

UNIFICATION OF SCIENCE -

Einstein's Missing Steps in $E=mc^2$ and His Missing Link to Quantum Gravity

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Abstract -

A MONOGRAPH DEALING WITH UNIFICATION IN RELATION TO DARK ENERGY, DARK MATTER, COSMIC EXPANSION, $E= mc^2$, QUANTUM GRAVITY, "IMAGINARY" COMPUTERS, CREATION OF THE INFINITE AND ETERNAL UNIVERSE USING ELECTRONIC BITS + PI + "IMAGINARY" TIME, EARTHLY EDUCATION, SCIENCE-RELIGION UNION, THE HUMAN CONDITION, SUPERCONDUCTIVITY, PLANETARY FIELDS, HOW GRAVITATION CAN BOOST HEALTH, SPACE-TIME PROPULSION FROM THE EMDRIVE TO THE BROUWER FIXED-POINT THEOREM, "LIGHT MATTER", ETC. THESE EFFECTS WERE ORIGINALLY DISCUSSED IN SEVERAL SHORT INTERNET ARTICLES.

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INTRODUCTION -

$E=mc^2$, General Relativity and Quantum Mechanics are the major themes of this article. Throughout the article, a few equations show the missing steps in $E=mc^2$. These steps could not be included in the original equation because that was developed before things like superconductivity and wave-particle duality were discovered. Of course, things would be different if Einstein knew how to access Quantum Gravity or the Unified Field Theory he spent his last 30 years working on. A complete unified theory that includes everything in space-time (time is emphasized here) has practical applications. It gives us some understanding of the laws that govern the universe* - including the unknown (when $E=mc^2$ was published in 1905) laws of superconductivity and wave-particle duality. The article starts with John Bardeen's comment that "The idea of paired electrons, though not fully accurate, captures the sense of it." He's referring to the mechanism by which superconductivity works (he shared in the 1972 Nobel Prize for Physics for this). That topic goes beyond paired electrons with wave-particle duality (which includes electromagnetic waves but also the paired electrons). The subsection on superconductivity ends with explanation of planetary magnetism and accounting for the electric fields of the planets.

*Mathematical and non-mathematical expression of that understanding can both contribute to knowledge. The progress of science does not depend on writing in a certain fashion, but on presenting insights clearly and in an extremely thorough and careful way. We might allow ourselves to think knowledge can only advance through the jargon and maths this tiny bit of history we live in calls scholarly writing. But then we merely validate what German physicist Max Planck (1858-1947) said: "A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a

new generation grows up that is familiar with it.” — Max Planck, "Scientific Autobiography and Other Papers"

From there, it goes on to quantum-macroscopic union and speaks of gravitational / electromagnetic waves sharing properties with water waves. This leads to new interpretation of the motions of photons and gravitons (this is a new interpretation of John Wheeler's geon or "gravitational electromagnetic entity", an electromagnetic or gravitational wave which is held together in a confined region by its own nature). Such new motion deletes the concepts of universal expansion, dark energy and dark matter. Then a paper published by Albert Einstein in 1919 is mentioned which is titled "Do gravitational fields play an essential role in the structure of elementary particles?" (Prof. Wheeler's speculation that there's a relationship between geons and elementary particles supports this). Soon after the final formulation of general relativity, Einstein pointed out the need for a quantum modification of the theory. In later years, Einstein hoped a unified theory of electromagnetic and gravitational fields would explain the quantization of matter and energy. Both approaches appear valid. This article proposes that (1) the Wheeler–Feynman absorber theory and the Transactional Interpretation of Quantum Mechanics (TIQM) modify electromagnetic and gravitational waves to produce quantum modification, and (2) that electromagnetic and gravitational fields would be unified in the sense that the waves composing each field would possess both "retarded" and "advanced" components. The forwards and backwards movement can cancel to produce a quantum entanglement, and thus quantization. The result of this modification might well be modification of understanding of the strong and weak nuclear forces, as well as of the Higgs field. And if the ideas of TIQM-advanced/retarded waves should lead to someone developing a viable, formal theory of quantum gravity; that theory could test the idea of a relationship between geons and elementary particles.

Headings have been added which outline the basics of (a) the Higgs-gravity relation (even though such an idea is supposed to be completely wrong) and (b) how, using quantum spin of the photon

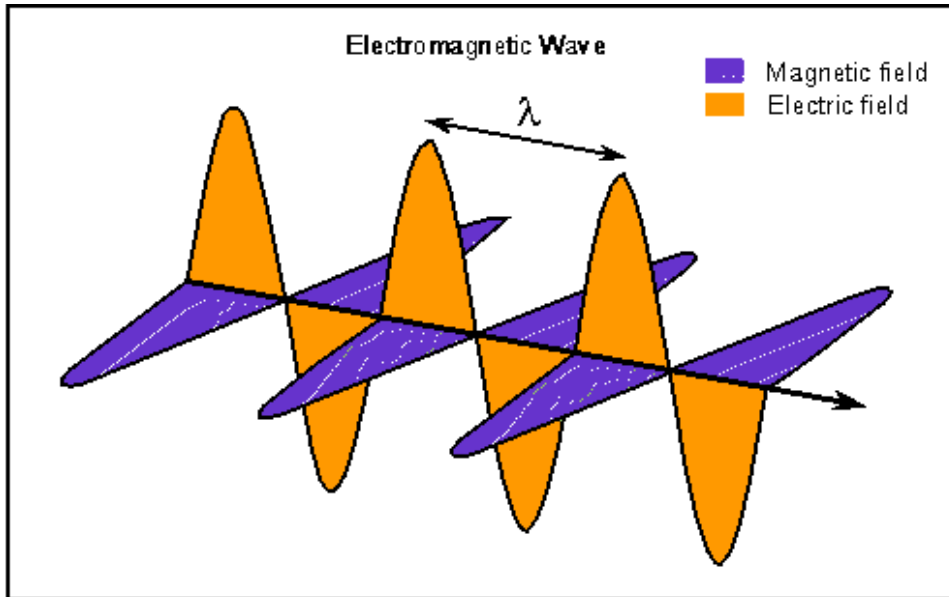
and graviton, both the Higgs boson and matter particles can be produced (the basic ideas behind production of the photons and gravitons themselves in a lab is explained, too). I've read that it is very hard to write down logically sound theories. My literal mind interprets this to mean mathematics is almost always essential. My mind also interprets it as a challenge – write down the science of spin interaction using plain English, with maths no more complex than 1 divided by a half.

SUPERCONDUCTIVITY AND PLANETARY MAGNETIC / ELECTRIC FIELDS

The Meissner effect (or Meissner–Ochsenfeld effect) is the expulsion of a magnetic field from a superconductor* during its transition to the superconducting state. The German physicists Walther Meissner and Robert Ochsenfeld discovered this phenomenon in 1933. Regarding the Meissner effect: Think of the electromagnetic wave relativistically. In General Relativity, the simple analogy of space-time being regarded as a rubber sheet is commonly used. Instead of resorting to complex and lengthy relativistic mathematics, we can simply picture an electromagnetic wave as a cylinder made of rubber. If 2 sides of the cylinder are pushed in with your fingers (say, the ones representing the electric component), the sides in the perpendicular direction (representing the magnetic component) will bulge outwards - this can be verified by placing a ruler behind the cylinder. Compressing the electric component will force the magnetic component to bulge outwards ie there will be little or no magnetic field within the superconductor, only an external magnetic field. An externally-applied magnetic field also conforms to the bulging outwards and is expelled from within the superconductor.

* High temperature superconductors are known for not displaying the Meissner effect. The explanation below of planetary magnetic fields means, though the fields cannot be a product of

the condensed-matter physics known as superconductivity, they might be considered a previously unrecognized variation of superconductivity, which is zero (electrical) resistance.



An electromagnetic wave showing electric and magnetic fields, and the wavelength (λ) which is the distance between crests of a wave.

Courtesy of nrao.edu

An electromagnetic wave can have its electrical part compressed through eg introduction of copper-and-oxygen compounds called cuprates or use of hydrogen sulfide (speaking of molecules as well as waves refers to quantum mechanics' wave-particle duality). This means the explanation of superconductivity developed by John Bardeen, Leon Cooper, and John Schrieffer in 1957 (for which they shared the 1972 Nobel Prize) need not depend on the Cooper pair or BCS pair - a pair of electrons (or other fermions) bound together at low temperatures in a certain manner first described in 1956 by American physicist Leon Cooper. (Cooper, Leon N. (1956). "Bound electron pairs in a degenerate Fermi gas". *Physical Review*. **104** (4): 1189–1190). In a Cooper

pair, an electron in a metal attracts the positive ions that make up the rigid lattice of the metal. This positive charge can attract other electrons, and it has also been recently demonstrated that a Cooper pair can comprise two bosons. ["Dynamical Creation of Bosonic Cooper-Like Pairs" by Tassilo Keilmann and Juan José Garcia-Ripoll: Phys. Rev. Lett. **100**, 110406 (2008)].

John Bardeen comments - "The idea of paired electrons, though not fully accurate, captures the sense of it." (J. Bardeen, "Electron-Phonon Interactions and Superconductivity", in Cooperative Phenomena, eds. H. Haken and M. Wagner [Springer-Verlag, Berlin, Heidelberg, New York, 1973], p. 67).

A more accurate description of superconductivity might refer to the following links. 'Physicists now believe that entanglement between particles exists everywhere, all the time, and have recently found shocking evidence that it affects the wider, "macroscopic" world that we inhabit.' ['The Weirdest Link' (*New Scientist*, vol. 181, issue 2440 - 27 March 2004, 32, <http://www.biophysica.com/QUANTUM.HTM>)] Though the effect is measured for distances in space, the inseparability of space and time means that moments of time can become entangled too. (Caslav Brukner, Samuel Taylor, Sancho Cheung, Vlatko Vedral, 'Quantum Entanglement in Time', <http://www.arxiv.org/abs/quant-ph/0402127>) This link between the quantum and macroscopic worlds would unite the subatomic electrons of superconductivity with the wave motion in a pool of water. If a stone is dropped into a pool of calm water, many circular waves soon cover the surface of the water, and the water appears to be moving outwards from where the stone was dropped in. Actually, the particles of water simply rise then fall – it's the wave motion that moves outward. Similarly, the particles called paired electrons possess relatively little movement themselves – and John Bardeen's comment about the idea of paired electrons not being fully accurate can mean that superconductivity is a wave motion.

Phrased informally, a more accurate description of superconductivity might refer to the illustration above of an electromagnetic wave. If compression is sufficient; the electric

component no longer follows a long, curved path but its path is now linear and follows the shortest distance between two points. In other words, a superconductor that operates at room temperature and normal atmospheric pressure has been manufactured. Any resistance would, like a rock in the bed of a stream causing water to flow around it, lengthen the distance and mean the compound is not a perfect superconductor. This analogy to "a rock in the bed of a stream" refers to the relative non-movement of paired electrons. Superconductivity is a wave motion, where energy is transferred from one place to another without involving an actual transfer of matter.

"Magnetic Fields" (<http://www.astronomynotes.com/solarsys/s7.htm>) says, "Mercury's situation was a major challenge to the magnetic dynamo theory.* In true scientific fashion, the theory made a testable prediction: Mercury should have no magnetic field or one even less than Mars' one because its core should be solid. Observation, the final judge of scientific truth, contradicted the prediction. Should we have thrown out the magnetic dynamo theory then? Astronomers were reluctant to totally disregard the theory because of its success in explaining the situation on the other planets and the lack of any other plausible theory. Is their reluctance a violation of the objectivity required in science? Perhaps, but past experience has taught that when confronted with such a contradiction, nature is telling you that you forgot to take something into account or you overlooked a crucial process."

*The cause of Earth's magnetic field is said to be the geodynamo, also called the magnetic dynamo theory. The heat from the solid inner core puts the liquid outer core in motion, and the movements of the outer core's electrically conducting fluids (such as molten iron) generate the planet's magnetic field. Electrically conducting fluids occur in the Sun, other stars and most planets – and are the scientifically accepted mechanism for magnetic fields.

The idea of compressed electric fields (they could be compressed by gravitational, or gravitational-electromagnetic, waves) and bulging, expelled magnetic fields is a very plausible alternative to Earth's geodynamo. It gains additional support by explaining why the planet Mercury has a significantly strong, apparently global, magnetic field (approx. 1.1% of Earth's).(1,2,3) Venus' core is thought to be electrically conductive and, although its rotation is often thought to be too slow, simulations show it is adequate to produce a dynamo. Simple reversal – compression of electromagnetism's magnetic component with expulsion of the electric component - means certain astronomical bodies, such as the planet Venus, could have no intrinsic magnetic field as a result. (It does have a much weaker one than Earth, induced by an interaction between the ionosphere and the solar wind).(4,5,6) ***But it would have a strong electric field – and the European Space Agency's Venus Express spacecraft did detect one.***(7) 'Scientists using Venus Express have identified another difference between the two planets: Venus has a substantial electric field, with a potential around 10 V. This is at least five times larger than expected. Previous observations in search of electric fields at Earth and Mars have failed to make a decisive detection, but they indicate that, if one exists, it is less than 2 V. “We think that all planets with atmospheres have a weak electric field, but this is the first time we have actually been able to detect one,” says Glyn Collinson from NASA’s Goddard Flight Space Center.' ("Venus Has Potential – But Not For Water" by the European Space Agency, 2016 ([http://www.esa.int/Our Activities/Space Science/Venus Express/Venus has potential but not for water](http://www.esa.int/Our_Activities/Space_Science/Venus_Express/Venus_has_potential_but_not_for_water)))

Numbered references in above paragraph -

[1] Seeds, Michael A. (2004). "Astronomy: The Solar System and Beyond" (4th ed.). Brooks Cole. ISBN 0-534-42111-3

[2] Williams, David R. (January 6, 2005). "Planetary Fact Sheets". NASA National Space Science Data Center

[3] "Mercury's Internal Magnetic Field". NASA. January 30, 2008. Archived from the original on March 31, 2013

[4] Luhmann, J. G.; Russell, C. T. (1997). "Venus: Magnetic Field and Magnetosphere". In Shirley, J. H.; Fainbridge, R. W. Encyclopedia of Planetary Sciences. New York: Chapman and Hall. pp. 905–907. ISBN 978-1-4020-4520-2

[5] "Caught in the wind from the Sun". European Space Agency. 28 November 2007

[6] Dolginov, Sh.; Eroshenko, E. G.; Lewis, L. (September 1969) "Nature of the Magnetic Field in the Neighborhood of Venus". Cosmic Research. 7: 675

[7] "Electric Field at Venus" - <http://sci.esa.int/venus-express/57967-electric-field-at-venus/> (2016)

How does this alternative account for magnetic-field reversals? The incoming gravitational waves can compress electric fields, resulting in a strong magnetic field. As motions in planetary cores occur, relocated electric waves can be compressed less, causing reduced expelling of the magnetic waves and weakening of Earth's field. Electromagnetic waves can change orientation by 180 degrees, causing the expelled magnetism's polarity to reverse.

CO-MOVEMENT OF PHOTONS AND GRAVITONS

About pure maths -

Many scientists have said mathematics is a universal language because $1+1=2$ no matter who you are. The trend in modern physics is towards a unified theory of the universe - starting with the unified theories of the 20th century (notably Einstein's) and extending to string theory and

quantum gravity. What happens if a person in, say, the 24th century is raised believing in a unified theory that has implications in physical terms for everything in space-time? Would he or she think there is actually only one thing? Would (s)he think it's a mistake to add one apparently separate thing to another apparently separate thing to produce two, and that such addition is merely the result of the way the body's senses operate? (Our whole mathematical system is ultimately based on the idea that $1+1=2$, and would therefore be incomplete in a unified universe.)

Assuming the maths humanity has developed does indeed apply to the universe, it cannot be totally in error – merely incomplete. Even Einstein's famous mass-energy equation $E=mc^2$ would be incomplete, requiring quantization ie unification with the wave-particle duality of quantum mechanics (which has also been repeatedly verified by experiment). Duality says subatomic particles also exhibit wave-like properties while waves (e.g. electromagnetic) also possess particle-like properties. Concerning the former (particles), it's as if mass was composed of the coupling of the long-range gravitational and electromagnetic waves, in accord with the mass-giving Higgs field being the result of coupling - this refers to theories where the role of the Higgs field is fulfilled by particular couplings (in this case, of the graviton and photon - see M. Tanabashi; M. Harada; K. Yamawaki. Nagoya 2006: "The Origin of Mass and Strong Coupling Gauge Theories". International Workshop on Strongly Coupled Gauge Theories. pp. 227–241). And the completed $E=mc^2$ may be, as "About practical maths" suggests, $E = \nu = f\lambda = \text{distance/duration} = \text{space/time} = mc^2$.

About practical maths -

The wave-particle duality mentioned in the section above can be described by starting with $v=f\lambda$ (wave velocity equals frequency times Greek letter lambda which denotes wavelength). Velocity (speed in a constant direction) of a collection of particles like a car equals distance divided by duration. Since distance is a measure that has to do with space while duration is a measure that has to do with time, it equals space divided by time. (Brian Greene in "Speed", part of his "Space,

Time and Einstein" course at <http://www.worldscienceu.com/courses/1/elements/YhF9pw>)
Gravitational and electromagnetic wave motion (space-time motion) travels at c , the speed of light ie

$$v = f\lambda = \text{distance/duration} = \text{space/time} = c$$

A particle's velocity, whether the particle be a boson or fermion, is directly dependent on its energy – so it may be said that

$$E = v = f\lambda = \text{distance/duration} = \text{space/time} = c$$

This is not quite right since c represents energy alone, and space-time deals with mass-energy, so it's better to say

$$E = v = f\lambda = \text{distance/duration} = \text{space/time} = mc$$

What about the 2 in $E=mc^2$? In later papers Einstein repetitively stressed that his mass-energy equation is strictly limited to observers co-moving with the object under study. Co-movement is defined as:

An inertial frame of reference* which happens to be moving in the same direction, at the same speed, as an object or an accelerated frame which we're examining.

* A frame of reference is a system of geometrical axes in which the size, position or motion of something is described. "Inertial" means objects in the frame are not being accelerated - they are at rest or they move at a constant velocity in a straight line.

In order for $E=mc^2$ to apply to the universe (and it does), observers must be able to co-move with anything being studied (even a light beam). Moving in the same direction is no problem but how can anyone or anything move at the same speed? The link between the quantum and macroscopic worlds would do more than unite the subatomic electrons of superconductivity with the wave

motion in a pool of water. It also means the transverse wave motion of electromagnetic waves is identical to the transverse wave motion in a body of water. Present-day observers can never move at the speed which light covers in the vacuum of space-time, so the only way for observers and light to co-move is for the nature of electromagnetism to be revised.

Like waves of water, electromagnetic waves are known as transverse. Consequently, the particles (photons) of light and microwaves etc that travel through space-time would have relatively little movement themselves. It's the disturbances from the sources of electromagnetism (shock waves of fluctuating amplitudes and frequencies) that travel. (They go through the fields of energy filling the so-called vacuum). Since $E=mc^2$ only applies to photons when they're at rest, the equation can only describe photons that have no motion in one direction – the horizontal "line of propagation" in which the shock wave moves. The photons can only move in the vertical direction, perpendicular to the shock wave – if they move at all. The formula then required to connect the photons and shock waves may be the extended version of Einstein's equation, called the relativistic energy–momentum relation.

$$E^2=m_0^2c^4+p^2c^2$$

("Dynamics and Relativity", J.R. Forshaw, A.G. Smith, Wiley, 2009, ISBN 978-0-470-01460-8, and "Physics" - <https://physics.stackexchange.com/questions/6202/does-e-mc2-apply-to-photons>)

As Paul Camp, Ph.D. in theoretical physics, writes at <https://www.quora.com/How-big-is-a-photon> -

"A photon is a quantum of excitation of the electromagnetic field. That field fills all space and so do its quantum modes."

This is consistent with energy being transferred from one place to another (as wave motion) without involving an actual transfer of particles (little or no movement of photons). General Relativity says gravitation IS space-time ie the gravitational field also fills all space, so the seeming motion of gravitational waves could also be due to fluctuations of shock waves' amplitudes and wavelengths causing excitations (called gravitons) in the field. These excitations cover 186,282 miles every second. (Savard, J. "From Gold Coins to Cadmium Light". John Savard. WebCite: <http://www.quadibloc.com/other/cnv03.htm> on 2009-11-14: The speed of light is based on an inch of exactly 2.54 cm and is exactly 186,282 miles, 698 yards, 2 feet, and 5 21/127 inches per second.)

The above ideas of gravitational and electromagnetic waves displaying little or no motion are a new interpretation of John Wheeler's geon or "gravitational electromagnetic entity", an electromagnetic or gravitational wave which is held together in a confined region by its own nature.

If there's little or no movement of photons and gravitons, the universe could not be expanding. And non-expansion eliminates the need for repelling Dark Energy that makes the universe expand. Here's a bit more supporting those ideas –

GENERAL RELATIVITY DELETES DARK ENERGY, DARK MATTER AND UNIVERSAL EXPANSION – See "REFERENCES (Part 1)"

Abstract -

This article is suggesting that dark energy, dark matter and universal expansion are intimately related. However, they aren't viewed as revolutions in cosmology which are essential to a complete understanding of the modern universe. They are instead viewed as properties which need to be added to the cosmos when Einstein's theory of gravity (General Relativity) is apparently still not thoroughly comprehended a little over a century after it was published. If General Relativity truly does eliminate Dark Energy and Dark Matter plus Universal Expansion, then its treatment of gravitation as a push must necessarily be reflected in every encounter with gravity. The author has developed possible solutions (hypotheses) about this in the second section - which has topics ranging from M-sigma through geysers on Saturn's moon Enceladus and the Law of Falling Bodies to tides.

Science admires General Relativity. However, respect for tradition seems to prevent science from embracing Einstein's theory completely. General Relativity says gravity is a push exerted by the curvature of space-time. But the world still holds to the Newtonian view that gravity is a pull. Since Isaac Newton's mathematics works so well, it's understandable that his gravitational pull is accepted. It's time to explore ways in which gravitation as a push could produce identical physical results. The second part of this article (**HYPOTHESES SUPPORTING GRAVITATION AS A PUSH** – proposed later) suggests hypotheses – not formal theories – to this end.

Article -

Edwin Hubble (1889-1953), the astronomer credited with discovering cosmic expansion, remained doubtful about the expansion interpretation for his entire life. He believed “expanding models are a forced interpretation of the observational results.” (“Effects of Red Shifts on the Distribution of Nebulae” by E. Hubble, *Ap. J.*, 84, 517, 1936). According to astronomer Allan Sandage, "Hubble believed that his count data gave a more reasonable result concerning spatial curvature if the redshift correction was made assuming no recession. To the very end of his writings he maintained this position, favouring (or at the very least keeping open) the model

where no true expansion exists, and therefore that the redshift "represents a hitherto unrecognized principle of nature." [Sandage, Allan (1989), "Edwin Hubble 1889–1953", The Journal of the Royal Astronomical Society of Canada, Vol. 83, No.6]

The great majority of scientists will simply dismiss Hubble's concerns because they agree that discovery of the Cosmic Microwave Background (CMB) in 1964 by American radio astronomers Arno Penzias and Robert Wilson proved the universe is expanding from the Big Bang. (Penzias, A. A.; Wilson, R. W. [1965]. "A Measurement of Excess Antenna Temperature at 4080 Mc/s". The Astrophysical Journal. 142 [1]: 419–421). Explanation of why this isn't so can be summed up in one sentence - "The quantum entanglement of microwaves with all of space-time means the Cosmic Microwave Background radiation fills the entire sky and is not produced by the Big Bang as most scientists believe (quantum entanglement has been repeatedly confirmed experimentally)."

Now for a few words about redshift - according to General Relativity, gravity does not exist in space-time but IS space-time. The acceleration known as cosmic expansion is offset by the relativistic proposal that the space-time composing the cosmos IS gravitation. In astrophysics, gravitational redshift or Einstein shift is the process by which electromagnetic radiation originating from a source that is in a gravitational field is reduced in energy and in frequency / increased in wavelength, or redshifted to the red end of the spectrum. Since gravity is just another term for the curvature of space-time, the gravitational field responsible for a particular example of electromagnetic radiation and redshift is not limited to a particular galaxy or galaxy cluster but spans (indeed, is) the whole of space-time.

The farther away a galaxy is, the greater is the amount of gravitation which any electromagnetic radiation has to traverse. So the electromagnetism weakens more than expected and the

gravitational redshift, which is larger than anticipated, naturally increases with distance. All of the redshift not due to the Doppler effect is gravitational redshift, which is always grounded in space-time-spanning gravity. It never indicates universal expansion, which would make it what is called cosmological redshift and would require space-time and gravitation to be separate things.

This gravitational redshift can be applied to anything and everything, including the type 1a supernovae used by the Supernova Cosmology Project and the High-Z Supernova Search Team when they supposedly discovered accelerating expansion of the universe in 1998 (they compared the stars' brightnesses with their measured redshifts, and attributed the apparent expansion to dark energy). (Overbye, Dennis [20 February 2017]. "Cosmos Controversy: The Universe Is Expanding, but How Fast?" New York Times)

Nor does Dark Matter seem to be necessary. General Relativity says gravity is a push exerted by the curvature of space-time. Here are 3 physicists who agree - According to James Overduin, a physicist at Towson University in Maryland, USA who specializes in gravitation - gravity is just another term for the curvature of space-time. To quote from the article "Gravitation" by Robert F. Paton, MS PhD in "The World Book Encyclopedia" (Field Enterprises Educational Corporation, 1967): "(Bodies) merely follow the line of least resistance through the hills and valleys of the curved space that surrounds other bodies. Objects that fall to the earth, for example, are not "pulled" by the earth. The curvature of space-time around the earth forces the objects to take the direction on toward the earth. The objects are pushed toward the earth by the gravitational field rather than pulled by the earth." (I've also heard the modern physicist Michio Kaku agree that gravity is a push.)

The first formal inference about the existence of dark matter ("The redshift of extragalactic nebulae", Fritz Zwicky's first paper on this topic, appeared in 1933 in the obscure journal

Helvetica physica acta, vol. 6, p. 110) said that some unseen matter provided the mass and associated gravitation to hold the Coma cluster of galaxies together. A galaxy or galaxy cluster would indeed tend to fly apart if its gravitation is considered to be a pull from its centre that weakens with the distance to its edge.* But thinking of general relativity's definition of gravity as a push means the galaxy's or cluster's edges are being pushed towards its centre**, thus holding it together. Galactic shrinkage is offset by the orbiting speeds of bodies and / or Einstein's paper that was written 4 years after General Relativity was published - "Do gravitational fields play an essential role in the structure of elementary particles?" ("Spielen Gravitationsfelder im Aufbau der materiellen Elementarteilchen eine wesentliche Rolle?" by Albert Einstein - Sitzungsberichte der Preussischen Akademie der Wissenschaften, [Math. Phys.], 349-356 [1919] Berlin). His paper suggests electromagnetism is the other contributor. (Prof. Wheeler's speculation that there's a relationship between geons - electromagnetic or gravitational waves held together in a confined region by their own nature - and elementary particles supports this.)

* The inverse-square law says that if stars A and B emit light of equal intensity but star B is twice as distant, it will appear one quarter as bright as star A i.e. as the inverse square of 2 (1/4). It also says the gravity between any 2 objects is only one quarter as strong if the distance between the objects doubles.

** Since gravity is by far the weakest force in the universe,^ it's entirely reasonable to think that this acceleration towards the centre requires the 10^{36} times more powerful electromagnetic force. In that case, the gravitational field which electromagnetic radiation originates from could be interpreted as G (gravitation) and EM (electromagnetism) constituting a unified GEM force. This would be consistent with "Do gravitational fields play an essential role in the structure of elementary particles?" There are 2 other known references to the similarities between gravitation and electromagnetism: (1) "Electromagnetic and Gravitational Waves: the Third Dimension" by Gerald E. Marsh, Argonne National Laboratory (Ret) - <https://arxiv.org/pdf/1101.2247> states,

"The motion of a set of test particles under the influence of a plane gravitational wave differs considerably from the electromagnetic case. Yet, there are similarities: not only do both have two independent polarization states, but when one includes the longitudinal motion, the surface associated with the motion of a charged particle responding to an elliptically polarized wave is similar to the constant phase surfaces of a set of particles driven by a plane gravitational wave; in both cases the latter surfaces derive their longitudinal motion from trigonometric double angle functions."

(2) According to "Similarity Between Gravitation and Electrostatic Forces" by mathematician and physicist Ron Kurtus (5 December 2010 - http://www.school-forchampions.com/science/gravitation_electrostatic.htm#.Wkw9dcs_5Ah) - Under the heading "Gravitomagnetism", he states that

"An analogy of gravitational and electromagnetic fields is seen by comparing the Einstein Field Equations from the General Theory of Relativity with Maxwell's Field Equations for electrical and magnetic fields."

This analogy might mean the quantum entanglement of microwaves with all of space-time (gravitation) means the Cosmic Microwave Background radiation fills the entire sky and is not produced by the Big Bang as most scientists believe (quantum entanglement has been repeatedly confirmed experimentally).

^ Why is gravity the weakest force in the universe? Some scientists, including American theoretical physicist Lisa Randall, wonder if it's because gravity is "diluted" by radiating into other dimensions. According to this text, that makes sense since gravity is the fabric of space-time and other parts of this writing say that a unified theory of quantum gravity would unite space-time with the extra dimensions of "imaginary space-time" (see pages 26, 32 and 48). One way of determining if gravity – and the gravitational push which is part of dark matter (for thoughts about other parts, see "**How EmDrive May Work**" and the abstract for "**A PROPOSAL FOR THE TRUE HUMAN CONDITION THAT RECONCILES SCIENCE**

WITH RELIGION") - belongs to a higher dimension would be to measure its effects in space dimensions. In three dimensions, the gravitational force drops to 1/4 if one doubles the distance. In four dimensions (4th-dimensional hyperspace), it would drop to 1/8 and in five dimensions (5th-dimensional hyperspace) to 1/16: "A Brief History of Time" by Stephen Hawking – Bantam Press 1988, pp. 164-165. The positive direction on the x-axis (representing the 3 space dimensions of "real" space-time) is in continuous contact with the negative direction on x (this may be called the 5th space dimension, complex space-time, providing access to the past). Therefore, real gravity is perpetually amplified by complex gravity. Using Professor Hawking's figures, the amplification equals $\frac{1}{4} \times \frac{1}{4}$ ie doubling the distance in 5 space dimensions causes gravity to become 1/16 as powerful. It is not $\frac{1}{4} \times -\frac{1}{4}$ since numbers have the same property regardless of direction on the Complex Number Plane (they increase in value). To conserve this sameness, the second one must be $+\frac{1}{4}$ if the first one is $+\frac{1}{4}$. Alternatively, the gravity's strength is reduced 4 times and this number is multiplied by another 4 to reduce it 16 times overall. In the 4th space dimension/2nd time dimension represented by the imaginary axis, this y-axis is half the distance (90 degrees) from the real x-axis that the complex x-axis is (it's removed 180 degrees). So gravitational weakening from doubling distance in 4 space dimensions = (reduction of 4 times multiplied by another reduction of 4 times) / 2, for an overall reduction of 8 times to a strength of 1/8. Only 5 space dimensions can exist – along with real time, imaginary time and complex time.

THE RELATION OF THE HIGGS FIELD TO GRAVITY

Regarding Einstein's 1919 paper, it's certainly true that general relativity plus electromagnetism in their present forms cannot explain the existence and stability of elementary particles. Einstein showed that it is necessary to modify General Relativity's gravitational field equations (soon after the final formulation of general relativity, he pointed out the need for a quantum modification of the theory). ("ViaLibri – The World's Largest Marketplace for Old, Rare & Out-of-Print Books":

<https://www.vialibri.net/years/items/1338292/1919-einstein-albert-spielen-gravitationsfelder-im-aufbau-der-materiellen>). Therefore, the future quantum modification of gravitation and electromagnetism could, possibly, prevent galactic shrinkage because the waves are weakened during their role of building up the structure of elementary particles. And possibly, during formation of particles' associated strong and weak nuclear forces.

This refers to theories where the role of the Higgs field is fulfilled by particular couplings (in this case, of the graviton and photon - see M. Tanabashi; M. Harada; K. Yamawaki. Nagoya 2006: "The Origin of Mass and Strong Coupling Gauge Theories". International Workshop on Strongly Coupled Gauge Theories. pp. 227–241). In connection with the proposed Higgs field: "to justify giving mass to a would-be massless particle, scientists were forced to do something out of the ordinary. They assumed that vacuums (empty space) actually had energy. That way, if a particle that we think of as massless were to enter it, the energy from the vacuum would be transferred into that particle, giving it mass." (Wikipedia - Higgs field - Reason for Higgs effect). This means the Higgs field cannot be separate from the universal Gravitational - ElectroMagnetic (GEM) field. If it was, massless gravitons and photons would enter the Higgs field and become massive. Since they're the same thing, graviton-photon interaction can be called the Higgs field if that term is preferred. Nothing would be able to move faster than light because, as suggested by a paper published by Einstein in 1919, all masses are made of light – or EM – interacting with G waves, which also travel at the speed of light (the limiting speed of light is thus built-in to particles).

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- 6) Kibble T. 2009. "Englert-Brout-Higgs-Guralnik-Hagen-Kibble mechanism". *Scholarpedia* 4: 6441–6410.

Without going into formal theory ourselves, we can use the conclusions derived from the quantum and mathematical theories of others to make an educated guess as to what the future quantum modification of gravitation and electromagnetism will be -

the existence of both advanced waves (which travel backwards in time)* and retarded waves (which travel forwards in time) as admissible solutions to James Clerk Maxwell's equations about electromagnetism was explored in the Wheeler–Feynman absorber theory last century, as well as in the more recent transactional interpretation of quantum mechanics (TIQM). Einstein's equations say gravitational fields carry enough information about electromagnetism to allow Maxwell's equations to be restated in terms of these gravitational fields. This was discovered by the mathematical physicist George Yuri Rainich. [George Yuri Rainich, *Transactions of the American Mathematical Society*, 27, 106 - Rainich, G. Y. (1925)] Therefore, gravitational waves also have a 'retarded' component and an 'advanced' component. They can travel forward or backward not only in space, but in time too.

*On pages 277-278 of "Physics of the Impossible" (Penguin Books, 2008), Michio Kaku writes, "Analyzing (Paul) Dirac's (1902-1984) original work on the electron, (Richard) Feynman (1918-1988) found something very strange. If he simply reversed the direction of time in Dirac's equation, the equation remained the same if he also reversed the electron charge. In other words, an electron going backward in time was the same as an antielectron going forward in time! ... Feynman had found the reason that nature allowed these backward-in-time solutions: they represented the motion of antimatter."

17th century scientist Isaac Newton's idea of gravity acting instantly across the universe could be explained by gravity's ability to travel back in time, and thereby reach a point billions of light years away not in billions of years, but in negative billions-of-years. That is; the negative/advanced component of a gravitational wave would already be at its destination as soon as it left its source, and its journey is apparently instant. Instantaneous effect over large distances is known as quantum mechanics' entanglement and has been repeatedly verified experimentally. If the retarded (forwards) wave component travels in positive space, the advanced (backwards) component corresponds to an equal amount of negative distance. The forwards and backwards movement in time can potentially cancel to produce a quantum (and macroscopic) entanglement that eliminates the need for the Big Bang's and Cosmic Inflation's solution that the universe is roughly the same everywhere on large scales because everything was once in contact in a tiny space.

The quantum entanglement of microwaves with all of space-time means the Cosmic Microwave Background radiation fills the entire sky and is not produced by the Big Bang as most scientists believe (quantum entanglement has been repeatedly confirmed experimentally). For more about entanglement, see 'The Weirdest Link' (*New Scientist*, vol. 181, issue 2440 - 27 March 2004, 32, <http://www.biophysica.com/QUANTUM.HTM>) and 'Quantum Entanglement in Time' by

Caslav Brukner, Samuel Taylor, Sancho Cheung, Vlatko Vedral,
<http://www.arxiv.org/abs/quant-ph/0402127>.

As far as I can tell, the Higgs field is so weak because it's a manifestation of the extremely weak gravitation filling the universe. This is despite physicist Matt Strassler's 2012 article "Why the Higgs and Gravity are Unrelated" (<https://profmattstrassler.com/2012/10/15/why-the-higgs-and-gravity-are-unrelated/>). Despite all his attention to maths and scientific detail, Prof. Strassler makes an inexplicable claim. He says there is no "mathematical connection between gravity and the Higgs field" partly because "gravitational fields ... are described as part of space and time". According to James Overduin, a physicist at Towson University in Maryland, USA who specializes in gravitation - General Relativity states gravity is just another term for the curvature of space-time ie gravity is not part of space-time: it IS space-time. Prof. Strassler undoubtedly simply had a brief lapse in his attention to detail, but the lapse leads to my conclusion that there indeed is a mathematical connection between gravity and the Higgs field. By itself, this lapse is not a good enough reason to dismiss Prof. Strassler's maths and details.

To show a connection between gravity and the Higgs field, more is necessary than saying gravity is not part of space-time: it IS space-time. We must consider the complete sentences in "Why the Higgs and Gravity are Unrelated". They are "Gravitational fields have spin 2 and are described as part of space and time; they interact with all particles and fields in nature. The Higgs field, which has spin 0, only interacts directly with elementary particles and fields that also participate in the electromagnetic and weak nuclear forces." In Prof. Strassler's words,

"The majority of the mass of an atom is its nucleus, not its lightweight electrons (elementary particles) on the outside. And nuclei are made from protons and neutrons (composite particles) — bags of imprisoned or “confined” quarks, antiquarks and gluons. These quarks, antiquarks and gluons go roaring around inside their little prison at very high speeds, and the masses of the proton and neutron are as much due to those energies, and to the energy that is needed to trap the

quarks etc. inside the bag, as it is due to the masses of the quarks and antiquarks contained within the bag. **So the proton's and neutron's masses do not come predominantly from the Higgs field.**" From <https://profmattstrassler.com/2012/10/15/why-the-higgs-and-gravity-are-unrelated/>

A complete, not merely partial, connection between gravity and the Higgs field requires explanation of quantum spins (taking up the challenge of attempting to write down a logically sound hypothesis, this will now be done non-mathematically).

SPIN INTERACTIONS AND MAKING BOSONS OR FERMIONS

This begins with the description of spin in "A Brief History of Time" by Stephen Hawking – Bantam Press, 1988, pp.66-67. Prof Hawking writes,

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

Spin 1 (like an arrow-tip pointing, say, up: a photon has spin 1).

Has to be turned round a full revolution of 360 degrees to look the same.

Spin 2 (like an arrow with 2 tips - 1 pointing up, 1 down: a graviton's spin).

Turned half a revolution (180 degrees), it looks the same.

Spin 0 (like a ball of arrows having no spaces between arrows, particles with spin 0 look like a dot: the same from every direction).

The Higgs boson has spin 0.

Spin 1/2 This is the spin of matter particles such as the proton, neutron, electron, neutrino and quark. (Author's opinion: I think they look like a Mobius Strip).*

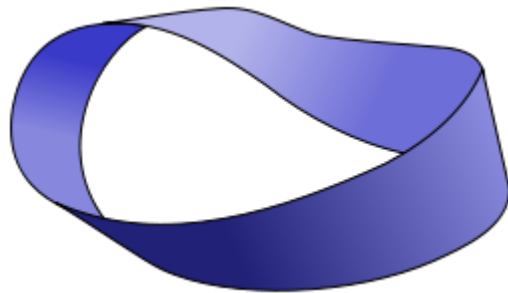
*These particles must be turned through 2 complete revolutions to look the same, and you must go round a Mobius twice to reach your starting point.

To produce the spin of matter particles (1/2) from the photon (1) and graviton (2), 1 is divided by 2. Photon/graviton may equal distance/duration ie the revised electromagnetism above with shock waves (horizontal distance) and rising or falling spin-1 photons (vertical distance) divided by the time taken to traverse part of the universe's gravitational field (composed of spin-2 gravitons).

To produce the spin of the Higgs boson (0), 1 is subtracted from 1. Visualize a photon's spin (the first 1) as a playing card connected to another card, which represents a graviton. The connection might be pictured as a nail punched vertically through the middle of one card and into the centre of the other: the connection represents the continuous interaction of the long-range electromagnetic and gravitational forces filling space-time. The photon card pulls the graviton card around with it while making a revolution that affirms its identity. During this, the graviton completes a second half-revolution and still looks the same (retains its identity). The second half-revolution is the second 1 in this paragraph's first line. Together with the first 1 its subtracted from, it forms the 0 revs and spin 0 of the Higgs boson. Einstein's hoped-for gravitational-electromagnetic unification is achieved by adding photons and gravitons. However, he never found the quantum modification he sought. So the quantum interaction and entanglement

accomplished via advanced and retarded waves or the Transactional Interpretation of Quantum Mechanics is better described as subtracting gravitons from photons.

Mobius Loop (source: http://www.polyvore.com/mobius_strip_public_domain_clip/thing?id=72360021)



There are 4 scientists I know of that support the idea of the universe being composed of information/mathematics:

1) In 1990, John Wheeler (1911-2008) suggested that information is fundamental to the physics of the universe. According to this "it from bit" doctrine, all things physical are information-theoretic in origin. (Wikipedia's description of *Wheeler, John A. (1990). "Information, physics, quantum: The search for links". In Zurek, Wojciech Hubert. Complexity, Entropy, and the Physics of Information. Redwood City, California: Addison-Wesley.*

2) Erik Verlinde says gravity is not a fundamental force of nature, but an emergent phenomenon. In the same way that temperature arises from the movement of microscopic particles, gravity emerges from the changes of fundamental bits of information, stored in the very structure of spacetime. ["Emergent Gravity and the Dark Universe" by E. P. Verlinde, 7 Nov 2016 (arxiv.org/abs/1611.02269)]

3) Cosmologist Max Tegmark hypothesizes that mathematical formulas create reality – ["Our Mathematical Universe" by Max Tegmark – Random House/Knopf, January 2014]

4) "Pioneered (in the late 1980's) by Rafael Sorkin, a physicist at the Perimeter Institute in Waterloo, Canada, the theory (causal sets) postulates that the building blocks of space-time are simple mathematical points that are connected by links, with each link pointing from past to future." ["Theoretical physics: The origins of space and time" by Zeeya Merali ("Nature" **500**, 516–519 – 28), August 2013]

Recalling John Bardeen's statement on superconductivity, "(Revolution in quantum spin), though not fully accurate, captures the sense of (spin)". "The quantum spin of a particle cannot be explained in terms of classical rotation since it can only have certain values that are equal to either a whole number or half a whole number multiplied by *Planck's constant* h - ratio of a photon's energy to its frequency - divided by $2(\pi)$ (a quantity called \hbar): "Quantum" by Manjit Kumar (Icon Books, 2008). **It seems plausible that the particular values of spin could be determined by another set of particular values viz those in electronics' BInary digiTS, which always take the form of either 1 or 0.* If a subatomic particle of matter really does look like a Mobius strip, this - when combined with the previous sentence - is a clue as to how to make particles (of light and gravity, as well as matter).** First, the 1's and 0's are programmed to form the shape of a Mobius strip, which is merely two-dimensional (2-D). The recent science paper "From Planck Data to Planck Era: Observational Tests of Holographic Cosmology" by Niayesh Afshordi, Claudio Corianò, Luigi Delle Rose, Elizabeth Gould, and Kostas Skenderis: Phys. Rev. Lett. 118, 041301 (2017) - Published 27 January 2017(<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.118.041301>) says - In a holographic universe, all of the information in the universe is contained in 2D packages trillions of times smaller than an atom. ("Holographic" could refer to the interference between gravitational and electromagnetic waves, while "2D packages trillions of times smaller than an atom" could refer to Mobius strips.)

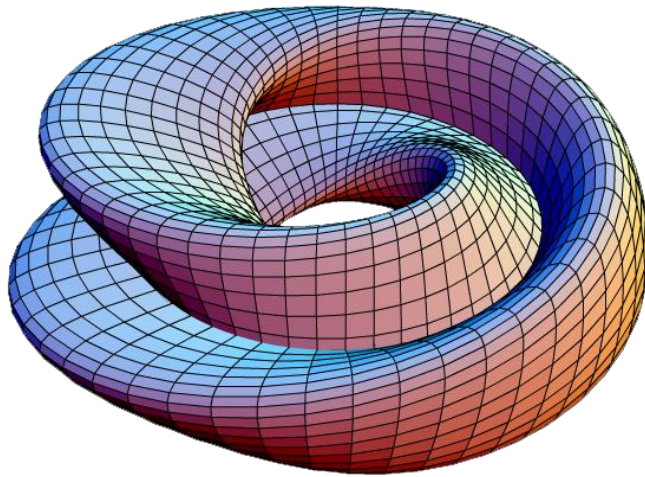
***These electronic BITS fill the universe – and give it Artificial Intelligence (AI) on chemical, subatomic, biological and astronomical levels. However, the true origin of life cannot be evolution and chemicals alone – it must be the brains producing natural AI.**

Then two strips must be joined to make a 4-D Klein bottle which has length, width, depth and the 4th dimension of movement in time: "Imaging maths - Inside the Klein bottle" by Konrad Polthier (<http://plus.maths.org/content/os/issue26/features/mathart/index>). The type of Klein bottle formed would appear to be the figure-8 Klein. A diagram of many figure-8 Klein bottles would show that their positive curvature (on the spherical parts) fits together with their negative curvature (on saddle-shaped parts) to cancel and produce the flat curvature of space-time ("The WMAP science team has nailed down the curvature of space to within 0.4% of 'flat' Euclidean." - "Wilkinson Microwave Anisotropy Probe" - <https://map.gsfc.nasa.gov/>). Like the pommel protruding from the front of a saddle, negative curvature can cause an "imaginary" space – and thanks to the indissoluble union of spatial plus temporal phenomena, "imaginary" time*; to extend 90 degrees from the "surface" of real, flat space-time. When you have trillions of Mobius and figure-8 Klein elements assembled, an appropriate number of photons and gravitons must be included to give it what we call mass. You can make massless photons and electromagnetic fields by omitting gravitons and changing programming of spin from 1/2 to 1. Massless gravitons and gravitational fields can be made by omitting photons and programming spin values that are 2/1 instead of 1/2.

*Professor Itzhak Bars of the University of Southern California in Los Angeles says, 'one whole dimension of time and another of space have until now gone entirely unnoticed by us'. (Tom Siegfried, 'A Two-Time Universe? Physicist Explores How Second Dimension of Time Could Unify Physics Laws', May 15 2007 <https://m.phys.org/news/2007-05-two-time-universe-physicist-explores-dimension.html>) Could Prof. Bars' second dimension of space be imaginary (in the sense of $i = \sqrt{-1}$) space which is united with imaginary time the same way ordinary space

and time are joined? And in the unification of a quantum gravity universe, the real and imaginary would be connected.

Figure-8 Klein Bottle (source: <http://commons.wikimedia.org/wiki/File:KleinBottleFigure8-01.png>) Note that, when considering many bottles, the reddish positive curvature fits together with the bluish negative curvature to produce the flatness implying space-time's infinity/eternity.



The Higgs field is thus weak like gravity. In fact, it may have no independent existence from the gravitational field. Different proposed measurements for the Higgs and gravitational fields are expected because the gravitational field which fills space-time is perpetually interacting with the electromagnetic field that also fills space-time.

THE FINAL MISSING STEPS IN $E=mc^2$

Since Einstein's mass-energy equation is strictly limited to observers co-moving with the object under study, $E=mc^2$ becomes a cosmological constant (G, the gravitational constant, is another) and c^2 must be added to the mass/light-speed part of this article's equation -

$$E = v = f\lambda = \text{distance/duration} = \text{space/time} = mc^2$$

Simplified by removal of the middle elements, this becomes $E=mc^2$

(any other result would suggest the inventor of Relativity was wrong).

$E=mc^2$ only applies to the photon at rest. Since it's plausible that the photon can indeed be at rest within what is called an electromagnetic wave, the equation seems to tell us that all distances in space, and time, can be completely eliminated (permitting us to instantly reach anywhere in space-time – see **Biological Revolution, Gravitation, and Brouwer Fixed Point Theorem's Use In Future Space-Time Travel**). Let's represent the masslessness of photons by 0 (zero), and also the masslessness of the theoretical gravitons by zero. Suppose theories developed from Einstein's 1919 paper "Spielen Gravitationfelder im Aufbau der materiellen Elementarteilchen eine wesentliche Rolle?" ("**Do gravitational fields play an essential role in the structure of elementary particles?**") are proven correct one day. Then mass could result from photon-graviton interaction (this agrees with theories where the role of the Higgs field is fulfilled by particular couplings), and we could replace the m with zero. This results in $E=0*c^2$ ie outside familiar circumstances (such as in black holes), it is possible for E to equal 0. Having reduced the equation to nothing but E, $m=0$ and $c^2=0$ which means $m=c^2$. At first glance, $m=c^2$ seems to be saying mass exists at light speed. But the absence of E (energy) refers to there being no interaction of light energy and gravitational energy, and therefore no mass. If mass cannot be produced, Einstein's paper suggests mass-producing space-time/gravity must be described by zero. The zero-ness of space-time/gravity does not mean it doesn't exist ... it obviously does. It means we can relocate matter and information superluminally, or travel into the past and future, because distance equals zero and can be eliminated from both space and time.

WHAT WILL EDUCATION BE LIKE IN 2049? LEARN BY HOLOGRAPHIC TEACHERS USING QUANTUM MECHANICS, "IMAGINARY" COMPUTERS AND A UNIFICATION OF PHYSICS THAT WILL BRING EDUCATION TO EVERYONE, EVERYWHERE

Augmented reality and Neuroscience

How will students and teachers interact? This is where augmented reality and neuroscience could be relevant. The teacher may be a hologram who uses quantum mechanics. That way, he or she can be in more than one place at once – even everywhere at once. The teacher-hologram may also be able to quantum-mechanically implant information directly into the brains of students, bypassing the tedious process of sitting in one spot for hours and listening to lectures or watching videos.

There are two more areas in which my guesses might prove to be more than wild science-fiction. First, the computers students use might make today's laptops and desktops – even tomorrow's quantum computers – look like something from ancient history.

1 - GOING BEYOND QUANTUM COMPUTERS WITH "IMAGINARY" TIME

Our present approach to developing computers has gone about as far it can. The problems of chips generating too much heat - and of quantum uncertainties making transistors hopelessly unreliable at the scale of atoms - demand a new approach. I'm proposing that the successor to today's silicon technology (and tomorrow's quantum computers) lies in new concepts of time. An "imaginary" computer using the Complex Number Plane's vertical axis of imaginary time can perform calculations at the familiar rate of time's passing while the horizontal axis of "real" time sees absolutely no elapsed time (the possibility of no time passing in the normal sense is hinted at by Special Relativity's time dilation or slowing of time).

For a hundred and ten years, science has accepted the concept of space-time which was formulated by Russian-German mathematician Hermann Minkowski and unites one time dimension with three space dimensions. Today, so-called imaginary numbers (such as i , which equals $\sqrt{-1}$) describe so-called imaginary time. Imaginary time is a concept derived from special relativity and quantum mechanics. Geometrically, imaginary numbers are found on the vertical axis of the Complex Number Plane, allowing them to be presented perpendicular to the real axis of space-time as we know it. 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.

The ultraviolet catastrophe, also called the Rayleigh–Jeans catastrophe, is a failure of classical physics to predict observed phenomena: it can be shown that a blackbody - a hypothetical perfect absorber and radiator of energy - would release an infinite amount of energy, contradicting the principles of conservation of energy and indicating that a new model for the behaviour of blackbodies was needed. At the start of the 20th century, physicist Max Planck derived the correct

solution by making some strange (for the time) assumptions. In particular, Planck assumed that electromagnetic radiation can only be emitted or absorbed in discrete packets, called quanta. Albert Einstein postulated that Planck's quanta were real physical particles (what we now call photons), not just a mathematical fiction. From there, Einstein developed his explanation of the photoelectric effect (when quanta or photons of light shine on certain metals, electrons are released and can form an electric current). So it appears entirely possible that another supposed mathematical trickery (imaginary time) will find practical application in the future.

To introduce you to the idea of extra dimensions, consider this – Professor Itzhak Bars of the University of Southern California in Los Angeles says, one whole dimension of time and another of space have until now gone entirely unnoticed by us. (Tom Siegfried, 'A Two-Time Universe? Physicist Explores How Second Dimension of Time Could Unify Physics Laws', May 15 2007 <https://m.phys.org/news/2007-05-two-time-universe-physicist-explores-dimension.html>) The temporal dimension would be "imaginary" time and the spatial dimension would be "imaginary" space, which must exist since time cannot exist apart from space (just as there is space-time, there would be imaginary space-time). Now suppose engineers warp space-time so the functioning of a computer's processor takes place in so-called imaginary time. If warping is looped so results emerge in so-called real time, its calculations would be retrieved instantly after they were entered into the computer because billions of years might pass in imaginary time yet no period at all could elapse in our real time. These warps and loops are viable because they're inspired by Einstein's Special Relativity – and propose the use of space-time warping which, though in its infancy, is a technology being worked on today by places like NASA.

Second; 2 describes how higher education in 2049 could include all people, everywhere.

2 - Possible Application Of A Universal Unified Theory To Education

Professor Stephen Hawking wrote in his book "A Brief History of Time" (p. 168) that "If a complete unified theory was discovered, it would only be a matter of time before it was digested and simplified and taught in schools, at least in outline. We should then all be able to have some understanding of the laws that govern the universe and are responsible for our existence."

A complete unified theory would not be restricted to mathematics, for that would make the theory incomplete. A complete theory would, by definition, affect everything in space-time. Affecting everything in time means the generation of 2049 – and even what you and I would call past or present generations - would be able to learn how to intuitively access the knowledge of future centuries.

Unification necessarily means today's scientific approach of viewing objects and events as separate will become limited to the way senses perceive objects and events. Separateness will belong to "classical" existence, and unification to "quantum mechanical" existence where all energy and matter, objects and events in space-time are entangled.

HYPOTHESES SUPPORTING GRAVITATION AS A PUSH

- See "REFERENCES (Part 2)"

(1) M-SIGMA, THE NON-FUNDAMENTAL NUCLEAR FORCES

The M-sigma relationship was only discovered in 2000 and is observational, meaning scientists noticed it first and are now trying to understand the cause. M refers to the mass of a galaxy's central black hole, and sigma stands for the speed at which stars fly about in the galaxy's bulge. The bigger the black hole, the faster the stars move - the greater is their velocity dispersion. (1)

Gravitational waves would explain the cause. Some of the ocean waves passing an island are refracted - when they enter shallow water, they're refracted by friction with the mass of the seabed. They change direction and head towards the island, breaking onto its beaches. Similarly, gravitational waves are refracted and focus on the centre of a mass. In this case, the mass the waves are headed toward is the black hole, where they help form its composition. Some waves passing a star near the black hole strike the left side of the star and would set it spinning in a certain direction (say clockwise, as seen from above). But this motion is countered by waves striking the star's right side at the same time and producing counterclockwise movement. The result, if the waves on each side have identical strengths, is that there's no change in rotation. But the energy from the waves striking the star has to have an effect. It probably cannot push the star closer to the black hole since gravitational waves from the opposite direction are balancing that effect by trying to push it further away - there may be a tiny imbalance eg in regard to the Astronomical Unit. (2) The tiny imbalance could naturally affect rotation, too.

Though the energy from the waves impacting the star has little influence on stars' rotation or distance from the black hole, Imaginary Time says that it speeds up the stellar orbital movements. Imaginary time - which is as real to physicists and mathematicians as our familiar real time - obtained its name because it was originally a purely mathematical representation of time which appears in some approaches to the special relativity and quantum mechanics theories developed in the early decades of last century. We can picture imaginary time in the following way. One can think of ordinary, real, time as a horizontal line. On the left, there's the past - and on the right,

the future. But there's another kind of time in the vertical direction. This is called imaginary time (it's described with imaginary numbers such as i which equals $\sqrt{-1}$).

As mathematical physicist Paul Davies writes in *The Real Glean In The Imaginary 'i'* (20 FEBRUARY 2017 - <https://cosmosmagazine.com/mathematics/the-glean-in-the-i>) -

"The name has stuck, even though today we accept imaginary numbers are just as real as real numbers."

It was, I think, in the next issue of *Cosmos* magazine that Prof. Davies wrote that imaginary time is just as real as the time we're familiar with. Professor Itzhak Bars of the University of Southern California in Los Angeles says, "one whole dimension of time and another of space have until now gone entirely unnoticed by us". ("A Two-Time Universe? Physicist Explores How Second Dimension of Time Could Unify Physics Laws" - May 15, 2007 by Tom Siegfried (Read more at: <https://m.phys.org/news/2007-05-two-time-universe-physicist-explores-dimension.html>)). Could Prof. Bars' second dimension of space be imaginary (in the sense of $i = \sqrt{-1}$) space which is united with imaginary time the same way ordinary space and time are joined? And in the unification of a quantum gravity universe, the real and imaginary would be connected.* If the waves play a role in the black hole's mass and gravitational field, their influence would not be limited there and they'd also play a role in forming those properties in any other body they encounter.** The bigger the black hole, the more gravitational waves would be entering it, and the greater would be the effect on the orbits of nearby stars.

* General Relativity proposes that the space-time composing the cosmos IS gravitation. Gravitational waves not only compose space-time but also imaginary-space-time. The linear motion of waves headed towards the central black hole and striking stars' sides during the journey is converted into increased (and perpendicular) orbital speed of the stars since the gravitational waves of imaginary time are at 90 degrees to the gravitational waves of space-time (recall how

we can picture imaginary time as another kind of time in the vertical direction when familiar time is a horizontal line). The waves give the false impression of penetrating the entire universe because they're constantly absorbed into what could be called wave packets to refresh matter and the nuclear forces associated with it, then re-radiated.

** See (3) - Einstein's paper was written prior to the discovery of the nuclear forces. However, it seems to imply to modern science that the 2 nuclear forces are not fundamental but, like the matter they're associated with, are products of gravitational - electromagnetic interaction (a coupling which produces the energy of the strong force's gluons, as well as the mass of the weak force's W and Z particles). This agrees with theories in which the role of the mass-bestowing Higgs field is played by various couplings (4).

Let's apply this aspect of gravity to a few more instances -

(2) GEYSERS ON SATURN'S MOON ENCELADUS

"A small water jet on Enceladus, an icy moon of Saturn, spews its fiercest eruptions when the moon is farthest from the planet, a new study suggests, but the overall gas output doesn't increase much during that time. The study points to a mystery in Enceladus' plumbing." (5)

Basically, the problem seems to be that humans haven't caught up with Einstein's ideas about gravity yet. In 1919, he submitted a paper to the Prussian Academy of Sciences asking "Do gravitational fields play an essential role in the structure of elementary particles?" (3) If so, gravitational waves from deep space would focus on the centre of a planet's mass. When

Enceladus is near Saturn, it would also be close to increased activity of the waves. The increased push from them would suppress emission of dust-sized water-ice grains, which is 3 times greater at the moon's farthest point because suppression is reduced there. Gas emission is also increased. Since this is not 3 times more, but only 20% more, a plumbing problem would be causing the discrepancy.

(3) GRAVITY, FALLING BODIES

An article (6) in a 50-year-old encyclopedia got me thinking. It said Newton's laws of gravity explain why an object loses weight when buried in the earth - because only the mass below the object is pulling down on it (at earth's centre, the object would weigh nothing, it said). Einstein's interpretation of gravitation can be regarded as a push by the curved space-time surrounding our planet, so I wondered how this push - rather than pull - could make objects lose weight when they're buried.

Gravitational waves penetrating the surface (let's call it surface A) would try to push the object towards the centre of Earth (the earth's substance would easily resist the push). But this couldn't make the object lighter. Waves passing thru the earth from the opposite side of the globe (from surface B) would try to push the object upwards. This makes the object a tiny bit buoyant, and lighter. The waves from the space-time above surface A supposedly propel all objects toward that surface at 32 feet per second (the falling-bodies law). Note that Einstein wrote a 1919 paper about gravitation playing a role in the composition of elementary particles. (3) Since gravity/gravitational waves is the curvature of space-time, our planet (and the rest of the universe) would not be separate from space-time. Everything in time and the universe is part of a continuum ... a unification. In the not-surprising eventuality that Einstein is proven correct yet again (regarding his 1919 paper this time); I think there should be a minuscule, presently unmeasurable difference in the rate of descent of more massive and less massive bodies. This is because a

greater mass would, by definition, be a greater concentration of the gravitational waves pushing the object to the surface. The Microscope satellite currently in orbit will test the falling-bodies law with a precision that is 100 times greater than can be achieved on Earth - and could possibly confirm Einstein's 1919 paper, revising our understanding of the law.

The waves above surface B start out pushing objects at 32 ft/s but gravity weakens to 1/4 when distance is doubled. By the time they pass through the planet and emerge at surface A, they're far too weak to accelerate even the lightest objects upward enough to make them float. The weakening of the waves might be caused by their involvement in production of matter and mass. Perhaps they're also weakened by production of matter's associated strong and weak nuclear forces ie by production of the gluon's energy (strong force), as well as the mass of W and Z particles (weak). At the exact centre of the world, the object would be subject to equal quantities and strengths of gravitational waves from every direction. It'd have no tendency to move in any direction and would be as weightless as if it were floating in space.

(4) EARTH'S TIDES, ASTRONOMICAL UNIT, COSMIC BACKGROUNDS

When ocean waves pass an island, some enter shallow water and are refracted by friction with the seabed. They change direction and head towards the island, breaking onto its beaches. Similarly, gravitational waves are refracted and focus on the centre of a mass. Exerting a force on that centre (a push) in partnership with the 10^{36} -times-more-powerful electromagnetic waves, the gravitation might build up more mass concentrically with the centre to create a subatomic particle or a planet [3]. Newton's mathematics describes the gravitational force very well even though he describes gravitation as an attractive pull. Einstein says it's a push. To quote from [6]:

"(Bodies) merely follow the line of least resistance through the hills and valleys of the curved space that surrounds other bodies. Objects that fall to the earth, for example, are not "pulled" by the earth. The curvature of space time around the earth forces the objects to take the direction on toward the earth. The objects are pushed toward the earth by the gravitational field rather than pulled by the earth."

As the refracted gravitational wave passes through space, part of it is diverted by mass to form more mass (the more mass, the more gravity is diverted). Though the International Space Station weighs almost 413 tons, it has tiny mass compared to any planet and the isolation of its severely reduced number of gravity waves produces so-called weightlessness. Black holes – ranging from about 3 solar masses for the smallest stellar variety to billions of solar masses for supermassive black holes in galaxy centres – have so much mass and diverted gravity that light pushed into them is unable to escape.

Entering a black hole on anything except a very special pathway into it is predicted to cause you to be shred into long, thin pieces – a process called spaghettification, and caused by the black hole's tidal forces (differences in its gravitational effect on an object's nearer and more distant ends). The relatively insignificant gravitational forces associated with Earth push your head and feet down without any noticeable difference, though the difference does exist. Experimenters have shown that a clock on the ground floor of a building 25 metres tall runs more slowly than one near its top, and attributed the difference to gravitational effects [14]. The closer you get to the black hole, the greater is the number of gravitational waves you'll encounter – because their number increases in any given volume of spacetime as they approach the black hole they're focused on. Assuming you fall feet first - the extreme gravitational waves associated with a black hole push your head towards the hole with tremendous force but are vastly magnified by addition of many more waves in the 5 or 6 feet between one end of you and the other. This results in your

feet being much, much closer to the black hole's centre and you become spaghettified into a long, thin strand.

How, then, can repelling or pushing gravity account for the apparent attraction of ocean tides towards the Moon? I believe such an idea of gravity requires the idea of 17th-century scientists Isaac Newton and Johannes Kepler that the moon causes the tides, to be joined with Galileo's idea that the Earth's movements slosh its water.

"If a barge (carrying a cargo of freshwater) suddenly ground to a halt on a sandbar, for instance, the water pushed up towards the bow then bounced back toward the stern, doing this several times with ever decreasing agitation until it returned to a level state. Galileo realized that the Earth's dual motion—its daily one around its axis and its annual one around the sun—might have the same effect on oceans and other great bodies of water as the barge had on its freshwater cargo."
[15]

Gravity's apparent attraction can be summarized by the following – gravitation-is/gravitational-waves-are absorbed into what may be called wave packets and the inertia of the theoretical gravitons (united with far more energetic photons) carries objects towards Earth's centre at 9.8 m/s or 32 ft/s. The mass of the oceans on Earth is estimated at nearly 1.5 billion cubic kilometres [16]. All this water is being pushed towards Earth's centre at 32 feet per second every second. But the seafloor prevents its descent. So there is a recoil, noticeable offshore (it is only where oceans and continents meet that tides are great enough to be noticed). This recoil is larger during the spring tides seen at full and new moon because sun, Earth and moon are aligned at these times.

The previous paragraph's alignment of Sun, Earth and moon therefore refers to their being lined up where the gravitational current is greatest (in the plane where planets and moons are created) - and to more of the gravitational waves travelling from the outer solar system being captured by solar and lunar wave packets, and less of them being available on Earth to suppress oceanic recoil (there are still enough to maintain the falling-bodies rate of 32 feet per second per second). At the neap tides of 1st and 3rd quarter; the sun, earth and moon aren't lined up but form a right angle and our planet has access to more gravitational waves, which suppress oceanic recoil to a greater degree. The same effect is achieved if we imagine the sun and moon pulling earth's water in different directions at neap tide, but suppression of oceanic recoil appears to be a more accurate description. If variables like wind/atmospheric pressure/storms are deleted, this greater suppression causes neap tides which are much lower than spring tides.

After absorption (whether in oceans, in space, or anywhere else), most of the gravitational waves are used in building and refreshing matter and its associated nuclear forces. The remnant is re-radiated from stars, planets, interstellar gas and dust, etc. It's radiated as gravitational waves (a Gravity Wave Background, challenging the idea that the traditional form of Cosmic Inflation was necessary to generate gravitational waves). Suppose "General Relativity eliminates Dark Energy, Dark Matter and Universal Expansion" is correct when it suggests G (gravitation) and EM (electromagnetism) constitute a unified GEM force. Then the gravity waves emitted after absorption could also be radiated as all types of electromagnetic waves – including an infrared background whose heat output exceeds that of the stars alone, in addition to a microwave background. The latter challenges the idea that existence of the cosmic microwave background proves the universe began with the traditional Big Bang.

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. 99% of the solar system's mass / gravitational waves / gravity are

associated with our star, so the gravitational push on Earth from its sphere may be slightly greater than the push from the waves originating in deep space. In the end, our planet's orbit would be growing slowly larger. The distance between Sun and Earth is growing by approx. 15 centimetres per century according to [2]. The two authors attribute this increase of the Astronomical Unit (AU – the average distance between Earth and the Sun) to dark energy. The increase may actually be gravitational. **The waves from deep space are a possible unrecognized contributing factor to the Pioneer anomaly, where the Pioneer spacecraft near the solar system's edge are a few thousand kilometres closer to the Sun than predicted.**

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A PROPOSAL FOR THE TRUE HUMAN CONDITION THAT RECONCILES SCIENCE WITH RELIGION

Abstract -

My article began as a reply to astrophysicist Jeff Hester's (pro-evolution) pages on entropy. (1) The letter pointed out evolution's pluses (eg adaptations) and minuses (regarding origins). It went on to speak of a human, scientific, entirely natural explanation for God. It proposes the human condition after death and before conception* is as a member of the Elohim - a name used for God in the Old Testament which, according to World Book Encyclopedia, means the PLURAL MAJESTY OF THE ONE GOD. This led to why some people call a natural process

'supernatural'. Maybe it's because of the applications** in thousands of years of finding a theory of quantum gravity (union of quantum mechanics and Einstein's theory of gravity - general relativity). Like quantum mechanics and gravitation, those apps would include all space and all time, and would be as mysterious to us as our technology would be to the builders of Egypt's pyramids. Proposing the human condition after death and before conception is as a member of the Elohim means humans of the distant future must be capable of the creation attributed to God by many people through the centuries. Therefore, a subsection entitled **Creation Of The Infinite, Eternal Cosmos Using Electronic BITS, Pi And Imaginary Time** has been added.

*The development of the human brain would gradually erase all memory of "super-human" existence as a member of the Elohim. That superhuman life is like quantum mechanics and gravitation, and includes all space and all time (**it would definitely NOT be a "soul" or "spirit", which suggests it's limited to an individual body**). Therefore, memory of the life must persist to some extent during early childhood. However, we become immersed in being human and the brain we now possess becomes our sole source of memories. All those Elohim recollections fade and usually completely disappear after a few years. This connection is part of a unification of everything in space-time (from the quantum to the cosmic). So I can think of no reason why other life, such as animals that die, should be exempt from this eternal life or the expanded "cosmic consciousness" it brings.

**In 1925, the Austrian physicist Wolfgang Pauli discovered the exclusion principle. This says two similar particles cannot have both the same position and velocity. If two electrons could have identical positions and velocities, they could all collapse into a roughly uniform, dense "soup". Protons and neutrons would do the same, and there would be no well-defined atoms. So we need the exclusion principle. Force-carrying particles like photons and gravitons do not obey the exclusion principle so we might assume the immaterial body wouldn't be well-defined and would collapse into a ghostly soup. But perhaps a well-defined structure can be built by programming

photons that are substituted for the body's particles; thus creating a body of “light matter”. The beginnings of this technology may be in “Turning Light into Matter - Physicists have created a device that binds photons together to form "light molecules." by Shannon Palus - Thursday, March 13, 2014 (<http://discovermagazine.com/2014/april/6-how-to-make-lightmatter>) which speaks of one photon being “stuck” to another. Though unnecessary on quantum (subatomic) scales, making a light-matter body by gluing together trillions of photons might require gravitational cohesion which might be obtained by the addition of gravitons. "Light matter" travelling through space-time might not interact physically with familiar matter, only gravitationally. It could thus be a part of the "dark matter" science is perplexed by. Gravitational and electromagnetic waves travelling back in time would, if they constitute mass as well as space-time, also partly explain Dark Matter.

Subsection 1

Biological Revolution, Gravitation, and Brouwer Fixed Point Theorem's Use In Future Space-Time Travel

I've enjoyed Dr. Hester's articles immensely. They're extremely informative! I have a question about my wristwatch, though. Assuming it's less complex than the brain and body of its owner (which evolved, science tells me), why didn't atoms of metal and quartz come together to form the watch without the intelligent design of humans? (Many people would answer that evolution only affects living things – that's merely stating watches truly are less complex than their owners.) I also owe a debt to astronomer Bob Berman's words in the same magazine -

'I first want to acknowledge that many religious Astronomy letter-writers merely want to get to the bottom of the deep questions, just as we scientists do.' And in regard to attributing life's origin to either awesome intelligence or random chemical reactions, he says '(we) offer a single, unassailable, factually accurate conclusion: “We do not know.” '

In this spirit, I offer this article as a possible reconciliation between science and religion. Dr. Hester's 2nd article was in the Nov. issue featuring a story on gravitational waves. After thousands of years of further progress, scientists may not only be detecting these waves from collisions between black holes or neutron stars, but may also be detecting weaker waves on terrestrial and atomic scales. They may also be manipulating them, rather like the way electromagnetic waves are exploited today. General Relativity says gravity doesn't exist in space-time but IS space-time. Manipulating gravity is therefore manipulation of space-time and will lead to presently unbelievable revolutions in space travel and so-called time travel (including travel millions of years into the uninhabited past).

Early last century, the Dutch mathematician and philosopher Luitzen Egbertus Jan Brouwer (1881-1966) had one of the most useful theorems in mathematics named after him - the amazing topological result known as the Brouwer Fixed Point Theorem (see "Back to the Moon and On to the Stars"). 'In dimension three, Brouwer's theorem says that if you take a cup of coffee, and slosh it around, then after the sloshing there must be some point in the coffee which is in the exact spot that it was before you did the sloshing (though it might have moved around in between). Moreover, if you tried to slosh that point out of its original position, you can't help but slosh another point back into its original position. More formally the theorem says that a continuous function from an N-ball into an N-ball must have a fixed point. Continuity of the function is essential (... if you slosh discontinuously, then there may not be (a) fixed point).'

 (2)

Translating this into a possible method of future spacetime travel - take the universe and 'slosh it around' (this refers to gravitational waves of varying strengths constantly moving in different directions in space as well as time). Assume the point which is in the exact spot after the sloshing as it was before the sloshing is a point an orbiting spaceship might occupy near Mars - this orbital point might be encoded using the BITS (BINARY digiT'S, 1's and 0's) of electronics. Since the point

might have moved around thanks to the Brouwer Fixed Point Theorem, it could be encoded to pick up a spaceship orbiting Earth and quickly transport it to Mars orbit (greatly reducing astronaut/cosmonaut exposure to radiation, bone and muscle wasting, etc.) Sloshing (continuously manipulating gravitational waves) so that part of the Andromeda galaxy is in the exact spot after the sloshing as it was before the sloshing would, even assuming travel at light-speed was possible, reduce travel time to a star in that galaxy by millions of years. The journeys - to Andromeda or Mars or any other spot in space, or the time which can't be separated from space - wouldn't depend on slow rocket power but on fast electronics and, as will be seen in **Quantum Gravity and Elohim**, gravitational waves that can travel backwards in time, acting instantly across the universe and being entangled with any selected point in space or time.

If we combine these revolutions with the unimaginable biotechnology and genetic engineering of centuries to come; isn't it conceivable that plants, animals and even humans are the product of entirely natural* intelligent design by humanity of the distant future? Making production a two-way process is the fact that humans of the distant future rely on the reproductive instincts of past and present men and women for their existence. Evolution would always exist in the forms of adaptation and of modification to anatomy/physiology, but it would not explain origins.

Subsection 2

Quantum Gravity and Elohim

* How does an "entirely natural" process end up being called "supernatural" by some people? The universal gravitational field (Einstein's Theory of General Relativity says gravity IS space-time) might possibly combine with quantum mechanics to form the unified field of quantum gravity. For example - The existence of both advanced waves (which travel backwards in time)

and retarded waves (which travel forwards in time) as admissible solutions to James Clerk Maxwell's equations about electromagnetism was explored in the Wheeler–Feynman absorber theory last century, as well as in the more recent transactional interpretation of quantum mechanics (TIQM). Einstein's equations say gravitational fields carry enough information about electromagnetism to allow Maxwell's equations to be restated in terms of these gravitational fields. This was discovered by the mathematical physicist George Yuri Rainich. (3) Therefore, gravitational waves also have a 'retarded' component and an 'advanced' component. They can travel forward or backward not only in space, but in time too.

17th century scientist Isaac Newton's idea of gravity acting instantly across the universe could be explained by gravity's ability to travel back in time, and thereby reach a point billions of light years away not in billions of years, but in negative billions-of-years. That is; the negative/advanced component of a gravitational wave would already be at its destination as soon as it left its source, and its journey is apparently instant. Instantaneous effect over large distances is known as quantum mechanics' entanglement and has been repeatedly verified experimentally.

'Physicists now believe that entanglement between particles exists everywhere, all the time, and have recently found shocking evidence that it affects the wider, "macroscopic" world that we inhabit.' (4) Though the effect is measured for distances in space, the inseparability of space and time means that moments of time can become entangled too. (5) If the retarded (forwards) wave component travels in positive space, the advanced (backwards) component corresponds to an equal amount of negative distance. The forwards and backwards movement in time can potentially cancel to produce a quantum (and macroscopic) entanglement that eliminates the need for the Big Bang's and Cosmic Inflation's solution that the universe is roughly the same everywhere on large scales because everything was once in contact in a tiny space.

'Many religions, from Hinduism to Gnostic Christianity to Mormon doctrine, teach that – as impious as it may sound – it is the goal of humans to become gods.' (6)

Learning to link with the unified field of quantum gravity would give people in the far future abilities like omnipresence (being everywhere and everywhen in space-time), omniscience (knowing everything) and omnipotence (being able to do anything). Incomprehensible to today's population as being entirely natural, these qualities would be dubbed supernatural. As support for the naturalness of what is called God, the following is offered: In a science TV program (7), Dr. Graham Phillips reported that "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." The billions upon billions of possessors of omnipotence, omniscience and omnipresence could be described by the word Elohim - a name used for God in the Old Testament which, according to World Book Encyclopedia, means the PLURAL MAJESTY OF THE ONE GOD.

When his engineer friend Michele Angelo Besso died, Albert Einstein wrote a letter of condolence to the Besso family, including his now famous quote: 'Now he has departed from this strange world a little ahead of me. That means nothing. People like us, who believe in physics, know that the distinction between past, present and future is only a stubbornly persistent illusion.' This suggests the following interpretation of his statement - if someone is alive in what we call the present, they must continue to be alive at any point in the future, all points of which have no actual separation from the present (though that future life would not be in the form we know). So there would be life after death. If all times in the past are united with the present, there must also be life before conception (in a different form). It seems very plausible that, after death and before conception, a human exists as a member of the Elohim - humans from the distant future who have learned how to affect all space and all time, including our past and present. Since anything and everything is possible for such a being, we could either exist eternally in that condition or choose

to be born on Earth and have a human life. The latter would give us new perspective and experiences. It would also allow us to directly contribute to the eventual rise of Elohim civilization - perhaps by adding something to some field of knowledge or technology (this might oneday lead to the ability to choose eternal life as a human), perhaps by ensuring that the human race continues into new generations, perhaps by sharing with - and otherwise helping - whomever we can.

Einstein's quote that 'the distinction between past, present and future is only a stubbornly persistent illusion' - plus the above paragraph's statement about 'humans from the distant future ... affect(ing) all space and all time, including our past and present' - are both compatible with the sentence from 4 paragraphs ago which says 'forwards and backwards movement in time can potentially cancel to produce a quantum (and macroscopic) entanglement'.

Subsection 3

Creation Of The Infinite, Eternal Cosmos Using Electronic BITS, Pi And Imaginary Time

Imaginary time - which is as real to physicists and mathematicians as our familiar real time - obtained its name because it was originally a purely mathematical representation of time which appears in some approaches to the special relativity and quantum mechanics theories developed in the early decades of last century. We can picture imaginary time in the following way. One can think of ordinary, real, time as a horizontal line. On the left, there's the past - and on the right, the future. But there's another kind of time in the vertical direction. This is called imaginary time (it's described with imaginary numbers such as i which equals $\sqrt{-1}$).

'The name has stuck, even though today we accept imaginary numbers are just as real as real numbers.' (8)

It was, I think, in the next issue of Cosmos magazine that Prof. Davies wrote that imaginary time is just as real as the time we're familiar with. Professor Itzhak Bars of the University of Southern California in Los Angeles says, 'one whole dimension of time and another of space have until now gone entirely unnoticed by us'. (9) Could Prof. Bars' second dimension of space be imaginary (in the sense of $i = \sqrt{-1}$) space which is united with imaginary time the same way ordinary space and time are joined? And in the unification of a quantum gravity universe, the real and imaginary would be connected.

Like the surface of the Earth, imaginary time has no boundaries (you can go around the world without falling over any edge) but, also like Earth, it is finite unless pi or another infinite number is incorporated into each and every part - numbers could be encoded into parts using the BITS (BInary digiT'S, 1's and 0's) of electronics. Dr. Andrea Alberti of the Institute of Applied Physics of the University of Bonn says, 'Quantum mechanics allows superposition states of large, macroscopic objects. But these states are very fragile, even following (a) football with our eyes is enough to destroy the superposition and (make) it follow a definite trajectory.' (10)

So although we only see one Earth; it's within the realm of possibility that it, and everything else, is not finite but is infinite and superposed and actually existing in more than one place - even everywhere in spacetime. This may be what happens when imaginary time teams up with incorporation of infinite numbers to remove boundaries - in this case, between existence in one location and existence in more than one spot.* This makes the universe infinite and, because space cannot be separated from time but forms one space-time, eternal.

*The existence of Earth and everything else in every spot and time is consistent with a never-ending number of Cosmic DVD's extending infinitely in every possible direction, and any object's position not being restricted to any one DVD. This condition would not be accessible to present-day humanity since consciousness is comparable to illumination by the player's laser, and people today have limited concepts of space-time compared to people living centuries from now. A member of the omnipresent Elohim could instantly traverse the space-time from, say, Earth of a billion years ago to a faraway galaxy billions of years in the future. The above need not violate Pauli's exclusion principle which says that two similar particles of matter cannot have both the same position and the same velocity. If electrons on different Cosmic DVDs occupy the same position, they must have different velocities. This strange state could give rise to the idea of a multiverse - other universes with different laws of physics existing alongside ours.

A model of the cosmos might be built that consists of a never-ending number of (Cosmic) DVD's extending infinitely in every possible direction. Entanglement in the simulation is unable to remain separate from the quantum-mechanical and macroscopic entanglement existing in our perceived reality because imaginary time removes all boundaries between the two universes. They naturally merge, influencing each other and becoming one. The poorly-named imaginary time of physics and mathematics unites with pi (both are necessary to generate an infinite universe - alone, unbounded imaginary time is finite). Also, their union with the future simulation/presently-perceived-as-exclusively-real present universe frees it of boundaries and makes it infinite/eternal.

Professor Stephen Hawking says that boundaries and singularities exist in real time but don't exist in imaginary time. (11) There really are boundaries in real time and it must hypothetically be possible to step outside the universe if only real time exists. But when so-called imaginary time also exists, it is not possible to step outside the universe because the boundaries simply aren't

there and the universe has no end or start (neither in space nor in time). Only one universe can then exist, and there is no multiverse.

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BACK TO THE MOON AND ON TO THE STARS

Abstract -

This is a copy of a comment I sent to ABC TV about their "Catalyst" program on 13/02/2018. That comment was limited to 1,500 words but readers get a bonus here: the comment's been expanded to 1,900 words. Professor Duffy's comment in "Catalyst" about using the Moon as a launching pad to Mars, then the stars, is a great dream for our future. But our present slow rockets aren't very convenient for travel to the stars. I can see 3 better ways - each is faster than the previous one. (1) is the controversial EmDrive which, through future application of Maxwell's and Einstein's theories as well as the Transactional Interpretation of Quantum Mechanics, may not only see huge benefits for spaceflight but also huge benefits to many areas of life for the average person who never journeys to space. (2) is the combining of a 2009 electrical-engineering experiment at America's Yale University with the ideas of Albert Einstein to produce a type of wormhole, or shortcut through space-time. (3) is mathematical – the use of the Brouwer Fixed Point Theorem in future space-time travel (there's no cause for concern if you're not trained in maths – it's explained in English).

Article -

(1) HOW EM DRIVE MAY WORK

The website Reddit says 'EmDrive (also known as an RF resonant cavity thruster) is a purported reactionless propulsion technology, which would - if true - revolutionize space travel and the world economy. After nearly 20 years since its "invention", there is no compelling empirical evidence that it works as described* despite ample testing of a relatively simple design and all theoretical explanations for the so-called EmDrive effect are completely at odds with our most fundamental theoretical knowledge of physics.' (<https://www.reddit.com/r/EmDrive/>). Australian astrophysicist Prof. Alan Duffy says, "If this rocket really doesn't need fuel to create thrust then that would be the end of physics as we know it." That's a very interesting statement - and an accurate one, too. Let's try to produce an explanation for how the EM drive might work without using alternatives such as fuel, thermal expansion ... or, as is written in "Why does the Impossible Thrust work" by J.R. Croca, P. Castro, M. Gatta, L. Gurriana (2017, <http://vixra.org/pdf/1706.0283v1.pdf>), the pilot waves of eurhythmic physics (real physical waves – not probability waves – of nonlinear quantum physics). An explanation for how the EmDrive might work without using alternatives "... would be the (beginning) of physics as we (don't) know it". Incidentally, my previous references to bits or binary digits agree with the idea of real physical waves opposed to mere probability waves. Binary digits are proposed to be the Hidden Variables which "are an interpretation of quantum mechanics based on the belief that the theory is incomplete and that there is an underlying layer of reality that contains additional information about the quantum world. This extra information is in the form of the hidden variables, unseen but real quantities. The identification of these hidden variables would lead to exact predictions for the outcomes of measurements and not just probabilities of obtaining certain results." ("Quantum" by Manjit Kumar - Icon Books, 2008 - p. 379)

*This invention by British engineer Roger Shawyer is claimed to use patented microwave technology which converts electrical energy into thrust by amplification of the microwaves creating pressure which drives the vehicle's front forwards.

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

And "Physics of the Impossible" by Michio Kaku (Penguin Books, 2009) states on p.276, "When we solve Maxwell's equations for light, we find not one but two solutions: a 'retarded' wave, which represents the standard motion of light from one point to another; but also an 'advanced' wave, where the light beam goes backward in time. Engineers have simply dismissed the advanced wave as a mathematical curiosity since the retarded waves so accurately predicted the behavior of radio, microwaves, TV, radar, and X-rays. But for physicists, the advanced wave has been a nagging problem for the past century."

Light is one form of electromagnetism – microwaves are another. So some of the microwaves are advanced, and travelling back in time. To this action, there is - agreeing with Isaac Newton's 3rd law of motion - an equal and opposing reaction ie a thrust forward in time. Since space can never be regarded separately from time, an object in space is affected and the forward thrust in time could power a spacecraft through the void.

Many people believe the reason a jet aircraft is propelled forward is because its exhaust pushes against the air outside. This cannot be the reason a spaceship moves forward in the vacuum of space where there is no air. The spaceship's movement is attributed to the 3rd law of motion. But what exactly is the 3rd law? Does it need to simply be accepted as a mysterious abstraction which "just is" the way things work? Could there be an explanation in physics for why a rocket in space behaves the way it does? Planets, stars, galaxies - everything - is constantly in motion. In an infinite universe existing eternally, that motion guarantees any point in the remotest depths of space would have once been occupied by dense matter for the rocket's exhaust to push against. If the rocket fuel and exhaust is composed of gravitational and electromagnetic waves which have components going back in time, the exhaust must inevitably and perpetually push against some form of dense, undetectable (dark) matter. Also, some microwaves in an EmDrive would travel back in time to produce, via the 3rd law, a thrust forward in time which could power a spacecraft through the void.

In an infinite universe existing eternally, any point – whether on Earth or in the remotest depths of space - must have once been occupied by dense matter preventing the forward motion of spacecraft, or even your heartbeat and the raising of your little finger. These obstacles are overcome by these sentences in "Creation of the Infinite, Eternal Cosmos ..." - "The existence of Earth and everything else in every spot and time is consistent with a never-ending number of Cosmic DVD's extending infinitely in every possible direction, and any object's position not being restricted to any one DVD. This condition would not be accessible to present-day humanity since consciousness is comparable to illumination by the player's laser, and people today have limited concepts of space-time compared to people living centuries from now."

In physics, the observer effect is the theory that simply observing a situation or phenomenon necessarily changes that phenomenon. This is often the result of instruments that, by necessity,

alter the state of what they measure in some manner. The need for the "observer" to be conscious has been rejected by mainstream science as a misconception rooted in a poor understanding of the quantum wave function ψ and the quantum measurement process.

From <[https://en.wikipedia.org/wiki/Observer_effect_\(physics\)](https://en.wikipedia.org/wiki/Observer_effect_(physics))>

However, this rejection by mainstream science could itself turn out to be the misconception if this monograph is eventually proven correct when it asserts that human consciousness is essential to Creation of the Infinite, Eternal Cosmos. It maintains that the observer is not limited to being an instrument or detector, but can be conscious. Therefore, the state of human consciousness in the early 21st century restricts any object's position to one DVD (unlike the Elohim civilization[^]). To be precise, I should say it restricts any MACROSCOPIC object's position to one DVD, meaning a person's movements or spacecraft's forward motion are not impeded by obstacles in another time. Science and the world are awakening to the mysteries of the quantum (subatomic) world and realizing that quantum states can be superposed (particles can exist in more than one condition or location). This wakening means we live in the most suitable period of history in which this monograph's proposed mechanism of EmDrive's workings can be made.

[^] The Elohim would have no problems with obstacles of any kind because they'd have conscious control of all space-time and all extra dimensions. Extending the remainder of this paragraph - they'd be a Type IV civilization, who could manipulate infinity and eternity (the universe as a whole). 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. Electronic manipulation that prevents the expansion 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 ("Physics of the Impossible" by Michio Kaku – Penguin Books, 2008, pp.145-147). A Type III civilization – 10 billion times more powerful – could utilize the power of an entire galaxy. A plausible addition is 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 (I think Earth would be fascinating for entomologists, who love ant hills). Establishing colonies throughout space and time would prevent overpopulation on Earth. 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. They might look and think differently, due to adaptations - possibly including genetic engineering - to alien environments.

ITS OTHER SCIENTIFIC APPLICATION

Four years after publishing General Relativity, Einstein published a paper that asked "Do gravitational fields play an essential role in the structure of elementary particles?" ["Spielen Gravitationsfelder im Aufbau der materiellen Elementarteilchen eine wesentliche Rolle?"] by Albert Einstein - Sitzungsberichte der Preussischen Akademie der Wissenschaften [Math. Phys.] 349-356 [1919] Berlin. That paper was published in an attempt to clarify the inner workings of the atom. (See the 2012 article "How Einstein Discovered Dark Energy" by Alex Harvey (<https://arxiv.org/pdf/1211.6338v1.pdf>). But it might well apply to EmDrive's second app.

Albert Einstein's equations say gravitational fields carry enough information about electromagnetism to allow Maxwell's equations to be restated in terms of these gravitational fields. This was discovered by the mathematical physicist George Yuri Rainich - "Transactions of the American Mathematical Society" 27, 106 - Rainich, G. Y. (1925). Therefore, gravitational waves also have a "retarded" component and an "advanced" component. They can travel forward or backward not only in space, but in time too.

What are the consequences if gravitational fields play an essential role in the structure of elementary particles, and if gravitational waves can travel back in time? Then the equal and opposite reaction providing the forward thrust in time could not only "power a spacecraft through the void", but it could power anything with gravitational waves in their composition (in ways yet to be discovered).

(2) ELECTRICAL ENGINEERING AND SPACE-TIME WARPS

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. 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 ["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".

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. My sources for my belief that this union will be achieved include Einstein's paper "Do gravitational fields play an essential role in the structure of elementary particles?" and 2 references to the similarities between gravitation and electromagnetism: (1) "Electromagnetic and Gravitational Waves: the Third Dimension" by Gerald E. Marsh, Argonne National Laboratory (Ret) - <https://arxiv.org/pdf/1101.2247> states, "The motion of a set of test particles under the influence of a plane gravitational wave differs considerably from the electromagnetic case. Yet, there are similarities: not only do both have two independent polarization states, but when one includes

the longitudinal motion, the surface associated with the motion of a charged particle responding to an elliptically polarized wave is similar to the constant phase surfaces of a set of particles driven by a plane gravitational wave; in both cases the latter surfaces derive their longitudinal motion from trigonometric double angle functions."(2) According to "Similarity Between Gravitation and Electrostatic Forces" by mathematician and physicist Ron Kurtus (5 December 2010 - http://www.school-for-champions.com/science/gravitation_electrostatic.htm#.Wkw9dcs_5Ah) - (under the heading "Gravitomagnetism"), he states on that "An analogy of gravitational and electromagnetic fields is seen by comparing the Einstein Field Equations from the General Theory of Relativity with Maxwell's Field Equations for electrical and magnetic fields."

Achievement of this means the quantum components (gravitons) of gravity/spacetime-warps between spaceships and stars could mimic the Optical Effect and be attracted together, thereby partially eliminating distance (this is similar to traversing a wormhole, or shortcut, between two folds in space-time).

(3) BROUWER FIXED-POINT THEOREM (see Biological Revolution, Gravitation, and Brouwer Fixed Point Theorem's Use In Future Space-Time Travel)

NORMALISING PATIENTS WITH GRAVITATION

Abstract -

Is it a waste of time taking bicarb of soda mixed in a glass of water? Would the bicarb just be neutralised by the stomach acid? It seems that its benefits are not psychological only. While the

stomach acid is neutralising the bicarb, the bicarb would also be neutralising the stomach acid and would reduce acidity there (and possibly throughout the body to some extent). It also seems possible that benefits lie in physics and a paper about gravity and matter which was published by Albert Einstein just under a century ago (this interdisciplinary approach relies on the great physicist's wish that he had made a bigger contribution to medicine). This would provide a plausible explanation of the placebo effect.

Article -

Years ago, I had a conversation with a GP about stomach ulcers. The doctor said something which I can't get out of my head. I wondered if it's a good idea to take a 1/2 teaspoon of bicarb of soda in a glass of water, in addition to the often-prescribed Nexium. The response was that the bicarb would just be neutralised by the stomach acid. After thinking about this, my conclusion is that its benefits are not psychological only. While the stomach acid is neutralising the bicarb, the bicarb would also be neutralising the stomach acid and would reduce acidity there (and possibly throughout the body to some extent). An article in the Los Angeles Times reports that the work of a few medical specialists – pharmacologist, gastroenterologist, surgeon - says the sodium bicarbonate makes the drugs, including Nexium, a lot more effective [1].

It also seems possible that any benefits of sodium bicarbonate lie in physics and a paper published by Albert Einstein a century ago. That paper is "Do gravitational fields play an essential role in the structure of elementary particles?" [2]. The world thinks of this paper as a mistake by Einstein, but maybe it wasn't.

The gravity surrounding us is absolutely everywhere, all the time. If the particles composing both the patient and their treatment (such as sodium bicarbonate) include gravitational fields, the patient and treatment would always be connected because gravity always fills any intervening space. This is a plausible explanation of the placebo effect in which health benefits occur despite

no medicine being administered, and being aware of this constant connection to sodium bicarbonate would greatly enhance success of the treatment. Of course, treatment in this case also includes Nexium. Constant gravitational connection to Nexium or any drug would produce dangerous side effects.

In a thousand years, people might have learned how to navigate the gravitational waves connecting them to substances, so that they receive the benefits they need while avoiding side effects they don't want. This is possible because "Physicists now believe that entanglement between particles exists everywhere, all the time, and have recently found shocking evidence that it affects the wider, 'macroscopic' world that we inhabit" [3]. "Caslav Brukner, working with Vlatko Vedral and two other Imperial College researchers, has uncovered a radical twist. They have shown that moments of time can become entangled too" [4]. If accurate, this last reference would permit today to connect with the 31st century.

Science might prove these ideas to be true oneday. At the moment, it can only detect gravitational waves from extreme events like colliding black holes [5]. But it may well be routinely detecting the gravitational waves associated with the body, and with other substances, within a century.

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