

Title - Explaining The Mysterious Connection Between Physics and Mathematics By Reconciling the Unified Field and Anthropic Principle

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Abstract –

This is a copy of my entry in the latest essay contest conducted by the Foundational Questions Institute (FQXi). That contest restricts me to 25,000 characters, so I've added Notes to the end of the essay (FQXi allows the addition of notes but limits their length to much less than what I want to say). Other excellent essays in FQXi's current contest will inform readers about the role of Fibonacci numbers and the Golden Ratio in nature [14], as well as referring to the book "Our Mathematical Universe" [9] and the use of pi in a science-fiction book by astronomer Carl Sagan to show that "the universe was made on purpose" [15]. Rather than merely repeat the other essays' wisdom, I'll take a different approach. I hope my approach will be novel and original, but only time will reveal where it may lead. I want to show that you can combine the topology (rubber-sheet geometry), binary digits and $E=mc^2$ of maths with the matter, energy and forces of physics to

- 1) explain dark energy and dark matter,
 - 2) open up the whole universe and all time to human exploration and creation,
 - 3) show that there's an infinite, eternal cosmos (not a multiverse) beyond our observable universe,
 - 4) unify gravitation with electromagnetism, the other fundamental forces, and the physical universe;
- and 5) reconcile the anthropic principle with the unified theories of physics (via a strong version of that principle - that a direct link exists between human existence and the actual form of the laws of nature).

Is this an incredibly ambitious challenge for one person? Yes, and maybe you think an essay competition is not the right place for this. You might be right - but I feel ready to take on the challenge. And people tell me there's no time like the present. An important weapon in my arsenal is R136a1 -

R136a1 is a monstrous-sized star 165,000 light years away in the Large Magellanic Cloud, one of our Milky Way's satellite galaxies. It currently has 265 times the mass of the Sun and may have been 320 solar masses when it first formed. It's the most massive and most luminous star ever found, being 10 million times brighter than the Sun. "Owing to the rarity of these monsters, I think it is unlikely that this new record will be broken any time soon," said (English

astrophysicist Paul) Crowther [3] [4]. It's important to my essay because adopting a view in which everything in all space and all time (such as gravitation, electromagnetism and matter) is part of a unification says a star in the Large Magellanic Cloud and the imaginings in the human brains on Earth must indeed be connected. Instead of fantasy, the anthropic principle arises and is reconciled with the unified theories of physics.

Albert Einstein showed that space-time is curved and warped, so it's possible that our own computer science (and terraforming, and biotechnology from many centuries in the future) found its way into the remote past. In [13], Dr Graham Phillips said, "(The physicist and writer) Paul Davies thinks the universe is indeed fine-tuned for minds like ours. And who fine-tuned it? Not God, but minds from the future, perhaps even our distant descendants, that have reached back through time ... and selected the very laws of physics that allow for the existence of minds in the first place. Sounds bizarre, but quantum physics actually allows that kind of thing."

Content -

If space-time (whose warping is gravity) forms mass, there could be "currents" of space-time flowing in the "oceans" between the galaxies. Space-time would form the matter in the galaxies, and it would form the Earth/objects on this planet. How? By some of the currents of space-time or gravity which pass the solar system's outer boundary being diverted towards the massive Sun's centre (just as some of the waves passing an island are refracted toward the shore by the island's mass). Along their course, the refracted gravitational waves are concentrated 10^{24} times in the intense warping we call matter - the more mass a body possesses, the more gravitation is diverted to play a part in that body's formation. Could sunward-heading gravitational waves from outside the solar system possibly explain why the Pioneer spacecraft are a few thousand miles closer to Earth than predicted?

c^2 and the Atom

When Einstein penned $E=mc^2$, he used c (c^2) to convert between energy units and mass units. The conversion number is 90,000,000,000 (light's velocity of 300,000 km/s x 300,000 km/s) which approx. equals 10^{11} . Gravity (and gravitation) can produce electromagnetic force, though there are other methods. An example of another method: X-rays can be emitted by matter swirling around a black hole when the atoms jostle and compress, and are heated to millions of degrees. Gravity waves with a strength of 10^1 are, via gravitational lensing, concentrated 10^{24} times after they're focused to form matter (to 10^{25} , weak nuclear force's strength* - giving the illusion that a weak nuclear force that is not the product of gravitation exists). (If binary digits form space-time and gravitation, and all particles are composed of those digits, the sequence of 1's and 0's composing gravitons can become the sequence making up the W^+ , W^- and Z^0

particles of the weak force; the gluons of the nuclear strong force; or of electromagnetism's photons.) Waves are magnified by the matter's density to achieve electromagnetism's strength (10^{36} times gravity's strength) i.e. 10^{25} is multiplied by Einstein's conversion factor [10^{11}] and gives 10^{36} (this gives the illusion of the existence of electric and magnetic fields that are not a product of gravitation – last century, Einstein stated that gravitation and electromagnetism are related). After absorption by atoms, the depleted remnant of the gravity waves is re-radiated from stars, interstellar gas and dust, etc. as electromagnetic waves - possibly gamma rays, or a microwave background - and as gravitational waves which have lost most of their energy or strength during formation of forces (returning to a strength of " 10^1 ".)

* Remember, this is only one example: the so-called weak force's "strength isn't constant" and varies with distances [1].

Gravitational Radiation

The Sun (and other bodies) can also radiate gravitational waves, according to the second paragraph. For a moment, revert to the accepted notions of gravitation being purely attractive, and of the upper size limit of stars being 150 solar masses (due to its stellar wind blowing away gas it could use to fuel its fusion). Then one of these supergiants might be represented on paper by a circle with a line radiating from its centre and bearing the number 150. Now recall that mass is the result of gravitation and continue with that analogy. The monster star R136a1, possibly being 320 solar masses at its birth, would not only have 150 gravitational-wave units (G units) radiating from it but would possess $320+150$ G units travelling from outside the solar system to leave it with a mass of 320 after 150 are emitted.

If the Unified Field Theory or Theory of Everything is assumed to have a final form that isn't purely mathematical, light and matter would be united with the stretching of space-time i.e. with gravity, which General Relativity says is the warping of space-time. If light and matter are produced by gravity, the three would be unified –

Digital String Theory and Dark Energy

String theory says everything's composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents. We can visualize tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) forming currents in a two-dimensional program called a Mobius loop – or in 2 Mobius loops, clockwise currents in one loop combining with counterclockwise currents in the other to form a standing current. Combination of the 2 loops' currents requires connection of the two as a four-dimensional Klein bottle. This connection can be made with the infinitely-long irrational and transcendental numbers. The gravitons of gravitational waves and photons of electromagnetic waves could be

ultimately composed of the binary digits of 1 and 0 encoding π , e , $\sqrt{2}$ etc {because, according to [9], the cosmos is fundamentally mathematical). Matter particles (and even bosons like the Higgs, W and Z particles) could receive their mass by gravitons/photons interacting in “wave packets” (explaining wave-particle duality). If binary digits form space-time and gravitation, and all particles are ultimately composed of those digits, the sequence of 1’s and 0’s composing gravitons can, via quantum-size gravitational lensing within atoms, become the sequence making up the W^+ , W^- and Z^0 particles of the weak force; the gluons of the nuclear strong force; or of electromagnetism’s photons. After forming the atomic forces and particles, the gravity waves that entered the atom are depleted of energy and re-radiated as a low energy microwave background and gravity waves reduced to the strength of the entering waves. Creation of light energy* by binary digits would also make 1's and 0's candidates for explanation of dark energy.

* It might initially seem more logical to say “Creation of (repelling gravitational) energy by binary digits would also make 1's and 0's candidates for explanation of dark energy.” But if you read this article plus [5], you’ll see that gravity is shown to be a repelling force (explanations of its apparent attraction are given in the latter) and electromagnetism is unified with gravitation – so referring to light energy and dark energy is indeed accurate.

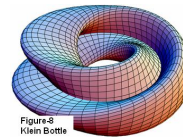
Waves from deep space can produce graviton-photon interaction, forming collapsing clouds of dust and gas from which stars form. If there’s no interaction, no matter is created and there is no cloud of gas and dust. A black hole – formed of gravitational waves and their precursors, binary digits - could be the result (supernovas can produce black holes, too).

Black Holes and More Dark Energy

Black holes may be thought of as meeting-places and “sinks” for the gravitational currents flowing in and between galaxies. Though they aren’t composed of matter, they do have mass because they are “gravity sinks” and gravity is capable of producing matter and mass. The holes possess charge because the universe’s mathematical foundation unites gravity/spacetime with electricity/magnetism. Since it has mass, a black hole can naturally possess the 3rd property of holes viz. spin. Far from the hole becoming infinitely dense, infinitely curved and infinitely massive; there is no singularity but the matter is “shred” (converted relativistically) into binary digits by the black hole’s fantastic pressure.

If a star only received the input of gravitational waves from deep space entering it, there would be no limit to its potential growth. Since it also radiates mass-forming gravitational waves, there is a limit to the growth – and this will be investigated, starting in the next paragraph. 99% of the solar system’s mass / gravity / gravitational waves are associated with our star, so the gravitational

push on Earth from its sphere may be slightly greater than the push resulting from the waves originating in deep space. In the end, our planet's orbit would be growing slowly larger. According to [2]; the distance between Sun and Earth is growing by approx. 15 centimetres per century. The two authors attribute this increase of the Astronomical Unit (AU) to dark energy which is, as noted above, a term describing the repelling force of gravity.



The Möbius Loop, the figure-8 Klein Bottle (2 Möbius loops are joined on their sides to form Bottle) and New Math

Suppose the effect on Earth is the result of 1 G unit from the Sun (see final paragraph). The Sun's mass is about 332,946 times the mass of the Earth, so our star has 332,946 G units. R136a1's mass at its birth may have been 320 x 332,946 (approx. 106 million) G units. If this monster star replaced the Sun, Earth would – at its current distance and angular size when viewed from the star's centre – receive 320 gravitational and electromagnetic (G+EM) units.* For life to flourish, we'd need to be at least 2,500 times further away. The inverse-square law says we'd then receive $1/(2500 \times 2500)$ i.e. $1/6,250,000$ as much gravitational energy. Earth's new distance from the monster star would get $106,000,000/6,250,000 = 16.96$ (~17) G units.

* See p.1 – electric and magnetic fields are a product of gravitation (in a non-unified universe, 320 G or gravitational units plus 320 EM or electromagnetic units equal 640 units of total radiation – but in a unified field where G, EM and matter are united; the 320 G units can contain the 320 EM units i.e. $320+320$ can equal 320 (related to final paragraph). See the section at essay's end called THE MATRIX, THE FIGURE-8 KLEIN BOTTLE, AND DARK MATTER where the

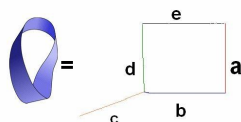


diagram is used to show that “ $90+90$ (the degrees between b & c added to the degrees between c & d) can equal 180, making a & d parallel. But $90+90$ can also equal 90, making a & d perpendicular.”

In science's present non-unified outlook on the universe, all things are as separate as they appear. Though unity is strongly hinted at by things such as mathematics' links to nature and the established unification of electricity and magnetism, scientists do not presently treat all of space and time as a single Unified Field in their daily work. When they do, even the inverse square will be unable to be a strictly one-way process within the cosmos, with quantities either increasing or decreasing according to distance. There will be many “impossible” situations - like distance in space and time proving to be so flexible as to be an

illusion (Special Relativity started this revolution long ago); and the “inverse of the inverse” will have real applications –

At Earth's previous distance of 1 AU, the gravitational radiation it receives would be the inverse of 17 G units, or $1/17$ G unit*. Electromagnetic energy (visible light is one example) also follows the inverse-square law – so Earth receives $1/17$ EM unit at 1 AU. Total radiation (gravitational plus electromagnetic) is $1/17 \times 1/17$, or $1/289$. If this monster star replaced the Sun, Earth would – at its current distance and angular size when viewed from the star's centre – receive 320 G+EM units (see final paragraph) The total radiation received is $1/289 \times 320/1$, or ~ 1.12 (an approximate return to 1 unit). Some figures in this article aren't exact e.g. the mass of the Sun in relation to Earth, and the birth-mass of R136a1. So the approximate answer given is appropriate (1.00 and 1.12 are, I believe, adequately close).

* Non-unification correctly states (within its limits) that the planet receives $6\frac{1}{4}$ million times as much radiation when it's moved from 2,500 AU to 1 AU. But a unified view in which distance is deleted says $1/17$ unit is correct (see The Optical Force and $E=mc^2$ at the end of essay, and its statement about the inverse square meaning “infinity equals the total elimination of distance, both in space and time”). This reminds us of Special Relativity where two answers are both correct e.g regarding the question of length contraction. Einstein wrote in 1911, “It doesn't "really" exist, in so far as it doesn't exist for a co-moving observer; though it "really" exists, i.e. in such a way that it could be demonstrated in principle by physical means by a non-comoving observer.” [7] In Einstein's theory, it depends on whether observers are co-moving or non-comoving. In this article, it depends on observers either co-moving with Unification or non-comoving with it and viewing reality from the viewpoint of Separatism. The text was speaking of a distance of 2500 AU and a measurement of 17 units. Traditionally, moving 1.7 times farther away (to 4,250 AU) would, via the inverse square, reduce incoming radiation 2.9 times (to ~ 5.9 or $\sim 1/17$). But when distance is 100% eliminated, $1/17$ unit is not connected to 4,250 AU in a Unification outlook but can, in the example using Earth's present distance from the Sun (meaning all distance outside 1 AU is deleted) exist at 1 AU.

^ In the paragraph above, it's shown that the Unification and Separatism approaches to cosmology are both correct. A few paragraphs ago, Unification was adopted when it was stated “320 G units can contain the 320 EM units i.e. $320+320$ can equal 320.” While two paragraphs ago, Separatism was used to say, “Total radiation (gravitational plus electromagnetic) is $1/17 \times 1/17$, or $1/289$.” According to Special Relativity, two different answers can both be correct, and aren't mutually exclusive. As Stephen Hawking writes in [6] when referring to real and imaginary time, “It is simply a matter of which is the more useful description.”

Do you know what all this means when it's condensed into a few sentences? It means mathematics is united with the physical world, and miracles can occur.

Computer programs are written with the binary digits of 0 and 1 - and these digits compose a form of maths. So anything you see on a computer screen can happen in real life. You have the potential to do anything you can imagine, as long as the laws of physics don't forbid it (we may not completely understand what those laws actually forbid for at least another thousand years).

Page 5 began with something completely arbitrary. The sentence "Suppose the effect on Earth is the result of 1 G unit from the Sun" in no way reveals a precise measurement. It's no more than one of the many things a person can imagine. Yet with the appropriate mathematical steps and scientific comprehension, it led to an astronomically observable object (a star with a mass approximately 300 times the Sun's). Clinging to physics' present view leads to the conclusion that absolutely no connection exists and that the article is fantasy. Adopting a view in which everything in all space and all time (such as gravitation, electromagnetism and matter) is part of a unification says a star in the Large Magellanic Cloud and the imaginings in the human brains on Earth must indeed be connected. Instead of fantasy, the anthropic principle arises and is reconciled with the unified theories of physics.

Page 5 ends by speaking of impossible situations – distance being eliminated, the inverse of the inverse, and 320 units equalling 17 units and becoming 1/17 unit. The reader might simply say these things are all impossibilities, and dismiss them. And she or he would be perfectly correct, according to early 21st-century thinking. However, Special Relativity suggests it's also perfectly correct that these three things (and infinitely more) do happen, condensing the multiverse's infinite possibilities into one universe. Deletion of distance, for example, can be demonstrated as an extrapolation of a 2009 electrical-engineering experiment at America's Yale University in which Hong Tang and his team demonstrated that, on silicon-chip and transistor scales, light can attract and repel itself like electric charges or magnets [8].

The Infinite, Eternal Universe Beyond the Observable Universe

A universe based on the infinite number pi – see page 3 – would be infinite and, because space and time are united into space-time, eternal. If the universe is infinite and eternal, there can only be one cosmos and not the many universes of a multiverse. "The evidence keeps flooding in. It now truly appears that the universe is infinite" and "Many separate areas of investigation – like baryon acoustic oscillations (sound waves propagating through the denser early universe), the way type 1a supernovae compare with redshift, the Hubble constant, studies of cosmic large-scale structure, and the flat topology of space – all point the same way." [10] Support for the article – a) after examining recent measurements by the Wilkinson Microwave Anisotropy Probe, NASA declared "We now know that the universe is flat with only a 0.4% margin of error." [11] and b) the shape of the Universe found to best fit observational data is the infinite flat model [12]

The Optical Force and $E=mc^2$

A 2009 electrical-engineering experiment at America's Yale University, together with the ideas of Albert Einstein, tells us how we could travel to other stars and galaxies in literally no time. Electrical engineer Hong Tang and his team at Yale demonstrated that, on silicon-chip and transistor scales, light can attract and repel itself like electric charges or magnets [8]. This is the "optical force". For 30 years until his death in 1955, Einstein worked on his Unified Field Theory with the aim of uniting electromagnetism (light is one form of this) and gravitation. Achievement of this – see Digital String Theory and Dark Energy plus c^2 and the Atom for a proposed method - means the microscopic components (gravitons) of warps of space (gravity, according to General Relativity) between spaceships and stars could mimic the Optical Effect and be attracted together, thereby totally eliminating distance (this is similar to traversing a wormhole, or shortcut, between two folds in space-time). Distance is not only deleted in space. There would no longer be any "distance" in time. Just as we can journey to particular stars, we could take trips to particular years in the past (using hyperspace) or future (using space-time).

So we can produce the effect of faster-than-light travel for both matter and information, without engaging in actual faster-than-light travel (that is impossible). Referring to $E=mc^2$, we can change the relationship between m and c^2 from multiplication to equality i.e. in popular teaching, m is multiplied by c^2 but $m = c^2$ in this circumstance - representing the masslessness of photons by 0 (zero) and replacing the m (mass in Einstein's famous equation relating energy, mass and the speed of light) with the masslessness results in $E=0 \cdot c^2$ i.e. $E=0$. Having reduced the equation to $E, m=0$ 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 refers to there being no interaction of light energy and gravitational energy, and therefore no mass (see Digital String Theory And Dark Energy). If mass cannot be produced, there must be no space-time/gravity and space=0, time=0 and gravity=0.* The zeroness of space-time/gravity does not mean it doesn't exist. It means we can appear to re-locate matter and information superluminally, or travel into the past and future, because distance is eliminated in both space and time by attracting together the folds in space-time that are called gravity.

* The zeroness of time might mean this - the basic standard of time in the universe is comparable to the 1960's adoption on Earth of the measurement of time as the vibration rate of cesium atoms. Continuing from the earlier conclusion that humans must have used time travel to the past as well as our computer science to create this subuniverse 13.8 billion years ago, we could borrow the conclusions of Special Relativity and set the standard for time measurement as the measuring of the motions of photons i.e. of the speed of light. At lightspeed, time = 0 (it is stopped). Below 300,000 km/sec, acceleration or gravitation causes time dilation (slowing of time as the speed of light is approached).

From Einstein's formula, $c^2=E/m$ and (using $m=c^2$) $c^2=E/c^2$ which means $E=c^4$. c^2 and the Atom states that graviton/photon interaction produces mass (both particles are equally vital), so E (mass-energy of photon) = c^2 (light's photon) multiplied by c^2 (gravity's graviton) ($c^2*c^2=c^4$). The speed of light is c and c^2 refers to observers and light co-moving. Einstein repetitively stressed that his mass-energy equation is strictly limited to observers co-moving with the object under study (I think he was referring to the time in the 1890s when he was imagining what it would be like to move along beside a beam of light). So the other c^2 refers to observers and gravity co-moving. The speed of gravitational waves is c and the speed of light is equal to the speed of gravity.* Of course, this ignores quantum entanglement – this implies that if the sun suddenly stopped shining or having a gravitational influence, those effects would be detectable instantly (as Isaac Newton believed).

* If the speeds of light and gravitational waves are equal (as scientists believe), light travels at the same speed as the stretching of space. A galaxy that sent light to Earth 13.3 billion years ago would be separated from us by 13.3 billion light years of space. Since space is never empty, there must now be several times as much matter (gas, dust, stars, etc.) between us and the galaxy. This matter absorbs and re-emits the light, increasing the redshift to that of a galaxy appearing to be 33 billion light years distant.

The "pairing up" of bits i.e. of the electronic binary digits of 1 and 0 in the largest and the smallest scales means this - quantum effects are not distinct from macroscopic events, and become apparent on a large (even astronomical) scale. This permits a "distant" event to instantly affect another (exemplified experimentally by the quantum entanglement of particles separated by light years – but also hypothetically possible for galaxies and humans). Pairing up also permits effects to influence seemingly separate causes on subatomic, galactic and human etc scales (retrocausality or backward causality). Quantum entanglement and retrocausality appear to be stepping stones on the road to proving the Unified Field of all space-time.

The inverse-square law states that the force between two particles becomes infinite if the distance of separation between them goes to zero. Remembering that gravitation (associated with particles) partly depends on the distance between their centres, the distance of separation only goes to zero when those particles' centres occupy the same space-time coordinates (not merely when the particles' or objects' sides are touching i.e. infinity equals the total elimination of distance, both in space and time). The infinite cosmos could possess this absence of distance in space and time via the electronic mechanism of binary digits (making it as malleable as any image on a computer screen). To distinguish this definition from "the universe going on and on forever", we can call it "electronic infinity or e infinity".

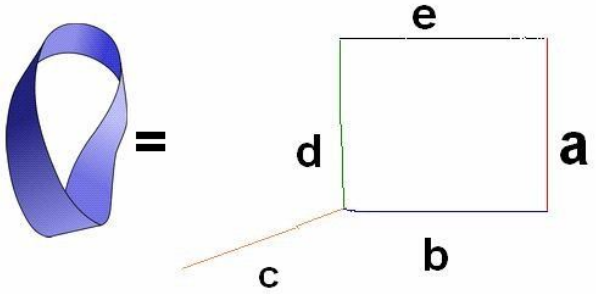
The Matrix, the Figure-8 Klein Bottle, and Dark Matter

shape of waves when viewed from the centres where they begin spreading out is CONVEX

There would be no gravity if space-time didn't curve and warp. So something must happen to ordinary matter in order for dark matter to arise. That something can be called translation or inversion. "Translation" refers to physics' "movement without rotation" or genetics' "making proteins from messenger RNA" (hyperspace's dark matter is made from space-time's ordinary matter).

"Inversion" refers to anatomy's "turning inwards of a part" and the twist on the right side of the Mobius loop illustrated below. Instantly travelling to a planet 700 light years away and instantaneously arriving at a spot in the future which a light beam could only reach by travelling for 7 centuries can be likened to a wave which spreads out from the point of departure. This is because of quantum mechanics wave-particle duality which can view the spaceship not as a collection of particles but as a wave, or collection of waves.

At the destination, the convex shape of the spreading spherical wave arrives instantly (meaning the ship and planet are quantum entangled). This situation is equivalent to space being translated (shifted) by 90 degrees so that the ship is perpendicular to length, width and height simultaneously. What if the spaceship is simultaneously quantum entangled with another spherical wave arriving at the planet from "the other side of the universe" (actually – far, far away)? Since the waves are entangled and unified, their motions are instant and this situation is equivalent to space being translated by 180 degrees. It's inverted and becomes 5th-dimensional hyperspace.



Width a is perpendicular to the length (b or e) which is perpendicular to height c. How can a line be drawn perpendicular to c without retracing b's path? By positioning it at d, which is then parallel to (or, it could be said, at 180 degrees to) a. d (the spaceship) is already at 90 degrees to length b and height c. To be at right angles to length, width and height simultaneously; it has to also be perpendicular to (not parallel to) a. This is accomplished by a twist, like on the right side of the Mobius loop pictured above, existing in a. Then part of a is

indeed at 180 degrees to d, but part of a is at 90 degrees to d. This situation requires a little flexibility or “fuzziness” which allows the numbers to deviate slightly from their precise values of 90 and 180. The fuzziness is represented in nature by past, present, future, space, time, and hyperspace existing everywhere rather than being confined to particular locations. Thus, 90+90 (the degrees between b & c added to the degrees between c & d) can equal 180, making a & d parallel. But 90+90 can also equal 90, making a & d perpendicular. (Saying $90+90=90$ sounds ridiculous but it has similarities to the Matrix [of mathematics, not the action-science fiction movie] which is an array of numbers placed in rows and columns. It was worked out in the mid-nineteenth century by British mathematician Arthur Cayley, matrix mechanics is a version of quantum mechanics discovered by Werner Heisenberg in 1925, and matrices say X multiplied by Y does not always equal Y times X. In this paragraph, the first 90 plus the second 90 does not always equal the second 90 plus the first 90 because $90+90$ can equal either 180 or 90.) Suppose the infinite universe is composed of subuniverses (our subuniverse is 13.8 billion years old) which are shaped like figure-8 Klein bottles. 2 Mobius loops are joined on their sides to form a Bottle, with binary digits filling in the central hole and perfectly adjusting the outer edges to fit surrounding subuniverses [simplified, this is similar to manipulation of an image on a computer screen]). In each subuniverse there would be 2 perpendicularities to the twist (one lot of $90+90$, then another $90+90$). $180+180$ could equal 360 – represented in physics as a subuniverse, a galaxy, or one of the spherical waves above producing quantum entanglement and translating space by 90 degrees. $180+180$ could also equal 180 – represented in physics by both of the above spherical waves interacting to produce inversion (translation by 180 degrees) of space which permits the spaceship to enter hyperspace. Since a fuzzily spherical figure-8 Klein bottle is necessary to form $(90+90) + (90+90)$, any spherical or fuzzily spherical thing in this fractal universe (subuniverse, galaxy, black hole, asteroid, subatomic particle, or anything made of either fermions or bosons) would be an example of altered or warped space-time and must include hyperspace in its composition.

With a single extra dimension of astronomical size, gravity is expected to cause the solar system to collapse [16] and [17]. However, it was shown in c^2 and the Atom that the Sun and other bodies radiate gravitational energy and this article repeatedly says gravity is a repelling energy. The Sun contains 99% of the solar system’s gravity. So if it radiates repelling gravitational waves outwards, it’d prevent the system around it collapsing in the presence of an extra astronomical dimension.

Nima Arkani-Hamed, one of the authors of [16], has said, “ ... 'dark matter' might be just ordinary matter because the light from a star on a fold only one millimeter away might have to travel billions of light years 'along the wall' to reach us. Although we feel its gravity, we haven't seen it yet.” This star’s in an extra dimension (space-time has 3+1 dimensions, so it can be called 5th-dimensional hyperspace) that has been mathematically inverted from space-time and is,

according to The Optical Force, absolutely no distance away because of the removal of distance. So the star's particles (dark matter) are in the same place as ordinary particles in space-time (hyperspace's dark matter is a mathematical inversion of space-time's ordinary matter).

The space-time we live in is described by ordinary [or "real"] numbers which, when multiplied by themselves, result in positive numbers e.g. $2 \times 2 = 4$, and -2×-2 also equals 4. Inverted positive space-time becomes negative hyperspace which is described by so-called imaginary numbers that give negative results when multiplied by themselves e.g. i multiplied by itself gives -1 .^{*} Many scientists say gravity is negative and balances space-time which is labelled positive [18]. This article says space-time's warps (which General Relativity says are gravity) would also be positive. It agrees with Professors Hawking and Mlodinow that black holes are positive, and claims the negative balance to space-time is an equal quantity of mass in a higher dimension. They say gravity is negative because it's attractive. This article aims to show that gravity repels and is indeed positive (the section about the Sun and Moon affecting Earth's tides is perhaps the best explanation of gravity's apparent attraction – it can be viewed in [5]).

NOTE #1 –

“HYPERSPACE'S DARK MATTER IS MADE FROM SPACE-TIME'S ORDINARY MATTER”

According to **c^2 and the Atom**, particles of matter in space-time radiate gravitational waves. Since the article states that gravitational waves form^{*} particles, the waves radiated from matter (as opposed to the waves which originally came from deep space to create the matter) form other particles. These other particles form a duplicate of the matter. Whether from a galaxy cluster or a pen you write with or a subatomic particle, the duplicate would be matter whose gravity we feel – far below detectability in the case of the pen or particle - though it cannot be seen (presumably because it's a mathematical inversion of space-time's ordinary matter – see Note #2). If the universe was purely physical, this extra matter would be visible. Since it has gravitational but not luminous effects, it shows that the universe is mathematical, and is called dark matter in an extra dimension

^{*} The Law of Conservation of Mass-Energy says neither matter nor energy can ever be created or destroyed. The universe would not be unified to near-uniform temperature and curvature by the whole cosmos having once been small enough for everything to be in contact, then undergoing extremely rapid expansion from a big bang during a period called inflation. It would be quantum entangled (unified) by everything having the same origin of binary digits (see Digital String Theory). “New” space-time isn't really formed but is simply the arrangement of binary digits into what we call the universe (for convenience, this can be simply referred to as the universal computer simulation[^]). This conservation can also be viewed as equal quantities of positive and negative space-time existing within the

universe, with changes adding up to zero (see last paragraph in Body of Essay, before the Notes begin).

^ This entire universe will, being a computer simulation, be filled with advanced artificial intelligence (AI) and consciousness – and since there is no separation or distance in its unification (see other sections in this essay), also be filled with human/humanoid intelligence, personality and consciousness. Erwin Schrodinger (1887-1961), the Austrian theoretical physicist who achieved fame for his contributions to quantum mechanics and received the Nobel prize in 1933, had a lifelong interest in the Vedanta philosophy of Hinduism and this influenced Schrodinger's speculations about the possibility of individual consciousness being only a manifestation of a unitary consciousness pervading the universe [19].

NOTE #2 – WHY IS SO MUCH MATTER “DARK”?

"We know the total amount of material made of atoms is around one-fifth of the total amount of dark matter, the invisible mass of the universe. So nothing that is made of atoms, or that ever was made of atoms, can be a significant portion of dark matter." [20] At the start of Note #1, it was suggested much of the material universe cannot be seen "because it's a mathematical inversion of space-time's ordinary matter. If the universe was purely physical, this extra matter would be visible. Since it has gravitational but not luminous effects, it shows that the universe is mathematical, and is called dark matter in an extra dimension". Inversion may indeed fully account for observational experiments in which nothing is visible but there might be associated consequences from the universe's programmability -

In the 1930's, Swiss astronomer Fritz Zwicky found that gravity alone would be only 1% of the force required to hold galaxies together in the clusters he was studying. To explain the orbits, he suggested an unseen dark matter – which he called *dunkle Materie* – must be present. The gravitational effects of dark matter – dark matter is the translation or inversion of space-time's ordinary particles into the "dark particles" of what is called hyperspace – are many and varied. Spacecraft and astronomical bodies can slow down, speed up, shrink or expand their orbit, get ejected from a system, undergo a "gravitational slingshot" effect ... but no amount of human, or humanoid, time travel (during which travellers would have gravitational effects but be invisible) would conceivably account for the extra 99% of gravity Zwicky's galaxy clusters required. There must be forms of time travel that are astronomical in scale.

One of these might involve a star's progression to a red giant (and, referring to **DIGITAL STRING THEORY**, possible programming back to the Main Sequence where it would resume fusing hydrogen into helium). It'd be necessary to "fast backward" the star in a particular region of the Cosmic DVD (skip ahead a couple of

paragraphs) before it reaches the red giant stage, and maintain it at an intermediate stage (such regular maintenance would make stellar engineering not obvious to present-day astronomers on, say, Earth). The Sun will become a red giant in 5 billion years if left to its own devices, but the heat from its present expansion will make Earth uninhabitable in no more than 1 billion years. This fast-backwarding could conceivably be achieved by what Russian astrophysicist Nikolai Kardashev has conjectured to be a Type II civilization, capable of utilizing the entire power of their sun [21]. A Type III civilization – 10 billion times more powerful – could utilize the power of an entire galaxy, and might be able to engage in creation of subuniverses. This could certainly be done by what I consider a plausible addition – a Type IV civilization, who could manipulate infinity and eternity (the universe as a whole). A Type I civilization, that can use all the power of their home planet, is 10 billion times LESS powerful than the Type II civilization that controls their sun. As for us, Earth only qualifies as Type 0 and Prof. Kaku rightly says we'd be as interesting as an ant hill (except for entomologists, who love ant hills). Establishing colonies throughout space and time would prevent overpopulation – instant intergalactic and time travel are explained later. With all our future instant intergalactic and time travel, these colonies – which will develop into civilization Types I, II, III and IV - throughout space and time would be composed of what we'd call aliens or extraterrestrials.

I may be wrong but I think they'd be our descendants (our descendants could only exist before us if time is not exclusively linear). Evolution only seems to explain adaptation, not origin. Humans obviously exist – so without evolution explaining origins, there would just be one inhabited planet in the universe – ours. But with all our colonizing due to future instant intergalactic travel and time travel to the past and future, there are an unlimited number of civilizations out there (always have been, and always will be). I've heard it said that angels rejoiced at the creation of the Earth. I don't think this necessarily has a religious meaning. I suspect it indicates a deep-seated (even totally unconscious) belief in every mind, ancient or modern, that Earth really is important ... that we're not just an insignificant rock orbiting an average star. Maybe life on Earth is the starting point for development of the magnificent Universe this essay speaks of ... and for extraterrestrial life that descends from us, wherever and whenever it may be found.

Going back to time travel for a moment - the past can never be changed from what occurred, and the future can never be altered from what it will be. Both are programmed by the 1's and 0's. These 1's and 0's correspond to the 1's and 0's of the pits and land (or pits and bumps) of a DVD. All of the "cosmic" DVD always exists even though a very limited set of sights, sounds and gravity effects can be detected at any point during its playing. How could the time travel loved by theoretical physicists come to pass without this "cosmic DVD"?

**NOTE #3 –
IMAGINARY TIME AND THE MOBIUS LOOP**

Referring to **The Matrix, the Figure-8 Klein Bottle, and Dark Matter** in my essay; the diagram near the start describes 5th-dimensional hyperspace using the Mobius loop and the final paragraph before these notes says, "Inverted positive space-time becomes negative hyperspace which is described by so-called imaginary numbers that give negative results when multiplied by themselves e.g. i multiplied by itself gives -1 .*"

As Stephen Hawking writes [6], "Which is real, 'real' or 'imaginary' time? It is simply a matter of which is the more useful description." Earlier in that paragraph, he says, "In real time, the universe has a beginning and an end at singularities that form a boundary to space-time and at which the laws of science break down. But in imaginary time, there are no singularities or boundaries. So maybe what we call imaginary time is really more basic ..." In [22] he says, "This absence of boundaries means that the laws of physics would determine the state of the universe uniquely, in imaginary time. But if one knows the state of the universe in imaginary time, one can calculate the state of the universe in real time. One would still expect some sort of Big Bang singularity in real time."

If we choose to believe "imaginary time is really more basic", there's no need to "expect some sort of Big Bang singularity in real time". The more basic imaginary time "is the more useful description" and there would be no Big Bang in reality. As Note #1 in my essay says, "The universe would not be unified to near-uniform temperature and curvature by the whole cosmos having once been small enough for everything to be in contact, then undergoing extremely rapid expansion from a big bang during a period called inflation. It would be quantum entangled (unified) by everything having the same origin of binary digits (see Digital String Theory)."

The microwave background is accepted as proof of the Big Bang but a new source of microwaves is offered here. The 1981 article [23] attempted an explanation of the CMB by claiming that it came from dust within our galaxy. In [24], P. M. Steidl also pointed out that (the absorption by dust) explanation had been attempted already (by supporters of the steady state model), but that this explanation was lacking. The primary problem is that dust is very clumpy, and hence we would expect that if the Cosmic Microwave Background (CMB) came from dust the CMB would be very clumpy. However, the CMB is very homogeneous (uniform). Also, radiation from dust has too high a temperature to be the source of the CMB.

Most of the problem simply disappears when the universe's infinity (the cosmos must be limitless if it's based on infinite π , as my second paragraph suggested) is combined with its quantum entanglement, because this solves the primary trouble of clumpiness. A universe of finite size can be pictured as filled with a limited number of microwave sources (stars, gas, dust) and would be very

inhomogeneous. The infinite universe advocated here would be 100% filled with those microwave sources - it would be of the same nature throughout, and very homogeneous. At first, this appears to be too smooth, because the CMB has tiny fluctuations and is only isotropic (uniform) to roughly one part in 100,000 – a problem fixed by the quantum fluctuations of 1's and 0's. The vast majority of microwaves from those sources could never reach Earth or any other particular spot in the universe when the waves are travelling at the limited speed of light (which is the speed of all electromagnetic waves). This re-introduces inhomogeneity, which again vanishes upon remembering that the famous 17th-century scientist Sir Isaac Newton once said the entire universe would instantly feel the loss of the sun's gravity if our star disappeared suddenly – I think modern science doubts this but zero separation (the Unified Field created by everything in the universe being quantum entangled) forces me to agree with him. In the same way, any microwave source in the infinite universe would instantly make its presence felt on Earth, restoring the homogeneous microwave background. Detectors on or near Earth receive photons from any particular source at particular infinitesimal fractions of a nanosecond, and don't receive them at others, because their construction necessarily restricts them to a small region of space and time - and they're completely unable to detect the unified nature of all space-time.

The temperature problem disappears when the microwaves and gravity meet in matter (interacting microwave photons and gravitational gravitons produce the gas or dust or stars etc.) Repeated absorption and re-radiation at lower energies by these homogeneous sources throughout the infinite universe lowers the temperature from “too high” to the recent measurement of 2.72548K [25].

Returning to the first paragraph in Note #3 and use of the Mobius loop to describe 5th-dimensional hyperspace – Since the particles in space-time co-exist with particles in hyperspace, space-time is warped because it's modelled on the Mobius loop, which can be fashioned by giving a strip of paper a 180-degree twist before joining the ends. Our “subuniverse” has a limited size (and age of 13.8 billion years), is expanding (not from a Big Bang but from binary digits “recycling” space-time*, with the “new” displacing the “old”). See Law of Conservation in Note #1.

Note #4 -

ARE HYPERTIME AND IMAGINARY TIME THE SAME THING?

First, let's define these - Since the time associated with the 3 dimensions of up-down, back-front and side-to-side is often called the 4th dimension, should negative time in a 5th dimensional hyperspace be called 6th-dimensional **hypertime**?

“Geometrically, imaginary numbers are found on the vertical axis of the Complex Number Plane, allowing them to be presented perpendicular to the real axis. One

way of viewing imaginary numbers is to consider a standard number line, positively increasing in magnitude to the right, and negatively increasing in magnitude to the left. At 0 on this x-axis (the so-called 'real' axis), a y-axis (the so-called imaginary axis) can be drawn with "positive" direction going up; "positive" imaginary numbers then increase in magnitude upwards, and "negative" imaginary numbers increase in magnitude downwards." [26].

"This (measuring time using imaginary numbers, and thus creating **imaginary time**) has an interesting effect on space-time: the distinction between time and space disappears completely." [27] A negative 5th-dimension is described by imaginary numbers so imaginary numbers eliminate distinctions between space-time and the 5th dimension, permitting hyperspace to exist in the same place as space-time (like the other side of a space-time coin) and also permitting dark matter (the particles existing in hyperspace) to co-exist with "ordinary" matter.

The article points out that imaginary numbers describe negative hyperspace. At first, it seems that the two times in the heading are different because hyperspace inverts 180 degrees and imaginary time is at 90 degrees to "real" time. However, **The Matrix, the Figure-8 Klein Bottle, and Dark Matter** upsets recognized maths by saying $90+90=180$, $90+90=90$, and by subtracting 90 from each side of the first equation, that $90=180$. Therefore, hyperspace (and hypertime, since they'd form a union like space-time) inverts 90 degrees and hypertime is at 90 degrees to "real" time.

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