Title –

Using $E=mc^2$ To Address 21st Century Science's Riddles

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Abstract –

This article started with what you might call boredom. I find E=mc^2 absolutely fascinating. But we've all seen it in that form plenty of times. We've even seen it plenty of times as m=E/c^2 (in the form where the equation is solved for mass). So I thought I'd play around with c^2=E/m (obtained by dividing both sides of E=mc^2 by m) and other forms, and see if they were related to the ideas I've been having in the last few years. For example, dividing both sides of m=E/c^2 by E means c^2=m/E, so E/m=m/E and mass-energy equivalence comes into being (and I plan to explore a few other partial forms of the equation). My keyboard was soon producing sentences about the speed of light, division by zero, "digital" string theory, repelling gravity and its apparent attraction, dark energy, a higher dimension, computer simulation, the universe and subuniverses (with the demise of both the Big Bang and inflationary cosmology), the Law of Conservation of Mass-Energy, imaginary numbers, hidden variables, quantum fluctuation, mass and masslessness, time dilation, unification of the fundamental forces, cosmic microwave background (addressing clumpiness and temperature concerns preventing its dissociation from the big bang), intergalactic and time travel, retrocausality and quantum/macroscopic entanglement. I don't know how all this appears to anyone else – but for myself, E=mc^2 gives me confidence that my extremely unusual ideas aren't fantasy but belong to the real world.

Content –

E=mc^2 – Part 1

Representing the masslessness of photons by 0 (zero) and incorporating the masslessness into Einstein's famous equation relating energy, mass and the speed of light results in E=0*c^2 i.e. E=0. German scientist Werner Heisenberg formulated his uncertainty principle in 1926. It says the more accurately you try to measure the position of a particle, the less accurately you can measure its speed (or velocity), and vice versa. If the position of a particle is defined as the location of its mass, there's no mass to be located regarding a photon and we can take the liberty of saying the position is known precisely.

Here's another way to look at the situation - Special Relativity says there's no change for co-moving observers and the photon is therefore massless at rest,

too. But for a stationary observer taking measurements in a lab, the mass increase at light speed would appear to be infinite and an infinite push, which doesn't exist, is required to make it go faster. In other words, nothing would be able to exceed light's velocity in a vacuum – and, for the purposes of this article, the infinite photon would fill all space-time and its position would indeed be known exactly.

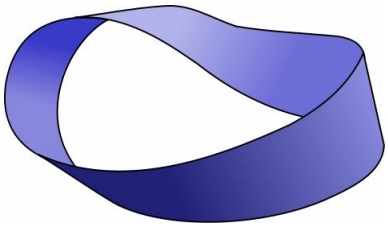
Whichever view is adopted, position is known exactly and the uncertainty principle says the photon's speed or velocity can't be measured accurately. But light's speed has been measured accurately - 299,792,458 metres per second [1]. This is not the average speed of an innumerable number of photons because, according to the previous paragraph, only one photon seems to exist (see **Digital String Theory**).

This indicates that the uncertainty principle may not be inherent to nature but might be a limit imposed by inadequate present comprehension of nature (specifically, of mathematics). Recalling that E=0, we must reduce that equation to E (energy) to determine the photon's speed or velocity when the position is known. Cancelling the 0 can be done through division by zero. Textbooks tell us that mathematical operation is undefined, and to never divide by 0 - "Basic Technical Mathematics with Calculus, SI Version Ninth Edition" by Allyn J. Washington (Pearson Education, 2010) states on p.9, "If 0/0 = b, then 0 = 0 x b, which is true for any value of b. Therefore, no specific value of b can be determined." But if 0 is divided by zero in this case, only E will remain and calculation of both the photon's position and speed will be possible. The section below will define zero by showing that division by zero is only possible if binary digits combine to make the cosmos – then 0 is "something" as surely as 1 is.

DIGITAL STRING THEORY

String theory says everything's composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents. We can visualize tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) forming currents in a two-dimensional program called a Mobius loop – or in 2 Mobius loops, clockwise currents in one loop combining with counterclockwise currents in the other to form a standing current. Combination of the 2 loops' currents requires connection of the two as a four-dimensional (figure-8) Klein bottle. This connection can be made with the infinitely-long irrational and transcendental numbers (see **Universe as a Whole is Infinite and Eternal** for support of the universe's infinity). Such an infinite connection translates - via bosons being ultimately composed of the binary digits of 1 and 0 encoding pi, e, √2 etc.; and fermions being given mass by bosons interacting in matter particles' "wave packets" – into an infinite number of figure-8 Klein bottles which are, in fact, "subuniverses".

Mobius Loop



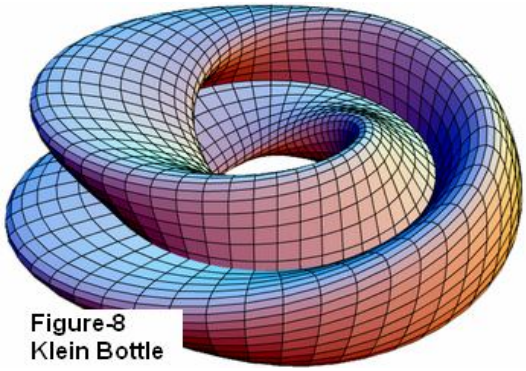
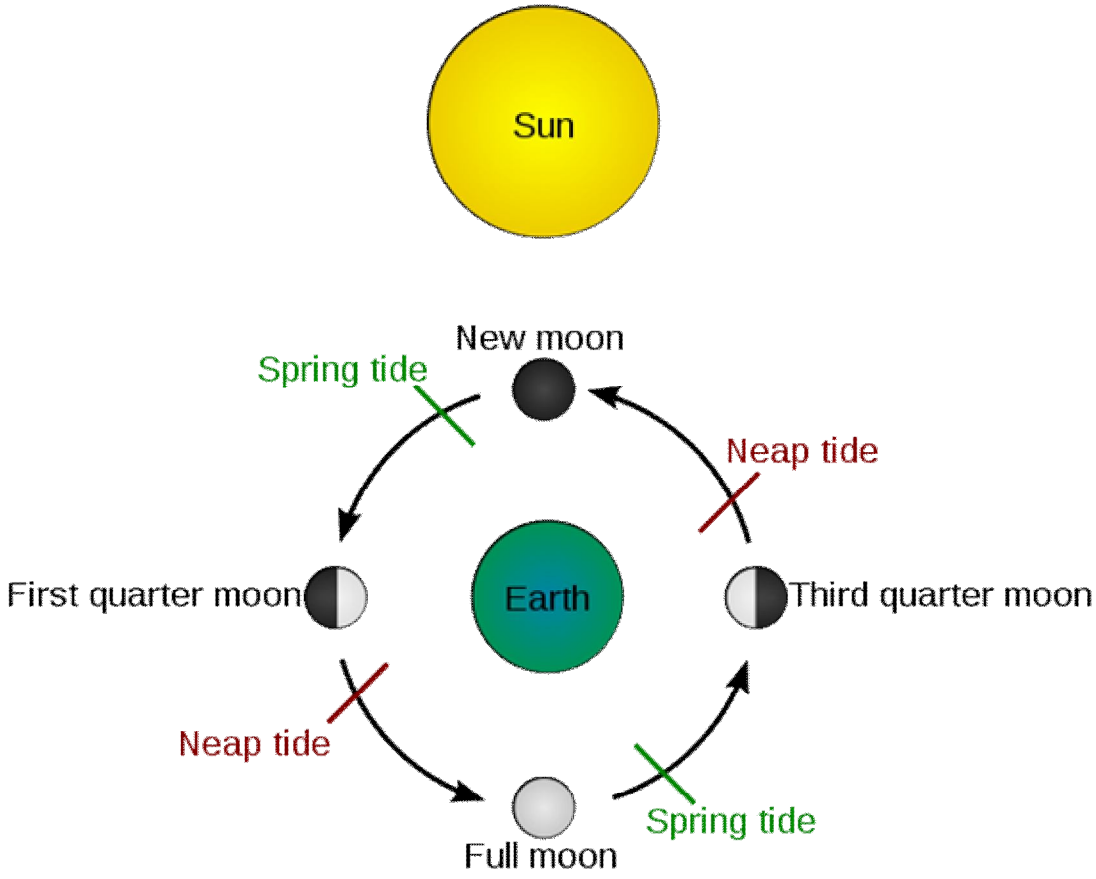


Figure-8
Klein Bottle

Slight “imperfections” in the way the Mobius loops fit together determine the precise nature of the binary-digit currents (the producers of space-time, gravitational waves, electromagnetic waves, the nuclear strong force and the nuclear weak force) and thus of exact mass, charge, quantum spin. When the digits form space-time, space-time’s warps produce gravitation whose force (in the form of gravitons) interact with photons’ forces to produce matter and mass.^ The photons come into existence because gravitation produces them (see **c^2 and the Atom**). They would also produce black holes - whose binary digits could, in the case of the sun, come from our star being compressed to 2.95 kms (“From the Big Bang to Dark Energy” – a lecture on coursera.org by Hitoshi Murayama from the University of Tokyo), in which case the pressure increase "shreds" the sun into its binary digits (its mass is relativistically converted into the energy of binary digits).

^ When binary digits form gravity then matter, gravity cannot be a force of attraction originating within matter. It would be a repelling force originating in deep space – wherever the digits are, possibly in the higher dimension mentioned in a few paragraphs – which then produces astronomical bodies as well as objects on Earth. Dr Adam Riess, co-discoverer of this subuniverse’s accelerating expansion, writes at http://www.stsci.edu/~ariess/darkEnergy.htm - “Indeed, all incarnations of energy with negative pressure are called dark energy”. This means 5-D hyperspace and its resultant repelling gravity could indeed be dark energy if hyperspace possesses negative energy (as explained in a few paragraphs, the gravity need not be negative). Gravity’s apparent attraction can be summarized by the following - gravitation is absorbed into wave packets and the inertia of the gravitons 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 (“Ocean Volume and Depth” – Van Nostrand’s Scientific Encyclopedia, 10th edition 2008). 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. This alignment produces the same effect as would 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 ft/s^2). At the neap tides of 1st and 3rd quarter**;** the sun, earth and moon aren’t lined up but form a right angle and this produces the same effect as if our planet has access to more gravity waves, which suppress oceanic recoil to a greater degree. The waves come from all directions but, for simplicity, we can imagine the sun and moon pulling earth’s water in different directions at neap tide. If variables like wind/atmospheric pressure/storms are deleted, this causes neap tides which are much lower than spring tides.



Binary digits can be assembled into computer simulations. The appearance of a stream of photons can be duplicated using a single photon. If it's presented in position A, then B, then C, and so on**;** it can deceive an observer or detector into believing it's in motion. If displayed simultaneously at A and B and C, it appears to be a number of particles streaming through space and time.

Universe as a Whole is Infinite and Eternal

"Infinite Universe" by Bob Berman, "Astronomy" (Nov. 2012) says, "The evidence keeps flooding in. It now truly appears that the universe is infinite" and "Many separate areas of investigation – like baryon acoustic oscillations (sound waves propagating through the denser early universe), the way type 1a supernovae compare with redshift, the Hubble constant, studies of cosmic large-scale structure, and the flat topology of space – all point the same way." Support for the article – a) after examining recent measurements by the Wilkinson Microwave Anisotropy Probe, NASA declared "We now know that the universe is flat with only a 0.4% margin of error." (WMAP's Universe (http://map.gsfc.nasa.gov/universe/uni_shape.html)
and b) according to "The Early Universe and the Cosmic Microwave Background: Theory and Observations" by Norma G. Sànchez, Yuri N. Parijskij - published by Springer, (31/12/2003), the shape of the Universe found to best fit observational data is the infinite flat model)

Each "subuniverse" (bubble or pocket universe) is one of an infinite series composing the physically infinite and eternal space-time of the universe. The infinite numbers make the cosmos physically infinite, the union of space and time makes it eternal, and it's in a static or steady state because it's already infinite and has no room for expansion. Gaps or irregularities between subuniverses shaped like figure-8 Klein bottles are "filled in" by binary digits in the same way that computer drawings can extrapolate a small patch of blue sky to make a sky that's blue from horizon to horizon. Our own subuniverse has a limited size (and age of 13.8 billion years), is expanding (not from a Big Bang but from binary digits "recycling" space-time*, with the "new" displacing the "old") and has warped space-time because it's modelled on the Mobius loop, which can be fashioned by giving a strip of paper a 180-degree twist before joining the ends.

* The Law of Conservation of Mass-Energy says neither matter nor energy can ever be created or destroyed. The universe would not be unified to near-uniform temperature and curvature by the whole cosmos having once been small enough for everything to be in contact, then undergoing extremely rapid expansion from a big bang during a period called inflation. It would be quantum entangled (unified) by everything having the same origin of binary digits. This conservation can also be viewed as equal quantities of positive and negative space-time existing within the universe, with changes adding up to zero. Positive space-time (that means gravity – spacetime's warps - is positive too, contradicting modern theories of the universe's beginning that say gravity is negative ^) would be balanced by an

equal quantity of negative space-time in another dimension (it'd be described by imaginary numbers, which give negative results as well as eliminating singularities and boundaries). This other dimension would be invisible but since its particles would still be the product of gravity (see **c^2 and the Atom**), it'd have gravitational effects – could this higher dimension be what is called dark matter?**)

** Imaginary numbers give negative results when multiplied by themselves e.g. i multiplied by itself gives -1. Imaginary time can be equated with dark matter in this way - it's already known that calculating time using imaginary numbers makes distinctions between time and space disappear. A negative 5th-dimension (translated 180 degrees from positive space-time) is described by imaginary numbers so imaginary numbers eliminate distinctions between space-time and the 5th dimension, permitting dark matter to exist as "ordinary" matter's scaffold. Our initial reaction is that this is wrong because it implies that the total amount of dark matter can be equal to the total amount of ordinary, visible matter. As stated by Kim Griest from the University of California in San Diego – "We know the total amount of material made of atoms is around one-fifth of the total amount of dark matter, the invisible mass of the universe. So nothing that is made of atoms, or that ever was made of atoms, can be a significant portion of dark matter."
But the fact is that the total amounts of matter and dark matter can indeed be equal i.e. dark matter can be ordinary matter's scaffold. We merely have to stop assuming that we can perceive all of the ordinary matter, and that our scientific instruments can detect all of the dark matter (by means of its gravitational effects), in any region of space-time. Time travel could account for the invisibility of some ordinary matter. The undetectability of most dark matter could be accounted for by the following - the past can never be changed from what occurred, and the future can never be altered from what it will be. Both are programmed by the 1's and 0's. These 1's and 0's correspond to the 1's and 0's of the pits and land (or pits and bumps) of a DVD. All of the "cosmic" DVD always exists even though a very limited set of sights, sounds and gravity effects can be detected at any point during its playing. How could the time travel loved by theoretical physicists come to pass without this "cosmic DVD"?

^ Modern science is incorrect when it uses quantum fluctuation to explain the universe originating from nothing. This violates its own Law of Conservation of Mass-Energy which says neither matter nor energy can ever be created (or destroyed). A quantum fluctuation is the temporary change in the amount of energy at a point in space, and the fluctuations of 1's and 0's change the energy in quantum-size regions of space-time, eliminating probabilities and introducing the exactness called for by quantum mechanics' Hidden Variables theory. This article proposes that the 1's and 0's manifesting as the universe and space-time originate from something. If time always goes in a straight line from past to present to future, these binary digits would emanate from a God or another universe in a multiverse. But Albert Einstein showed that space-time is curved

and warped, so it's possible that our own computer science (and terraforming, and biotechnology) found its way into the remote past (see **The Optical Force**) and that there's only one universe.

E=mc^2 – Part 2

Having reduced the equation to E in **E=mc^2 – Part 1**, m=0 and c^2=0 which means m=c^2 at the speed of light. In popular teaching, m is multiplied by c^2. From Einstein's formula, c^2=E/m and (using m=c^2) c^2=E/c^2 which means E=c^4. **c^2 and the Atom** states that graviton/photon interaction produces mass (both particles are equally vital), so E (mass-energy of photon) = c^2 (light's photon) multiplied by c^2 (gravity's graviton) (c^2*c^2=c^4). At first glance, m=c^2 seems to be saying mass exists at light speed. But the absence of E refers to there being no interaction of light energy and gravitational energy at light speed (and therefore no mass) - suggesting that at light speed, space=0 and gravity=0 * (without spacetime/gravity, there's no creation of mass). Matter always possesses mass, so it can't exist at light speed. Matter and energy are related by the speed of light but matter and energy are obviously not absolutely identical. Energy can exist at the speed of light, though it must remain massless.

* As a result of space and time being permanently linked in a union called space-time, time must = 0. It has been seen how space-time becomes 0 in the sense of enduring masslessness at light speed. But how does it become 0 in the sense of time stopping? The basic standard of time in the universe is comparable to the 1960's adoption on Earth of the measurement of time as the vibration rate of cesium atoms. Continuing from the earlier conclusion that humans must have used time travel to the past as well as our computer science to create this subuniverse 13.8 billion years ago, we could borrow the conclusions of Special Relativity and set the standard for time measurement as the measuring of the motions of photons i.e. of the speed of light. At lightspeed, time = 0 (it is stopped). Below 300,000 km/sec, acceleration or gravitation causes time dilation (slowing of time as the speed of light is approached).

c^2 and the Atom

When Einstein penned E=mc^2, he used c (c^2) to convert between energy units and mass units. The conversion number is 90,000,000,000 (light's velocity of 300,000 km/s x 300,000 km/s) which approx. equals 10^11. Gravity can produce electromagnetic force, though there are other methods. For example, X-rays can be emitted by matter swirling around a black hole when the atoms jostle and compress, and are heated to millions of degrees. If absolutely everything in space-time is the result of gravitation, it's OK to leave out the word "can" and just say "Gravity produces electromagnetic force" (to be technical, the word "gravitation" is used when referring to the universe and "gravity" when referring to Earth – but I get lazy sometimes, and just type "gravity" because "gravitation" is too long a word). Gravity waves with a strength of 10^1 are, via gravitational

lensing, concentrated 10^24 times after they're focused to form matter (to 10^25, weak nuclear force's strength - giving the illusion that a weak nuclear force that is not the product of gravitation exists). (If binary digits form space-time and gravitation, and all particles are composed of those digits, the sequence of 1's and 0's composing gravitons can become the sequence making up the W+, W- and Z^0 particles of the weak force**;** the gluons of the nuclear strong force**;** or of electromagnetism's photons.) Waves are magnified by the matter's density to achieve electromagnetism's strength (10^36 times gravity's strength) i.e. 10^25 is multiplied by Einstein's conversion factor [10^11] and gives 10^36 (this gives the illusion of the existence of electric and magnetic fields that are not a product of gravitation – last century, Einstein stated that gravitation and electromagnetism are related). After absorption by atoms, the depleted remnant of the gravity waves is re-radiated from stars, interstellar gas and dust, etc. as electromagnetic waves - possibly gamma rays, or a microwave background * - and as gravitational waves which have lost most of their energy or strength during formation of forces (returning to a strength of "10^1".) ^^

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* The cosmic microwave background or CMB is assumed to be left over from the "Big Bang" of cosmology, and was discovered in 1964 by American radio astronomers Arno Penzias and Robert Wilson. A problem with microwaves from dust is pointed out in "Comments on the Cosmic Microwave Background" by Dr. Danny Faulkner on March 19, 2014 – **https://answersingenesis.org/astronomy/cosmology/comments-on-the-cosmic-microwave-background/**

The 1981 article "A recent creation explanation of the 3° K background black body radiation" by Akridge, R., T. Barnes, and H.S. Slusher in *Creation Research Society Quarterly* 18, no. 3:159–162 attempted an explanation of the CMB by claiming that it came from dust within our galaxy. In his letter, P. M. Steidl (1983. Comment on the 3° microwave background. *Creation Research Society Quarterly*19, no.4:228–230) also pointed out that this explanation had been attempted already (by supporters of the steady state model), but that this explanation was lacking. The primary problem is that dust is very clumpy, and hence we would expect that if the CMB came from dust the CMB would be very clumpy. However, the CMB is very homogeneous (uniform in composition or character; of the same nature throughout). Also, radiation from dust has too high a temperature to be the source of the CMB.

Most of the problem simply disappears when the universe's infinity is combined with its quantum entanglement, because this solves the primary trouble of clumpiness. A universe of finite size can be pictured as filled with a limited number of microwave sources (stars, gas, dust) and would be very inhomogeneous. The infinite universe advocated here would be 100% filled with those microwave sources - it would be of the same nature throughout, and very homogeneous. At first, this appears to be too smooth, because the CMB has tiny fluctuations and is only isotropic (uniform) to roughly one part in 100,000 – a

problem fixed by the quantum nature of digital string theory, with its quantum fluctuations of 1's and 0's. The vast majority of microwaves from those sources could never reach Earth or any other particular spot in the universe when the waves are travelling at the limited speed of light (which is the speed of all electromagnetic waves). This re-introduces inhomogeneity, which again vanishes upon remembering that the famous 17th-century scientist Sir Isaac Newton once said the entire universe would instantly feel the loss of the sun's gravity if our star disappeared suddenly – I think modern science doubts this but zero separation (the Unified Field* created by everything in the universe being quantum entangled) forces me to agree with him. In the same way, any microwave source in the infinite universe would instantly make its presence felt on Earth, restoring the homogeneous microwave background.

* This unified field is the gravitational field which produces everything in space-time. The unified/gravitational field could even be termed the Higgs field – because the Higgs field is supposed to be responsible for the existence of mass, and this article says gravitation produces mass. The mass of the Higgs boson (126 GeV/c^2 **) is proposed to be the product of the gravitational field. Or since the Higgs field talks of smallest possible excitations, perhaps we could reserve "Higgs field" for the binary digits that are the fundamental constituents of the entire universe (including gravity). The Higgs field is used to explain why the weak force has a much shorter range than the electromagnetic force. This article's **c^2 and the Atom** showed that gravity can account for differences between the weak force (with its massive W and Z particles only being able to transmit the force 10^-18 metre) and electromagnetic forces (whose massless photon gives it limitless range).

** Scientists use E=mc^2 to measure a particle's mass. The equation's solved for mass, giving m=E/c^2. So the Higgs boson's mass is equal to 126 GeV or giga-electron volts (its energy) divided by c^2 (the velocity of light squared). The highest speed possible is Lightspeed. Physically speaking, it cannot be multiplied. Einstein himself proved this. The equation E=mc^2 can be considered a degenerate form of the mass-energy-momentum relation for vanishing momentum. Einstein was very well aware of this, and in later papers repetitively stressed that his mass-energy equation is strictly limited to observers co-moving with the object under study (I think he was referring to the time in the 1890s when he was imagining what it would be like to move along beside a beam of light).

The temperature problem disappears when we look ahead to **E=mc^2 – Part 3** where Einstein's equation says m=c^2 and the absence of E refers to there being no interaction of light energy and gravitational energy at light speed (E=0 and no mass). In this case, the electromagnetic energy referred to is not light but microwaves. When the microwaves and gravity meet in matter (homogeneous microwave sources, including widely scattered dust – all matter is created by gravity) distant from the matter they radiated from, they heat the sources just as microwave ovens heat food. Absorption by these homogeneous sources

throughout the infinite universe lowers the temperature from “too high” to the recent measurement of 2.72548K (Fixsen, D. J. 2009.”The temperature of the cosmic microwave background”. *The Astrophysical Journal* 707, no. 2: 916–920).

The source of microwaves proposed in the above paragraph should be kept in mind when Universe as a Whole is Infinite and Eternal proposes that our subuniverse is expanding not from a Big Bang but from binary digits “recycling” space-time with the “new” displacing the “old”, in agreement with the Law of Conservation of Mass-Energy which says neither matter nor energy can ever be created or destroyed.

On 17 March 2014, astrophysicists of the cosmic microwave background (CMB) experiment called BICEP2 (Background Imaging of Cosmic Extragalactic Polarization) announced the detection of a swirling imprint of inflationary gravitational waves in the Cosmic Microwave Background. Reporting these results in “Breaking Down a Big Bang Breakthrough” (http://astrokatie.blogspot.com.au/2014/09/breaking-down-big-bang-breakthrough.html - September 24, 2014), theoretical astrophysicist Katie Mack says –
“Two papers came out (not long after BICEP2’s initial announcement of inflationary gravitational-wave imprints in the cosmic microwave background) showing that the BICEP2 signal – the one that was supposed to be a beautiful picture of gravitational waves – could have been entirely due to dust in our Galaxy mimicking the primordial signal.”
Microwaves from homogeneous microwave sources, including widely scattered dust, appears consistent with her report.

When a gravitational wave becomes an electromagnetic wave, it not only has to change its strength in the way described above but it also has to change its shape. Although the rest of this paragraph speaks of the photon, it can adapt to include the graviton if these particles are simply two variations in sequences of binary digits. It’s accepted in physics that a single photon can actually interfere with itself e.g. particles can be quantum entangled by sending a single photon through a special crystal that yields two photons. Does this mean a photon is not indivisible (consisting of 1’s and 0’s) but can decouple from itself and separate into two photons - or decouple from itself to alter a wave’s shape from quadrupole gravitational to dipole electromagnetic? The decoupling and consequent change in the wave’s shape might result from the extreme forces involved in matter’s density magnifying (lensing) gravitational waves that enter it Recalling earlier points in this article, the decoupling may merely appear to exist, actually being the display of a photon as two photons or as different waves – though this could not be seriously considered by many, it would be consistent with a Unified Field and Theory of Everything that are not restricted to mathematics but also have consequences for the physical, and living, worlds..

The Optical Force

A 2009 electrical-engineering experiment at America's Yale University, together with the ideas of Albert Einstein, tells us how we could travel to other stars and galaxies in literally no time. Electrical engineer Hong Tang and his team at Yale demonstrated that, on silicon-chip and transistor scales, light can attract and repel itself like electric charges or magnets ("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. Achievement of this – see **Digital String Theory** plus **c^2 and the Atom** for a proposed method - means the microscopic components (gravitons) of warps of space (gravity, according to General Relativity) between spaceships and stars could mimic the Optical Effect and be attracted together, thereby totally eliminating distance (this is similar to traversing a wormhole, or shortcut, between two folds in space-time). Distance is not only deleted in space. There would no longer be any "distance" in time. Just as we can journey to particular stars, we could take trips to particular years in the past or future. Now we just need some clever engineers to design a spacecraft that works according to the Einstein-Yale principle.

So we can produce the effect of faster-than-light travel for both matter and information, without engaging in actual faster-than-light travel (that is impossible). We can, as **E=mc^2 – Part 2** stated, change the relationship between m and c^2 from multiplication to equality i.e. in popular teaching, m is multiplied by c^2 but m =c^2 at the speed of light. We only appear to re-locate matter and information superluminally because distance is eliminated (or, if you prefer, time is stopped) by attracting together the folds in space-time that are called gravity.

E=mc^2 – Part 3

Recall these two sentences from **E=mc^2 – Part 2** – "At first glance, m=c^2 seems to be saying mass exists at light speed. But the absence of E refers to there being no interaction of light energy and gravitational energy at light speed (and therefore no mass)." In **Part 2**, E=c^4 while in **Part 1,** E=0 – in both cases, E is referring to the gravitational-electromagnetic interaction. E=0 is actually saying the graviton is massless like the photon. The speed of light is c and c^2 refers to observers and light co-moving. So the other c^2 refers to observers and gravity co-moving. The speed of gravitational waves is c and the speed of light is equal to the speed of gravity. Of course, this ignores quantum entanglement – this implies that if the sun suddenly stopped shining or having a gravitational influence, those effects would be detectable instantly. The "pairing up" of bits (binary digits) i.e. of the electronic binary digits of 1 and 0 in the largest and the smallest scales, means this: quantum effects are not distinct from macroscopic events, and become apparent on a large (even astronomical) scale. This permits

a “distant” event to instantly affect another (exemplified experimentally by the quantum entanglement of particles separated by light years – but also hypothetically possible for galaxies and humans). Pairing up also permits effects to influence seemingly separate causes on subatomic, galactic and human etc scales (the first steps to proving this can be seen in the retrocausality or backward causality promoted by Israeli physicist Yakir Aharonov and others). (One of the others is the USA’s Washington Uni’s John Cramer – “Physicist’s weird reverse-causality experiment goes in a new direction” by Alan Boyle, Science Editor NBC News – Jan. 6, 2014 (http://www.jeraddatz.com/2014/01/09/physicists-weird-reverse-causality-experiment-goes-in-a-new-direction/)
Quantum entanglement and retrocausality appear to be stepping stones on the road to proving the Unified Field of all space-time.

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[1] Penrose, R (2004). “The Road to Reality: A Complete Guide to the Laws of the Universe”. Vintage Books. pp. 410–1. ISBN 978-0-679-77631-4. "... the most accurate standard for the metre is conveniently defined so that there are exactly 299,792,458 of them to the distance travelled by light in a standard second, giving a value for the metre that very accurately matches the now inadequately precise standard metre rule in Paris."

(the remainder of the references are included at appropriate points in the text)

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