

## AN ASTRONOMICAL HYPOTHESIS IN 6 PARTS -

1) UNITING QUANTUM MECHANICS WITH GENERAL RELATIVITY

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6) DARK ENERGY, DARK MATTER, AND THE UNIFYING QUBIT IN A NONEXPANDING AND TOPOLOGICAL COSMOLOGY

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### ABSTRACT

Science today - this report focuses on physics, quantum physics, cosmology and mathematics - is naturally very dependent on the empirical aspects of observation and experiment. The trend in modern physics is towards a unified theory of the universe - starting with the unified theories of the 20th century (notably Einstein's) and extending to string theory. At present, no observation or experiment can confirm or deny the existence of unification. The main point of this report is to show how sciences, and maths, could be altered by a unified space-time. In 1919, Einstein wrote a paper asking if gravitational waves play an essential role in forming elementary particles. If so, the waves that fill the space-time between particles would connect them in a unified field which a future LIGO (Laser Interferometer Gravitational-wave Observatory) may be able to detect.\* With waves that travel forwards in time being potentially cancelled by waves going back in time (see TIQM and Wheeler-Feynman absorber theory in this report), the cancelling of the waves might unite Relativity's gravity with quantum mechanics by producing what we call entanglement.

\* See "Physicists use Einstein's 'spooky' entanglement to invent super-sensitive gravitational wave detector" - May 17, 2017 by David Blair - [https://theconversation.com/physicists-use-einsteins-spooky-entanglement-to-invent-super-sensitive-gravitational-wave-detector-77822?utm\\_medium=email&utm\\_campaign=Latest%20from%20The%20Conversation%20for%20May%2018%202017%20-%2074045680&utm\\_content=Latest%20from%20The%20Conversation%20for%20May%2018%202017%20-%2074045680+CID\\_479fe7b086ff8111075a1533a506859f&utm\\_source=campaign\\_monitor&utm\\_term=Physicists%20use%20Einsteins%20spooky%20entanglement%20to%20invent%20super-sensitive%20gravitational%20wave%20detector](https://theconversation.com/physicists-use-einsteins-spooky-entanglement-to-invent-super-sensitive-gravitational-wave-detector-77822?utm_medium=email&utm_campaign=Latest%20from%20The%20Conversation%20for%20May%2018%202017%20-%2074045680&utm_content=Latest%20from%20The%20Conversation%20for%20May%2018%202017%20-%2074045680+CID_479fe7b086ff8111075a1533a506859f&utm_source=campaign_monitor&utm_term=Physicists%20use%20Einsteins%20spooky%20entanglement%20to%20invent%20super-sensitive%20gravitational%20wave%20detector)

## INTRODUCTION

The article "Why Is There Something Rather Than Nothing?" (April 11, 2017 - <https://www.bigquestionsonline.com/2017/04/11/why-there-something-rather-than-nothing/>) by CERN (European Centre for Nuclear Research) experimental physicist Michael Doser asks a question relevant to modern science and this perspective - "What might the existence of asymmetries in physics suggest about the nature of reality?"

We might have to accept that asymmetry exists between what experiments and observations reveal, and what we are capable of doing in the far future. Below, I outline a very basic (though grounded in science) proposal for human creation of the universe. Such a proposal may seem laughable, outrageous and pure fantasy to many. But if you stay on Earth for an unknown number of centuries, a descendant of CERN may force you to eat your words.

"Many religions, from Hinduism to Gnostic Christianity to Mormon doctrine, teach that – as impious as it may sound – it is the goal of humans to become gods." ["Pale Blue Dot – A Vision of the Human Future in Space" by Carl Sagan - *Headline Book* (1995, p. 382)]. A name used for God in the Old Testament is Elohim, which means the "plural majesty of the one god" i.e. the billions of earth's inhabitants\*\* entangled with (see report's 4th last paragraph), and dispersed throughout, the united infinity of the universe and eternity of time. Such entanglement suggests extrasensory perception and telekinetic independence from technology are possible (and that there is truth in practices like astrology), despite modern science's objections which appear to be based on non-unification.

\*\* Plus the inhabitants of countless billions of other worlds that will be colonized in the past and far future as well as the present and near future by humans who have adapted to, or been genetically engineered to fit, other worlds as they explore the universe. Any complicated form of life – humanoid, animal or plant – anywhere in space would have to evolve into existence, unless human biotechnology and genetic engineering of future centuries produced it. The evolution proposed by Charles Darwin is indeed wonderful, and the Miller-Urey Experiment of 1952 made amino acids (which are relatively simple, and are the building blocks of protein) from inorganic material and by natural causes in a lab. Indeed, many molecules – including sugars and amino acids – have been found in space. But evolution appears limited. In a biological sense, the Theory of Evolution certainly explains adaptations and modifications in large forms of life. But believing it also explains their origins is unwarranted extrapolation. It takes an idea that accounts for some parts of life and, since it's the only scientific explanation we currently have, assumes it accounts for all parts of life. Any large lifeform is far more advanced than any amino acid. It appears impossible for a collection of amino acids and other molecules to spontaneously develop into the incredible complexity of a large lifeform (even in innumerable tiny steps taken over billions of years).



## UNITING QUANTUM MECHANICS WITH GENERAL RELATIVITY

In 1957, Charles Misner and John Wheeler claimed Albert Einstein's latest equations demonstrated the unified field theory ("Classical physics as geometry" by John A Wheeler and Charles W Misner - "Annals of Physics": Volume 2, Issue 6, December 1957, Pages 525-603). Scientists today point out that his theory was a failure. However, addition of only thing - the transactional interpretation of quantum mechanics - makes it a unique success, as well as opening the door to quantum gravity. Quantum mechanics incorporates the existence of both advanced waves (which travel backwards in time) and retarded waves (which travel forwards in time) as admissible solutions to James Clerk Maxwell's equations. This was explored in the Wheeler-Feynman absorber theory in the first half of last century. Also, John Cramer's 1986 proposal of the transactional interpretation of quantum mechanics (TIQM) - updated on Aug. 2, 2016 by Ruth E. Kastner in "The Transactional Interpretation and its Evolution into the 21st Century: An Overview" (<https://arxiv.org/abs/1608.00660>) - says waves are both retarded and advanced. The waves are seen as physically real, rather than a mere mathematical device. And "Physics of the Impossible" by Michio Kaku (Penguin Books, 2009) states on p.276, "When we solve Maxwell's equations for light, we find not one but two solutions: a 'retarded' wave, which represents the standard motion^ of light from one point to another; but also an 'advanced' wave, where the light beam goes backward in time. Engineers have simply dismissed the advanced wave as a mathematical curiosity since the retarded waves so accurately predicted the behavior of radio, microwaves, TV, radar, and X-rays. But for physicists, the advanced wave has been a nagging problem for the past century."

^ Time can be regarded as merely the motions of particles in space, thus unifying space and time in the inseparable union of space-time. In 1905, Einstein published a paper about Brownian Movement,\*\* an irregular movement of ultramicroscopic particles suspended in a liquid or gas ("Über die von der molekularkinetischen Theorie der Wärme geforderte Bewegung von in ruhenden Flüssigkeiten suspendierten Teilchen" [English: "On the movement of small particles suspended in a stationary liquid demanded by the molecular-kinetic theory of heat"] - Annalen der Physik, 1905). It confirmed the atomic theory of matter. If time is the motions of particles in space, it must also possess a form of movement. And "The Meaning of Imaginary Time: Creativity's Dialog with Timelessness" (<https://textureoftime.wordpress.com/2015/07/15/the-meaning-of-imaginary-time/>) - posted on July 15, 2015 by Kerri - confirms that it does by saying "(Wick rotation, also known as the circle of  $i$ ) suggests a cyclic, oscillating nature of time, as it moves between the real and imaginary realms." See the first 3 paragraphs of "The Meaning of Imaginary Time", and their included diagram.

\*\* The Brownian motion indicating existence of atoms must also indicate the existence of space, if a neglected paper by Einstein is correct viz "Spielen Gravitationsfelder im

Aufbau der materiellen Elementarteilchen eine wesentliche Rolle?" [Do gravitational fields play an essential role in the structure of elementary particles?"] by Albert Einstein - Sitzungsberichte der Preussischen Akademie der Wissenschaften, [Math. Phys.], 349-356 [1919] Berlin. Physicist James Overduin stated in the May 2017 issue of Discover Magazine that, according to General Relativity, the gravitational field does not live in space-time: it IS space-time. From this, I logically conclude that if gravitational fields play an essential role in the structure of elementary particles, space-time itself is essential to their structure. Einstein's paper suggests that the other contributor to their structure is the photons of electromagnetism (elementary particles composed of gravitational + electromagnetic waves would possess wave-particle duality). And the first paragraph of "Special Relativity Viewed from Einstein's Unified Field" offers the idea (backed up by well known experiments) that waves of gravitation produce photons ie vibrations of space-time itself produce vibrations travelling through space-time. This means both matter particles and photons are composed of nothing except space-time; and other parts of this essay propose space-time to be constructed from binary digits, Möbius strips, and figure-8 Klein bottles. The paragraph above links the Brownian motion of space to the oscillatory motion of time.

Albert Einstein's equations say that in a universe possessing only<sup>^</sup> gravitation and electromagnetism, the gravitational fields carry enough information about electromagnetism to allow the equations of James Clerk Maxwell to be restated in terms of these gravitational fields. This was discovered in 1925 by the mathematical physicist George Yuri Rainich. [Transactions of the American Mathematical Society 27, 106 - Rainich, G. Y. (1925)]. Gravitation carrying info about electromagnetism means gravitational waves also possess advanced and retarded forms as admissible solutions to Maxwell's equations about electromagnetism. The waves travelling back in time would cancel the waves going forwards in time, producing no motion in time. This lack of temporal movement causes instantaneous contact between particles that would otherwise be widely separated in time (and in space, thanks to the union of space and time into one entity called space-time). In other words, the entanglement of quantum mechanics is produced. This covers macroscopic/astronomical bodies in space-time, and quantum mechanics is reconciled with gravity/relativity, introducing the graviton and the theory of quantum gravity.

<sup>^</sup> This means the strong and weak nuclear forces would not be fundamental but, like the particles they're associated with, would be products of gravitational-electromagnetic interaction. This agrees with a) "Spielen Gravitationsfelder im Aufbau der materiellen Elementarteilchen eine wesentliche Rolle?" [Do gravitational fields play an essential role in the structure of elementary particles?"] by Albert Einstein - Sitzungsberichte der Preussischen Akademie der Wissenschaften, [Math. Phys.], 349-356 [1919] Berlin, and with b) theories in which the role of the mass-bestowing Higgs field is played by various couplings [M. Tanabashi; M. Harada; K. Yamawaki. Nagoya 2006: "The Origin of Mass and Strong Coupling Gauge Theories". International Workshop on Strongly Coupled Gauge Theories. pp. 227-241].



## SPECIAL RELATIVITY VIEWED FROM EINSTEIN'S UNIFIED FIELD

When developing the Unified Field Theory, one of Einstein's aims was to combine gravitational and electromagnetic equations. Imagine that gravitation (G) and electromagnetism (EM) are not separate, but are united into a GEM field that creates everything in space-time ("everything" includes matter and mass – see "Spielen Gravitationsfelder im Aufbau der materiellen Elementarteilchen eine wesentliche Rolle?" ["Do gravitational fields play an essential role in the structure of elementary particles?"] by Albert Einstein - Sitzungsberichte der Preussischen Akademie der Wissenschaften, [Math. Phys.], 349-356 [1919] Berlin). This could mean G produces EM and could account for the Fermi Space Telescope detecting a burst of gamma rays just 0.4 seconds after the first detection of gravitational waves on September 14, 2015 - from the same general area of the sky. G producing EM also means there would be an imprint of gravitational waves in the Cosmic Microwave Background. On 17 March 2014, astrophysicists of the cosmic microwave background (CMB) experiment called BICEP2 (Background Imaging of Cosmic Extragalactic Polarization) announced such a detection.

G exists everywhere in the universe, all the time. So light, or some form of EM, also fills the entire universe. Disturbances in the GEM field would cause individual light rays, other EM waves, and gravitational waves. Filling the cosmos like an ultra-low-density ocean or ether, light/EM/G in its "parent" GEM form would be relatively static and would possess a constant or uniform "velocity" that's independent of the movement of observers/any object. The individual disturbances or currents emitted from the parent have a separate velocity and might be called the offspring form. These offspring give rise to theories of light's velocity not being constant. Variable Speed of Light theories were proposed by Albert Einstein in 1911, Robert Dicke in 1957, Jean-Pierre Petit in 1988, John Moffat in 1992, and the two-man team of Andreas Albrecht and João Magueijo in 1998 (Einstein gave up his VSL theory because in 1911 he had considered variable time only, while in general relativity both space and time measurements are variable).

### ImageMobius Strip

Since these disturbances originate with the "GEM field that creates everything in space-time", they reflect Special Relativity's idea that light does not change so space-time must (this present topic modifies that to: the GEM field always remains, and the things created in space-time by photon-graviton interaction must change). The difference between space-time and its contents is that the masses in it result from interaction between EM waves' photons and G waves' presently hypothetical gravitons (the coupling of these waves gives wave-particle duality to mass), while space-time is the Virtual Particles of physics (the gravitons and virtual photons that do the interacting). ("A Brief History of Time" by Stephen Hawking - Bantam Press 1988, p. 69 relates the virtual photons which can never be directly detected to the real photons that are the

energy pulses within light waves). Virtual particles are quantum fluctuations and temporary changes in the amount of energy at a point in space – which makes them equivalent to energy pulses. The on/off, or increased-energy/decreased-energy, states of the pulses can be interpreted as the binary digits (bits) of 1 and 0, i.e. base-2 maths.\* These can be arranged in the shape of 2D (two-dimensional) Mobius Strips that may be trillions of times smaller than the subatomic particles they compose.

^ Pairs of two-dimensional Möbius strips then follow the rules of maths^^ and combine into four-dimensional Klein bottles long before reaching the scale of subatomic particles. One theory scientists have for the universe's shape says it is a doughnut. From that, I conclude the type of Klein bottle that Mobius Strips combine into is the figure-8 Klein bottle (because this somewhat resembles the doughnut).

ImageFigure-8 Klein Bottle

This topological (rubber-sheet geometry) cosmology of the Mobius and Klein leads to the belief of Edwin Hubble (the astronomer credited with discovering universal expansion) that "expanding models are a forced interpretation of the observational results." I conclude there is no cosmic expansion but that the measurements attributed to expansion actually measure what I call topological extension from binary digits to Mobius strips to figure-8 Klein bottles to quantum particles to macroscopic forms to astronomical forms to the entire universe. Is it possible that the extension by mathematical topology's figure-8 Klein bottles is, in Edwin Hubble's words, "one of the principles of nature that is still unknown to us today"? ("Effects of Red Shifts on the Distribution of Nebulae" by E. Hubble, Ap. J., 84, 517, 1936)

\*The motions of virtual particles filling space-time appear to be random but a principle of Chaos theory - perhaps science's most important theory after relativity and quantum mechanics (QM) - is "order within apparent disorder". So their randomness may well be an illusion. Bell's theorem says any system of Hidden Variables that agrees with QM's predictions must be non-local. The binary digits (bits) I speak of are hidden variables, removing probability and restoring exactness (a precision hidden within apparent disorder). The digits are the most basic composition of gravitational waves, and the universal nature of these waves and bits, plus their trips back and forth in space and time, causes them to immediately affect any distant location ie cause entanglement and non-locality (more on this soon.)

^ "From Planck Data to Planck Era: Observational Tests of Holographic Cosmology" by Niayesh Afshordi, Claudio Corianò, Luigi Delle Rose, Elizabeth Gould, and Kostas Skenderis: Phys. Rev. Lett. 118, 041301 (2017) - Published 27 January 2017 (<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.118.041301>)

^^ Polthier K, "Imaging maths - Inside the Klein bottle" - <https://plus.maths.org/content/os/issue26/features/mathart/index>



Nothing would be able to move faster than light because, as suggested by Einstein's 1919 paper, all masses are made of light – or EM – interacting with G waves, which also travel at  $c$  (the speed of light and other electromagnetic waves). The limiting speed of light is thus built-in to particles. If we leave Earth at a significant fraction of  $c$  and return after a few years, Earth's civilisation will indeed have advanced by centuries because we'll have travelled through much space-time (not just through a lot of space, but also through a lot of time). At 99.9% of light speed, 3.7 years pass in a spaceship while 21.6 years go by on Earth. At 99.999999% of light speed, 9 years pass in the ship while Earth experiences 6,847 years (from reporting of the English physicist Eric Sheldon's computer model named STELLA, in the 1991 book "Starbound" in the "Voyage Through the Universe" series, pp. 131-133). This agrees with Special Relativity's statement about events not being simultaneous for different observers. If the ship leaves in 2008, the calendar of its occupants will say their return occurs in 2017. The calendars of those who stayed on Earth will say it's 8855.

#### MATHEMATICS AND UNIFICATION

When quantum physics is united with general relativity, what are the possible consequences for mathematics and today's scientific mysteries?

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

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

Does this mean that maths as we know it today is not the universal language we believe it to be? Will maths as we know it in a hundred years require all the maths and physics of today to be reexamined?

#### IMAGINARY TIME, QUANTUM GRAVITY AND CREATING THE COSMOS

There does seem to be a way out of this predicament. If humans created the universe, the maths we know today could describe that universe. Of course, our present understanding of maths would need a few revisions in the future.

For example, creating the cosmos could conceivably be done in the far future by

creating a computer simulation that obeys General Relativity's mathematical and physical principle of space AND TIME being curved. This means time wouldn't always flow in a straight line from past to future, but it could also provide quasi-hyperboloid paths (similar to wormholes) for computer signals to follow from the 24th century to 13.8 billion years ago, where refreshment/reloading of part of the simulation might produce what we interpret as the Big Bang. Time's nonlinearity could also provide paths to the future.

Another possibility for change in our understanding of maths would be if IT (imaginary time), like the quantum, was no longer viewed as purely mathematical. The ultraviolet catastrophe, also called the Rayleigh–Jeans catastrophe, is a failure of classical physics to predict observed phenomena: it can be shown that a blackbody - a hypothetical perfect absorber and radiator of energy - would release an infinite amount of energy, contradicting the principles of conservation of energy and indicating that a new model for the behaviour of blackbodies was needed.

At the start of the 20th century, physicist Max Planck derived the correct solution by making some strange (for the time) assumptions. In particular, Planck used maths to show that electromagnetic radiation can only be emitted or absorbed in discrete packets, called quanta. Albert Einstein postulated that Planck's quanta were real physical particles (what we now call photons), not just a mathematical fiction. From there, Einstein developed his explanation for the photoelectric effect (when quanta or photons of light shine on certain metals, electrons are released and can form an electric current).

Stephen Hawking writes, "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 ..." ("A Brief History of Time" by Stephen Hawking - Bantam Press, 1988, p.139). Could a future computer simulation of all the galaxies and planets - including the Milky Way and Earth - that includes boundaryless imaginary time cause the simulation to be eternal, infinite, and indistinguishable from this "real" universe? (It would also avoid Relativity's breaking down at the scale of quantum mechanics, thus introducing the graviton and the theory of QG or Quantum Gravity.)

Would the universe we live in then not only be infinite and eternal, but could its simulation origin be refreshed/reloaded to overcome the entropy\* of the 2nd law of thermodynamics - ensuring that, in reference to a musical record from Professor (and CERN member) Brian Cox's earlier life, "Things Can Only Get Better". Could this refreshing be interpreted as a Big Bang, with refreshing of a single star - e.g. the Sun in a few billion years - preventing it from becoming a red giant? If the universe is truly infinite, would its infinity be continuous? (See DARK ENERGY, DARK MATTER AND THE UNIFYING QUBIT IN A NONEXPANDING AND TOPOLOGICAL COSMOLOGY below.) This



means there could not be separated universes composing a multiverse. Would a multiverse only exist if the universe was unified and all past and future versions of the universe co-exist with the present version? (Our limited perspective at any point is analogous to the limited sights and sounds available on any one point of a DVD.)

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#### SUBSECTION: NEGATIVE ENTROPY AND ETERNAL LIFE

\* Entropy may be regarded as disorder, and suggests that systems naturally progress from order to disorder. How do biological systems develop and maintain such a high degree of order, or negative entropy? Now for a discussion of something called "negative temperature". To give a brief explanation of negative temperature, here's what Simple English Wikipedia says on the subject ([https://simple.wikipedia.org/wiki/Negative\\_temperature](https://simple.wikipedia.org/wiki/Negative_temperature)):

"In physics, absolute zero (0°K) is one of the coldest temperatures. At that point, subatomic particles stop moving (entropy is at its minimum). Certain things can reach temperatures below absolute zero, known as negative temperatures. This is very difficult to do, and only very small objects can reach negative temperatures.

"It might seem absurd, but things at negative temperatures are actually hotter than things at positive temperatures (above absolute zero). If something with a negative temperature comes in contact with a positive-temperature object, heat will go from the negative object to the positive. This is because temperature is a trade-off between energy and entropy. If you add energy to a positive-temperature object, it will increase in entropy. If you add energy to a negative-temperature object, it will decrease in entropy.

"Many objects cannot achieve negative temperatures, because adding energy to them will increase their entropy. Only very small things discussed in quantum mechanics can reach this state."

I also refer you to Frequently Asked Questions by two authors of the original paper on negative temperature (<https://www.quantum-munich.de/research/negative-absolute-temperature/>). The FAQ has a link to their paper at the top of the page.

Living things are known to have positive temperature - any thermometer will confirm this - to which added energy will increase entropy, eventually causing death. Could their high degree of order result from living things also being negative-temperature systems that, as implied by a 1919 paper by Einstein, have gravitational and electromagnetic energy constantly added to them? ("Spielen Gravitationsfelder im Aufbau der materiellen Elementarteilchen eine wesentliche Rolle?" ["Do gravitational fields play an essential role in the structure of elementary particles?"] by Albert Einstein - Sitzungsberichte der

Preussischen Akademie der Wissenschaften, [Math. Phys.], 349-356 [1919] Berlin). This gives them the innate potential to decrease entropy perpetually, and to be immortal. Since time doesn't always follow a straight line from past to future, our deceased ancestors can one day benefit from this potential being realised ... they'd be resurrected! Only very small things discussed in quantum mechanics can supposedly reach this negative-temperature state. We've seen how living things could share the function of being renewed by gravitational / electromagnetic energy. In other words, the quantum and macroscopic worlds are united. Then planets and constellations could, like the particles in quantum mechanics, also disregard distance and light-speed restrictions; behaving as if time doesn't exist.

Following Einstein's paper that asks "Do gravitational fields play an essential role in the structure of elementary particles?", our brains and the universe could be considered holograms in the sense of being interference patterns between gravitational and electromagnetic waves. British quantum physicist David Bohm (1917-1992) said our brains are holograms and smaller pieces of the larger holographic image known as the cosmos, and that they contain the whole knowledge of the universe (Geoff Haselhurst - "David Bohm and the Holographic Universe" [2005], [http://www.bibliotecapleyades.net/ciencia/ciencia\\_holouniverse04.htm](http://www.bibliotecapleyades.net/ciencia/ciencia_holouniverse04.htm)). Each mind always contains the whole picture, but with an unclear perspective i.e. its knowledge is "complete, though distorted", like the Moon reflecting in the multitude of wavelets over a body of wavy water (the reflection's called a glitter path). The column "Secret Sky" in Astronomy magazine (September 2013) says "If you could separate the multitude of wavelets and look at them in detail, you would see that each and every one of them reflects a complete, though distorted, image of the Moon ..."

We'll make very reliable and extremely rapid progress in the search for truth when our brains learn how to decode our complete, though distorted, image of the world and space-time.

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#### DARK ENERGY, DARK MATTER, AND THE UNIFYING QUBIT IN A NONEXPANDING AND TOPOLOGICAL COSMOLOGY

"Continuous" in the paragraph before NEGATIVE ENTROPY AND ETERNAL LIFE refers to the continuous curvature of a Mobius Strip, and an idea based on "A Brief History of Time" by Stephen Hawking (Bantam Press, 1988): pp. 66-67, which says "One way of thinking of spin is to imagine the particles as little tops spinning about an axis. However, this can be misleading, because quantum mechanics tells us that the particles do not have any well-defined axis. What the spin of a particle really tells us is what the particle looks like from different directions ... there are particles that (must be turned) through two complete revolutions (to look the same). Such particles are said to have spin  $\frac{1}{2}$ . Particles of spin  $\frac{1}{2}$  make up the matter in the universe ..."



My interpretation is that it's possible for the Mobius Strip to correspond to spin  $\frac{1}{2}$  since you must travel around a Strip twice to reach your starting point (this equals turning particles through two complete revolutions to look the same). Curvature implies this quantum spin could be continuous. Since it's known this type of spin can only have discrete values, these values (and space's curves) must be determined by individual pulses of energy. The on/off or increased-energy/decreased-energy pulses of the virtual particles<sup>^</sup> filling space-time (or in other words, composing gravity) would produce the discrete values of binary digits' 1's and 0's). These 1's and 0's are encoded in the shape of a Möbius.

<sup>^</sup> These "particles" are actually quantum fluctuations/energy pulses, and their motions could be seemingly random if they obey Chaos theory's principle of "hidden order existing in apparent disorder".

The Mobius strips, which are only two-dimensional, then follow the rules of maths and pair up to combine into four-dimensional Klein bottles [Polthier K, "Imaging maths - Inside the Klein bottle": <https://plus.maths.org/content/os/issue26/features/mathart/index>] long before reaching the scale of quantum particles.\* This produces the 3 spatial dimensions/1 temporal dimension known to us. There could be extra dimensions unified with these e.g. the previously mentioned Imaginary Time which, following the union of time and space into space-time, might be linked to a so-called Imaginary Space full of Dark Matter. Geometrically; imaginary numbers, and imaginary time, are found on the vertical axis of the Complex Number Plane, allowing them to be presented perpendicular to the horizontal axis. If so-called imaginary time becomes real physics oneday, the Complex Number Plane describing it will also become physical. One way of viewing imaginary numbers is to consider a standard number line, positively increasing in magnitude to the right (this represents Einstein's gravitation and the positive curvature of relativistic space-time: it's called the "real" axis and includes the 4 known dimensions). The standard number line negatively increases in magnitude to the left, can be called the "complex" axis (extrapolating from the real, imaginary, and complex numbers used in maths), and represents gravitation oppositely directed not only in space but also in time. That is, the line represents "antigravity" which has been equated with Dark Energy by science, and could also represent a 5th space/3rd time dimension that's home to still more Dark Matter (science says the universe contains 5 times as much dark matter as ordinary matter). The positive and negative surfaces of figure-8 Klein bottles (see final few paragraphs) on the horizontal axis can combine in the universe's largest scales to produce cosmic flatness: for a report from 2013 on its flatness, see "WMAP - Shape of the Universe" ([https://map.gsfc.nasa.gov/universe/uni\\_shape.html](https://map.gsfc.nasa.gov/universe/uni_shape.html)). Flatness is compatible with space and time extending infinitely, and not being limited to the areas and volumes within curves. If space-time's infinite, it cannot occupy separate locations from imaginary space-time or complex space-time, and must unavoidably be unified with them. At 0 on this horizontal x-axis, a y-axis (the so-called imaginary axis) can be drawn with "positive" direction going up -

"positive" imaginary numbers then increase in magnitude upwards, and "negative" imaginary numbers increase in magnitude downwards. The imaginary y-axis - like the pommel protruding from the front of saddle-shaped, negatively-curved space-time (the negative surfaces of figure-8 Klein bottles) - causes an "imaginary" space (and thanks to the indissoluble union of spatial plus temporal phenomena, an imaginary time) to extend 90 degrees from the "surface" of that flat spacetime.

\* The proposal is that quantum particles - in the form of photons (whether virtual or detectable), and gravitons - are ultimately composed of the binary digits of 1 and 0 encoding  $\pi$ ,  $e$ ,  $\sqrt{2}$  etc. These 1's and 0's composing everything in the universe form an infinite, eternal QUBIT - QUantum computer's Binary digIT - which can be a superposed 1 and 0. This is done via the universe's gravitational and electromagnetic waves, which are composed of 1's and 0's, obeying a) the Wheeler-Feynman absorber theory, b) the Transactional Interpretation of Quantum Mechanics (TIQM), and c) George Yuri Rainich's discovery - "Transactions of the American Mathematical Society" 27, 106: Rainich, G. Y. (1925). His discovery was that, in a universe containing only gravity and electromagnetism, Einstein's gravitational equations can be reworked in terms of James Clerk Maxwell's electromagnetic equations (this universe containing only gravity and electromagnetism means the two nuclear forces would not be fundamental since, like the matter they're associated with, they'd be results of gravitational / electromagnetic interaction).\*

\* "Spielen Gravitationsfelder im Aufbau der materiellen Elementarteilchen eine wesentliche Rolle?" [Do gravitational fields play an essential role in the structure of elementary particles?] by Albert Einstein - Sitzungsberichte der Preussischen Akademie der Wissenschaften, [Math. Phys.], 349-356 [1919] Berlin). Gravitational / electromagnetic interaction would also help compose every form of mass, including the Higgs boson, if we refer to theories where the role of the Higgs field is fulfilled by particular couplings (in this case, of the graviton and undetectable virtual photon - see M. Tanabashi; M. Harada; K. Yamawaki. Nagoya 2006: "The Origin of Mass and Strong Coupling Gauge Theories". International Workshop on Strongly Coupled Gauge Theories. pp. 227-241). Today, science cannot detect virtual photons and can only detect gravitational waves from events like colliding black holes. But in several decades, it might routinely detect gravitational waves from, say, a moving hand ... as well as all virtual particles.

The unifying qubit is produced by the binary digits composing waves that, according to the absorber and TIQM theories, travel forwards and backwards in time without being seen as purely mathematical, but as physical and real. The forwards and backwards movement in time can potentially cancel to produce a quantum (and macroscopic) entanglement that eliminates the need for the Big Bang's and Cosmic Inflation's solution that the universe is roughly the same everywhere on large scales because everything was once in contact in a tiny space.



One theory scientists have for the universe's shape says it is a doughnut. From that, I conclude the type of Klein bottle that Mobius Strips combine into is the figure-8 Klein bottle (because this somewhat resembles the doughnut). "Some scientists believe that large warm and cool spots in the Cosmic Microwave Background could actually be evidence for this kind of ... (doughnut/figure-8 Klein bottle) ... topology".@ ["What Shape is the Universe?" by Vanessa Janek: (May 11, 2015) - [http://www.universetoday.com/120157/what-shape-is-the-universe/#google\\_vignette](http://www.universetoday.com/120157/what-shape-is-the-universe/#google_vignette)]

@ Referring to "The Universe According to Emmy Noether" by Steve Nadis/illustrations by Jay Smith - Discover Magazine: June 2017, Noether's theorem can state that the continuous symmetry of the Möbius strip has the corresponding conservation law that information is always conserved (retained). The next step in the power and longevity of her theorem would appear to be recognition that the universe's conserved information takes the form of the 1's and 0's composing electronic's binary digits, as well as the data in the topology of figure-8 Klein bottles.

"Topological extension" from binary digits to Mobius strips to figure-8 Klein bottles to quantum particles to macroscopic forms to astronomical forms to the entire universe throughout time might offer an alternative to the idea of an expanding universe. Edwin Hubble, the astronomer credited with confirming expansion, actually believed "expanding models are a forced interpretation of the observational results." ("Effects of Red Shifts on the Distribution of Nebulae" by E. Hubble, Ap. J., 84, 517, 1936). Is it possible that the extension by mathematical topology's figure-8 Klein bottles is, in Edwin Hubble's words, "one of the principles of nature that is still unknown to us today"? Measurements of the expanding universe and redshifts are conceivably misinterpretations of cosmic topological extension.

Recalling Quantum Gravity, "A topological extension of general relativity" by Marco Spaans (<http://www.sciencedirect.com/science/article/pii/S0550321397800442>) says "A set of algebraic equations for the topological properties of space-time is derived, and used to extend general relativity into the Planck domain." However, the idea naturally leads to "a boundary condition for the universe" which means *AN ASTRONOMICAL HYPOTHESIS* concludes the idea conflicts with "... in imaginary time, there are no singularities or boundaries. So maybe what we call imaginary time is really more basic ..." ("A Brief History of Time" by Stephen Hawking - Bantam Press, 1988, p.139). This article you're reading believes "imaginary" is, in this case, a most unfortunate word. Imaginary time is real, boundary less, and causes "the simulation to be eternal, infinite, and indistinguishable from this 'real' universe? (It would also avoid Relativity's breaking down at the scale of quantum mechanics, thus introducing the graviton and the theory of QG or Quantum Gravity.)"

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