Title –

Unified Field, Relativity and Quantum Mechanics Meet String Theory, Parallel Universes, the Mathematical Universe, and TOE

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Abstract –
It is my belief that Charles Misner and John Wheeler were correct in 1957 when they said, in the “Annals of Physics”, that Albert Einstein’s latest equations united gravitation and electromagnetism, and demonstrated the unified field theory (“Classical physics as geometry” - Volume 2, Issue 6, December 1957, Pages 525–603). (The unified field wouldn’t be complete without references to mass increase and time dilation – so those are included here.) In January 2012, I wrote a little article called “Misner/Wheeler correct about Einstein's Unified Field Theory being successful”. That was just a summary of this present article, sketching its basic outline and the points that needed to be filled in. I’ve spent the following 14 months developing what I believe are satisfactory answers to UFT’s problems. The first point of debate is – it has been argued that the gravitational fields, if known everywhere but only for a limited time, do not contain enough information about their electromagnetism to allow the future to be determined, so Einstein's unified theory fails. Physicists also argue that a unified "theory of everything" must now include not just gravity and electromagnetism, but also the weak and strong nuclear forces plus dark matter and dark energy. I address all these concerns in detail. But I do so in the form of an essay (there is mathematics, but no equations) that uses concepts like planetary motion, revised gravitation, and string theory to arrive at a theory of everything. The essay might be suitable for a young teenager living in the second part of this century. Why is it written this way? "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 Brief History of Time" by Stephen Hawking, Introduction by Carl Sagan)

Introduction –
I wrote to Professor Misner (the coauthor of the 1957 article which I'm taking another look at) over a year ago for information about his article with John Wheeler regarding Albert Einstein’s Unified Field Theory. His reply was very helpful indeed. I wrote a short piece at the time, which turned out to be just a basic outline of my present article. I’ve spent 14 months filling it with more and more detail. I still think Professor Misner was correct. I’ve tried to reconcile Einstein’s theory with modern concerns like dark matter, dark energy and the nuclear forces. The ideas I came up with are very unusual sometimes, but they were necessary to fit in with the unified theory being correct. Despite most of the world considering Einstein's unified field to be a failure, it's interesting that his work is making my heart beat a little faster more than 80 years after he started

work on it. As my article shows, the unified field is based in mathematics but will prove to have remarkable consequences not just for maths, but also for the physical world. I therefore chose to write it in the form of an essay (there is mathematics, but no equations) that uses concepts like planetary motion, revised gravitation, and string theory to arrive at a theory of everything. In "A Brief History of Time" by Stephen Hawking, it was stated "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." The essay I've written might therefore be valuable in the education of a young teenager living in the second part of this century.

Keywords –
Unified Field Theory; Theory of Everything; gravitation; electromagnetism; nuclear weak force; nuclear strong force; graviton; photon; dark matter; dark energy; Einstein; Maxwell; Wheeler; Misner; Rainich; Penrose; binary digits; Mobius loop; Figure-8 Klein bottle; Poincare conjecture; string theory; fractal geometry; irrational numbers; transcendental numbers; pi; e; quantum mechanics; computer science; time; wave packets; cosmic wormhole; cosmic string; tides; falling bodies; Kepler; planetary motion; Bell; Rubin; matrices; time travel; Wilkinson Microwave Anisotropy Probe; hidden variables; virtual particles; Aharonov; Cramer; retrocausality; backward causality; quantum entanglement; 5th dimensional hyperspace; space-time; moon; evolution; Earth; mass increase; time dilation; General Relativity; Special Relativity

Content –
In the 19th century, Scottish mathematician and physicist James Clerk Maxwell unified electricity and magnetism into electromagnetism. Albert Einstein's equations say that in a universe possessing only gravitation and electromagnetism, the gravitational fields carry enough information about electromagnetism to allow the equations of Maxwell to be restated in terms of these gravitational fields. This was discovered by the mathematical physicist George Yuri Rainich (1886 -1968).

England’s Professor Penrose has argued that the gravitational fields, if known everywhere but only for a limited time, do not contain enough information about their electromagnetism to allow the future to be determined, so Einstein's unified theory fails. But I have faith in Einstein. So I used an approach to understanding unification which does not rely on mathematics alone but largely depends on visualization combining subjects like physics, cosmology, quantum mechanics and computer science. This makes it clear that all time is unified with the gravitational and electromagnetic fields - meaning the gravitational fields are not known for only a limited time, they do contain enough information, and Einstein succeeded!

My approach regarding the nature of time - it’s impossible to point to the 4th

dimension of time, so this cannot be physical. Since the union of space-time is well established in modern science, we can assume the 4th dimension is actually measurement of the motions of the particles occurring in the 3 dimensions of length, width, and height [0]. My approach concerning unification of those particles with gravity and EM - suppose Albert Einstein was correct when he said gravitation plays a role in the constitution of elementary particles (in "Do Gravitational Fields Play An Essential Part In The Structure Of The Elementary Particles Of Matter?", a 1919 submission to the Prussian Academy of Sciences). And suppose he was also correct when he said gravitation is the warping of space-time. Then it is logical that 1) gravitation would play a role not only in elementary particles but also in the constitution of the nuclear strong force and the weak nuclear force i.e. the nuclear forces may not be separate from gravitation but may be modifications of it [1], and 2) the warping of space-time that produces gravity means space-time itself plays a role in the constitution of elementary particles and in the nuclear forces. Therefore, time is unified with the gravitational and electromagnetic fields.

[0] The basic standard of time in the universe is the measurement of the motions of photons i.e. of the speed of light. This is comparable to the 1960's adoption on Earth of the measurement of time as the vibration rate of cesium atoms. At lightspeed, time = 0 (it is stopped). Below 300,000 km/sec, acceleration or gravitation causes time dilation (slowing of time as the speed of light is approached). If time's 0, space is also 0 because space and time coexist as space-time whose warping (gravity) is necessarily 0 too. Spacetime/gravity form matter/mass, so the latter pair can't exist at lightspeed and photons are massless (even when not at rest). Mass increase at increasing accelerations is inevitable because the object is encountering more spacetime and gravity (the producers of mass). But mass increase cannot become infinitely large since mass doesn't exist at lightspeed. The object is converted into energy which means mass and energy must be equivalent and Energy must equal Mass related to the Speed of Light (E=mc^2, in the words of Albert Einstein).

[0 continued] The former pair (spacetime/gravity) also lose existence at the speed of light. Since the universe is based on mathematics (see below), it's possible to progress in number-line fashion from the **positive** acceleration in space-time to the state of **zero** spacetime at lightspeed … and go beyond that to **negative** 5^{th}-dimensional hyperspace described by imaginary numbers (see below). Later parts of this article show that this hyperspace beyond the speed of light allows a particular kind of time travel (various interpretations of Einstein's theories have suggested superluminal velocity permits time travel). We couldn't reach this hyperspace by travelling faster-than-light because we would have turned into energy – and no energy can exceed light's speed. But we can access hyperspace at subluminal speeds by "inverting" space. Since there is zero, or no, spacetime at light speed; all distances – between here and there, past and future – are totally eliminated (a photon experiences the whole universe – and all time – in its existence). It is stated in [3.1] that the laws of gravity and the inverse-square

combine to say “infinity equals the total elimination of distance”. So infinity exists at light speed. In “Physics of the Impossible” by Michio Kaku (Penguin Books 2008, p.227), “.. whenever we naively try to marry these two theories (general relativity and quantum theory), the resulting theory makes no sense: it yields a series of infinite answers that are meaningless.” We see, by [0] and [0 continued], that infinite answers are supposed to be arrived at because “infinity (in the sense of total elimination of distance) exists at light speed”. Infinity and infinite answers are not barriers to uniting general relativity and quantum theory. When we realize that c=∞ (infinity exists at light speed), those infinite answers can yield not nonsense but real meaning.

[1] Speaking of the electroweak force, here’s a little bit about “the nuclear forces as modified gravity” - The strong force binds protons and neutrons (nucleons) together to form the nucleus of an atom. It’s also the force (carried by gluons) that holds quarks together to form protons, neutrons and other hadron particles. It’s 10^38 (100 trillion trillion trillion) times the strength of gravity because it’s the product of the electromagnetic force (10^36 times gravity’s strength) combined with 10^2 (100) gravitons per electromagnetic photon (the graviton is a hypothetical elementary particle that mediates the force of gravitation). The weak force is responsible for the radioactive decay of subatomic particles and initiating hydrogen fusion in stars. The weak force is 10^25 (10 million billion billion) times gravity’s strength because it’s the product of the electromagnetic force combined with 100 billion anti-gravitons. That is, it’s 10^36 times the strength of gravity divided by 10^11. Physicists argue that a unified "theory of everything" must now include not just gravity and electromagnetism, but also the weak and strong nuclear forces plus dark matter and dark energy. Although the nuclear forces weren’t well understood in Einstein’s day, I believe Einstein understood them better than any other scientist (both then, and in the nearly 60 years since his death) and was correct not to worry about including them in a unified theory. The title of one of his papers "Do Gravitational Fields play an Important Role in the Constitution of the Elementary Particles?" suggests that Einstein’s understanding of the nuclear forces may have been that they have no existence independently of gravitation. In the case of nuclear fusion within the sun - the electric repulsion between two positively charged proton nuclei is repulsive but when the separation is small enough, the attractive nuclear force is stronger. It’s essential to remember that this article is not saying electromagnetism and the nuclear forces do not exist. It’s saying they don’t exist independently of gravitation, which is the underlying cause of all repelling and attracting.

If the nuclear forces may be different facets of gravitation, is it possible that electromagnetism also has no existence independently of it? This is possible if all forces have a mathematical origin, in which case a few ideas can be borrowed from string theory’s ideas of everything being ultimately composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents in a four-dimensional looped superstring. We can visualize tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) forming currents in a

Mobius loop – or in 2 Mobius loops, clockwise currents in one loop combining with counterclockwise currents in the other to form a standing current [2] Combination of the 2 loops' currents requires connection of the two as a four-dimensional Klein bottle whose construction from binary digits would make it malleable and flexible, deleting any gap and molding its border to perfectly fit surrounding subuniverses. [3] This Klein bottle could possibly be a figure-8 Klein bottle because its similarities to a doughnut's shape describes an idea suggested by mathematics' "Poincare conjecture". The conjecture has implications for the universe's shape and says you cannot transform a doughnut shape into a sphere without ripping it. One interpretation follows: This can be viewed as subuniverses shaped like Figure-8 Klein Bottles gaining rips called wormholes when extended into the spherical spacetime that goes on forever (forming one infinite superuniverse which is often called the multiverse when subuniverses - which share the same set of physics' laws - are incorrectly called parallel universes[3.1] which are wrongly claimed to each possess different laws). Picture spacetime existing on the surface of this doughnut which has rips in it. These rips provide shortcuts between points in space and time – and belong in a 5th-dimensional hyperspace. The boundary where subuniverses meet could be called a Cosmic String (they'd be analogous to cracks that form when water freezes into ice i.e. cosmic strings would form as subuniverses cool from their respective Big Bangs).

[2] The flow of ones and zeros can produce waves that cancel and result in electric neutrality and masslessness – they can produce waves that reinforce and result in mass or electric charge. Whether the charge is positive or negative depends on the precise orientation of the Mobius. The orientation of a Mobius is equivalent to the relative positions of 2 Mobius loops. Synchronous motion of the currents in the loops means a neutral neutron can have a large mass of 939.566 MeV/c^2 (approx. 1839 times an electron's energy) because both quantum Mobius loops are in motion – moving together, at the same rate – and producing 939.566 MeV of energy. (This might be adapted to a neutral Higgs particle whose known example has a mass of about 125 or 126 GeV/c^2.) The orientation of a Mobius (relative positions of 2 Mobius loops) determines the many combinations of fractions, negativeness, neutrality or positivity of mass, charge and spin. The combinations are finite because the two-dimensional Mobius programs from which fermions and bosons originate, plus each four-dimensional Klein bottle which manifests and expresses the particles, are themselves limited and finite.

[3] Currents in the two 2-dimensional programs called Mobius loops are connected into a four-dimensional figure-8 Klein bottle by the infinitely-long irrational and transcendental numbers. Such an infinite connection translates - via bosons being ultimately composed of 1's and 0's depicting 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. As Bob Berman's article "Infinite Universe" ("Astronomy" – Nov. 2012) wrote, "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."
"Monthly Notices of the Royal Astronomical Society" reports that the WiggleZ galaxy survey confirms that matter is distributed evenly at the largest scales. But if we disregard the largest scale of infinite flatness; smaller scales reflect the idea of fractals e.g. from roughly spherical galaxy clusters, down to stars, down to atoms.
(after examining recent measurements by the Wilkinson Microwave Anisotropy Probe, NASA declared "We now know that the universe is flat with only a 0.4% margin of error." - http://map.gsfc.nasa.gov/universe/uni_shape.html;
and 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).

[3.1] God's existence cannot possibly be scientifically comprehended in the current non-unified understanding of the cosmos. Thus, many scientists need to invoke the existence of an unlimited number of parallel universes having limitless combinations of the laws of physics (so one of those universes would produce all the correct laws that enable beings such as ourselves to exist). However, BITS (BInary digiTS) only suggest existence of the divine if time is linear. A non-supernatural God is proposed via the inverse-square law coupled with eternal quantum entanglement, but Einstein taught us that time is warped. Warped time is nonlinear, making it at least possible that the BITS composing space-time and all particles originate from the computer science of humans. The inverse-square law states that the force between two particles becomes infinite if the distance of separation between them goes to zero. Remembering that gravitation partly depends on the distance between the centres of objects, the distance of separation between objects only goes to zero when those centres occupy the same space-time coordinates (not merely when the objects' sides are touching i.e. infinity equals the total elimination of distance – the infinite cosmos could possess this absence of distance in space and time, via the electronic mechanism of binary digits). Zero separation is the case in quantum-entangled space-time and physicist Michio Kaku says in his book "Physics of the Impossible" that modern science thinks the whole universe has been quantum-entangled forever. This means there's still room for the infinity known as God. God would be a suprapantheistic union of the universe's spatial, temporal, hyperspatial, material and conscious parts; forming a union with humans in a cosmic unification, and a universal intelligence. Science's own Law of Conservation says the total mass (or matter) and energy in the universe does not change, though the quantity of each varies (I interpret this Law as saying – to get matter and energy, you have to start with matter and energy; which means that time must be warped). So what happens if we subtract humans of the distant future - with their ability to travel into the past and use incomprehensibly-advanced cosmogenesis, terraforming and biotechnology (cosmos, Earth-like

planet, and life-generating abilities) from the origins of life? It becomes impossible for inorganic materials – and referring to the creation of amino acids in the laboratory by Harold Urey and Stanley Miller in 1952, relatively simple amino acids - to be assembled into complex plants and animals, whose adaptations are often called evolution.

The result is that the universe, including all its forces and matter, is built on gravitation – and this gravitation is built on mathematics. When forced to summarize the general theory of relativity in one sentence, Einstein said: time and space and gravitation have no separate existence from matter.

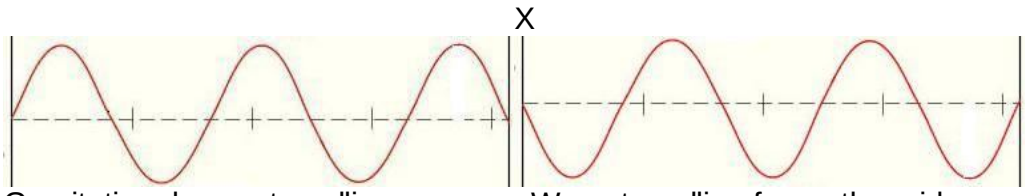
Of course, this was merely my own approach to understanding unification. In developing his unified field theory, Einstein had one which is well exemplified by the quote he made at the funeral of his engineer friend Michele Angelo Besso (1873 – 1955): "Now Besso has departed from this strange world a 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".

Physicists also argue that a unified "theory of everything" must now include not just gravity and electromagnetism, plus the weak and strong nuclear forces (all previously addressed).The theory must also include dark matter and dark energy. Gravity is only the apparent foundation of the universe – the cause we can detect, and see the effects of. But gravity is also an effect – of mathematics generated in a 5^{th} dimension. The true foundation of the universe is maths. Now I'm going to write about dark matter and dark energy. But it's appropriate to do so nonmathematically. This is because revealing the Theory of Everything can only be done with the most flexible of attitudes, and I've already stated that the foundation of the universe is maths. To continue the use of maths (in describing dark matter/dark energy) would only reveal inflexibility and a conservative nature incapable of adapting to the TOE's requirements.

In relation to wave packets (referring to Einstein's paper "Do Gravitational Fields Play An Essential Part In The Structure Of The Elementary Particles Of Matter?") - Gravity causes both attraction and repulsion if electromagnetism and the nuclear forces are not independent of it. Considering the repulsive aspect of gravity, it would eliminate the need for dark energy [4] (see the paragraphs below, enclosed in borders) to exist and cause universal expansion. But the sun and moon cause varying tide levels as a result of the constantly varying position, relative to Earth, of the gravitation-absorbing wave packets which compose them i.e. the gravity associated with the sun and moon causes attraction (more about tides in coming paragraphs). The apple that was supposed to have hit Isaac Newton on the head wouldn't have been pulled there by our planet's centre – it would have been pushed there by gravity coming from the outer solar system (and ultimately by warps of space outside our galaxy). Not all of the gravity encountering the sun or moon is blocked by being diverted into solar and lunar

wave packets. Much reaches Earth and is diverted into the wave packets of all things from the top of the atmosphere, to the surface, to the centre of the inner core. Gravity pushes planets toward the sun (planets' orbital speeds prevent them falling into the sun). Some gravitational waves from outside the solar system pass by and some are diverted towards the sun (just as some of the ocean waves passing an island are diverted to the shore by being refracted by the island's mass). As the waves pass the outer planets, more of the waves are refracted by the planetary masses and **appear** to cancel each other at the planet's centres. No interactions in wave packets occur there, meaning there is no mass and, agreeing with conclusions from Isaac Newton's theories, (hypothetical) objects weigh nothing.

X = centre of planet, where waves meet and appear to cancel each other



Gravitational wave travelling from one side of planet to centre

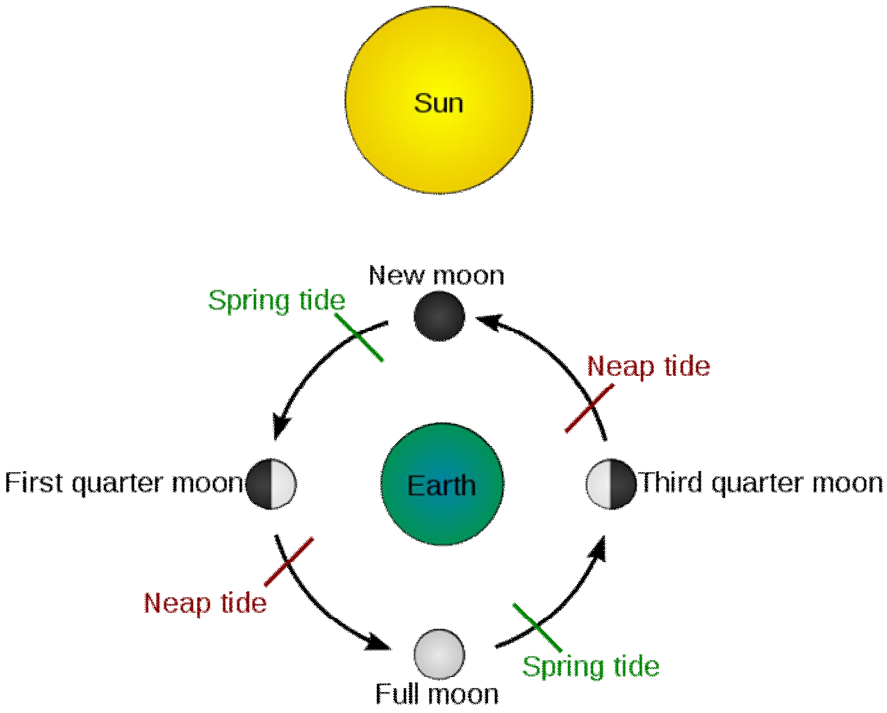
Wave travelling from other side of the planet to its centre

If an equal amount of gravitational waves from every direction in the outer solar system converged on a planet whose composition was separate from the gravitation; the orbit of our planet would be equally pushed towards and pushed away from the sun at every point in its orbit and would be a perfect circle. But the gravitational balance is upset because the gravitation composes the planet's matter-forming wave packets. We might expect waves from every direction to contribute equally to the formation of wave packets. This would be so if local space-time was uniform in composition or character everywhere (flat and homogeneous). However, General Relativity attests that space-time is curved and warped and the Mobius loop attests the same when it's transformed from the abstract world of maths to the world and cosmos we know via gravity being ultimately composed of binary digits. These digits make space-time (and its warps which are called gravity) appear to be nothing when they're actually something, and they make mass when they're combined in wave packets with the modified gravity known as electromagnetism. Upsetting of gravitational balance by planets means their orbits cannot be circular but must be elliptical (Johannes Kepler's 1st law of planetary motion says orbits are oval or elliptical). Fractal scaling of the Mobius could cause individual planets to each possess their own balance and have tiny variations in warping of the surrounding space (a variation resulting in the Pioneer anomaly, and also variously – sometimes imperceptibly - influencing the "flyby anomalies" of spacecraft receiving gravitational slingshots/gravity assists to alter their trajectory or speed). There is

no independence of time and space; so if flyby anomalies occur at different points in space, they must also occur at different times at the same point in space (space-time warps are very dynamic).

Why will two bodies dropped from the same height in a vacuum reach the ground simultaneously (this was verified by the Apollo astronauts on the Moon using a feather and a wrench or hammer)? They actually don't. There's an incredibly tiny, immeasurable, difference explained this way - the more mass a body possesses, the more gravitation is diverted to play a part in that body's formation (and the more inertia is imparted by the gravitons); though the International Space Station weighs around 400 tons, it has tiny mass compared to any planet and produces so-called weightlessness while 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.

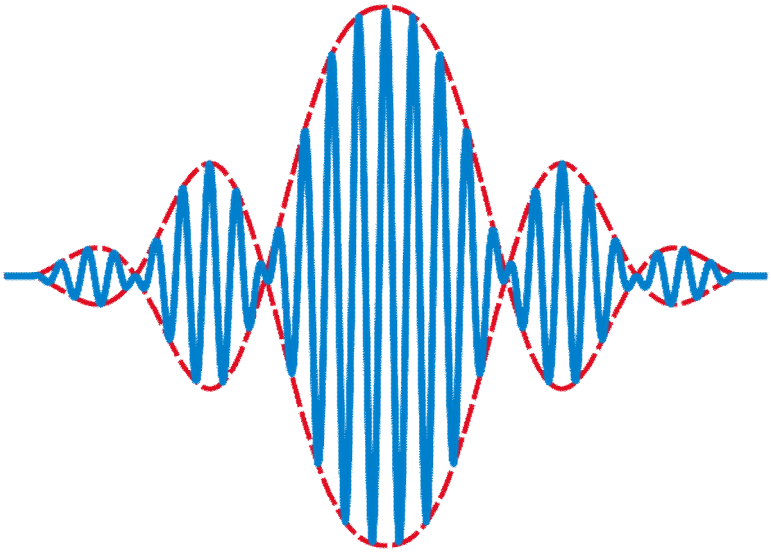
In further relation to wave packets and the tides - The difference in mass between a space station and a black hole is enormous; but the difference between a feather and tool is, in comparison, nothing. So while the heavier tool does fall faster then the lighter feather as the ancient Greek philosopher Aristotle believed, the difference is many billions of times beyond science's finest measuring instruments. It's appropriate to use the results of the experiments of Italian physicist Galileo, and say gravitation is absorbed into wave packets and the inertia of the gravitons carries objects towards Earth's centre at 9.8 m/s^2 or 32 ft/s^2. 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, 10^{th} edition 2008). All this water is being pushed towards Earth's centre at 32 feet per second per 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 means more of the gravitational waves travelling from the outer solar system are captured by solar and lunar wave packets, and less of them are 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 1^{st} and 3^{rd} quarter, only the moon is significantly suppressing oceanic recoil. If variables like wind/atmospheric pressure/storms are deleted, this causes neap tides which are much lower than spring tides.



The explanation for Johannes Kepler's 2nd Law of planetary motion (the three laws were announced between 1609 and 1618, and the second states that a planet or moon moves fastest when at its closest to the star or planet it orbits) can be phrased in terms of recoil. Referring to Earth's moon (I'll explain this physically because I believe the equations used in mathematics, though accurate and precise, often confuse our comprehension of what is actually happening) – when the moon is near Earth, gravitational waves from one direction of the outer solar system are captured in lunar wave packets before reaching Earth, and the momentum of this capture both pushes the moon towards Earth and causes it to move faster when it's near. It suppresses recoil. In this case, the moon's orbit corresponds to the seafloor in the above paragraph – but recoil from the seafloor is not suppressed as is the case with neap tides. The moon's capture of gravitational waves means more gravity waves repress "orbital recoil", the moon's tendency for inertia to move it away from Earth (either by flying off into space, or by increasing the radius of its orbit) i.e. recoil from the moon's orbit is diminished and our satellite remains near to Earth for a time. Eventually the moon's inertia transports it to the farthest point in its orbit where it is orbiting at its slowest speed because our satellite's increasing distance has been allowing more and more gravitational waves to reach Earth (more of them are interacting in wave packets here - and less are available in the space of the Earth-moon system to repress the moon's orbit or to add speed to that orbit). So it can move from perigee to apogee where an imaginary line called the radius vector which joins Earth's centre to the moon's centre sweeps out an equal area in an equal time. (The very slight difference in gravity waves available to Earth is not enough to make the moon crash into Earth or fly off into space - but only enough to

cause slight variations in its nearly circular orbit.) At lunar apogee, the strength of gravitational waves pushing the moon toward Earth is greater than those passing Earth (i.e. not tied up in this planet's wave packets) and heading to the moon. It returns to perigee where gravitational waves from one direction of the outer solar system are captured in lunar wave packets before reaching Earth, and this capture pushes the moon towards Earth and accelerates its orbit. Then to apogee again because its inertia and increasing distance have been allowing more and more gravitational waves to reach Earth (more of them are interacting in wave packets here - and less are available in space to repress the moon's orbit or to keep it orbiting as quickly). Since astronomical bodies receive virtually identical amounts of gravitational waves from all directions, the waves' effect on rotation is normally insignificant, only having appreciable effect over the much larger distances (and much greater exposure periods) of their orbits.

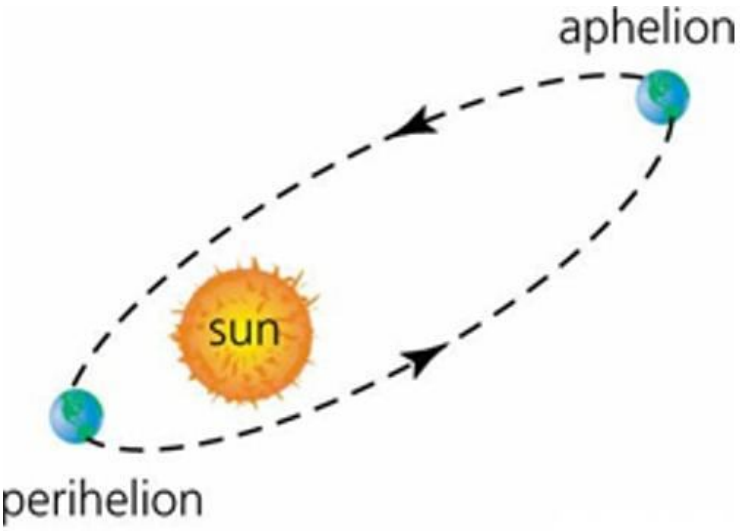
So every aspect of the moon's orbit, and all orbits, is dependent on the wave packet (a concept in quantum mechanics - introduced in 1926 by Erwin Schrodinger and interpreted later that year as a **probability wave** by Max Born, grandfather of the singer Olivia Newton-John).
"Einstein says that bodies do not attract each other at a distance. They 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." ("Gravitation" - Robert F. Paton, M.Sc., Ph.D.)
Wave packets are the product of a type of "micro gravitational lensing" (lensing is not achieved directly by matter's mass, but by base-2 mathematics comprising gravitons – and their close relative, photons – then forming mass by interaction in wave packets). Gravitational microlensing on a quantum scale magnifies gravitation by concentrating it inside matter's wave packets. This magnified momentum of gravitons composing the gravitation also explains why the moon is pushed to perigee, and why orbits are fastest when a planet or moon is closest to the body it orbits (the paragraph above phrased this as "the momentum of this capture both pushes the moon towards Earth and causes it to move faster when it's near" - and, at apogee, "less (gravitational waves) are available in the space of the Earth-moon system (because there's a tiny increase in the number of them interacting in Earth's wave packets) to repress the moon's orbit or to keep it orbiting as quickly".



Wave packet

Planets nearer the Sun orbit faster than those farther out because an outer planet concentrates gravity waves in itself – the increasing density with depth corresponds to increasing concentration and magnification of wave packets and gravitational waves. When gravity waves meet in the planetary centre, they appear to cancel and have their progress terminated. However, the waves continue – following the oscillations of the wave that entered the planet's opposite side. They eventually emerge from that opposite side, in a magnified condition which they are able to transfer to an inner planet as they journey to the sun (inevitably, the vast majority of magnified waves do not encounter any planet but dissipate into space). This magnification accounts for planets nearer the sun orbiting faster than those farther out i.e. for Kepler's 3rd law of planetary motion.

Speaking of planets orbiting the sun, here's a nonmathematical paragraph about how dark energy/gravitation causes attraction in the solar system –



As gravitational waves travel from the outer solar system towards the sun (as a starting point, let's say they're coming from the lower left in this picture), they'd push the orbiting Earth to aphelion, its farthest distance from the sun – 152 million km. But gravity waves are also coming towards the sun from the aphelion direction. So Earth's progress to the upper right is stopped and it follows the line of least resistance to waves pushing it from both the lower and upper directions – this corresponds to the path indicated by the arrow pointing left. When it reaches perihelion (its closest approach to the sun – 147 million km), the waves from the right are pushing it back while waves from the left are pushing it forward. Our planet follows the boundary between waves assaulting it from opposite directions and its inertia compels it to follow the arrow pointing right. Upon reaching aphelion again, the tug-of-war continues and Earth's momentum causes it to go left. We mustn't forget the waves that push Earth towards and away from the sun at both its perihelion and aphelion points. The balance between these forces reinforces the planet's tendency to stay in the illustrated orbit. The sun's position in the illustration is exaggerated – it should be closer to the centre of the ellipse since the difference between perihelion and aphelion is only about 3%. The existence of this difference would rely on the planet manifesting as a multitude of matter-forming wave-packets which divert some gravity waves to every point from the top of the atmosphere to the centre of the inner core – thus slightly upsetting the balance of gravity waves from opposing directions.

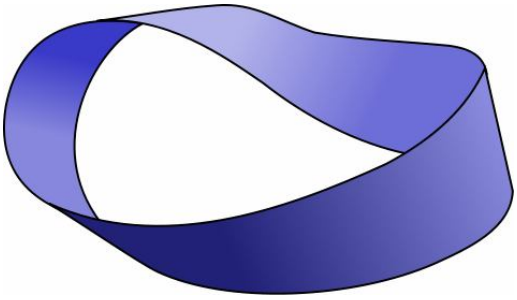
The warping of space-time in General Relativity is not separate from matter but gives an electron a mass of 0.511 MeV (mega electron volts) – technically, physicists say "0.511 Mev/c^2" because an electron volt is actually a measurement of energy, and mass units equal energy units divided by c^2, or $m = E/c^2$ (which is E=mc^2 when both sides are multiplied by c^2). (E=mc^2 means a tiny amount of mass can be converted into a very large amount of energy.

Similarly, m=E/c^2 means a very large amount of energy is converted into a tiny amount of mass.)

Back to Kepler's 3rd Law - the average density of the Milky Way is much less than the solar system. Picture the galaxy, except for the central dense bulge that may be roughly 10,000 light years in diameter, made up of solar systems like ours and separated by 4 or 5 light years (the closest star to the Sun is Proxima Centauri, 4.2 light years away). Within those systems, there is a lot of mass and density in the form of stars, planets, moons, asteroids, comets, gas, and dust. But the vast reaches of near vacuum between systems lowers average density enormously – the MacMillan Encyclopedia of Physics says the average density of matter between the stars of the Milky Way is 0.1 neutral hydrogen atoms per cubic centimetre. Since density corresponds to concentration of wave packets and magnification of gravitational waves, there would be extremely little magnifying of gravity waves in interstellar space. I suspect that if it is (very approximately) 10^15 times or a million billion times less, there would be insufficient gravitational magnification to accelerate the stars in the central core or bulge beyond the orbiting speeds of the galaxy's outermost stars.

In the 1970s, Vera Rubin concluded outer stars were being sped up by the gravitational attraction of unseen Dark Matter in a halo well beyond the galaxy. This partial revision of gravity states there would be no such thing as dark matter of this nature. However, the term "dark matter" could be used to describe particles in the 5th dimension, or travelling through time, that would be invisible but still exert gravitational influence (in a universe structured according to the rules of fractal geometry, 5th dimensional hyperspace would occupy every fermion and boson, alongside space-time which is ultimately composed of 1's and 0's like particles). The 3 familiar dimensions of length, width and height could be said to correspond to the integrated clockwise and anticlockwise currents in the two-dimensional loops that are integrated by transcendental numbers like pi, and likewise-infinite irrationals, into an infinite number of subuniversal figure-8 Klein bottles. 1's and 0's portraying those physical dimensions would comprise photons and gravitons that interact in wave packets to create mass. After the 2 loops are integrated, they could be thought of as one loop. The 3 physical dimensions represent the left side of the loop and the time dimension is perpendicular to them (the twisted part at the top in the picture below – the entire strip is curved; so it translates into the warps common to space, time and hyperspace). And there would also exist an integrating (without it, there would be no space-time) 5th dimension called hyperspace, at right angles to the 4th and (it could be said) 180 degrees from the length/width/height i.e. on the right. H-space is extended from the side along the loop's bottom because the WMAP space probe (Wilkinson Microwave Anisotropy Probe) has determined that a very large 72% of the universe is dark energy, and transmissions of binary digits from hyperspace are an interpretation of dark energy – since binary digits are mathematical, this means the WMAP SPACECRAFT HAS DETECTED

EVIDENCE THAT THE UNIVERSE HAS MATHEMATICAL FOUNDATION. The other interpretation of dark energy is gravitation in its repelling role – just as there is quantum entanglement in space, there is retrocausality or backward causality in space-time's other half which means the effect of gravitation has no separation in time from the cause of binary digits. To reach the total of 72%, h-space must also invade parts of the loop assigned to time and normal space. That's not surprising since hyperspace "creates" spacetime – the Law of Conservation says neither matter nor energy can be created or destroyed (though the quantity of each can change), so a better phrase might be "hyperspace recycles spacetime" (when matter changes into energy or energy becomes matter, we say matter or energy has been created). This takes the reader full circle in her or his exploration of nonlinear dynamics - and she or he will see that electromagnetism, though modification of gravitation, is the source of gravitation too.



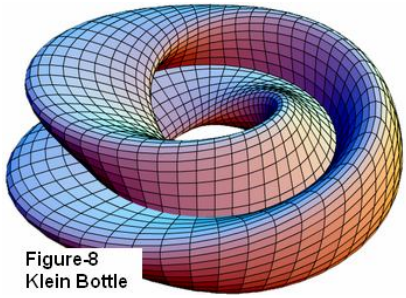


Figure-8
Klein Bottle

(2 Mobius loops – each one is 2 dimensional - joined along their edges can form a 4 dimensional figure-8 Klein Bottle) Remember that the flexibility afforded by 1's and 0's seamlessly welds this, a subuniverse, with surrounding subuniverses as well as deleting the gap from its centre.

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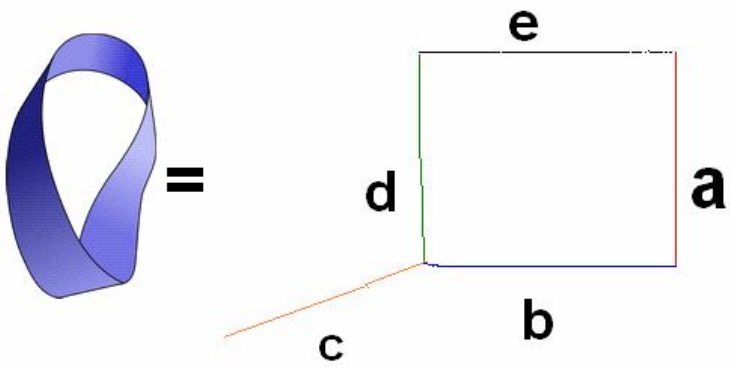
[4] An alternative interpretation of dark energy would be to consider it as radiation of binary digits from hyperspace. It seems to me that gravitation can be viewed as the effect of the cause known as binary digits. What if Israeli scientist Yakir Aharonov, and others, are correct about the theory of retrocausality (that effects influence causes – therefore, causes and effects are not necessarily separate?) Gravitation would then be dark energy too, and I think it would change the astronomy world if scientists would study this possibility.

"Hidden variables" is an interpretation of quantum mechanics which is based on belief that the theory is incomplete (Albert Einstein is the most famous proponent of hidden variables) and it says there is an underlying reality with additional information of the quantum world. I suggest this underlying reality is binary digits generated in 5D hyperspace. These allow time travel by making it possible to warp space [5] (wormholes being one example of doing this) simultaneously adding precision and flexibility to the elimination of distances; and the "fitting together" of subuniverses to form a continuous superuniverse. (The boundaries where subuniverses meet might be called Cosmic Strings - analogous to "cracks" in spacetime formed as subuniverses cool and similar to cracks that form as water freezes into ice - and first contemplated by the theoretical physicist Tom Kibble in the 1970s.)

[5] Maybe hidden variables called binary digits could permit time travel into the future by warping positive space-time. And maybe they'd allow time travel into the past by warping a 5D hyperspace that is translated 180 degrees to space-time, and could be labelled as negative or inverted.[6] (The space-time we live in is described by ordinary [or "real"] numbers which, when multiplied by themselves, result in positive numbers e.g. 2x2=4, and
-2x-2 also equals 4. Inverted "positive" space-time becomes negative hyperspace which is described by so-called imaginary numbers that give negative results when multiplied by themselves e.g. i multiplied by itself gives -1. [Supporting info from Stephen Hawking's "A Brief History of Time" – Bantam Press 1988, p.134]) 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. Our free will can be used to a small extent to change the course of our personal lives … but it's powerless to stop Hitler doing what he did, or to prevent humans learning to time travel oneday.



[6]

Width a is perpendicular to the length (b or e) which is perpendicular to height c. How can a line be drawn perpendicular to c without retracing b's path? By positioning it at d, which is then parallel to (or, it could be said, at 180 degrees to) a. d (the spaceship) is already at 90 degrees to length b and height c. To be at right angles to length, width and height simultaneously (the state equivalent to time travel); it has to also be perpendicular to (not parallel to) a. This is accomplished by a twist, like on the right side of the Mobius loop pictured above, existing in a. Then part of a is indeed at 180 degrees to d, but part of a is at 90 degrees to d. This situation requires a little flexibility or "fuzziness" which allows the numbers to deviate slightly from their precise values of 90 and 180. The fuzziness is represented in nature by past, present, future, space, time, and hyperspace

existing everywhere rather than being confined to particular locations. Thus, 90+90 (the degrees between b & c added to the degrees between c & d) can equal 180, making a & d parallel. But 90+90 can also equal 90, making a & d perpendicular. (Saying 90+90=90 sounds ridiculous but it has similarities to the Matrix [of mathematics, not the action-science fiction movie] which is an array of numbers placed in rows and columns. It was worked out in the mid-nineteenth century by British mathematician Arthur Cayley, matrix mechanics is a version of quantum mechanics discovered by Werner Heisenberg in 1925, and matrices say X multiplied by Y does not always equal Y times X. In this paragraph, the first 90 plus the second 90 does not always equal the second 90 plus the first 90 because 90+90 can equal either 180 or 90.) If the universe is composed of an infinite number of subuniverses shaped like two 2-D Mobius loops joined to form a 4-D figure-8 Klein bottle, in each subuniverse there would be 2 perpendicularities to the twist (one lot of 90+90, then another 90+90). 180+180 could equal 360 – represented in physics as a subuniverse, galaxy, black hole, subatomic particle (or a spherical wave that spreads to its destination instantly, translating space by 90 degrees i.e. producing quantum entanglement). 180+180 could also equal 180 – represented in physics by two spherical waves instantly arriving from opposite directions and their simultaneous quantum entanglement producing inversion of space (translation by 180 degrees - i.e. making length, width and height simultaneously perpendicular, or travelling in time) which permits the spaceship to enter hyperspace and journey into the past).

"Empty" space (according to Einstein, gravitation is the warping of this) seems to be made up of what is sometimes referred to as **virtual particles** by physicists since the concept of virtual particles is closely related to the idea of quantum fluctuations (a quantum fluctuation is the temporary change in the amount of energy at a point in space). The production of space by BITS (BInary digiTS) necessarily means there is a change in the amount of energy at a certain point, and the word “temporary” refers to what we know as motion or time. Vacuum energy is the zero-point energy (lowest possible energy that a system may have) of all the fields (e.g. electromagnetic) in space, and is an underlying background energy that exists in space even when the space is devoid of matter. Binary digits might be substituted for the terms zero-point energy (since BITS are the ground state or lowest possible energy level) and vacuum energy (because BITS are the underlying background energy of empty space). Relativistically, space can’t be mentioned without also mentioning time, whose warping can therefore also be viewed as gravitation (since “dark matter” is invisible but has gravitational influence, its existence could be achieved by ordinary matter travelling through time).

I call hidden variables (or virtual particles) binary digits generated in a 5th-dimensional hyperspace which makes them - as explained in the next sentence - a non-local variety, in agreement with the limits imposed by Bell's theorem.

(Bell's Theorem is a mathematical proof discovered by John Bell in 1964 that says any hidden variables theory whose predictions agree with quantum mechanics must be non-local i.e. it must allow an influence to pass between two systems or particles instantaneously, so that a cause at one place can produce an immediate effect at some distant location [not only in space, but also in time].) Comparing space-time to an infinite computer screen and the 5th dimension to its relatively small – in this case, so tiny as to be nonexistent in spacetime – Central Processing Unit, the calculations in the "small" CPU would create and influence everything in infinite space and infinite time. This permits a distant event to instantly affect another (exemplified by the quantum entanglement of particles separated by light years) or permit effects to influence causes (exemplified by the retrocausality or backward causality promoted by Yakir Aharonov and others (see "Five Decades of Physics" by John G. Cramer, Professor of Physics, University of Washington - http://www.physics.ohio-state.edu/~lisa/CramerSymposium/talks/Cramer.pdf). This means quantum processes, in which effects and causes/distant events are not separated, wouldn't be confined to tiny subatomic scales but would also occur on the largest cosmic scales.

Do you know what all this means when it's condensed into a few sentences? It means mathematics is united with the physical world, and miracles can occur. Computer programs are written with the binary digits of 0 and 1 - and these digits compose a form of maths. So anything you see on a computer screen can happen in real life. You can do anything you can imagine, as long as the laws of physics don't forbid it (we may not completely understand what those laws actually forbid for at least another thousand years).

You don't even need to be a mathematician or computer programmer. All things (matter, energy, space, time, etc.) are part of Einstein's Unified Field. Your mind is already united with all maths and all computers. Performing miracles is no more difficult than pressing a button to switch your computer on. All you need is FAITH - an absolute, unshakeable knowledge that you can do anything; even if it's supposed to be impossible. That sounds easy, but I can't do anything I can imagine ... not yet! :)

The bottom line is that Einstein's Unified Field Theory has apparently been reconciled with the concerns raised by modern science. Despite most of the world considering the unified field to be a failure, this article reviewing it and the Misner/Wheeler article asserts that it was a vastly unappreciated success!

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