# UNDERSTANDING THE UNIVERSE IN 6 EASY, BUT CONTROVERSIAL, STEPS

Author –Rodney Bartlett

abstract -

The Italian scientist Galileo described his experiments mathematically some 400 years ago. Ever since, scientists all over the world seem to distrust articles that don't include mathematics, comparing them to mistakes made by the members of the ancient Greek philosophers who didn't use maths (unless, of course, those articles are the result of Einstein's "thought experiments"). Many famous scientists have said that if you really understand something, you can explain it in plain English or to a young person with no maths training. So, as I normally do, I'll shy away from equations and scientific language (the great Isaac Newton and Albert Einstein used both things, so I think I must use them to some degree if I want to understand the universe) and try to rely on pure logic. Another great scientist of 100 years ago, Niels Bohr, was said to be able to do his work without relying on maths, so perhaps equations are over-rated and are actually the servants of intuitive insights. The early-20th-century's Jules Henri Poincare was one of the greatest mathematicians of modern times, but also one of the greatest believers in intuition.

This article feels more like doing a 40-year-long jigsaw puzzle than something that required me to be an author. Sure, it took a long time and required a lot of thinking. There were times when the going felt frustrating, or tiring, or like smooth sailing. But I always had the feeling, similar to that of Paul McCartney when he wrote the song "Yesterday" for the Beatles or of Wolfgang Amadeus Mozart writing his classical music in the 18$^{th}$ century, that all the pieces of the puzzle already exist and I just had to put them together. Sometimes, I even felt as though pieces were being handed to me in the right order … at the right time. The article was written after reading "How the Universe Will End" by Francis Reddy (a senior science writer at NASA) in Astronomy magazine – Sep. 2014, and my article is restricted to the 6 topics which came to mind while reading it. The 6 steps are 1) Space Cannot Expand Faster Than Light, 2) Cosmic Inflation Replaced, 3) Dark Energy and the Big Rip, 4) What Is the Relation Between Gravitation and Black Holes?, 5) What Is Dark Matter?, and 6) The Universe Will Not End.

An important point to remember –

Einstein's General Relativity gives a geometrical description of space-time and gravitation. The "Digital String Theory" section, speaking of the Mobius loop etc, doesn't contradict that description but complements it since the Mobius and Klein

bottle belong to a branch of geometry called topology or "rubber-sheet geometry". String theory has been called "a little piece of the 21$^{st}$ century that dropped into the 20$^{th}$ century" (it's the 21$^{st}$ century now, so it's time for string theory to become more than a self-consistent theory and to blossom into the wondrous thing it was destined to be). Combining it with electronics and the above topology into "Digital String Theory" might possibly present an accuracy to description of space-time which simply wasn't available when Albert Einstein lived (although one of the first papers on topology was mathematician and physicist Leonhard Euler's 1736 paper on the Seven Bridges of Königsberg, the digital age was only approx. a decade old when Einstein died).

Essay -

## 1) Space Cannot Expand Faster Than Light

Cosmic inflation is the exponential expansion of space in the early universe. The inflationary epoch lasted from $10^{-36}$ seconds after the Big Bang to sometime between $10^{-33}$ and $10^{-32}$ seconds. Following the inflationary period, the universe continues to expand, but at a less accelerated rate. The inflationary hypothesis was developed in the 1980s by physicists Alan Guth and Andrei Linde. Technically, the expansion during this period of inflation proceeded faster than the speed of light. We often hear that the laws of physics aren't violated by space expanding faster than the speed of light. On 17 March 2014, astrophysicists of the cosmic microwave background (CMB) experiment called BICEP2 (Background Imaging of Cosmic Extragalactic Polarization) announced the detection of inflationary gravitational waves in the B-mode power spectrum. If confirmed, this would provide clear experimental evidence for the theory of inflation.

However, on 19 June 2014, lowered confidence in confirming the findings was reported by 3 sources: 1) Ade, P.A.R. (BICEP2 Collaboration) et al. (19 June 2014). "Detection of B-Mode Polarization at Degree Angular Scales by BICEP2", Physical Review Letters 112 (24): 241101, 2) Overbye, Dennis (19 June 2014). "Astronomers Hedge on Big Bang Detection Claim". New York Times, 3) Amos, Jonathan (19 June 2014). "Cosmic inflation: Confidence lowered for Big Bang signal". BBC News). The lowered confidence expressed only a few months after the supposed detection makes me think it could well be correct to say space cannot expand faster than light, and there was no cosmic inflation. To condense the explanation into one sentence (a fuller explanation is in "Why Is Gravity Weak?" in this essay), electromagnetic light is produced by gravitation which is the warps in space-time (if space-time's warps make light waves, those light waves could never travel at a speed independent of space's expansion rate). So if space (space-time) is actually expanding faster (or expanding at all), light's velocity would increase at the same rate and Variable Speed of Light theories would be correct in their final conclusion. If the speed of light is a universal constant; the 1998 conclusion of accelerating universal

expansion deduced by Saul Perlmutter, Brian Schmidt and Adam Riess could not be correct (as we'll see, it is correct that our **SUB**universe has accelerating expansion).

Experiments are needed to resolve the possibilities into the truth. But I suspect Einstein's intuitions may have been correct. !n 1911 / 1912, Einstein was working on a Variable Speed of Light theory. But he abandoned it in favour of the predictions of General Relativity, which proved to be accurate. The cosmological constant was originally introduced by Albert Einstein in 1917 as an addition to his theory of general relativity, to achieve a static universe. Einstein abandoned the concept as his "greatest blunder" after Edwin Hubble's 1929 discovery that all galaxies outside our own Local Group are moving away from each other, implying an overall expanding universe. But perhaps it was not his "greatest blunder" at all. Maybe Hubble's discovery of galaxies' redshifts (light is shifted towards the red end of the spectrum when an object moves away from an observer) is not cosmological – due to the expansion of the universe – but one of the other kinds. Could it be a relativistic effect known as gravitational redshift? This is observed in electromagnetic radiation moving out of gravitational fields e.g. light being emitted out of distant galaxies. What happens to the Big Bang if the universe is, in Einstein's word, "static" (what Fred Hoyle and others term a Steady State universe)? The cosmic microwave background 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.

The following paragraphs offer a more detailed explanation of 1) both gravitation and electromagnetism being distortions or warps in space-time, or "Space-time's warps equal Gravitation which produces Electromagnetism" (S-t = G → EM), 2) a different source for the microwave background, and 3) a mechanism of expansion which does not involve a Big Bang**:**

**WHY IS GRAVITY WEAK?**

When Einstein penned E=mc^2, he used c (c^2) to convert between energy units and mass units. The conversion number is 90,000,000,000 (light's velocity of 300,000 km/s x 300,000 km/s) which approx. equals 10^11. After gravity forms matter*, successive (subsequent) gravity waves are, via gravitational lensing, concentrated 10^24 times (to 10^25, weak nuclear force's strength - giving the illusion that a weak nuclear force that is not the product of gravitation exists). Then they're further magnified by the matter's density to achieve electromagnetism's strength (10^36 times gravity's strength) i.e. 10^25 is multiplied by Einstein's conversion factor [10^11] and gives 10^36 (this gives the illusion of the existence of electric and magnetic fields** that are not a product of gravitation – last century, Einstein stated that gravitation and electromagnetism are related.). Successive gravity waves are absorbed by the matter and radiated as longer-wavelength waves (both as electromagnetic waves - possibly gamma rays, or a ***microwave background*** – and as gravitational waves which have lost

10^24 of their energy or strength (and are labelled "10^1".)

* The 2012 article "How Einstein Discovered Dark Energy" by Alex Harvey (http://arxiv.org/pdf/1211.6338v1.pdf) states, "Recall that in 1918 the only elementary particles known were the electron and the proton. Physicists were attempting to understand why these were stable despite their internal electromagnetic repulsion. Most attempts were based solely on electromagnetic theory. For a review of these efforts see W. Pauli, Theory of Relativity, Pergamon Press, London (1958). See Part V, p.184 ff]. Einstein's effort was to construct a model in which stability was achieved through the use of gravitational forces. In particular, he used modified gravitational field equations which included the cosmological constant [A. Einstein, "Speilen Gravitationfelder in Aufbau der Elementarteilchen eine Wesentliche Rolle" (Do gravitational fields play an essential role in the structure of elementary particles), Sitzungsberichte der Preussischen Akademie der Wissenschaften, (Math. Phys.), 349-356 (1919) Berlin]. The attempt was not successful and this was the last time he mentioned the cosmological constant other than to denounce it."

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

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

** Waves are generally classified as either transverse or longitudinal depending on the way the propagated quantity is oriented with respect to the direction of propagation. Gravitational waves are transverse waves but they are not dipole transverse waves like most electromagnetic waves, they are quadrupole waves. A dipole transverse wave has two "lobes", as in the following diagram of an electromagnetic wave.
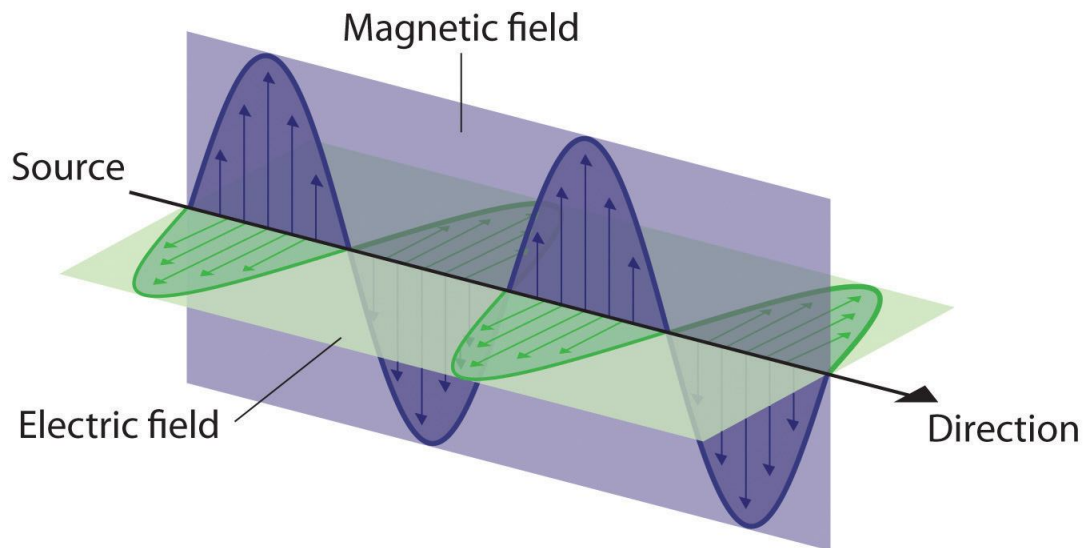
The simplest quadrupole (as in "gravitational wave") is two dipoles - they simultaneously squeeze and stretch matter in two perpendicular directions. If a quadrupole gravitational wave becomes a dipole electromagnetic wave, it not only has to change its strength in the way described above but it also has to change its shape. How can it transform from "two dipoles" to "two lobes"?

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

**Digital String Theory**

Let's borrow a few ideas from string theory's ideas of everything being ultimately

composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents in a four-dimensional looped superstring .We can visualize tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics)* forming currents in a two-dimensional program called a Mobius loop – or in 2 Mobius loops, clockwise currents in one loop combining with counterclockwise currents in the other to form a standing current. Combination of the 2 loops' currents requires connection of the two as a four-dimensional Klein bottle. This connection can be made with the infinitely-long irrational and transcendental numbers (see next paragraph for support of the universe's infinity)**. Such an infinite connection translates - via bosons being ultimately composed of the binary digits of 1 and 0 depicting pi, e, √2 etc.; and fermions being given mass by bosons interacting in matter particles' "wave packets" – into an infinite number of (possibly Figure-8) Klein bottles which are, in fact, "subuniverses". Binary digits fill in gaps and adjust edges of our 13.8-billion-year-old subuniverse to fit surrounding subuniverses (similar to manipulation of images by computers). Such manipulation also allows the appearance of motion where there is none (like in the individual cartoon frames called cells), and the appearance of a stream of photons when there is only one. Slight "imperfections" in the way the Mobius loops fit together determine the precise nature of the **binary-digit currents (the producers of space-time, gravitational waves, electromagnetic waves, the nuclear strong force and the nuclear weak force)** and thus of exact mass, charge, quantum spin. They would also produce black holes - whose binary digits could, in the case of the sun, come from our star being compressed to 2.95 kms, in which case the pressure increase "shreds" the sun into its binary digits (its mass is relativistically converted into the energy of binary digits). Referring to a BEC (Bose-Einstein condensate), the slightest change in the binary-digit flow (Mobius loop orientation) would alter the way gravitation and electromagnetism interact, and the BEC could become a gas (experiments confirm that it does).

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

** Each "subuniverse" (bubble or pocket universe) is one of a series (extending infinitely in every direction) composing the physically infinite and eternal space-time of the universe. The infinite numbers make the cosmos physically infinite (see "The Universe Will Not End"), the union of space and time makes it eternal (see "The Universe Will Not End"), and it's in a static or steady state because it's already infinite and has no room for expansion. Our own subuniverse has a limited size (and age of 13.8 billion years), is expanding, and has warped space-time because it's modelled on the Mobius loop, which can be fashioned by giving a strip of paper a 180-degree twist before joining the ends. (It may have DOUBLE

STRANDED, spiralling DNA because the universe is modelled on TWO twisted Mobius loops.) Bob Berman's article "Infinite Universe" ("Infinite Universe" by Bob Berman, "Astronomy" (Nov. 2012) says, "The evidence keeps flooding in. It now truly appears that the universe is infinite" and "Many separate areas of investigation – like baryon acoustic oscillations (sound waves propagating through the denser early universe), the way type 1a supernovae compare with redshift, the Hubble constant, studies of cosmic large-scale structure, and the flat topology of space – all point the same way." Support for the article – a) after examining recent measurements by the Wilkinson Microwave Anisotropy Probe, NASA declared "We now know that the universe is flat with only a 0.4% margin of error." (WMAP's Universe (http://map.gsfc.nasa.gov/universe/uni_shape.html) and b) according to "The Early Universe and the Cosmic Microwave Background: Theory and Observations" ("The Early Universe and the Cosmic Microwave Background: Theory and Observations" by Norma G. 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).
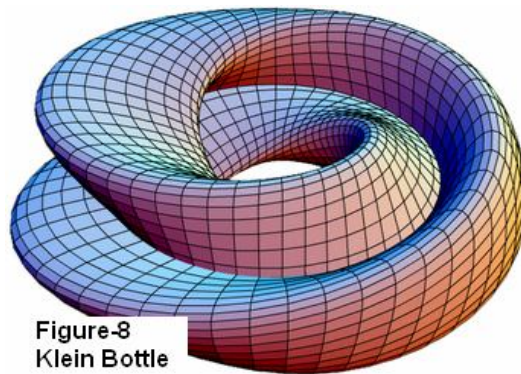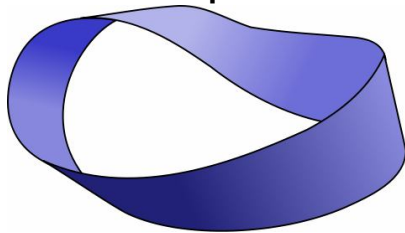
**Mobius Loop**





Figure-8
Klein Bottle

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

String Theory" might possibly present an accuracy to description of space-time which simply wasn't available when Albert Einstein lived (although the beginnings of topology belong with mathematician and physicist Leonhard Euler's 1736 paper on the Seven Bridges of Königsberg, the digital age was only approx. a decade old when Einstein died).

## 2) Cosmic Inflation Replaced

For the info below on Causal Sets, I thank Zeeya Merali and her article "Theoretical physics**:** The origins of space and time" ("Nature" 500, 516–519 - 28 August 2013).

"Pioneered 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." This article agrees that space-time's building blocks are mathematical (it proposes base-2 maths which consists of the binary digits of 1 and 0). Though the digits are programmed into Mobius loops in hyperspace, they form the physical universe and also 5-D hyperspace, the distinction between space-time and the $5^{th}$ dimension being meaningless (see "What Is Dark Matter?" below). As Stephen Hawking writes ("A Brief History of Time", p.139), "Which is real, 'real' or 'imaginary' time? It is simply a matter of which is the more useful description." Earlier in that paragraph, he says, "In real time, the universe has a beginning and an end at singularities that form a boundary to space-time and at which the laws of science break down. But in imaginary time, there are no singularities or boundaries. So maybe what we call imaginary time is really more basic …"

What if Digital String Theory is correct in asserting that bosons are ultimately composed of the binary digits of 1 and 0 depicting pi, e, $\sqrt{2}$ etc.; and fermions are given mass by bosons interacting in matter particles' "wave packets"? Then the 1's and 0's of computer science could be assembled into a computer simulation of space-time and the cosmos. If that simulation was not restricted to a single room and period, but filled all of space and all of time, it would no longer be just a simulation – it would become the universe itself, and the reality everyone has ever lived in or will be born into. As proposed at the end of the second last paragraph in this section "2 – Cosmic Inflation Replaced", the universe is "quantum entangled (unified) by everything having the same origin of binary digits." This universe/binary digit entanglement is consistent with the cosmos being no more or less than the ultimate computer simulation – one affecting all senses and all detectors.

 Here are a few thoughts concerning cosmogenesis –
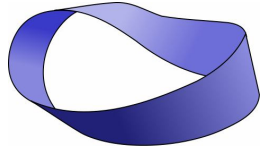
**Mobius loop – This is how it might be used in building a universe:** We write down everything our species has learned (an "Encyclopedia Universalis"). Instead of using ink, we use the binary digits of 1 and 0. And we do not write on paper or in computers in a linear fashion (one line after the other … left to right, top of page to bottom). We "write" in the warps of space-time and hyperspace and do so in Mobius fashion (everything is written so that it's comparable to being on a piece of paper that's given a twist before the ends are joined). This causes curving and warping in space-time, confusion of "here" and "there" (quantum entanglement), and muddled causes and effects (retro- or backward causality). Because of this entanglement of all time and space; if the writing is done in the year 3,000 it might possibly still include the knowledge of the year 3,000,000 or 3,000,000,000 and so on.
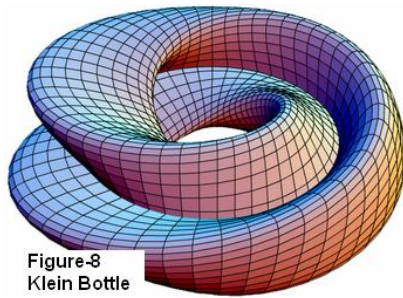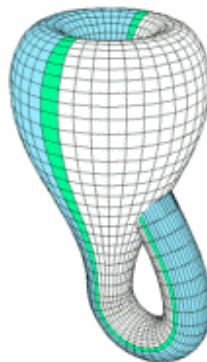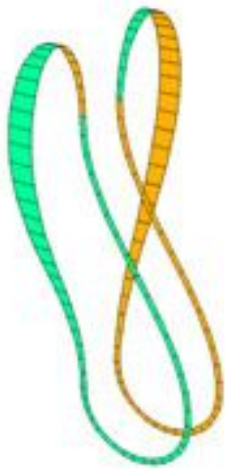


Figure-8
Klein Bottle

(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 hole from its centre.

2 unjoined Mobius bands are connected into an ordinary (non figure 8) Klein bottle by a band having a front and back
(thanks to http://plus.maths.org/content/os/issue26/features/mathart/index for illustration)

Are the many, seemingly obviously separate, objects and events in our lives really unified into one thing in physics' space-time? Perhaps this is comparable to a stream of binary digits (1's and 0's) ultimately causing pixels (picture elements) on a computer screen to be illuminated, unifying the separate elements on the screen because they all originate with one thing (a stream of 1's and 0's). The universe would **not** be unified to near-uniform temperature and curvature by the whole cosmos having once been small enough for everything to be in contact, then undergoing extremely rapid expansion from a big bang during a period called inflation. It would be quantum entangled (unified) by everything having the same origin of binary digits.

Back to Zeeya's "origins of space and time" – "In the late 1980s, Sorkin used this framework to estimate the number of points that the observable Universe should contain, and reasoned that they should give rise to a small intrinsic energy that causes the Universe to accelerate its expansion. A few years later, the discovery of dark energy confirmed his guess." This impresses me, but the part about "each link pointing from past to future" doesn't agree with my conviction that the future can influence the past, and that humanity was born from time travel to the past coupled with biotechnology and computer science existing centuries from 2014 ("Retrocausal" Sets exist too).

## 3) Dark Energy and the Big Rip

The Klein bottle in "Digital String Theory" 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 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 5$^{th}$-dimensional hyperspace.

It has been shown that the space and time of the cosmos could result from electronics' ones and zeros. Gravitation (space-time's warps) can then also be viewed as the effect of the cause known as binary digits. A possible interpretation of dark energy would be to consider it as radiation of binary digits from

hyperspace because this radiation of digits creates space-time. Gravitation, produced by emitted 1's and 0's, would then be the product of dark energy. Dark energy would continuously form new space-time which would displace the existing galaxies and other parts of the universe, pushing galaxy clusters apart and making a subuniverse (not the universe as a whole) expand. Subcosmic (on a subuniverse scale) expansion sped up about 5 billion years ago because the subuniverse had then reached the threshold of having enough space-time, and enough gravity, and enough of dark energy's/gravity's anti-gravitational effect*, to start expansion's speed-up. The greater the amount of space-time made by binary digits, the more dark energy will increase.

* The Big Rip can never tear space and time apart because dark energy is the hypothesized cause of such a Rip. The previous paragraph shows that gravity (and thus space-time, matter, electromagnetism …) is the product of dark energy i.e. binary digits in what another part of this article calls the computer simulation that becomes the cosmos. Like a bone continually being built up by osteoblast cells then broken down and repaired by osteoclasts, the universe is with us constantly and its space-time can't be shredded into oblivion. The simulation instantly "refreshes" or "reloads" itself, deleting any consequences of a Big Rip subroutine.

Fred Hoyle, Hermann Bondi and Thomas Gold calculated (in the middle of the 20th century) that matter or energy has to be created at a rate equal to one hydrogen atom in each quart of space ever half-billion years to keep the universe in a "steady state" ("The Universe" by David Bergamini and Life Nature Library – 1964, p.175). In accord with the Law of Conservation of Energy and Mass, "new" space-time isn't really formed but is simply the computer simulation that becomes the universe. This conservation can also be viewed as positive space-time (that means gravity is positive too, contradicting modern theories of the universe's alleged beginning that say gravity is negative) being balanced by an equal quantity of negative hyperspace (see "What Is Dark Matter?).

**4) What Is The Relation Between Gravitation and Black Holes?**

Of course, relating gravitation to radiating dark energy means gravity must be a repelling force. If space-time (whose warping is gravity) forms mass, there could be "currents" of space-time flowing in the "oceans" between the galaxies. Space-time would form the matter in the galaxies, and it would form the Earth/objects on this planet. How? By some of the currents of space-time or gravity which pass the solar system's outer boundary being diverted towards the massive Sun's centre (just as some of the waves passing an island are refracted toward the shore by the island's mass). Along their course, the refracted gravitational waves are concentrated 10^24 times in the intense warping we call matter (see "Why Is Gravity Weak?").

The more mass a body possesses, the more gravitation is diverted to play a part in that body's formation. Agreeing with Einstein's theory that gravitation is a push created by the hills and valleys of curved space, gravitational waves are a repelling force (this aspect of gravity is normally referred to as Dark Energy) refracted towards the Sun's centre. The waves ultimately originate far out in deep space where they push galaxy clusters apart. Having given the planets pushes which keep them in their orbits and prevent them flying off into space (gravitational waves from the opposite direction stop planets spiralling into the Sun), the waves arrive at the Sun where they interact with electromagnetism to form the masses of subatomic particles (mass being produced by G-EM interaction was proposed by Einstein in a 1919 paper to the Prussian Academy of Sciences - "Do Gravitational Fields Play An Essential Part In The Structure Of The Elementary Particles Of Matter?"). They also form the strong and weak nuclear forces associated with those particles (nuclear forces are a by-product of G-EM interaction). The rotating Sun bulges at its equator and therefore has a larger equatorial than polar diameter, and more mass at its equator. This means more gravitation has been diverted to that region. Planets are also made from G and EM interacting #, and must consequently lie in the path gravity waves took from the outer solar system to the solar equator (more gravitation was diverted here - so if planets are created by G and EM, it follows that they'd be created where the gravitational "current" is greatest). For simplicity, we say the Sun's gravitation is strongest at its equator and planets are compelled to orbit in the ecliptic plane.

**Newtonian and Relativistic Gravity**

# Matter would, in this case, be the concentrated form of gravitational waves. There's a stronger gravitational force on the surface of, and within, the Earth because gravity is concentrated in the matter there. So, like in a black hole^^, time is slowed down (by much less and at lower altitudes, in the case of Earth). The high velocities experienced by orbiting astronauts also slows time at their extreme altitudes. The article "Gravitation" by Robert F. Paton - The World Book Encyclopedia (Field Enterprises Educational Corporation, 1967) –states, "… when one object is inside another, gravitation decreases the closer their centers are to each other" and also states that Isaac Newton's 1687 Law of Gravitation explains why an object at the center of the earth would weigh nothing [1]. Objects in space or an orbiting spaceship are similarly free from the earth's (or any planet's or star's) concentrated gravity/mass which is below, instead of above, them and makes them relatively weightless. Gravity's repulsive [2] force (which propagates from all directions) is UNconcentrated and, as Penguin Encyclopedia tells us, FAR less than Earth gravity. The concentrated gravity forming the spaceship is insignificant compared to the gravity forming a planet or star, and causes no noticeable reduction of weightlessness.

## 5) What Is 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 is 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 simple 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, or that our scientific instruments can detect, ALL of the matter in any region of space-time. Time travel could account for a portion of the invisibility. This subject is addressed elsewhere in this article.

The remainder of the invisible matter in any region of space-time 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 or CD. Science's Law of Conservation has known since the 19th century that neither matter nor energy can ever be destroyed or created - they only change form. If nothing in any time can be destroyed (it only changes form at a different point on the DVD), all time might be like a DVD. All of the "cosmic" DVD always exists even though a very limited set of sights and sounds can be perceived at any point during its playing (this means, as the abstract mentioned, that all the pieces of the puzzle – of comprehending the universe - already exist). In different parts of the cosmic DVD; people are forever being born, forever taking their first step (are they in perpetual motion in an eternal present?), forever resting in peace. I believe English physicist Julian Barbour has the same understanding of time which this sentence speaks of (""From Here to Eternity" by Tim Folger - http://discovermagazine.com/2000/dec/20-cover#.UtedHdIW2bs). And I think medical science will someday advance so much (and in such unexpected ways) that we'll be able to say they're forever being resurrected ^. How could the time travel loved by theoretical physicists come to pass without this "cosmic DVD"?

^ Everything in the universe and on earth (in all space-time) has an electronic nature at its most basic level. It's fundamentally mathematical, being composed of 1's and 0's. The electronics enables a mind to be downloaded and recorded from the brain it's a product of. Then it can be inserted into a clone of a person's original body, where it functions dynamically and not as a static "snapshot" from an unchanging brain. This process can be repeated over and over, or genetic engineering – or quantum entanglement with all space and time (see, for example, pages 7-8 of "New Physics Suggests Darwin's Origin of Species is Incomplete, and that Godlike Humanity Will Emerge" at http://vixra.org/abs/1310.0170) - might make the clone immortal.

So $5^{th}$-dimensional hyperspace (necessary for time travel, at least to the past – see "The Universe Will Not End" for a proposed method of practical application) can exist. But is there a plausible means of entering it and traveling into the past?

**LOCALIZED UNIFIED FIELD**

Instantly travelling to a planet 700 light years away and instantaneously arriving at a spot in the future which a light beam could only reach by travelling for 7 centuries can be likened to a wave which spreads out from the point of departure. This is because of quantum mechanics' wave-particle duality which can view the spaceship not as a collection of particles but as a wave, or collection of waves.

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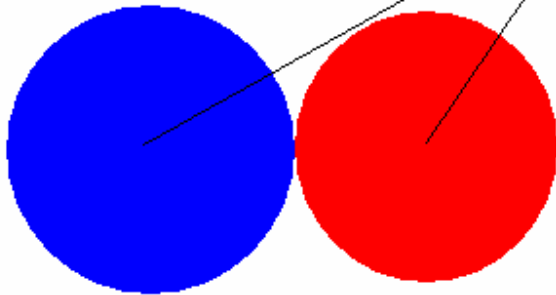
shape of waves when viewed from the planet
where they collide is
CONCAVE

At the destination, the convex shape of the spreading wave arrives instantly (meaning the ship and planet are quantum entangled). This situation is equivalent to space being translated (shifted) by 90 degrees so that the ship is perpendicular to length, width and height simultaneously. What if the spaceship is simultaneously quantum entangled with another wave arriving at the planet from "the other side of the universe" (actually – far, far away)? (This appears possible if the infinite cosmos is a computer simulation incorporating transcendentals and irrational numbers.) Since the waves are entangled and unified, their motions are instant and this situation is equivalent to space being translated by 180 degrees. It's inverted and becomes 5th-dimensional hyperspace.

**THE MATRIX AND THE FIGURE-8 KLEIN BOTTLE**
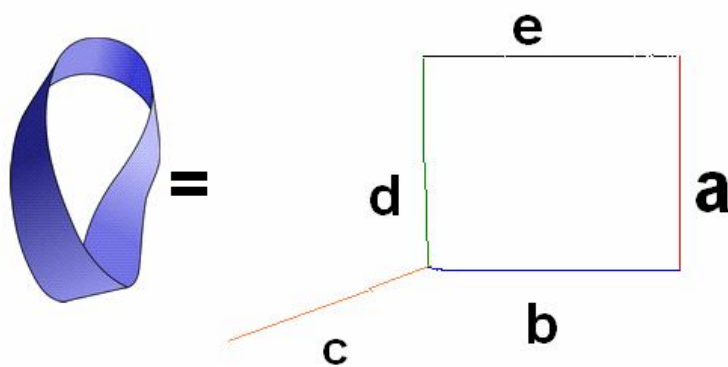
Width a is perpendicular to the length (b or e) which is perpendicular to height c. How can a line be drawn perpendicular to c without retracing b's path? By positioning it at d, which is then parallel to (or, it could be said, at 180 degrees to) a. d (the spaceship) is already at 90 degrees to length b and height c. To be at right angles to length, width and height simultaneously; it has to also be perpendicular to (not parallel to) a. This is accomplished by a twist, like on the right side of the 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 infinite universe is composed of subuniverses shaped like figure-8 Klein bottles (diagram at end of paragraph - 2 Mobius loops are joined on their sides to form Bottle, with binary digits filling in the central hole and perfectly adjusting the outer edges to fit surrounding subuniverses [simplified, this is similar to manipulation of an image on a computer screen]), in each subuniverse there would be 2 perpendicularities to the twist (one lot of 90+90, then another 90+90). 180+180 could equal

360 – represented in physics as a subuniverse, a galaxy, or one of the spherical waves above producing quantum entanglement and translating space by 90 degrees. 180+180 could also equal 180 – represented in physics by both of the above spherical waves interacting to produce inversion (translation by 180 degrees) of space which permits the spaceship to enter hyperspace. Since a fuzzily spherical figure-8 Klein bottle is necessary to form (90+90) + (90+90), any spherical or fuzzily spherical thing in this fractal universe (subuniverse, galaxy, black hole, asteroid, subatomic particle, or anything made of either fermions or bosons) would be an example of altered or warped space-time and must include hyperspace in its composition.
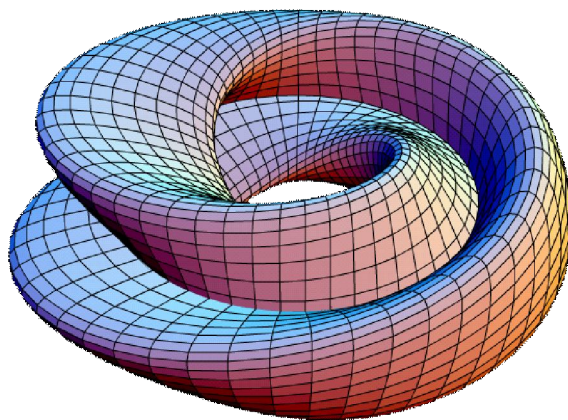


With a single extra dimension of astronomical size, gravity is expected to cause the solar system to collapse ("The hierarchy problem and new dimensions at a millimetre" by N. Arkani-Hamed, S. Dimopoulos, G. Dvali - Physics Letters B - Volume 429, Issues 3–4, 18 June 1998, Pages 263–272, and "Gravity in large extra dimensions" by U.S. Department of Energy - http://www.eurekalert.org/features/doe/2001-10/dbnl-gil053102.php) However, collapse never occurs if gravity accounts for repulsion as well as attraction on both subatomic and astronomical scales.

**6) The Universe Will Not End**

The universe is infinite and eternal (see "Digital String Theory") not only into the future but also into the past. It will never end - and this is why it had no beginning**:** 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. Entering hyperspace with its negatives (energy, matter, distance, time^) permits travel to the past since it would be impossible to travel 700 lightyears there, and only possible to travel minus 700 lightyears. Doing so instantly would enable a

spaceship to arrive at a spot in the past which a light beam could only reach by traversing negative distance for 7 centuries.

^ Should negative time in a 5$^{th}$ dimension be called the 6$^{th}$ dimension?

Applying this practically, a 2009 electrical-engineering experiment at America's Yale University, together with the ideas of Albert Einstein, tells us how we could travel to other stars and galaxies in next to no time (takeoff and landing require time). Electrical engineer Hong Tang and his team at Yale demonstrated that, on silicon-chip and transistor scales, light can attract and repel itself like electric charges or magnets. This is the "optical force". For 30 years until his death in 1955, Einstein worked on his Unified Field Theory with the aim of uniting electromagnetism (light is one form of this) and gravitation. Achievement of this – see "Digital String Theory" and "Why is Gravity Weak?" for a proposed method - means the microscopic components (gravitons) of warps of space (gravity, according to General Relativity) between spaceships and stars could mimic the Optical Effect and be attracted together, thereby eliminating distance (this is similar to traversing a wormhole between two folds in space). Distance is not only deleted in space. There would no longer be any "distance" in time. Just as we can journey to particular stars, we could take trips to particular years in the past or future. Now we just need some clever engineers to design a spacecraft that works according to the Einstein-Yale principle.

By employing Intergalactic/Time Travel, the beginning of each subuniverse can be at any location in space and time. Since the number of subuniverses is infinite, their beginning-locations in space and time are literally infinite (this is the same as saying there is no start to the universe as a whole). If a subuniverse ends, another can be started in its place *– and the universe as a whole has no end.

* (in this way, one subuniverse can expand within the non-expanding universe as a whole because another subuniverse has ended, possibly by dispersing into surrounding subuniverses, and no longer occupies the space which the new subuniverse expands into)

-------------------------------------------------------------------------------------------------