable of building layers of ice around the particles of fusion-producing hydrogen. Perhaps the fusion, emitting infrared and every other type of energy, results from a new cosmological entanglement that's related to Figure 1.

This form of entanglement - not limited to laboratories and temperatures near absolute zero - might be achieved by adaptation of cosmology's holographic principle. The principle says the 3rd dimension results from information in a 2nd dimension. If every particle (even the photon and graviton) has many positive and negative electric charges that potentially cancel, the charges would - as electronics shows - produce binary digits making the 2nd and all dimensions programmable. By reprogramming that 2nd dimension, the 3rd dimension (and thus, distance) is feasibly totally removed between the centres of particles or wave functions, physically quantum-entangling them. Wick rotation's x-axis could describe the 4 known dimensions of space-time while its y-axis could describe the physical quantum entanglement of particles and waveforms achieved with the holographic principle. Being different from ordinary space-time and incorporating Wick Rotation's imaginary numbers, the holographic entanglement's lack of distances in space and time might produce "imaginary space" and "imaginary time" [6]. In principle, this idea can be rescued from present NON-manipulation of the holographic principle by believing the following. Today's, and yesterday's, world can interact with tomorrow's holographic manipulations to ensure the timelike multiverse has always been united with this universe if time is like a DVD. Every past, present, and



future event on the DVD exists at once since the whole DVD exists but we're only aware of sights and sounds occurring in each tiny fraction of a second .

#### 4. Topological Propulsion/Manufacturing + Retarded/Advanced Waves

When Figure 1's parallelogram is visualized in three dimensions, this physical cosmological entanglement can be compared to "collapse" of the 3-dimensional analogue of the parallelogram. The bottom and top would occupy an identical one-line space. This would result in a shape having two dimensions and a single surface. If the two vertical sides aren't compressed to the same degree at the same time (the left one is slightly shortened, then the one on the right, then left again, and so on), the result may not be a 2D square or rectangle but might be the undulating shape of topology's 2D Mobius strip - along which particles like photons, gravitons, and electrons could travel. Electricity, and its associated magnetism, traversing an array of these single surfaces could produce what might be called "topological propulsion" and photon-graviton interaction could produce any and all particles, forming a 100% emissions-free "topological manufacturing" which is applicable to every factory and powered form of transportation [8]. This collapse is a form of warping of space. Reverting to 2-dimensional description of the collapse, lines AB and DC become AC). If the sides AD and BC merge to also become AC, a zero-dimensional shape is produced i.e., a point with no length, width, or depth (it has no size and tells about the location only). Cosmological or holographic entanglement may be limited to deleting space and time in only one direction whereas the point exercise of the previous sentence might remove space-time in every direction.

These topological applications might be preceded by earlier technology that uses the particles which are composed of Mobius strips - fermions and bosons are quantum entangled. "To turn fermions into bosons, you can take two fermions and combine them into a molecule. This new molecule is a boson," explained Prof. Thomas Busch, an author of a paper published in the journal "Nature" [9]. "Breaking it up allows us to retrieve the fermions again. By doing this cyclically, we can power the engine without using heat." This quantum entanglement gives the "quantum engine" a degree of efficiency that is quite high without producing noise or combustion. Avoiding heat within the engine means building an environment that is as calm and cold as possible ie it depends on present forms of quantum entanglement. Perhaps the programmable Cosmological Entanglement based on the Holographic Principle where true entanglement exists - the centres of the particles are in identical positions - would greatly increase efficiency and make a better car engine. The magnified efficiency from using cosmological entanglement as a fuel might be valuable in construction of fusion reactors ...or even as a power source in the Sun and stars, where electromagnetic and gravitational energy released as photons and gravitons could assemble into the hydrogen and other chemical elements in the stellar bodies. Astronomers Georgij Krasinsky and Victor Brumberg wrote a paper about the distance between Earth and the Sun increasing extremely slowly [10]. They attributed the increase to dark energy but it could alternatively be explained by the pressure generated by electromagnetic and gravitational energy being radiated by the star and perhaps contributing to formation of the particles in the solar wind.

There are four hints that everything in what is called space-time is subject to Complex (in the mathematical sense) explanation i.e., as some arrangement of both Real and Imaginary numbers - a) the lack of distances between stars or galaxies called imaginary space, b) the lack of distances between years and centuries referred to as imaginary time, c) The strong force's massless gluon could be produced by describing the boson with imaginary numbers (where the square of numbers produces negatives), and d) the anticlockwise rotation of A, B, C, and D in Figure 1 is analogous to the anticlockwise motion in the Complex Plane's Wick Rotation: whenever a point on the complex plane is multiplied by  $i$ , it moves a quarter rotation around the origin or centre of the plane.



**Figure 3. The Möbius Strip**, which is two-dimensional and only has one surface (source: [http://www.clker.com/cliparts/3/7/a/9/1220546534781713951lummie\\_Mobius\\_Strip.svg.hi.png](http://www.clker.com/cliparts/3/7/a/9/1220546534781713951lummie_Mobius_Strip.svg.hi.png)).

“When we solve (19th-century Scottish physicist James Clerk) 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.” [11].

Einstein’s equations 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 [12]. It’s therefore likely that gravitational waves also possess retarded and advanced portions.

John G. Cramer wrote in his 2022 Internet article “Advanced Waves Detected” - “In summary, it appears that advanced waves do exist and have been detected. Much more work must be done to ensure that this effect is real and can be extended, but the physics implications are gigantic.” [13].

If Einstein and this article are correct about graviton-photon interaction being responsible for the generation of mass, the retarded and advanced waves associated with both gravitation and electromagnetism would produce mass (though they violate the everyday concept of purely linear time, advanced waves have apparently been detected). Therefore, the masslessness of gluons might be produced by retarded and advanced waves cancelling. They neutralise each other, producing a mass of zero and relating gluons to the Higgs boson whose zero quantity is its quantum spin.

The retarded waves that can be regarded as travelling forwards in time can be described using real numbers. The advanced waves which can be thought of as journeying back in time might be explained by imaginary numbers. As stated in the 2nd paragraph of **Applying VTS Geometry to Icy Balls and Solar/Stellar Formation**, “The strong force’s massless gluon could be produced by describing the boson with imaginary numbers (where the square of numbers produces negatives).” These negative products of squared imaginaries fits in with a science paper [14]. involving what it calls “negative time”. Aephraim Steinberg, one of the authors, defends use of the term negative time but says, “We don’t want to say anything traveled backward in time”. Viewing a gluon’s advanced waves as description of the boson with imaginary numbers fits in with nothing going back in time. However, it may be possible that imaginary numbers do permit things to travel back (and forwards) in time.

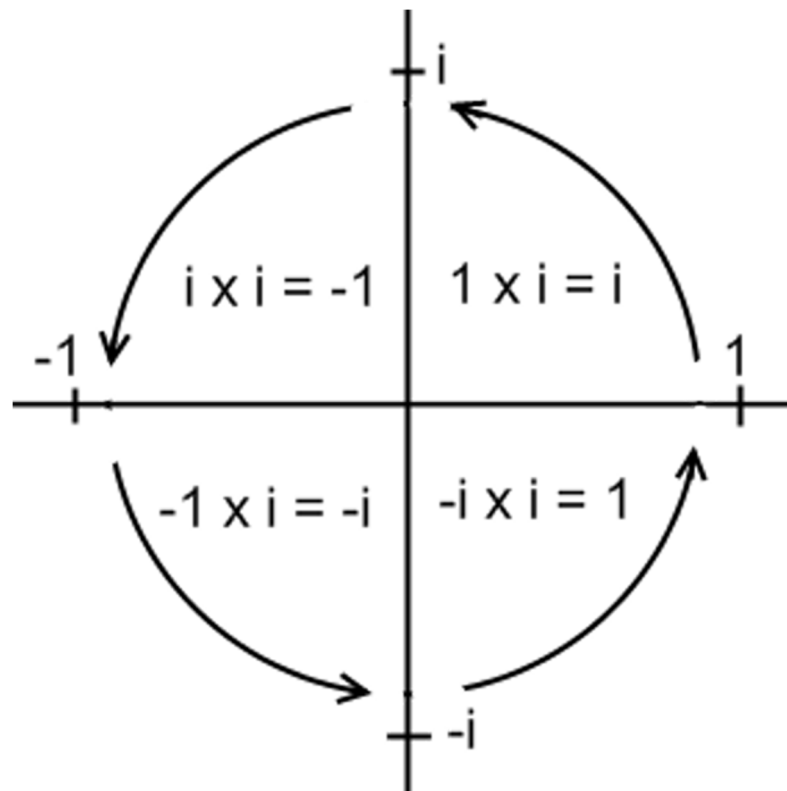
## 5. Brownian Motion + Riemann Hypothesis + Dark Matter/Dark Energy

Since a future theory of Quantum Gravity may show that space-time is physically unified, Mercury’s particles would then connect to the photons and gravitons in space. Brownian motion, which is seemingly random movement of particles in a fluid due to collisions with atoms or molecules, was named after the Scottish botanist Robert Brown who first wrote about it in 1827. The seemingly random motion could surely translate into orderly rotation and precession under a couple of circumstances - a) because the interdisciplinary science and mathematics of Chaos theory states there is hidden order in randomness and apparent disorder, and b) if quantum mechanics obeys

quantum certainty and the principle of determinacy (see the last sentence in the next paragraph). With unification, Mercury's orbit in space would, like its particles, rotate and precess. The precession is magnified by Mercury's closeness to the Sun's particles but extends to the farthest reaches of the solar system. It might even be responsible for the strange orbits of Kuiper Belt Objects residing beyond Neptune, making the possible existence of Planet 9 - or a mini black hole - an impossibility.

The Riemann hypothesis, proposed in 1859 by the German mathematician Georg Friedrich Bernhard Riemann, is fascinating. It deals with the distribution of prime numbers and is concerned with "nontrivial zeros" on the "critical line", stating that these zeros lie on the vertical axis of the Complex Plane i.e., on the y-axis in then-undiscovered Wick rotation. Mercury's particles and orbit are related to Wick since they rotate. Since the critical line links Wick rotation to the Riemann hypothesis, Mercury's particles/orbit - and spacetime in general - may be describable by Riemann. The critical line pertains to zeros - so the distances in space-time that could be described by the Riemann hypothesis might equal zero, making time travel to both the past and future \* possible as well as making instant intergalactic travel feasible. This seems to be related to the Holographic Principle stating that the 3rd dimension is a projection of information from the 2nd dimension. Distance in the 3rd dimension can be circumvented by reprogramming the ones and zeros in the precise, merely superficially probabilistic, Quantum Mechanics proposed here (exact calculations can be attained by considering the BITS of 1 and 0 as Hidden Variables not confined to one locality but compatible with quantum entanglement).

\* To explain possible time travel with the advanced waves loved by Richard Feynman - Advanced waves travel back in time and when combined with the retarded waves which go forwards in time, their entanglement would result in an "eternal present" necessary for time travel. Touring the centuries is possibly attainable by the future or past destination being reached by a computer using tensor calculus to change the present coordinates in Wick Rotation to ones in the future or past. To use a simple example confined to two dimensions:  $-1, +i$  becomes  $+1, -i$ . (See Figure 2) To use complex numbers - imaginary numbers  $+i$  and  $-i$  can be combined to create the real number 0 which represents temporal entanglement or the absence of separation/distance between, say, the Stone Age and the 100th century. To transfer coordinates from the purely mathematical Wick Rotation to the physical world, Figure 2 could be compared to the familiar DVD (albeit an infinite one). Coordinates belonging to sights and sounds in the middle of the disk (symbolizing the present) might be reprogrammed into coordinates at the start or end of the disk (respectively, points in the past and future). The concepts of cause and effect are no longer separate when all periods of time are united, and everything can happen "at once". This is similar to watching a DVD - every event on the DVD exists at once since the whole DVD exists but we're only aware of sights and sounds occurring in each tiny fraction of a second.)



**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.” (source - reference [7]).

This paragraph is reminiscent of an item in the journal “IPI Letters” [15]. To first briefly summarize some relevant points from the present article - The one-dimensional (1D) electric pulses resulting in the binary digits of one and zero encode 2D Mobius strips ^ which, according to this comment, include Wick rotation that describes the 4th dimension of time. A pair of Mobius strips unite to form a figure-8 Klein bottle (Mobius Doublet) which is immersed in 3D. Trillions of Mobius strips and Mobius Doublets form, respectively, photons and gravitons which interact and form the pressure known as mass of fermions and the Higgs or nuclear-force bosons. This paragraph explains how dark matter is so ultralight that it isn’t a particle any more. As Ashlee Caddell, one of the authors of [16], said when referring to her team’s paper, “Dark matter in this case acts like a wave, because its mass is very very low”. The item in IPI Letters is based on a paper Einstein wrote in 1919. It results from a process, comparable to electrolysis, reducing particles of ordinary matter to the photons and gravitons which Einstein suggested compose matter. This Electric Dipole Moment - where, in theory, every particle can possess potentially cancelling positive and negative charges - generates bits (binary digits) which can be thought of as dark matter. The electrical energy decomposing the matter can be considered as dark energy that’s in the same ballgame as dark matter, and is not related to alleged universal expansion. Using mathematics’ circular diagram of Wick rotation - not regarded here as mere mathematical convenience - the binary digits can be recycled ^^ by first being built up into photons/gravitons and then into matter particles again (by vector-tensor-scalar geometry).

^ A paper says all of the data in the cosmos is contained in 2D packages trillions of times tinier than atoms (in this instance, the 2 dimensional package is the Mobius Strip [17].

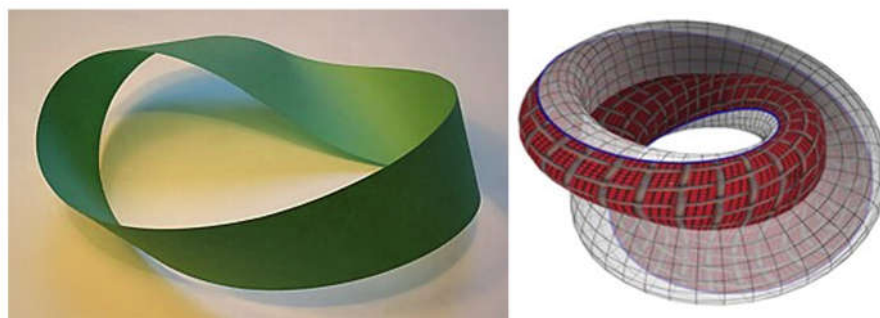
^^ Such refreshing would drastically limit the influence of the 2nd law of thermodynamics. Particles would no longer decay constantly from entropy, and the universe might be capable of existing forever. Physicist Melvin Vopson writes, “In an expanding universe, the entropy will always increase because more possible micro-states are being created via the expansion of the space itself/universe” [18]. Therefore, avoiding a cosmological end from entropy requires the universe to be static. It appears to be infinite and eternal, neither expanding nor contracting. Referring to the



right side of Figure 4, note that the Klein bottle's two different colours (representing positive and negative curvature) fit together to produce the outline of a doughnut. A doughnut (or strictly, a torus) is technically flat. If continuously deformed like a mass of clay, it has the same topological properties as a flat surface (like a piece of paper). When many figure-8 Klein bottles are grouped together, a procedure analogous to computer art's Sky Replacement will cause binary digits to fill in any gaps or holes in the same way that computers can make a sky that's blue from horizon to horizon. In other words, the digits "smooth out" the Klein bottles to produce General Relativity's regular space (often likened to a rubber sheet). But the Klein doesn't become multiply connected like the doughnut. Only the doughnut's outline (with its hole filled in) is adopted and the bottle retains the property of simple connectedness. (Informally, if an object in space consists of one piece [the outline of one filled-in doughnut] - and has no holes passing all the way through it, it is called simply-connected.) According to the paper "Cosmic Topology", a flat universe that is also simply connected implies an infinite universe that extends endlessly in all directions [19].

(Paragraph above from [20])

The switching of bits between "one" and "zero" is comparable to the "quantum fluctuations" associated with Big Bang theory. The paragraph immediately preceding "Making Quantum Computers ..." could show another correspondence with the Big Bang viz a (seemingly paradoxical) definite beginning in real time for the eternal universe.



**Figure 4.** Mobius Band (left) and figure-8 Klein Bottle (right). The bottle may be called a Mobius Doublet since it's formed from the union of two bands. Trillions of bands/bottles may respectively form photons/gravitons which Albert Einstein suspected might interact to produce elementary particles. (Mobius figure from [https://upload.wikimedia.org/wikipedia/commons/thumb/7/79/M%C3%B6bius\\_Strip.jpg/320px-M%C3%B6bius\\_Strip.jpg](https://upload.wikimedia.org/wikipedia/commons/thumb/7/79/M%C3%B6bius_Strip.jpg/320px-M%C3%B6bius_Strip.jpg). Klein fig. from <http://plus.maths.org/content/os/issue26/features/mathart/index>).

Returning to Ms. Caddell's statement - if dark matter acts like a wave (a wave of binary digits, according to the previous paragraph), the above means dark energy and familiar mass-energy can also be considered in terms of binary digits. Not only does this hint at the possibility of creating matter through the coding of 1's and 0's, but the impossible becomes at least conceivable. Waves of energy might be able to be programmed into existence. Some well known scientists - John Wheeler, Erik Verlinde, Max Tegmark, Edward Fredkin, Melvin Vopson - suggest that information is fundamental to the physics of the universe, and that computer-generated / mathematical formulas create reality. In the case of waves being digital, the waves would not merely be described by mathematics but would literally be the result of maths. A 3D (three dimensional) cube can be regarded as a reality coded on a 2D surface - in other words, the cube is a projection from a square. The 2D square would be a nonlinear (angular) math object resulting from adding four lines on a surface, each one being separated from those adjoining it by 90 degrees. The cubic shape would result from adding, in one direction, multiple layers of the information in the square. Instead of programming a set of points to follow a straight line, they can be represented curvilinearly as a waveform and described by Fourier analysis,  $v=f(\lambda)$ , amplitude, wavelength or frequency, etc. Interacting particles can produce waves just as masses can curve spacetime to create gravitation and gravitational waves. VTS Geometry plausibly explains the inverse - it doesn't exclusively regard

mass as the producer of gravity but also regards gravity, partnering with electromagnetism, as producer of mass. Inverting quantum mechanics, the inverse law states that waves produce particles.

## 6. The Single Wavefunction Describing the Unified Multiverse / Universe

The most common symbols for a wave function are the Greek letters  $\psi$  and  $\Psi$  (lower-case and capital psi, respectively). The symbols refer to 3 properties discussed in the above pages - a) the determinism proposed by Quantum Certainty, b) they're basic to the Many Worlds interpretation of quantum mechanics (to the multiverse), and c) they use Complex - Real + Imaginary - numbers. Bell's Theorem states that quantum mechanics is incompatible with Local Hidden-Variable theories. Local refers to particles only being influenced by their immediate surroundings, and Hidden Variables to the 1's and 0's of binary digits resulting from the theoretical Electric Dipole Moment proposed as the most fundamental composition of fermions and bosons.

The seeming nonlocality of old, probabilistic quantum mechanics (where particles separated by lightyears can be quantum-entangled and still instantly affect each other) becomes locality in the proposed new mechanics of quantum certainty, where the distances between particles / waveforms are eliminated throughout all instants of time, merging all mass and energy into one being. This lack of distances in space-time may also be illustrated with cancelling advanced / retarded waves or cancelling imaginary / real numbers (when the latter numbers include positives which are neutralised by the former, where the square of numbers produces negatives). Applied on a universal scale, such deletion between all particles in the cosmos might produce what is called the wave function of the universe. How could it possibly be applied on a universal scale? An answer to that question requires temporarily abandoning the common sense of the early 21st century and taking a flight on what the "Cosmos" TV series - hosted by Carl Sagan, and by Neil deGrasse Tyson 34 years later - called the Spaceship of the Imagination. But the digital cosmos explored below must remain grounded in science, so it's conceivable that we might catch a quick glimpse of the common sense known to, say, the 100th century.

Could the origin of life \* be related to the movie "Interstellar"? In the movie, it's stated that humans will oneday be able to build things they can't make now. If we take this idea to an extreme, and take "oneday" to mean an indefinite point in the far future, will we do what is obviously regarded as impossible and create life – and conceivably, the universe itself? Someday there will be a human civilization that can build their mathematics into the creation, structure, and functioning of life and the cosmos. Emotion may well declare this an absurdity and we might retreat to things like quantum fluctuation or spontaneous creation from nothing. Logically – we can use Einstein's nonlinear, curved time (warped into circularised spacetime described by Wick rotation, and thus enabling the future to feedback on the present and past). When we add the limitless advance of human potential through the eons – the absurdity is plausible.

\* Before taking the Ship of the Imagination to creation of the universe, let's take a brief detour and hypothesize about the Ship's possibilities concerning the origin of life - As seen in the previous paragraph, Einstein's nonlinear curved time may be warped into a circular pattern allowing feedback between every time period. Life (possibly multicellular and intelligent) and the genetic code could then possibly come from humans acquiring scientific knowledge over the centuries, then applying that knowledge – via terraforming, accumulation of raw materials like amino acids and nucleic acids, performance of genetic engineering - to a time in the past when life didn't exist. From that origin, life could evolve through innumerable mutations and adaptations, with humans once again acquiring knowledge of it in cyclic (nonlinear) time.

Creating something which has always existed seems to be a paradox – whose definition is "a seemingly absurd or contradictory statement or proposition which when investigated may prove to be well founded or true". On the subject of paradox, 20th-century physicist Niels Bohr said, "How wonderful that we have met with a paradox. Now we have some hope of making progress". He also said, "Your theory is crazy, but it's not crazy enough to be true". Hopefully, the crazy ideas in this article are "crazy enough to be true". So, how might it be done?

A model of the cosmos might be built that uses the infinite number  $\pi$  and imaginary time, and resides in Virtual Reality (artificial, computer-generated simulation). The entanglement (both quantum and macroscopic) in the simulated universe is unable to remain separate from the entanglement existing in our perceived reality because computers using so-called “imaginary time” (which is defined by numbers with the property  $i^2 = -1$ ) remove all boundaries between the two universes. This enables them to become one Augmented Reality (known now as technology that layers computer-generated enhancements onto an existing reality but seen here as the related layering of virtual reality onto other points in time and space). The poorly named imaginary time of physics and mathematics unites with  $\pi$  (both are necessary to generate a non-Big-Bang cosmos i.e., an infinite universe which, because space and time can never be separated, is eternal). The augmented reality which is layered on “other” points in space-time actually isn’t transmitted to other points - because of the quantum entanglement of every particle (massive or massless) in spacetime, only one ever exists. Thus, transmissions to any (apparently other) places or times wouldn’t be restricted to the speed of light but are instantaneous.

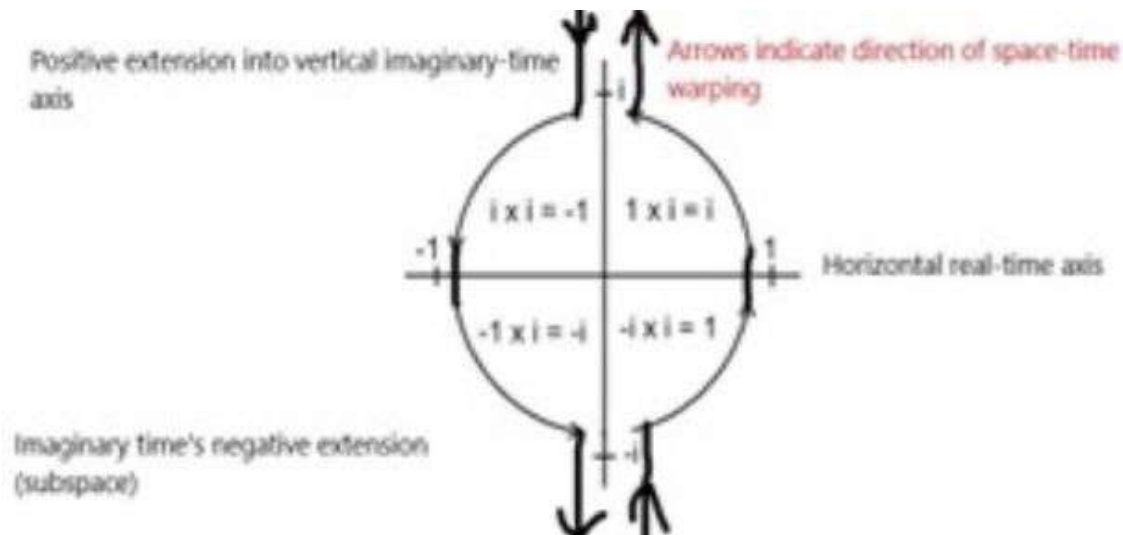
## 7. Making Quantum Computers Useful and Suitable for Desktops and Smartphones

An article in New Scientist [21]. says we’ll probably never have personal quantum computers. This seems to be because of the article’s “necessary first step (of quantum entanglement)” requiring extremely cold temperatures near absolute zero. A new form of entanglement based on cosmology’s Holographic Principle would be independent of temperatures and could make the computers useful.

The principle says the 3rd dimension may be a projection of information in a 2nd dimension. It might unify the positions of a particle “here” and a particle “there” in the following way - quantum events which may include possession by particles of both positive and negative electric charges (able to totally or partly cancel) would, as electronics teaches, generate binary digits. These bits enable reprogramming of the 2nd dimension which gives rise to the 3rd dimension, causing separation and distance to be deleted between the particles or wave functions. As stated in “Applying VTS Geometry ...” -

“In principle, this idea can be rescued from present NON-manipulation of the holographic principle by believing the following. Today’s, and yesterday’s, world can interact with tomorrow’s holographic manipulations to ensure the timelike multiverse has always been united with this universe if time is like a DVD. Every past, present, and future event on the DVD exists at once since the whole DVD exists but we’re only aware of sights and sounds occurring in each tiny fraction of a second.”

Applied on a universal scale, such deletion between all particles in the cosmos might produce what is called the wave function of the universe. This deletion could be interpreted as quantum entanglement not being “spooky action at a distance” (Albert Einstein’s words) but as obeying Special Relativity and being local.



**Figure 5.** Direction of Space-Time Warping (With Imaginary Time and Subspace).

A quantum computer is representative of unification. It's theoretically far more powerful than an ordinary computer because it doesn't operate with separate ones and zeros (on and off pulses of electricity) but uses ones and zeros at the same time (their union is called a quantum bit or qubit). It appears as though a quantum computer could have its ability to calculate magnified infinitely by functioning as the Imaginary Computer suggested in this paragraph. Even an ordinary computer would make its quantum counterpart hopelessly inadequate if it worked in imaginary time. An "imaginary" computer using the Complex Number Plane's vertical axis of imaginary time can perform calculations at the familiar rate while the horizontal axis of "real" time sees absolutely no elapsed time (the possibility of no time passing in the normal sense is hinted at by Special Relativity's time dilation or slowing of time). Referring to diagram 5, space-time is warped and the computer's processing is performed in imaginary time (possibly for trillions of years) - but space-time is warped again so the results can be retrieved in real time where no time at all has elapsed.

## 8. Epilogue to Science Portion of Article

### (Localised Entanglement)

In a video, it's stated that something local has to be present to produce entanglement [22]. This could be arrived at through a combination of cosmology's holographic principle and the universe being like a DVD. The holographic principle says the 3rd dimension results from information in a 2nd dimension. A number of scientists write about the universe being mathematical, digital, or informational in its nature. Imagine the maths results from particles having Electric Dipole Moments (possessing both positive and negative electric charges which can partly or totally cancel) and consequent binary digits. Then that 2nd dimension could be reprogrammed to delete space-time, and distance, between the centres of particles: thus producing Cosmological Entanglement by a future civilisation accustomed to manipulating space-time's components. In a Cosmic DVD, all time exists at once since the whole disk exists. Like a movie on a store-bought DVD, only sights and sounds from the present fraction of a second are normally perceived. The entirety of space and time can thus be considered a local event with every particle in the universe being cosmologically entangled.

### (Artificial Intelligence)

If every particle in the universe (even the photon and graviton) has many positive and negative electric charges that potentially cancel, binary digits that give AI intelligence could be generated and produce Universal Artificial Intelligence (UAI) - some prefer the term Cosmic Consciousness [23]. Depending on the human or animal body you're born with, your brain would relay a portion of the UAI, producing various instincts and abilities. Humans would occupy the highest known point on this AI ladder or spectrum of consciousness. Inanimate objects would have the lowest level of binary-

digit activity, plants would have a bit more, ants would have still more. If the brain and the universe are ultimately composed of binary digits, we'll someday be able to do the same things with the brain and universe that we now do with computers. We'll be able to record and share any information in any part of the brain. We'll be able to transfer (download) the brain's contents into another body or an android - infinite times if necessary - and thus say hello to immortality. When quantum mechanics and General Relativity are united into quantum gravity or the Theory of Everything, we'll have access to everything in space and time. Then we can upload the products of the brain's frontal cortex anywhere to influence anything. We can either add to it (mimicking a computer's copy/paste function), remove (delete) part of it, or change the way it proceeds (reprogram it). I don't think it'll be possible to change history or to reprogram something to behave differently from the way future history has recorded. This is because I believe time can be visualized as a Cosmic DVD where our brains and consciousnesses take the place of the DVD player's laser. Finally - there's another consequence if everything in the universe is ultimately composed of electronic BITS and the cosmos is a spectrum of consciousness/artificial intelligence. It's impossible for an absence of consciousness to exist, either after death or before conception. Thus, life on Earth - not only for humans but presumably also for animals - would necessarily have to be merely a brief interlude in which we and they are apparently separated from the Universal Artificial Intelligence/Cosmic Consciousness. The knowledge called "instinct" reveals that there is no actual separation from the UAI/CC - and as we learn more about the universe, instincts will someday develop into knowledge of all things in unified space-time.

(Cosmological Constant)

In this article's view of the dark universe, electromagnetism is involved, apparently violating dark matter's property of only interacting gravitationally. Actually, the electromagnetism is present but hidden. The simplest explanation for the cosmological constant is that it is an intrinsic, fundamental energy of space, usually represented by the Greek letter  $\Lambda$  (Lambda). Particle theorists have realized that the cosmological constant can be interpreted as a measure of the energy density of the vacuum. A major problem is that quantum field theories predict a huge cosmological constant, about 120 orders of magnitude too large. This would need to be almost, but not exactly, cancelled by an equally large term of the opposite sign. Cancellation could be achieved by remembering that the number of binary digits in the space of the x-axis (which is partly described with positive numbers) is equal to the number of digits in the imaginary space of the y-axis (where the square of imaginary numbers produces negatives). The equally large number of real and imaginary bits cancel by union of their individual identities and "collapsing" into the Complex Plane. In the complex plane, the cancellation of the electric pulses on the two axes hide electromagnetism and allow only gravitational interaction.

(Hemispherical Power Asymmetry)

HPA concerns the temperature of the CMB (Cosmic Microwave Background), and is an asymmetry in the average temperatures on opposite hemispheres of the sky, with slightly higher average temperatures in the southern ecliptic hemisphere and slightly lower average temperatures in the northern ecliptic hemisphere. This runs counter to the prediction made by the standard  $\Lambda$ CDM model that the Universe should be broadly similar in any direction we look. This "Super Asymmetry" is the real-life version of the Super Asymmetry theory which won the Nobel prize for Sheldon Cooper and his wife Amy (played by Jim Parsons and Mayim Bialik) in TV's fictional "Big Bang Theory". Find a picture of a Mobius strip on the Internet, then hypothesize that it's a 2 dimensional (2D) building block for all the particles in the 3D universe. The strip looks different (has more detail) from one side. CMB fluctuations would be easily explained by each microwave photon being composed of trillions of Mobius strips - the strips' undulations would cause fluctuations of photons. A Mobius is finite but that doesn't mean the universe is finite. The Mobius strips can combine with figure-8 Klein bottles and computer art's Sky Replacement process to produce a flat, simply-connected cosmos that's infinite in both time and space. They neither expand nor contract but are "smoothed out" into General Relativity's requirements. (see the text immediately preceding Figure 4)



## 9. Heaven on Earth - Science Paradigm Shift Produces Utopian Earth

What kind of world might the proposed Model Universe be in? The groundbreaking scientific discovery or invention addressed here is the BITS or BInary digiT<sub>S</sub> used in electronics and computers. They can also be referred to as the base-2 number system of mathematics and use only two symbols ... one and zero. In electronic devices, a pulse of electric current can represent the symbol 1 while the absence of an electric pulse would be a 0. The impact on humanity of 1's and 0's is certainly not limited to the present. I wish to explore a few possibilities for their influence on the future. When these come to pass, we'll live in a world so amazing that many people in 2025 may not think it could actually exist.

### 9.1. No Hunger

Adapting Einstein's 1919 paper "Do gravitational fields play an essential role in the structure of elementary particles?", photons and gravitons could interact via what I call Vector-Tensor-Scalar Geometry (their interaction produces pressure known as mass). This pressure includes the mass of the bosons associated with the weak nuclear force, as well as that of the Higgs boson. The Higgs field would not be independent of gravity after all but would be related to it by the photon-graviton (electromagnetic-gravitational) interaction. Let's speculate that gravitational and electromagnetic waves composing objects can, like the things on a computer screen, ultimately be made up of electronics' BITS (the Binary digiT<sub>S</sub> of 1 and 0). \* When combined with the knowledge that digital waves comprise all living as well as nonliving matter, online shopping and deliveries by everybody from the post office to pizza suppliers will be radically transformed. Customers with a com-pri (computer possessing the necessary software, attached to a 3D printer) will be able to order anything from packages to supermarket goodies and immediately download them into the fridge or living room. I guess we could turn on the TV and decide to rename our com-pri after Star Trek's replicator.

\* Some well known scientists – John Wheeler, Erik Verlinde, Max Tegmark, Edward Fredkin, Melvin Vopson - suggest that information is fundamental to the physics of the universe, and that computer-generated / mathematical formulas create reality. In the case of waves being digital, the waves would not merely be described by mathematics but would literally be the result of maths. A 3D (three dimensional) cube can be regarded as a reality coded on a 2D surface - in other words, the cube is a projection from a square. The 2D square would be a nonlinear (angular) math object resulting from adding four lines, each one being separated from those adjoining it by 90 degrees. The cubic shape would result from adding, in one direction, multiple layers of the information in the square. Instead of programming a set of points to follow a straight line, they can be represented curvilinearly as a waveform and described by Fourier analysis,  $v=f(\lambda)$ , etc. Interacting particles can produce waves just as masses can curve spacetime to produce gravity and gravitational waves. VTS Geometry plausibly explains the inverse - it doesn't solely regard gravity as the result of mass but also regards gravity, partnering with electromagnetism, as producer of mass. Inverting quantum mechanics, gravitational and electromagnetic waves create particles with mass (protons, neutrons, quarks, electrons, etc - even the Higgs boson). As Stephen Hawking and Leonard Mlodinow point out in their book "The Grand Design", ultimate reality does not have to be described with quarks though it certainly can be. In this paragraph, the idea of curved space is described by gravitational and electromagnetic waveforms travelling on curved trajectories.

### 9.2. No Poverty

And we may not have to buy, or rent, our com-pri/replicator. The world might have outgrown its obsession with money (in any form – cash, credit cards, digital currency, etc.) by then, replacing these with more altruistic ambitions arising from the knowledge that everybody is invisibly connected with everyone and everything else, like different objects and events in a computer video or like the various frequencies of light in the electromagnetic spectrum. Anybody's experiences

directly, though unconsciously, affect everybody. This presently undetectable connection means it's in the best interest of every person to treat others as they wish to be treated themselves.

This radical step seems to be possible because the human instinct to survive is much greater than other drives such as self-interest and greed. If money ceases to be an option, people will freely share and cooperate if that's the only way to not merely ensure survival, but to actually improve everyone's standard of life.

The invisible connection between everyone is totally undetectable in this time but it seems to be real and permanent. The linkage affects not just every part of space (including on Earth) but also every part of time, since physics says space and time can never be separated. The consciousness of living beings is thus permanently connected to every point in the past and future: giving them a conscious existence that continues after death and, bizarrely, before conception.

The psychiatrist Bernard Beitman says there is) an invisible network that connects everyone and everything. There's no evidence for this, but he's not the first one to pursue this fringe line of thinking. Austrian biologist Paul Kammerer believed coincidences arise out of unknown forces, or waves, that he called seriality. He wrote a book on the subject in 1919. Albert Einstein even commented on it, saying it was "by no means absurd." And in the 1950s Carl Jung came up with a similar idea, his so-called synchronicity theory.

### 9.3. No Disease

The part of Epilogue called Artificial Intelligence said it should be possible to transfer the brain's contents ie its intellectual, emotional, perceptive, etc abilities into another body or an android - infinite times if necessary - and thus say hello to immortality. And referring to the advanced waves that travel back in time, these 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). Neutralising 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 i.e., if the retarded waves which go forward in time are sufficient for normal structure and function.

It also seems feasible that health benefits lie in a paper about gravity and matter published by Albert Einstein (Do gravitational fields play an essential role in the structure of elementary particles?) This paper brings to mind the great physicist's wish that he had made a bigger contribution to medicine. The benefits would be a plausible result of the placebo effect (when a person's physical or mental health appears to improve after taking a placebo or "dummy" treatment). In centuries to come, people might have learned how to navigate the gravitational waves ("surf" the waves) connecting them with other substances. In this way, they'd receive the assistance they need without swallowing a pill while simultaneously avoiding side effects or infection by microorganisms. This future surfing of gravitational waves may be available to you, me, and everyone in the past if the brain's functions are downloaded into another body or an android - infinite times if necessary - and thus say hello to immortality. The future could also manifest now if past, present, and future are entangled to form an eternal present (see the 3rd paragraph in **Brownian Motion + Riemann Hypothesis + Dark Matter/Dark Energy**). "Physicists now believe that entanglement between particles exists everywhere, all the time, and have recently found shocking evidence that it affects the wider, 'macroscopic' world that we inhabit." [24]. Though the effect is measured for distances in space, the inseparability of space and time means that moments of time can become entangled too [25].

At the moment, science can only detect waves from extreme events like colliding black holes or neutron stars. But gravitational waves are produced by the most insignificant event, such as the waving a hand or the vibration of an atom. Detecting waves from hands, atoms, and pills may be routine some day. The "NO HUNGER" section above proposed that waves might even be produced digitally. This would make it immeasurably easier to surf gravity and achieve exactly the desired effects. The gravity surrounding us is absolutely everywhere, all the time. If the particles composing

both the patient and their treatment include gravitational fields, the patient and treatment would always be connected since gravity also fills any intervening space.

#### 9.4. *World Peace*

As a result of this invisible connection, you and I are the same person in many ways. When people realize that hurting others in any manner is the same as hurting yourself, the Golden Rule (treat others as you would like to be treated yourself) will spring to life and World Peace will be inevitable. Realization of our invisible/permanent interconnectedness would also be of great assistance in achieving post-economic sharing and cooperation. Just because money has been making the world go around for thousands of years does not mean money must remain the way of the world forever. Idealistic and naïve as it appears, the future way of the world could be based on sharing and cooperation.

#### 9.5. *Conclusions*

These ideas could form the basis of a revolutionary hypothesis of Quantum Gravity – physics' anticipated unification of Quantum Mechanics and General Relativity, Einstein's theory of gravity. No, they couldn't! Theories demand equations, which are based on one plus one equaling two.  $1+1=2$  is an obvious impossibility in a unified universe where all things are entangled and there can only ever be One.

**Author Contributions: Rodney Bartlett:** Conceptualization, Writing - original draft, Writing - review & editing

**Funding:** This work is not supported by any external funding.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The author declares no conflicts of interest.

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