

Title –

# THE UNIVERSE IN ANOTHER NUTSHELL

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Abstract –

There are already two universes in a nutshell that I know of. The first, and best known, is “The Universe in a Nutshell” – a 224-page book written by the world-famous English physicist, cosmologist and mathematician Professor Stephen Hawking (born January 8, 1942) that was published by Bantam Spectra on November 6, 2001. The second is “Michio Kaku: The Universe in a Nutshell” – a 42-minute video for The Floating University that is presented by Michio Kaku (born January 24, 1947), Henry Semat Professor of Theoretical Physics at the USA’s CUNY (City University New York). It has been viewed more than 2.6 million times, was uploaded to You Tube on August 15, 2012 and was directed / produced by Jonathan Fowler, Kathleen Russell, and Elizabeth Rodd.

Now, along comes my little version – “The Universe in Another Nutshell”, published in December, 2013 at [http://vixra.org/author/rodney\\_bartlett](http://vixra.org/author/rodney_bartlett). References are not listed at the article’s end but are included in the text. As a kind of index, subheadings are typed in my short article (usually after every few paragraphs) to help remind readers where specific info can be found.

Subheadings are –

**PARTICLES FROM GRAVITY AND NO SUPERSYMMETRY;  
RELATING UNIFIED FIELD THEORY TO “PARTICLES FROM GRAVITY”;  
WHY IS GRAVITY WEAK? (C<sup>2</sup> AND THE ATOM);  
ATTRACTING & REPELLING GRAVITY;  
IMAGINARY NUMBERS, FRACTAL GEOMETRY AND DARK MATTER;  
ENTANGLED IMMORTALITY;  
IMAGINARY MATHS OF NEGATIVE TIME (TRIPS TO PAST);  
LOCALIZED UNIFIED FIELD;  
THE MATRIX AND THE FIGURE-8 KLEIN BOTTLE,  
INTERSTELLAR, INTERGALACTIC AND TIME TRAVEL;  
BANDGAP IMPLANTS, THEN UNIFICATION, GO FAR BEYOND STAR TREK;  
TIME DILATION, THE UNIFIED FIELD AND THE MATHEMATICAL COSMOS;  
“DIGITAL” STRING THEORY AND RENORMALIZATION;  
HIDDEN VARIABLES, VIRTUAL PARTICLES AND SUBUNIVERSES;  
e<sup>∞</sup>;  
QUANTUM ENTANGLEMENT AND RETROCAUSALITY**

Content –

**PARTICLES FROM GRAVITY AND NO SUPERSYMMETRY**

Suppose Albert Einstein was correct when he said gravitation plays a role in the constitution of elementary particles (in “Do Gravitational Fields Play An Essential Part In The Structure Of The Elementary Particles Of Matter?”, a 1919 submission to the Prussian Academy of Sciences). Einstein also said gravity and electromagnetism may be related – in his paper to the Prussian Academy, he

said “Therefore, by equation (1)  $G_{\mu\nu} - \frac{1}{2}g_{\mu\nu}G = -\kappa T_{\mu\nu}$ , we cannot arrive at a theory of the electron by restricting ourselves to the electromagnetic components of the Maxwell-Lorentz theory ...” The term “wave packet” means a quantum-mechanical superposition of waves that allows the existence of a particle. A wave packet consisting of gravitation and electromagnetism would possess what we call mass because of those forces’ effects. In this scenario, the Higgs field and boson described by the Standard Model of interactions between forces and particles would not be the origin of mass. We could, of course, refer to the superposition of gravitational and electromagnetic waves as “the Higgs field” (making that field truly the originator of mass – and also, it’s suggested here, of particles that have no mass). The Higgs boson would represent the field on a quantum scale (just as photons are the quantum representatives of electromagnetism and gravitons are the quantum representatives of gravitation). But the boson’s relation to the field would not be any more special than that of any other particle (photon, graviton, electron, proton, neutron, etc. etc.) Bosons (force-carrying particles) and fermions (matter particles) would be two facets of the same thing without there being any need for supersymmetry [1]. And the Higgs boson would be just one more product of the Higgs field (interpreted as another name for the gravitational-electromagnetic field). The particle would not be the originator of any particle’s mass.

[1] The failure of the Large Hadron Collider to find evidence for supersymmetry has led some physicists to suggest that the theory should be abandoned. (Wolchover, Natalie [November 29, 2012]. "Supersymmetry Fails Test, Forcing Physics to Seek New Ideas". Scientific American.)

## **RELATING UNIFIED FIELD THEORY TO “PARTICLES FROM GRAVITY”**

And suppose Einstein was also correct when he said gravitation is the warping of space-time. Then it is logical that 1) gravitation would play a role not only in elementary particles and their masses but also in the constitution of the forces associated with those particles i.e. the nuclear strong force and the electroweak force (combination of electromagnetism and the weak nuclear force), and 2) the warping of space-time that produces gravity means space-time itself plays a role in the constitution of elementary particles, their masses, and in the forces. Therefore, time is unified with the gravitational and electromagnetic fields (overcoming the 50-year-old objection to Einstein's Unified Field Theory which was put forth by Penrose [2]).

[2] In the 19th century, Scottish mathematician and physicist James Clerk Maxwell unified electricity and magnetism into electromagnetism. Albert Einstein's equations say that in a universe possessing only gravitation and electromagnetism, the gravitational fields carry enough information about electromagnetism to allow the equations of Maxwell to be restated in terms of these gravitational fields. This was discovered by the mathematical physicist George Yuri Rainich (1886 -1968). England's Professor Penrose has argued that the gravitational fields, if known everywhere but only for a limited time, do not contain enough information about their electromagnetism to allow the future to be determined, so Einstein's unified theory fails. Physicists also argue that a unified "theory of everything" must now include not just gravity and electromagnetism, but also the weak and strong nuclear forces plus dark matter and dark energy. Quite a few of my vixra articles ([http://vixra.org/author/rodney\\_bartlett](http://vixra.org/author/rodney_bartlett)) offer perspectives on including the nuclear and dark elements in unification e.g. dark matter and dark energy are proposed to be explicable in terms of combination of repulsive gravity and 5<sup>th</sup>-dimensional hyperspace – please browse ...

How might gravity play a role in interaction of forces and particles?

### **WHY IS GRAVITY WEAK? (C<sup>2</sup> 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 (300,000 km/s x 300,000 km/s). Since we'll be dealing with numbers in the trillions of trillions, and since the many particles and atoms require varying amounts of gravity for their formation, a good approximation will be to round up the conversion factor to  $10^{11}$ . After gravity forms matter, following (succeeding) gravity waves are, we deduce by looking at the example of astronomy's gravitational lensing, concentrated  $10^{24}$  times by density (to  $10^{25}$ ). Then they're further magnified by the matter's density so they achieve EM's (ElectroMagnetism's) strength ( $10^{36}$  times gravity's strength) i.e.  $10^{25}$  is multiplied by Einstein's conversion factor [ $10^{11}$ ] and gives us  $10^{36}$ . Just as visible light can be absorbed by interstellar dust and re-radiated at infrared wavelengths, the following gravity waves are absorbed by the matter and radiated as longer-wavelength waves (both as electromagnetic waves - possibly gamma rays, or a microwave background – and as gravitational waves which have lost  $10^{24}$  of their energy or strength. Though they start with a strength of  $10^{25}$  within the atom, they finish with far less energy and a strength that is equal to the gravity waves existing prior to the matter's formation, which is labelled "1".)

What happens when gravity and electromagnetism interact within an atomic nucleus? If  $10^2$  gravitons interact with each photon (or 100 photons with each graviton), the strong force is produced (it's  $10^{38}$  times gravity's strength). There are two ways to produce the weak force ( $10^{25}$  times as strong as gravity). It could be 1) the normal function of gravity in  $10^{25}$  mode when acting over a distance of  $10^{-18}$  metres (the weak force's range) i.e. the weak force IS gravity

in  $10^{25}$  mode, or 2) the result of EM's photons interacting with  $10^{11}$  anti-gravitons i.e.  $10^{36}$  would be divided by Einstein's speed-of-light conversion and give  $10^{25}$ . Not only does 2) relate gravity and electromagnetism, but it suggests electromagnetism is converted retrocausally i.e. "backwards" (from  $10^{36}$  to  $10^{25}$ ), and also plays a part in mass formation along with gravitation (as Einstein's 1919 paper stated).

Gluons (the strong force's carriers) and the  $W^+$ ,  $W^-$  and  $Z^0$  particles (the weak force's carriers) have all been discovered – but that doesn't mean the strong and weak nuclear forces exist independently of gravity and electromagnetism. The nuclear forces might have no existence apart from  $G$  (gravitation) +  $EM$  (electromagnetism) but could simply be products of graviton-photon interaction: the strong nuclear force could be gravity "added to" electromagnetism (the electromagnetic force combined with 100 gravitons per electromagnetic photon) while the weak nuclear force could be gravity "subtracted from" electromagnetism (the product of the electromagnetic force combined with 100 billion anti-gravitons). Similarly, both  $G + EM$  are needed to produce a Higgs boson.

## **ATTRACTING & REPELLING GRAVITY**

If space-time forms mass, there could be "currents" of space-time flowing in the "oceans" in and between the galaxies. Space-time (warped into gravity) 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 ocean waves passing an island are diverted to the shore by being refracted by the island's mass) and, along their course, being concentrated  $10^{24}$  times (this number's explained in " $c^2$  and the Atom") in the intense warping we call matter. Gravity is both attractive and repulsive\*, like electric charges and magnets. When the gravity waves which are concentrated to form matter (possibly resulting in the pre-solar nebula, or giant molecular cloud whose gravitational collapse formed the solar system) are acting, gravity travels from an external source to the matter i.e. it's in repulsive mode and this repulsive gravity (together with gravity's "creation" or conversion from the energy of the binary digits of 1 and 0) may be what we call dark energy. When succeeding gravity waves are absorbed and re-radiated by the matter, they produce the interactions described in " $c^2$  and the Atom" and the wave radiated from the matter to an external location has the same strength as the repulsive wave (the re-radiated gravity is attractive, causing falling apples and orbiting moons).

## **IMAGINARY NUMBERS, FRACTAL GEOMETRY AND DARK MATTER**

\* Imaginary time (see **IMAGINARY MATHS OF NEGATIVE TIME**) is indistinguishable from directions in space. If one can go north, one can turn around and head south; if one can go forward in imaginary time, one can turn

round and go backward. ("A Brief History of Time" by Stephen Hawking – Bantam Press 1988, p. 143) Just as the "arrow of time" can be reversed without changing the laws of science, directions in space (from the external to an atom; from an atom to the external) can be reversed – in this case, from attraction to its reverse of repelling – without changing the laws of science. The binary digits referred to as the origin of gravity in the above paragraph are also, as "Imaginary Maths ..." shows, the origin of the 5<sup>th</sup> dimension of hyperspace. This reinforces the view in **RELATING UNIFIED FIELD THEORY TO "PARTICLES FROM GRAVITY"** that dark energy (and, I believe, dark matter) is explicable as a combination of repulsive gravitation and hyperspace. If gravity originates with 1's and 0's, so does space-time.

French mathematician Benoit Mandelbrot developed fractal geometry and coined the word fractal (a fractal is a shape such that, if you look at a small piece of the shape, then it looks the same as the original, just on a smaller scale – it is used to describe coastlines, mountain ranges, etc). The diminishing size of spheres may be seen as representing cosmic, galaxy cluster, stellar, quantum-particle scales. We may have varying speed of flow of time during our life because of the accelerating expansion of space-time in the universe. Space is expanding but time is also expanding (and at an accelerating pace). In our youth, it proceeded at a very slightly reduced pace whereas it's going a tiny bit faster now that we've gained experience. So the increased pace is not subjective. If things in space and time were separate, we certainly could never be aware of this accelerating time - the change in our lifetimes is infinitesimal. But things are different if we humans, and the entirety of space-time, are different aspects of the fractal geometry i.e. of the unified field. We are unified with every step of the universe's past and future expansion. Therefore, we can perceive its accelerating expansion ... which we interpret as our having more time in our youth. Our perception of time moving faster will be interpreted by most people as purely subjective and psychological. But in fact, it appears to support the idea of fractals - of gravity accounting for repulsion and attraction not merely on quantum scales but, fractally, also on astronomical and macroscopic scales. This quantum-cosmic correlation is consistent with the unified field. As a human manifestation of the field and its fractal scales might be decreased time as we age, a manifestation in animals might be that of instinct (which humans also share to a degree).

If hyperspace and space-time both originate with 1's and 0's, fractals in the universe would exist not merely in a vertical direction (large to small) but also in a horizontal direction – side to side between the equal partners of space(time) and (hyper)space. Variations of the horizontal and vertical would depict points on an oblique axis. Imaginary numbers describe hyperspace, and have shown themselves useful in the first paragraph of this subheading when describing gravity (fundamental to space-time). Does this mean the horizontal, vertical and oblique axes of the graph of space-time and hyperspace interactions are best described with imaginary numbers? Professor Hawking says, on p. 134 of "A Brief History of Time", calculating time using imaginary numbers has an

interesting effect: the distinction between time and space disappears completely. So calculations of the space-time-hyperspace graph that use imaginary numbers should eliminate the distinction between space-time and hyperspace. This allows dark matter – a hybrid of space-time’s gravity and hyperspatial binary digits – to exist as the scaffold on which “ordinary” matter adheres.

## ENTANGLED IMMORTALITY

During absorption, something very special occurs. The warping of space-time in General Relativity is not separate from matter but gives an electron a mass of 0.511 MeV (mega electron volts) – technically, physicists say “0.511 MeV/c<sup>2</sup>” because an electron volt is actually a measurement of energy, and mass units equal energy units divided by c<sup>2</sup>, or  $m = E/c^2$  (which is  $E=mc^2$  when both sides are multiplied by c<sup>2</sup>). ( $E=mc^2$  means a tiny amount of mass can be converted into a very large amount of energy. Similarly,  $m=E/c^2$  means a very large amount of energy is converted into a tiny amount of mass.) E (energy) is measured in joules (J), m is the mass in kilograms (kg; 1 kg = approx. 2.2 pounds), and c is the speed of light (about 186,282 miles/299,792.458 kilometres per second) measured in metres per second (m/s or ms<sup>-1</sup>).

According to “E=mc<sup>2</sup>, Solving the Equation” ([http://www.emc2-explained.info/Emc2/Equation.htm#\\_UrY7RdlW2bv](http://www.emc2-explained.info/Emc2/Equation.htm#_UrY7RdlW2bv)), “So from 1kg of matter, *any* matter, we get  $9 \times 10^{16}$  joules of energy. Writing that out fully we get: 90,000,000,000,000,000 joules (enough to power a 100 watt lightbulb for 28,519,279 years). “

90,000,000,000,000,000 joules equals 21,501,266,185,710,000 calories – and the average person only burns around 2,000 calories a day. All that energy in every kilogram of your body should be enough to completely repair and replace your entire body for trillions of years (hundreds of times longer than the present figure for the age of the universe). So why do we end up with a lifetime less than one little century on average?

In the chapter “Black Holes Ain’t So Black” – in the book “A Brief History of Time” (Bantam Press 1988) - Stephen Hawking discusses the second law of thermodynamics and the quantity called entropy (which measures the degree of disorder of a system). Applied to the present article instead of black holes, one sentence captures our attention – “This radiation is required to prevent violation of the second law.” So a plausible reason for our insignificant lifespan is that the re-radiation of gravitational waves (in the form of infrared rays) from our body’s atoms carries away energy and increases disorder. There are 31,536,000 seconds in a year and infrared energy varies from  $2.9 \times 10^{-19}$  J to  $2 \times 10^{-22}$  J. Losing even this tiny amount of energy billions and billions of times each second will reduce longevity by millions multiplied by millions of times in a century.

What can we do to fix this problem? It’s impossible to stop emitting energy. All nature does this continuously ... causing bones to crumble, buildings to collapse and the stars in the sky to die. Try learning a variation of time travel in which your

body and brain are quantum entangled with the state existing before you emit the energy (actually, there seems to be nothing to learn - physicist Michio Kaku says in his book "Physics of the Impossible" – Penguin Books, 2008 - that modern science thinks the whole universe has been quantum-entangled forever). Doing this over and over will enable you to live literally forever, not merely for trillions of years. Being permanently entangled with earlier and earlier times will enable your life to do more than extend infinitely far into the future. You'll have a life that goes beyond the birth of your present body; and that life can extend infinitely far into the past, too.

### **IMAGINARY MATHS OF NEGATIVE TIME (TRIPS TO PAST)**

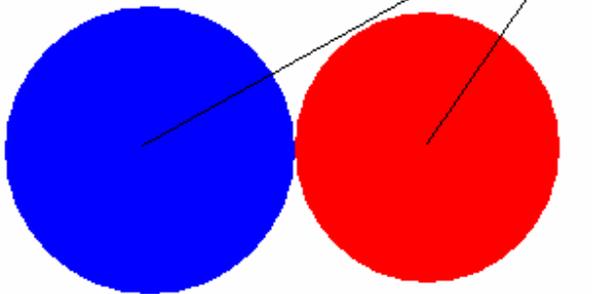
Is there any reason to think time travel is possible? A 5<sup>th</sup>-dimensional hyperspace would have negative energy, negative mass, negative distances and negative time (permitting travel into the past) – these things are impossible and meaningless in the universe we know, but are definitely possible and full of meaning in a universe based on mathematics (see "**DIGITAL**" **STRING THEORY AND RENORMALIZATION**). (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  $-2 \times -2$  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  $-1$ .) 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 Binary digiTS (BITS) of 1 and 0. 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 or CD. Science's Law of Conservation has known since the 19th century that neither matter nor energy can ever be destroyed or created - they only change form. If nothing in any time can be destroyed (it only changes form at a different point on the DVD), all time might be like a DVD. All of the DVD always exists even though a very limited set of sights and sounds can be perceived at any point during its playing. Similarly, everything always exists even though we can't physically perceive every one of those things at this time. In different parts of the cosmic DVD; people are forever being born, forever taking their first step (are they in perpetual motion in an eternal present?), forever resting in peace. I believe English physicist Julian Barbour has the same understanding of time which this sentence speaks of ("From Here to Eternity" by Tim Folger | Friday, December 01, 2000 – from the December 2000 issue of Discover Magazine) And I think medical science will someday advance so much (and in such unexpected ways) that we'll be able to say they're forever being resurrected. How could the time travel loved by theoretical physicists come to pass without this "cosmic DVD"? (also see **QUANTUM ENTANGLEMENT AND RETROCAUSALITY** at this article's end)

So hyperspace can exist. But is there a plausible means of entering it?

### **LOCALIZED UNIFIED FIELD**

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.

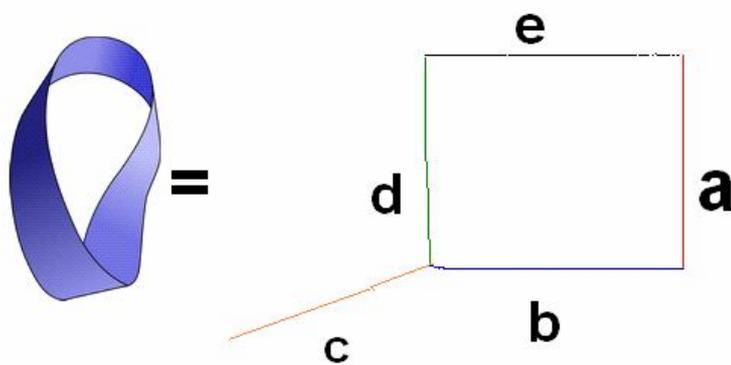
shape of waves when viewed from the centres  
where they begin spreading out is  
CONVEX



shape of waves when viewed from the planet  
where they collide is  
CONCAVE

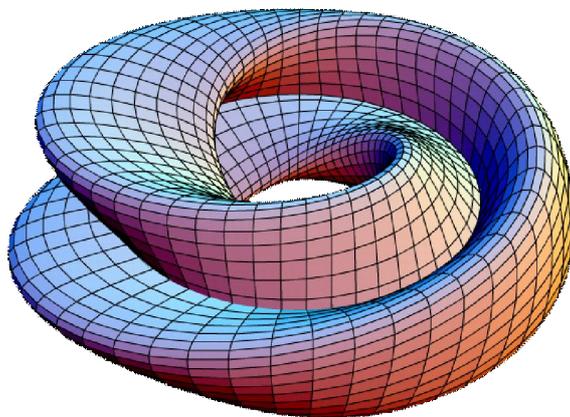
At the destination, the convex shape of the spreading wave arrives instantly (meaning the ship and planet are quantum entangled). This situation is equivalent to space being translated (shifted) by 90 degrees so that the ship is perpendicular to length, width and height simultaneously. What if the spaceship is simultaneously quantum entangled with another wave arriving at the planet from the other side of the universe? 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.

## **THE MATRIX AND THE FIGURE-8 KLEIN BOTTLE**



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 Möbius 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.) If the infinite universe is composed of subuniverses shaped like figure-8 Klein bottles (diagram at end of paragraph - 2 Möbius loops are joined on their sides to form 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 (“The hierarchy problem and new dimensions at a millimetre” by N. Arkani-Hamed, S. Dimopoulos, G. Dvali - Physics Letters B - Volume 429, Issues 3–4, 18 June 1998, Pages 263–272, and “Gravity in large extra dimensions” by U.S. Department of Energy - <http://www.eurekalert.org/features/doe/2001-10/dbnl-gil053102.php>) However, collapse never occurs if gravity accounts for repulsion as well as attraction on both subatomic and astronomical scales (accounts for dark energy and familiar concepts of gravity, as well as repelling aspects of the electroweak force [such as placing two like magnetic poles together] and attracting electroweak/strong force aspects). “Electroweak” and “strong” force can be united in that sentence because gravitation and space-time are united with both the (electro)weak and strong nuclear forces.

And is there any way time travel could be made practical?

## **INTERSTELLAR, INTERGALACTIC AND TIME TRAVEL**

In July 2009, electrical engineer Hong Tang and his team at Yale University in the USA demonstrated that, on silicon-chip and transistor-scales, light can attract and repel itself like electric charges/magnets (“Tunable bipolar optical interactions between guided lightwaves” by Mo Li, W. H. P. Pernice & H. X. Tang

- Nature Photonics 3, 464 - 468 (2009). This is the "optical force", a phenomenon that theorists first predicted in 2005 (this time delay is rather confusing since James Clerk Maxwell showed that light is an electromagnetic disturbance approx. 150 years ago). In the event of the universe having an underlying electronic foundation, it would be composed of "silicon-chip and transistor-scales" and the Optical Force would not be restricted to microscopic scales but could operate universally. Tang proposes that the optical force could be exploited in telecommunications. For example, switches based on the optical force could be used to speed up the routing of light signals in fibre-optic cables, and optical oscillators could improve cell phone signal processing. From 1929 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 (proposals in this article) means warps of space (gravity, according to General Relativity) between spaceships/stars could mimic the Optical Effect and could be attracted together, thereby eliminating distance (similar to traversing a wormhole between two folds in space). And "warp drive" would not only come to life in future science/technology ... it would be improved tremendously; even allowing literally instant travel to points many, many billions of light years away. This reminds me of the 1994 proposal by Mexican physicist Miguel Alcubierre of a method of stretching space in a wave which would in theory cause the fabric of space ahead of a spacecraft to contract and the space behind it to expand - Alcubierre, Miguel (1994). "The warp drive: hyper-fast travel within general relativity". Classical and Quantum Gravity 11 (5): L73–L77. Therefore, the ship would be carried along in a warp bubble like a person being transported on an escalator, reaching its destination faster than a light beam restricted to travelling outside the warp bubble. There are no practical known methods to warp space – yet. (And if infinity is the total elimination of distance in space-time, there would be nothing to prevent time travel to the past and future – see  $e^\infty$ .)

## **BANDGAP IMPLANTS, THEN UNIFICATION, GO FAR BEYOND STAR TREK**

**Surely it'd be more convenient to travel to stars and galaxies, and through time, and achieve entangled immortality, by simply using our brain instead of relying on technology. Is this fantastic idea even remotely possible? How could we manipulate the unification and zero separation of all space-time? First, band-gap structures – then the unified field. Band-gap structures are more advanced than the Star Trek technology of replicators, transporters and starships. While these things can do what band-gap implants do, the implant technology is not external but is located solely within the brain. An even more advanced system - one that has the advantage of seeming more natural to many people – may be possible. That system would do everything band-gap implants do, but would rely solely on the entire universe and all space-time-hyperspace being a unification or unified field. Whatever anyone can think of can be done – as long as it doesn't**

**violate the laws of physics (and the limits of physical law won't be understood for maybe a thousand years).**

Morpho butterflies create colour by selectively adding and deleting certain wavelengths of light. Physicists have only recently devised comparable materials, called photonic band-gap crystals; and are now exploring their use in phone switches, solar cells and antennas. No surprise, then, that some engineers are looking to the living world for the next generation of optic inspirations.

("Illuminated Life - Meet the true masters of optics: Animals that know a lot more about slicing, dicing, and twisting beams of light than we do" By George M. Whitesides, Felice Frankel – Discover Magazine, August 2005 issue). I believe advances in engineering and biology will enable humans, like the morpho butterfly, to selectively add and delete certain wavelengths of light. But the word "light" need not only refer to visible wavelengths. It can be extended and refer to any wavelength of the electromagnetic spectrum. Science accepts that radio, infrared, ultraviolet waves and X-rays as well as gamma radiation are all forms of light. Suppose matter acquires all its properties (including mass) by the superimposing of electromagnetic and gravitational waves (computer-generated in a 5th dimension and projected into the hologram of 3+1 dimensions which we call space-time). So the day will come when we can add or delete wavelengths of matter anywhere and anytime we choose!

I anticipate people will oneday have band-gap structures in their brains that are no bigger than a computer chip (these won't require surgical implantation, but simply downloading, because of the pre-existing unified and digital nature of all parts of the universe). Photonic band-gap crystals would, of course, only deal with light in its photonic forms (energy forms such as visible light or radio waves). The band-gap structures I have in mind would need to deal with forms like genes, so they could add or delete anything and everything we choose. They might accomplish this by acting similarly to a modem that acts on a scale billions of times smaller than a modem manufactured by nanotechnology, and would be capable of manipulating digitised matter. Then they could emulate computers' copy/paste function to add things; as well as their delete function, to remove things (now that's what I call genetic engineering!) This ability must only come to fruition in a future, ideal society: it would only be wasted and abused in the present warring and selfish world!

## **TIME DILATION, THE UNIFIED FIELD AND THE MATHEMATICAL UNIVERSE**

To explain why time dilation occurs, we need to accept that Einstein's Unified Field Theory is correct (see "RELATING UNIFIED FIELD THEORY TO "PARTICLES FROM GRAVITY" above). Everything (the whole universe, all time, and everything they contain) would then be part of this unified field, existing in an "eternal present". The human race – being composed of the gravitational/electromagnetic field ("c<sup>2</sup> and the Atom", above) – is naturally also

part of the unified field, in which the distinction between past and present and future is not real but merely an illusion created by our limitations (“Entangled toy universe shows time may be an illusion” - 25 October 2013 by Jacob Aron [<http://www.newscientist.com/article/dn24473-entangled-toy-universe-shows-time-may-be-an-illusion.html#.Urosw9IW2bs>] – also see the Journal reference used by New Scientist “Time from quantum entanglement: an experimental illustration” by Ekaterina Moreva, Giorgio Brida, Marco Gramegna, Vittorio Giovannetti, Lorenzo Maccone, Marco Genovese (*Submitted on 17 Oct 2013*) [[arxiv.org/abs/1310.4691](http://arxiv.org/abs/1310.4691)]).

This means time is not exclusively rectilinear (it doesn't always operate in a straight line) and humans of the far more advanced distant future not only influence the space-time of the future, but also – thanks to the unified field – the space-time of the distant past. It's impossible to point to the 4th dimension of time, so this cannot be physical. Since the union of space-time is well established in modern science, we can assume the 4th dimension is actually measurement of the motions of the particles occurring in the 3 dimensions of length, width, and height. The basic standard of time in the universe is the measurement of the motions of photons - specifically, of the speed of light. This is comparable to the 1960's adoption on Earth of the measurement of time as the vibration rate of cesium atoms. 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). If time's 0, space is also 0 because space and time coexist as space-time whose warping (gravity) is necessarily 0 too. Spacetime/gravity form matter/mass, so the latter pair can't exist at lightspeed and photons are massless at that velocity. Gravitons are also massless at Lightspeed since electromagnetism and gravitation are both disturbances in unified space-time.

How can space-time cease to exist at Lightspeed? Total elimination of distance, or space-time, produces nothing in a physical sense and reverts to theoretical physicist Lee Smolin's imagining of strings as “not made of anything at all” (p.35 of Dr. Sten Odenwald's article “What String Theory Tells Us About the Universe”: Astronomy – April 2013). It also reverts the universe to the mathematical blueprint from which physical being is constructed (this agrees with cosmologist Max Tegmark's hypothesis that mathematical formulas create reality, <http://discovermagazine.com/2008/jul/16-is-the-universe-actually-made-of-math#.UZsHDalwebs> and <http://arxiv.org/abs/0704.0646>). So, infinity = something, agreeing with Dr. Sten Odenwald's statement on p.32 of his article, that “The basic idea is that every particle of matter ... and every particle that transmits a force ... is actually a small one-dimensional loop of *something*.”

## **“DIGITAL” STRING THEORY AND RENORMALIZATION**

Let's borrow a few ideas from string theory's ideas of everything being ultimately composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents in a four-dimensional looped superstring (“Workings of the

Universe” by Time-Life Books – 1991, p.84). We can visualize tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) [3] 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. Such an infinite connection [4] translates - via bosons being ultimately composed of the binary digits of 1 and 0 depicting pi, e,  $\sqrt{2}$  etc.; and fermions being given mass by bosons interacting in matter particles’ “wave packets” – into an infinite number of subuniverses, also known as Figure-8 Klein bottles [5]. Slight imperfections in the way the Mobius loops fit together determine the precise nature of the binary-digit currents (the producers of space-time-hyperspace, gravitational waves, electromagnetic waves, the nuclear strong force and the nuclear weak force) and thus of exact mass, charge, quantum spin. They would also produce black holes - whose binary digits could, in the case of the sun, come from our star being compressed to 2.95 kms, in which case the pressure increase “shreds” the sun into its binary digits (its mass is relativistically converted into the energy of binary digits). Referring to a Bose-Einstein condensate, the slightest change in the binary-digit flow (Mobius loop orientation) would alter the way gravitation and electromagnetism interact, and the BEC could become a gas (experiments confirm that it does).

[4] If the material and immaterial universe consists of an infinite connection of transcendentals and irrationals, renormalization might be unnecessary in certain circumstances. This mathematical procedure is regarded as prerequisite for a useful theory and is used in attempts to unite general relativity with quantum mechanics to produce Quantum Gravity and the Theory of Everything. Renormalization seeks to cancel infinities – but in a literally infinite universe, retaining the infinite values might point the way to deeper understanding of the cosmos.

## **HIDDEN VARIABLES, VIRTUAL PARTICLES AND SUBUNIVERSES**

[3] Binary digits would be the hidden variables which Einstein said carry extra information about the world of quantum mechanics ... and complete it, eliminating probabilities and bringing about exact predictions. When photons of visible light are travelling through space, they’d also gain energy from space-time which is inherently energetic. To be precise, they gain energy from the 1’s and 0’s in the vacuum which are usually labelled “virtual particles”. Expansion of space depends on how much energy the binary digits contribute, and so the energy lost through expansion precisely matches the energy contributed – and the speed of light is constant in the vacuum of space. The concept of virtual particles is closely related to the idea of quantum fluctuations (a quantum fluctuation is the temporary change in the amount of energy at a point in space). The production of space by BITS (BInary digiT) necessarily means there is a change in the amount of energy at a certain point, and **the law of conservation requires “creation” of space to be increased conversion of the energy of binary digits into space.**

[5] Each one is a “subuniverse” (bubble or pocket universe) composing the physically infinite and eternal space-time of the universe. The infinite numbers

make the cosmos physically infinite, the union of space and time makes it eternal, and it's in a static or steady state because it's already infinite and has no room for expansion. Our own subuniverse has a limited size (and age of 13.8 billion years), is expanding from a big bang, and has warped space-time 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. (It also has DOUBLE STRANDED, spiralling DNA because the universe is modeled on TWO twisted Mobius loops. Agreeing with a 1919 paper which Einstein submitted to the Prussian Academy of Sciences ["Do Gravitational Fields Play An Essential Part In The Structure Of The Elementary Particles Of Matter?"], DNA is made of remarkably warped space-time / extremely intense gravity). Referring to the universe's infinity - "The universe IS something" ("Astronomy" magazine – March 2013, p.66) is interesting. This letter and its reply continue on from Bob Berman's article "Infinite Universe" ("Astronomy" – Nov. 2012) which says, "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." 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." -

[http://map.gsfc.nasa.gov/universe/uni\\_shape.html](http://map.gsfc.nasa.gov/universe/uni_shape.html);

and b) according to "The Early Universe and the Cosmic Microwave Background: Theory and Observations" by Norma G. Sánchez, Yuri N. Parijskij [published by Springer, 31/12/2003], the shape of the Universe found to best fit observational data is the infinite flat model).

**e<sup>∞</sup>**

It's an important property of force-carrying particles e.g. photons that they do not obey Pauli's exclusion principle – discovered in 1925 by Austrian physicist Wolfgang Pauli, this says two similar particles cannot exist in the same state. This means there is no limit to the number that can be exchanged. So starting with any unit of measurement – such as the angstrom (10<sup>-10</sup>, one ten-billionth of a metre) or the picometre (10<sup>-12</sup>, one trillionth of a metre) or even the metre itself – has no effect on the number of photons. The same amount of space can be occupied by a billion, 10 billion, a trillion ... or 1. Any number of photons (actually, all force-carrying particles) occupying the same space hints at unification. Unification could only happen if all fermions (particles of matter) also inhabited that quantum-sized space occupied by one photon. For a moment, forget that bodily senses and scientific instruments say this is ridiculous. Allow yourself to wonder about the mechanism that could make it happen [6] and consider the following lines –

"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. To distinguish this definition from "the universe going on and on forever", we can call it "electronic infinity or  $e\infty$ ".

[6] Expressing supreme confidence in the truth of general relativity prior to its confirmation by English astronomer Arthur Stanley Eddington, Einstein wrote his engineer friend Michele Angelo Besso, "I am fully satisfied, and I do not doubt any more the correctness of the whole system ... The sense of the thing is too evident." When Einstein received a telegram from the Dutch physicist Hendrik Antoon Lorentz announcing the outcome of Eddington's expedition confirming the theory, he showed it to his student Ilse Rosenthal-Schneider. She asked, "What would you have said if there had been no confirmation?" "I would have had to pity our dear Lord," Einstein replied. "The theory is correct." ("Coming of Age in the Milky Way" by Timothy Ferris – The Bodley Head, 1988, pp. 203-204) I cannot doubt the correctness of Electronic Infinity although it has not been experimentally confirmed - nor can I doubt its correctness even though it has not been confirmed mathematically. [7] Einstein is quoted as saying, "The intuitive mind is a sacred gift and the rational mind is a faithful servant. We have created a society that honors the servant and has forgotten the gift." ([http://www.goodreads.com/author/quotes/9810.Albert\\_Einstein?page=2](http://www.goodreads.com/author/quotes/9810.Albert_Einstein?page=2)) So Electronic Infinity is a sacred gift that has been handed to my intuition and, despite its correctness, society must forget it for now and only honour it when the faithful servants of experimentation and mathematical equations confirm it.

## QUANTUM ENTANGLEMENT AND RETROCAUSALITY

With all distances deleted, the cosmos has become infinite (it has shrunk infinitely beyond quantum-size to become purely mathematical). The "pairing up" of particles by e-infinity i.e. by the electronic binary digits of 1 and 0, permits matter we know to defy the exclusion principle. Also, "pairing up" of particles by e-infinity means 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 by the quantum entanglement of particles separated by light years), or permits effects to influence seemingly separate causes (exemplified by the retrocausality or backward causality promoted by Yakir Aharonov and others).

[7] The numerous experiments and mathematics behind **quantum entanglement** and **retrocausality** (go to Wikipedia – the free encyclopedia. See [http://en.wikipedia.org/wiki/Quantum\\_entanglement](http://en.wikipedia.org/wiki/Quantum_entanglement) and

<http://en.wikipedia.org/wiki/Retrocausality>) certainly seem to support Electronic Infinity. But it might be too optimistic to claim they confirm and prove  $e^\infty$ .

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