

Title -

EINSTEIN AND THE NEUTRINO VERSUS 3 NOBEL PRIZES OF THE LAST 45 YEARS

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Abstract -

This article surprised the author because there was no intention of addressing the theories of quarks, the nuclear weak force or the Higgs field at first. The article eventually led to pointing a way out of those Nobel Prize winning theories, though (in 1969, 1979 and 2013 respectively). And that way out gives me a deep feeling of satisfaction. The universe is awash with the peculiar subatomic particles called neutrinos. They have no electrical charge, are nearly massless (at least a million times as light as an electron), and trillions of these ghostly particles sail right through stars, planets, you, and me every second. They don't interact with the strong force which binds protons and neutrons together in atomic nuclei, nor do they interact with electromagnetic fields. To give an idea of how unreactive they are - in 2013, physicists in the USA began shooting neutrinos on a 503-mile trip from Fermilab (the Fermi National Accelerator Laboratory) west of Chicago to a detector in Minnesota. 150 trillion neutrinos leave Fermilab each second but only about ten interact with the detector in a whole week. Speaking of their near masslessness, physicists already know the Standard Model of particle physics (the theory of how particles and forces interact) is incomplete because it incorrectly predicts neutrinos possess no mass). Problems addressed in this article include 1) each particle is born as one of 3 flavors, or types - electron neutrino, muon neutrino or tau neutrino - but they can change flavor in a few thousandths of a second as they travel, 2) as far as scientists can tell, each neutrino is a combination of those 3 masses but they don't know which of the mixes is heaviest and which is lightest (this is the "mass ordering" problem), 3) the fundamental property of quantum systems called entanglement which means two quantum systems can become correlated in such a way that action on one system has implications for the outcome of a measurement on the other, and 4) single and double beta decay which involves neutron(s) decaying into proton(s) and emitting electron(s) plus antineutrino(s) in which, in double decay, the reaction is neutrinoless in some instances since an antineutrino is absorbed by a neutron as a neutrino (suggesting a neutrino is its own antiparticle).

Content –

1) FLAVOR TRANSFORMATION

Transformation is explicable if it's assumed the neutrino is not a fundamental particle but is in fact divisible, and that it shares this divisibility with space-time. As, for example, an electron neutrino cruises through space from the Sun; some

“indivisibility factors” could accumulate on it and increase its mass to that of the muon neutrino. A muon neutrino could transform into an electron neutrino by shedding or sloughing off “divisibility factors” during its trip, and thus losing mass. What would a “divisibility factor” need to be if it comprises both particles and space-time, and also has the property of conferring mass?

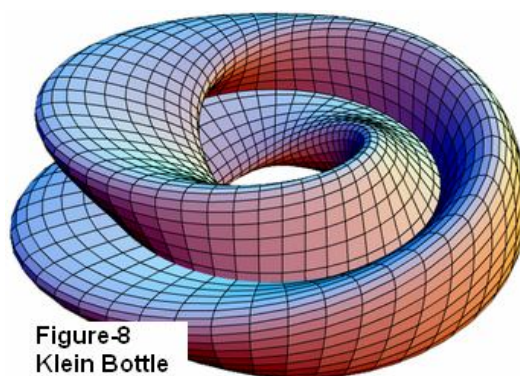
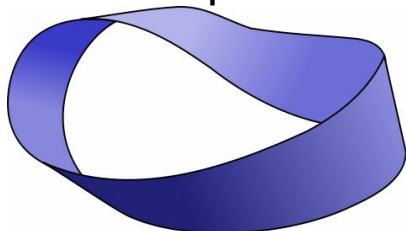
DIGITAL STRING THEORY

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. 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 (see next paragraph for support of the universe's infinity)**. Such an infinite connection 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 (possibly Figure-8) Klein bottles which are, in fact, “subuniverses”. Binary digits fill in gaps and adjust edges of our 13.8-billion-year-old subuniverse to fit surrounding subuniverses (similar to manipulation of images by computers). Such manipulation also allows the appearance of motion where there is none (like in the individual cartoon frames called cells), and the appearance of a stream of photons when there is only one (by displaying a single photon at many points). Slight “imperfections” in the way the Mobius loops fit together determine the precise nature of the **binary-digit currents (the producers of space-time, 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 BEC (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).

* Maybe binary digits are able to be called hidden variables - Einstein said hidden variables carry extra information about the world of quantum mechanics and complete it, eliminating probabilities and bringing about exact predictions. The 1's and 0's in space-time's so-called vacuum are usually labelled “virtual particles”. The idea of quantum fluctuations is valid (a quantum fluctuation is the temporary change in the amount of energy at a point in space, and the fluctuations of 1's and 0's change the energy in quantum-size [subatomic] regions of space-time).

** Each “subuniverse” (bubble or pocket universe) is one of a series (extending infinitely in every direction) 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 may have DOUBLE STRANDED, spiralling DNA because the universe is modelled on TWO twisted Mobius loops.) Bob Berman's article "Infinite Universe" ("Infinite Universe" by Bob Berman, "Astronomy" (Nov. 2012) 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." (WMAP's Universe (http://map.gsfc.nasa.gov/universe/uni_shape.html) and b) according to "The Early Universe and the Cosmic Microwave Background: Theory and Observations" ("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).

Mobius Loop



**Figure-8
Klein Bottle**

Einstein's General Relativity gives a geometrical description of space-time and gravitation. The above section, speaking of the Mobius loop etc, doesn't contradict that description but complements it since the Mobius and Klein bottle belong to a branch of geometry called topology or "rubber-sheet geometry". String theory has been called "a little piece of the 21st century that dropped into the 20th century" (it's the 21st century now, so it's time for string theory to become more than a self-consistent theory and to blossom into the wondrous thing it was destined to be). Combining it with electronics and the above topology into "Digital String Theory" might possibly present an accuracy to description of space-time which simply wasn't available when Albert Einstein lived.

SPACE-TIME IS WARPED

Most people will be seeing red flags in their mind now. The above seems to suggest something like humans being the "pets" of a God who has constructed a computer simulation called the universe. Science sees no proof that there's a God, and prefers to believe in a multiverse with an infinite number of possible universes – one of which had the precise laws of physics enabling beings like us to arise. If time always operated in a straight line from cause to effect, we would have to choose between God and the multiverse. But Einstein showed us that time (actually, space-time) is full of warps and curves and is anything but a straight line. Below are a couple of paragraphs proposing how humans could transfer their the 1's and 0's of the binary digits of their own computer science (as well as biotechnology and terraforming sciences from centuries and millennia ahead of the 21st century) back to the remote past. Therefore, this generation would be the ancestors of a humanity whose science will progress to the point where it will be Creator of the universe and itself.

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 . Entering hyperspace with its negatives (energy, matter, distance, time^\wedge) permits travel to the past since it would be impossible to travel 700 lightyears there, and only possible to travel minus 700 lightyears. Doing so instantly would enable a spaceship to arrive at a spot in the past which a light beam could only reach by traversing negative distance for 7 centuries.

^ These negatives are impossible and meaningless in the universe as we know it, but are definitely possible and full of meaning in a universe based on mathematics. Should negative time in a 5th dimension be called the 6th dimension?

Applying this practically, 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 next to no time (takeoff and landing require

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. 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” above and “Why Is Gravity Weak?” below 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 eliminating distance (this is similar to traversing a wormhole between two folds in space). 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 or future. Now we just need some clever engineers to design a spacecraft that works according to the Einstein-Yale principle.

^{^^} 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 partly depends on the distance between the centres of objects, the distance of separation between objects only goes to zero when those centres occupy the same space-time coordinates (not merely when the objects’ sides are touching). That is, infinity equals the total elimination of distance – the infinite cosmos could possess this absence of distance in space and time via the electronic mechanism of binary digits, which would make the universe as malleable and flexible as any image on a computer screen. Zero separation is the case in quantum-entangled space-time and Professor Michio Kaku says in his book "Physics of the Impossible" that modern science thinks the whole universe has been quantum-entangled forever.

2) & 3) MASS ORDERING AND QUANTUM ENTANGLEMENT

Mass ordering of the neutrinos is explicable if they are “correlated in such a way that action on one (particle) has implications for the outcome of a measurement on the other”. If they aren’t separate particles but are quantum entangled – the whole universe may be entangled forever – each neutrino would be a combination of 3 masses as far as scientists can tell (masses from the electron neutrino, muon neutrino or tau neutrino). Why isn’t there a particle which is a combination of neutron mass and proton mass, or (recalling the mass-energy relation of $E=mc^2$) one combining the energy in a photon with the energy in a graviton? No doubt these do exist in some context - which is why neutrons can become protons, protons can become neutrons, and why Einstein believed electromagnetism is related to gravitation.

Why are neutrinos more responsive to quantum entanglement than other particles? Maybe it’s because each combines extensive fermionic and extensive bosonic properties i.e. it’s a particle of matter with even greater penetrating ability than any boson e.g. a gamma-ray photon.

Recall the statement in “Digital String Theory” that binary digits fill in gaps and adjust edges of our 13.8-billion-year-old subuniverse to fit surrounding subuniverses (similar to manipulation of images by computers). Such manipulation also allows the appearance of motion where there is none (like in the individual cartoon frames called cells), and the appearance of a stream of photons filling 3 dimensions when there is only one photon being simultaneously displayed at infinite points by the universe’s electronic manipulations. Could many photons being one mean there are no **pro**tons, **pho**tons, **gravi**tons and **neutro**ns changing into each other and being related to one another? Is infinite space – and because of the space-time connection, eternal time – actually home to a single pro-pho-gravitron? Fascinating idea! It seems more consistent with present scientific attitudes that all the protons, photons, gravitons and neutrons etc. are quantum entangled (unified) by everything having the same origin of binary digits.

However, the pro-pho-gravitron is reminiscent of a hypothesis for why there is any matter in the universe. Today’s science says there was a Big Bang which produced equal quantities of matter and antimatter, and that should have annihilated each other to leave pure energy. It says the most plausible solution is that today’s neutrinos once had superheavy partners that were 100 trillion times more massive than a proton and could decay into either matter particles or antimatter particles. Suppose there was only one superheavy partner that existed in a computer simulation, and gave birth to the whole universe because it had infinite mass. 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). If the pro-pho-gravitron was “fractalized”, all the particles and antiparticles composing stars and planets – or you and me – would be smaller pieces of that shape. They’d look the same as the original infinitely massive particle but on a smaller scale (therefore, they’d look different). Protons, photons, gravitons, neutrons, electrons etc. difference from the original particle would not be confined to size but would also affect charge, mass, quantum spin, and ability to possess fermionic (matter particle) properties or bosonic (force-carrying particle) properties. Again, General Relativity’s geometric description of space-time is complemented (previously by topology or rubber-sheet geometry, now by fractal geometry).

Now for a few words about wave-particle duality: The proton / neutron is mainly fermionic and has relatively little bosonic activity (the second quality gives them enough transmuting ability to change into each other, and the first means they must remain particles of matter). The photon / graviton is mainly bosonic with little fermionic activity (this means they relate to each other in the way described below in the 1st paragraph of “WHY IS GRAVITY WEAK? (c^2 AND THE ATOM)”. It also means bosonic gravitons cause gravitational effects on fermionic matter and bosonic photons cause photoelectric effects on metals like potassium

or cesium in an “electric eye” (the greater the boson’s energy, the greater its effect on matter e.g. gamma photons are more fermionic than visible-light photons).

Are the many, seemingly obviously separate, objects and events in our lives really unified into one thing in physics' space-time? Perhaps this is comparable to a stream of binary digits (1's and 0's) ultimately causing pixels (picture elements) on a computer screen to be illuminated, unifying the separate elements on the screen because they all originate with one thing (a stream of 1's and 0's). 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.

4) NEUTRONS BECOMING PROTONS AND PROTONS BECOMING NEUTRONS (TOPIC DERIVED FROM THAT OF SINGLE AND DOUBLE BETA DECAY)

WHY IS GRAVITY WEAK? (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} . After gravity forms matter*, successive (subsequent) gravity waves are, via gravitational lensing, concentrated 10^{24} times (to 10^{25} , weak nuclear force's strength - giving the illusion that a weak nuclear force that is not the product of gravitation exists). Does this picture of the atom conflict with the theories of electroweak interaction (electromagnetism combined with the weak nuclear force) which won the 1979 Nobel Prize in Physics for Steven Weinberg, Sheldon Glashow and Abdus Salam? Then the succeeding gravity waves are further 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.). Successive 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 forming matter (and are labelled “ 10^1 ”).)

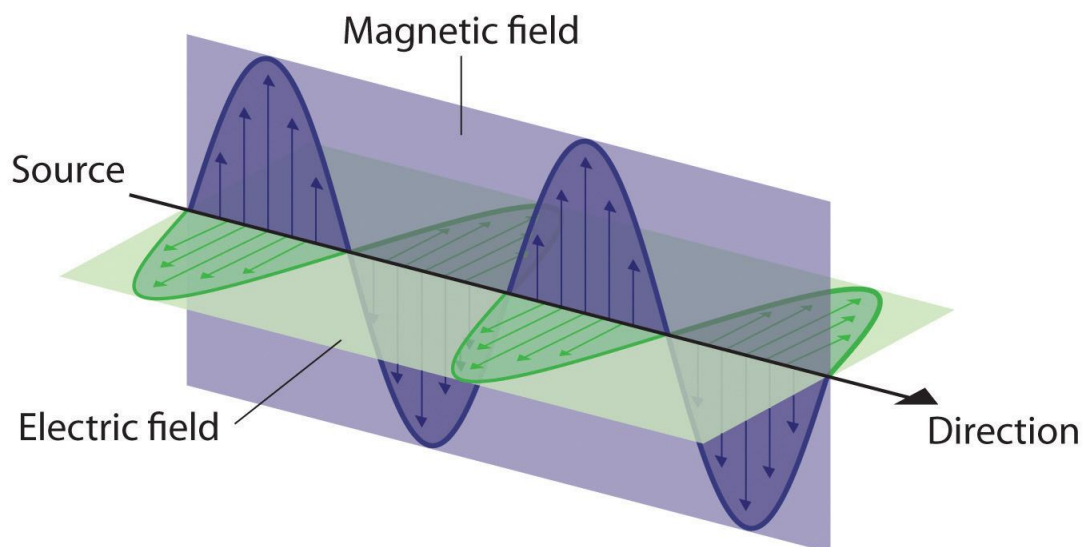
* The 2012 article “How Einstein Discovered Dark Energy” by Alex Harvey (<http://arxiv.org/pdf/1211.6338v1.pdf>) states, “Recall that in 1918 the only elementary particles known were the electron and the proton. Physicists were attempting to understand why these were stable despite their internal electromagnetic repulsion. Most attempts were based solely on electromagnetic

theory. For a review of these efforts see W. Pauli, Theory of Relativity, Pergamon Press, London (1958). See Part V, p.184 ff]. Einstein's effort was to construct a model in which stability was achieved through the use of gravitational forces. In particular, he used modified gravitational field equations which included the cosmological constant [A. Einstein, "Speilen Gravitationfelder in Aufbau der Elementarteilchen eine Wesentliche Rolle" (Do gravitational fields play an essential role in the structure of elementary particles), Sitzungsberichte der Preussischen Akademie der Wissenschaften, (Math. Phys.), 349-356 (1919) Berlin]. The attempt was not successful and this was the last time he mentioned the cosmological constant other than to denounce it."

(Though Einstein's effort to construct a model in which stability was achieved through the use of gravitational forces was not regarded as successful, success may be achieved nearly a century later when his model is adapted to the Westerlund 1 magnetar.)

(see "Are the Extreme Fields of Magnetars Due to Gravitational Waves and Photon Decoupling?" - <http://vixra.org/abs/1408.0187>)

** Waves are generally classified as either transverse or longitudinal depending on the way the propagated quantity is oriented with respect to the direction of propagation. Gravitational waves are transverse waves but they are not dipole transverse waves like most electromagnetic waves, they are quadrupole waves. A dipole transverse wave has two "lobes", as in the following diagram of an electromagnetic wave.



The simplest quadrupole (as in "gravitational wave") is two dipoles - they simultaneously squeeze and stretch matter in two perpendicular directions. If a quadrupole gravitational wave becomes a dipole electromagnetic wave, it not only has to change its strength in the way described above but it also has to change its shape. How can it transform from "two dipoles" to "two lobes"?

Photons are the basic constituents of the electromagnetic wave, and of the perpendicular electric field / magnetic field. Referring to "Are the Extreme Fields of Magnetars Due to Gravitational Waves and Photon Decoupling?" (<http://vixra.org/abs/1408.0187>) - in the Westerlund 1 magnetar, there's a certain amount of photon decoupling because the electric and magnetic components of electromagnetism possess separate destinies. The wave can be visualized as a stream of photons which can be split into two groups, each going its own way. But remember this – the appearance of a stream of photons can be duplicated using a single photon. If it's presented in position A, then B, then C, and so on; it can deceive an observer or detector into believing it's in motion. If displayed simultaneously at A and B and C, it appears to be a number of particles streaming through space and time (see "Digital String Theory"). It's accepted in physics that a single photon can actually interfere with itself. Does this mean it's **not indivisible** (Digital String Theory) but can decouple from itself and separate into a part that, for example, can be a compressed magnetic field and another part that can be an escaping electric field transported by a star? As well, a photon could decouple from itself to alter a wave's shape from quadrupole gravitational to dipole electromagnetic. The decoupling and consequent change in the wave's shape might result from the extreme forces involved in matter's density magnifying (lensing) the subsequent gravitational waves that enter it.

5) TO BE CONSISTENT WITH SPACE-TIME'S BEING WARPED, THIS CONCLUSION TO 4) AVOIDS BEING UN-NATURAL BY LOOPING BACK TO CONCLUSIONS IN "2) & 3) MASS ORDERING AND QUANTUM ENTANGLEMENT"

Now to put together a sentence in the 1st paragraph of "Why Is Gravity Weak?" with a sentence from the 1st paragraph of "Digital String Theory" viz.

"Then they're further magnified by the matter's density to achieve electromagnetism's strength (10³⁶ times gravity's strength) i.e. 10²⁵ is multiplied by Einstein's conversion factor [10¹¹] and gives 10³⁶ (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.)."

Is combined with

"Slight 'imperfections' in the way the Mobius loops fit together determine the precise nature of the **binary-digit currents (the producers of space-time, gravitational waves, electromagnetic waves, the nuclear strong force and the nuclear weak force)** and thus of exact mass, charge, quantum spin.

This may be a pointer to explaining how protons and neutrons can alter their electrical charges, magnetic properties, spin, and mass which does not invoke the quark model that was independently proposed by physicists Murray Gell-

Mann and George Zweig in 1964. Stephen Hawking and Leonard Mlodinow wrote on p.49 of "The Grand Design" (Bantam Press, 2010) – "It is certainly possible that some alien beings with seventeen arms, infrared eyes and a habit of blowing clotted cream out their ears would make the same experimental observations that we do (regarding the existence of quarks), but describe them without quarks." It may also point the way to mass not being a product of the Higgs field proposed in 1964 by Robert Brout, François Englert, Peter Higgs, Gerald Guralnik, C. Richard Hagen, and Tom Kibble (mass might originate from the gravitational field – see 2nd paragraph of "Why Is Gravity Weak?").
