

## THE EVOLUTION REVOLUTION

Author - Rodney Bartlett

Abstract -

Are you and I here because of evolution? Or are we here because there is a humanistic, rational, scientific and entirely natural explanation for what is called God? If there is, we must ask: how does an "entirely natural" process end up being called "supernatural" by some people? The answer seems to lie with the applications in thousands of years from now of quantum mechanics being unified with general relativity - and the seeming SUPERnaturalness of those apps to today's world (they apparently embrace all of space and time).

In years past, the denial of divine beings by science may have been logical. But times sometimes change radically. Such a paradigm shift seems to be upon us now, with the discovery of gravitational waves and the anticipation of quantum gravity. In changing times, scientists must always keep open minds. And if biological evolution explains less than we've come to believe, it is assumed that present theories concerning cosmic evolution might be in some - certainly not total - need of revision. This is explored in topics such as gravitation, infinity, quantum gravity, space-time travel, the universe's binary digits and topology, the reason the Higgs field is actually the gravitational - electromagnetic field, alleged universal expansion, and imaginary time.

Many references are from the scientific literature but I do not apologize for those that come from popular science sources. Authors cannot allow these to be inaccurate if they value their reputation at all. And such references are often excellent at communicating ideas.

I believe this article will obviously be seen by some as too speculative, and irrelevant to the early 21st century. The theoretical physicist John Wheeler once said some of the original papers on quantum mechanics were also considered extremely speculative. Look how far quantum mechanics has come in less than a century! So speculation is not a bad thing.

Intro -

As support for the naturalness of what is called God, the following paragraph is offered -

In the TV program "Custom Universe – Finetuned For Us?" (Australian Broadcasting Corporation's "Catalyst", August 29 2013), Dr. Graham Phillips reported that "the physicist and writer Paul Davies thinks the universe is indeed fine-tuned for minds like ours. And who fine-tuned it? Not God but minds from the future, perhaps even our distant descendants, that have reached back through time ... and selected the very laws



of physics that allow for the existence of minds in the first place. Sounds bizarre, but quantum physics actually allows that kind of thing."

As support for a revised interpretation of cosmic evolution, the remaining paragraphs in this Intro are put forward -

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

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

Unification necessarily means today's scientific approach of viewing objects and events as separate will become limited to the way senses perceive objects and events. Separateness will belong to "classical" existence - unification to "quantum mechanical" existence where everything affects everything else.

Article -

### **Biological Revolution and Gravitation**

I've enjoyed astrophysicist Jeff Hester's entropy articles immensely (Astronomy magazine - Oct. and Nov. 2017 - <http://www.astronomy.com/magazine/jeff-hester/2017/09/entropys-rainbow> and <http://www.astronomy.com/magazine/jeff-hester/2017/10/entropy-redux>). They're extremely informative! I have a question about my wristwatch, though. Assuming it's less complex than the brain and body of its owner (which evolved, science tells me), why didn't atoms of metal and quartz come together to form the watch without the intelligent design of humans?

Dr. Hester's 2nd article was in the Nov. issue featuring a story on gravitational waves. After thousands of years of further progress, scientists may not only be detecting these waves on terrestrial and atomic scales but may also be manipulating them, rather like the way electromagnetic waves are exploited today. General Relativity says gravity doesn't exist in space-time but IS space-time. Manipulating gravity is therefore manipulation of space-time and will lead to presently unbelievable revolutions in space travel and so-called time travel (including travel millions of years into the uninhabited past) - see **Tomorrow's Space-time Travel**.

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## Tomorrow's Space-time Travel

Using propulsion of the present and immediate future, we'll never even reach the nearest star in a short time. This submission proposes a method enabling us to reach any star or galaxy in the entire universe in a heartbeat. This sounds like fantasy, but it's based on Albert Einstein's theories spanning 1905-1955, as well as an electrical-engineering experiment at Yale University in 2009. The technology would allow trips into the past and future, plus incredibly shortening a journey to Mars - thus saving astronauts and cosmonauts from problems like radiation exposure and psychological isolation, and also from bone and muscle wasting.

Manipulating  $E=mc^2$  in weird ways (compatible with the weird physics of black holes) seems to say distance can be totally deleted from space-time. Though I've been told  $E=mc^2$  only describes the energy of the photon at rest, Einstein's famous equation would apply if the universe has a DVD nature where everything in our cosmos is at perpetual rest, with interaction of any kind being display of successive static parts. Sounds too fantastic to be true, but more will be explained later in regard to alleged cosmic expansion. Let's represent the masslessness of photons by 0 (zero), and also the masslessness of the theoretical gravitons by zero. Suppose theories developed from Einstein's 1919 paper "Spielen Gravitationfelder im Aufbau der materiellen Elementarteilchen eine wesentliche Rolle?" (**"Do gravitational fields play an essential role in the structure of elementary particles?"**) are proven correct one day. Then mass could result from photon-graviton interaction (this agrees with theories where the role of the Higgs field is fulfilled by particular couplings<sup>^</sup>), and we could replace the  $m$  with zero. Nothing would be able to move faster than light because, as suggested by Einstein's paper, all masses are made of light – or electromagnetism – interacting with gravitational waves, which also travel at the speed of light (the limiting speed of light is thus built-in to particles).

<sup>^</sup> 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.

This results in  $E=0*c^2$  ie outside familiar circumstances (such as in black holes),\* it is possible for  $E$  to equal 0. Having reduced the equation to nothing but  $E$ ,  $m=0$  and  $c^2=0$  which means  $m=c^2$ . At first glance,  $m=c^2$  seems to be saying mass exists at light speed. But the absence of  $E$  (energy) refers to there being no interaction of electromagnetic energy and gravitational energy, and therefore no mass. If mass cannot be produced, Einstein's paper suggests mass-producing gravity must be described by zero. General Relativity says gravity IS space-time. The zeroness of space-time/gravity does not mean they don't exist ... they obviously do. It means we can relocate matter and information SEEMINGLY superluminally, or travel into the past and future, because distance can be eliminated from space and time. If we leave Earth at a significant



fraction of  $c$  (the speed of light and other electromagnetic waves) 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 2009, the calendar of its occupants will say their return occurs in 2018. The calendars of those who stayed on Earth will say it's 8865.

\*  $E=0$  and  $m=c^2$  are necessary for black holes to be portals to other regions of time and space within the universe [black holes are regarded as portals in "Soft Hair on Black Holes" by Stephen W. Hawking, Malcolm J. Perry, and Andrew Strominger (Phys. Rev. Lett. 116, 231301 – Published 6 June 2016)]. But travel to black holes isn't necessary to use their portal abilities because 'Physicists now believe that entanglement between particles exists everywhere, all the time, and have recently found shocking evidence that it affects the wider, "macroscopic" world that we inhabit' ["The Weirdest Link" (New Scientist, vol. 181, issue 2440 - 27 March 2004, page 32 - online at <http://www.biophysica.com/QUANTUM.HTM>]. Caslav Brukner, working with Vlatko Vedral and two other Imperial College researchers, has uncovered a radical twist. They have shown that moments of time can become entangled too ["Quantum Entanglement in Time" by Caslav Brukner, Samuel Taylor, Sancho Cheung, Vlatko Vedral (Submitted on 18 Feb 2004) <http://www.arxiv.org/abs/quant-ph/0402127>].

Entanglement disposes of Cosmic Inflation's idea that the uniformity in the cosmos means particles in the universe as a whole - not merely our observable part - must have once been in such a tiny space that they were in physical contact. And without the need for the universe as a whole to be materially tiny, there's no need for a Big Bang theory and the consequent cosmic expansion.

Would the combining of gravitation and electromagnetism (also explained further later in regard to alleged cosmic expansion) allow the gravitons in gravitational waves to perform like the photons of light in Yale University's electrical-engineering experiment? ["Tunable bipolar optical interactions between guided lightwaves" by Mo Li, W. H. P. Pernice & H. X. Tang - Nature Photonics 3, 464 - 468 (2009)]. Those photons attract and repel each other at tiny scales – if a machine was built that caused gravitons to do the same, curves in space-time (gravity) could be drawn together, forming a type of wormhole and deleting distance. This would enable visits to other star systems or galaxies. Wikipedia reports on space-time warping -

1) For some time, physicist Ronald Mallett has been working on plans for a time machine. This technology would be based upon a ring laser's properties in the context



of Einstein's general theory of relativity. ([https://en.m.wikipedia.org/wiki/Ronald\\_Mallett](https://en.m.wikipedia.org/wiki/Ronald_Mallett))

2) Harold ("Sonny") White from NASA's Johnson Space Center is a member of Icarus Interstellar, the nonprofit foundation whose mission is to realize interstellar flight before the year 2100. At the 2012 meeting of 100YSS (the 100 Year StarShip vision), he reported using a laser to try to warp spacetime by 1 part in 10 million with the aim of helping to make interstellar travel possible.[Moskowitz, Clara (17 September 2012) "Warp Drive May Be More Feasible Than Thought, Scientists Say" - space.com Assistant Managing Editor | September 17, 2012 - <https://www.space.com/17628-warp-drive-possible-interstellar-spaceflight.html>].

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

### **Quantum Gravity and Elohim**

\* How does an "entirely natural" process end up being called "supernatural" by some people? When combined with the Wheeler–Feynman absorber theory from last century, as well as the more recent transactional interpretation of quantum mechanics (TIQM); the universal gravitational field (space-time) combines with quantum mechanics to form the unified field of quantum gravity. For example -

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

17th century scientist Isaac Newton's idea of gravity acting instantly across the universe could be explained by gravity's ability to travel back in time, and thereby reach a point billions of light years away not in billions of years, but in negative billions-of-years. That



is; the negative/advanced component of a gravitational wave would already be at its destination as soon as it left its source, and its journey is apparently instant. Instantaneous effect over large distances is known as quantum mechanics' entanglement and has been repeatedly verified experimentally. 'Physicists now believe that entanglement between particles exists everywhere, all the time, and have recently found shocking evidence that it affects the wider, "macroscopic" world that we inhabit.' ["The Weirdest Link" (New Scientist, vol. 181, issue 2440 - 27 March 2004, page 32 - online at <http://www.biophysica.com/QUANTUM.HTM>]. Though the effect is measured for distances in space, the inseparability of space and time means that moments of time can become entangled too, as "Quantum Entanglement in Time" by Caslav Brukner, Samuel Taylor, Sancho Cheung, Vlatko Vedral (<http://www.arxiv.org/abs/quant-ph/0402127>) showed. If the retarded (forwards) wave component travels in positive space, the advanced (backwards) component corresponds to an equal amount of negative distance. The forwards and backwards movement in time can potentially cancel to produce a quantum (and macroscopic) entanglement that eliminates the need for the Big Bang's and Cosmic Inflation's solution that the universe is roughly the same everywhere on large scales because everything was once in contact in a tiny space.

Many scientists have said mathematics is a universal language because  $1+1=2$  no matter who you are. The trend in modern physics is towards a unified theory of the universe - starting with the unified theories of the 20th century (notably Einstein's) and extending to string theory and quantum gravity. What happens if a person in, say, the 24th century is raised believing in a unified theory that has implications in physical terms for everything in space-time? Would he or she think there is actually only one thing? Would (s)he think it's a mistake to add one apparently separate thing to another apparently separate thing to produce two, and that such addition is merely the result of the way the body's senses operate? (And our whole mathematical system is ultimately based on the idea that  $1+1=2$ .)

Learning to link with the unified field of quantum gravity would give people in the far future abilities like omnipresence (being everywhere and everywhen in space-time), omniscience (knowing everything) and omnipotence (being able to do anything). Incomprehensible to today's population as entirely natural, these qualities would be dubbed supernatural. And the possessors of these qualities could be described by the word Elohim - a name used for God in the Old Testament which, according to World Book Encyclopedia, means the "plural majesty of the one god".

### **Cosmic Revolution and Infinity (continues to end of article and includes subsequent subheadings)**

And if biological evolution explains less than we've come to believe, could it be that Stephen Hawking and Leonard Mlodinow are mistaken about cosmic evolution when they write, on page 180 of their 2010 book "The Grand Design", a whole universe can just



appear out of nothing. Here's a suggested method for a whole universe appearing from Elohim -

"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 largescale structure, and the flat topology of space – all point the same way." ("Infinite Universe" by astronomer Bob Berman: "Astronomy" – Nov. 2012)

A model of the cosmos might be built that consists of a never-ending number of Cosmic DVD's extending infinitely in every possible direction. The disks mean all parts of the past, present and future exist simultaneously. But what we term the "here and now" is only the tiny portion of space and time illuminated by a DVD's laser. (The previous part of this paragraph is my modification of the Block Universe and Moving Spotlight theories - see "Does time pass?" at <http://news.mit.edu/2015/book-brad-skow-does-time-pass-0128>)

### **The Universe's Bits and Topology**

A DVD disk has two parts - the material one you can touch, and also the bits (binary digits of 1 and 0). The material part of a Cosmic DVD may begin with the idea - promoted by scientists like John Wheeler, Erik Verlinde, Max Tegmark and Rafael Sorkin - that information and mathematics are the basis of reality. Reality would be ultimately composed of the binary digits of 1 and 0 (base-2 maths), which would encode pi, e,  $\sqrt{2}$  etc. These 1's and 0's encoding infinite numbers like pi into every part of the cosmos form an infinite, eternal space-time. Also, the presence of binary digits automatically means Artificial Intelligence is present. This could be a synthetic universe full of binary digits, Mobius strips, figure-8 Klein bottles, and universal Artificial Intelligence on astronomical, subatomic and biological levels. This puts hidden order into apparent disorder.

Could the universe 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?

"A Brief History of Time" by Stephen Hawking (Bantam Press, 1988): pp. 66-67, 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 Möbius 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 must be determined by individual pulses of energy. The on/off or increased-energy / decreased-energy pulses of the Virtual Particles - presently hypothetical gravitons, plus the virtual types of photons - 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.

The Möbius strips, which are only two-dimensional, then 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, and Möbius strips/Klein bottles may be responsible for the curvature of space-time. One theory scientists have for the universe's shape says it is a doughnut. From that, I conclude the type of Klein bottle that Möbius 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) - [https://www.universetoday.com/120157/what-shape-is-the-universe/#google\\_vignette](https://www.universetoday.com/120157/what-shape-is-the-universe/#google_vignette)

\* In a holographic universe, all of the information in the universe is contained in 2D packages trillions of times smaller than an atom. - "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>). Following Albert Einstein's paper that asks "Do gravitational fields play an essential role in the structure of elementary particles?" ("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), our brains and the universe could be considered holograms in the sense of being interference patterns between gravitational and electromagnetic waves. The universe's mass would be created by interaction of gravitons and photons\*\* in the multi-frequency DVD's - including the mass of 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). Matter, like a DVD bought in a store, would have two parts: the material part you can touch, which is produced by gravitational-electromagnetic interaction. And the immaterial component you can never touch - bits or binary digits (plus the topologies of Möbius strips and figure-8 Klein bottles). Though I've been told  $E=mc^2$  only describes the energy of the photon at rest, Einstein's famous equation would apply to the interaction if the universe's DVD nature means our cosmos is one of perpetual rest, with interaction of any kind - including cosmic expansion - being display of successive static parts. (Interactions in nature aren't always real. Sometimes they're illusions - like seeing oases in a desert when they're not there, or encountering puzzling shapes. I hope to show that cosmic expansion is also illusory).

\*\* In connection with the interpretation known as the Higgs field: "to justify giving mass to a would-be massless particle, scientists were forced to do something out of the ordinary. They assumed that vacuums (empty space) actually had energy. That way, if a particle that we think of as massless were to enter it, the energy from the vacuum would be transferred into that particle, giving it mass." (Wikipedia - Higgs field - Reason for Higgs effect). This means the Higgs field cannot be separate from the universal gravitational - electromagnetic field. If it was, massless gravitons and photons would enter the Higgs field and become massive. Since they're the same thing, graviton-photon interaction can be called the Higgs field if that term is preferred. References Wikipedia provided -

- 1) Englert, François; Brout, Robert 1964. Broken symmetry and the mass of gauge vector mesons. *Physical Review Letters* 13 (9): 321–23.
- 2) Brout, R.; Englert, F. (1998). "Spontaneous symmetry breaking in gauge theories: a historical survey". [arXiv:hep-th/9802142](https://arxiv.org/abs/hep-th/9802142) [hep-th].
- 3) Higgs, Peter 1964. Broken symmetries and the masses of gauge bosons. *Physical Review Letters* 13 (16): 508–509.
- 4) Guralnik, Gerald; Hagen C.R. & Kibble T.W.B. 1964. Global conservation laws and massless particles. *Physical Review Letters* 13 (20): 585–587.
- 5) G.S. Guralnik 2009. The history of the Guralnik, Hagen and Kibble development of the theory of spontaneous symmetry breaking and gauge articles. *International Journal of Modern Physics A* 24 (14): 2601–2627.
- 6) Kibble T. 2009. Englert-Brout-Higgs-Guralnik-Hagen-Kibble mechanism. *Scholarpedia* 4: 6441–6410.

### **Main Text of "Alleged Cosmic Expansion"**

Should all interactions be of this nature, they could account for the attitude of Edwin Hubble (1889-1953), the astronomer credited with discovering cosmic expansion. Hubble remained doubtful about the expansion interpretation for his entire life. He believed "expanding models are a forced interpretation of the observational results." ("Effects of Red Shifts on the Distribution of Nebulae" by E. Hubble, *Ap. J.*, 84, 517, 1936). According to astronomer Allan Sandage, "Hubble believed that his count data gave a more reasonable result concerning spatial curvature if the redshift\* correction



was made assuming no recession. To the very end of his writings he maintained this position, favouring (or at the very least keeping open) the model where no true expansion exists, and therefore that the redshift "represents a hitherto unrecognized principle of nature." [Sandage, Allan (1989), "Edwin Hubble 1889–1953", The Journal of the Royal Astronomical Society of Canada, Vol. 83, No.6]

\* Redshift is when light or other electromagnetic radiation from an object is increased in wavelength, or shifted to the red end of the spectrum.

This "unrecognized principle" might reasonably be deduced to be "the universe's DVD nature means our cosmos is one of perpetual rest, with interaction of any kind - including cosmic expansion - being display of successive static parts." In December 1941, Hubble reported to the American Association for the Advancement of Science that results from a six-year survey with the Mt. Wilson telescope did not support the expanding universe theory. ("Savant Refutes Theory of Exploding Universe – Mt. Wilson Astronomer Reports Results of Long Searching With 100-Inch Telescope". The Los Angeles Times: 10. December 31, 1941.

Also, the 70-years-younger reference from Larry Harnisch (December 31, 2011). "Hubble: No Evidence of 'Big Bang' Theory". LA Daily Mirror (WP:NEWSBLOG).

Of course, the great majority of scientists will simply dismiss Hubble's concerns\* because they agree that discovery of the Cosmic Microwave Background (CMB) in 1964 by American radio astronomers Arno Penzias and Robert Wilson proved the universe is expanding from the Big Bang. (Penzias, A. A.; Wilson, R. W. (1965). "A Measurement of Excess Antenna Temperature at 4080 Mc/s". The Astrophysical Journal. 142 (1): 419–421). However, science does make mistakes, and may have compounded one error (the interpretation that Hubble's redshifts of galaxies mean the cosmos is expanding) with a second error (the interpretation that the CMB must be formed by the Big Bang).

\* The concerns of Steady State theorists would likewise be dismissed. In cosmology, the Steady State theory is an alternative to the Big Bang model of the evolution of our universe. It asserts that the universe has no beginning and no end. Its theorists include Hermann Bondi, Thomas Gold, Fred Hoyle, Geoffrey Burbidge, Margaret Burbidge, William Fowler and Jayant V. Narlikar.

The distinct possibility remains that the CMB - indeed, all electromagnetism (EM) - is a product of the universal gravitational (G) field which can exist eternally and therefore not require a big bang. This GEM field could exist if G and EM are sufficiently similar. According to "Similarity Between Gravitation and Electrostatic Forces" by mathematician and physicist Ron Kurtus (5 December 2010 - [http://www.school-for-champions.com/science/gravitation\\_electrostatic.htm#.Wkw9dcs\\_5Ah](http://www.school-for-champions.com/science/gravitation_electrostatic.htm#.Wkw9dcs_5Ah)) -

"The gravitational force equation and the electrostatic force equation can be seen as parallel to each other.



### **Gravitation**

The Universal Gravitation Equation states the force of attraction between two objects, where the mass is considered concentrated at their centers of mass:

$$F = GMm/R^2$$

where

F is the force of attraction between two objects

G is the Universal Gravitational Constant

M and m are the masses of the two point objects

R is the separation between the centers of the objects

### **Electrostatic**

The electrostatic force equation is called Coulomb's Law and states the force of attraction between particles of opposite electrical charge. It also represents the force of repulsion for like charges:

$$F = keqQ/r^2$$

where

F is the force of attraction or repulsion between two electrically charged particles

ke is the Coulomb force constant

q and Q are point charges of the two particles

r is the separation between the particles."

Under the heading "**Gravitomagnetism**", he also states on the above page that "An analogy of gravitational and electromagnetic fields is seen by comparing the Einstein Field Equations from the General Theory of Relativity with Maxwell's Field Equations for electrical and magnetic fields."

Suppose it's correct to associate Edwin Hubble's unrecognized principle with the proposed DVD nature of the universe. How would redshift be understood so that it "represents a hitherto unrecognized principle of nature"? The answer is - motion is the display of static parts in the Cosmic DVD's and redshift, as in alleged cosmic expansion, is not a phenomenon involving receding motion of a galaxy etc. A more complete explanation begins with my comment on "Scientists find 'behemoth' black hole so big it could challenge our understanding of the universe's beginning"

by Andrew Griffin

Wednesday 6 December 2017

[http://www.independent.co.](http://www.independent.co.uk/news/science/black-hole-nasa-supermassive-size-big-bang-gemini-mass-universe-beginning-a8095801.html#commentsDiv)

[uk/news/science/black-hole-nasa-supermassive-size-big-bang-gemini-mass-universe-beginning-a8095801.html#commentsDiv](http://www.independent.co.uk/news/science/black-hole-nasa-supermassive-size-big-bang-gemini-mass-universe-beginning-a8095801.html#commentsDiv)

In Andrew Griffin's words, "Scientists just found a very huge (800 million solar mass), very young (690 million year) supermassive black hole. As far as we know, it shouldn't be able to exist, and it just might re-write our understanding of the early universe. Even in the most generous and optimistic estimate of the formation of black holes, creating such a massive one in such a relatively short period of time would be impossible. That suggests that another, entirely unknown, process was happening at the same time."



Not surprisingly, Albert Einstein and General Relativity gave us the info to solve this puzzle a hundred years ago.

Supermassive black holes have enormous gravitation. This gravity does not need to be associated with previously existing stars that explode as supernovae. It can result from the region that becomes a supermassive black hole being the focus of many gravitational waves. The waves give the black hole mass, the wave motion gives it spin, and the hole adopts a spherical shape.

As well, it's possible that all supermassive black holes form as a result of being the target region of innumerable, powerful gravitational waves. This is consistent with a galaxy's greatest mass being formed (by the gravitational waves) at its centre, where its supermassive black hole lies.

General Relativity says gravity is a push exerted by the curvature of space-time. So gravitational waves (ripples in space-time) don't only form the mass of supermassive black holes. As they push from intergalactic space towards their focus of galaxy centres, they also contribute to formation of lesser masses - such as smaller black holes, stars, planets, atoms of dust and gas, etc. (Electromagnetism would be the other contributor.) This agrees with Einstein's paper "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. That paper was not, however, published in relation to black holes but in an attempt to clarify the inner workings of the atom. (See the 2012 article "How Einstein Discovered Dark Energy" by Alex Harvey (<http://arxiv.org/pdf/1211.6338v1.pdf>)).

If a supermassive black hole does not need to be associated with previously existing stars that explode as supernovae, neither would its growth be dependent on nearby black holes with which to merge or dust and gas etc it could consume. It could grow as a result of external gravitational and electromagnetic (GEM) waves homing in on it, and adding to its mass- and charge-bestowing preexisting content. The graviton-photon interactions forming matter are undoubtedly much more complex, not simply adding to existing composition and causing growth, but perhaps involving the breaking down of particles into their basic constituents (bits, Mobius strips, figure-8 Klein bottles) which are then built up into replacements of encountered structures.

As its mass increases, the gravitation associated with the black hole also increases. In astrophysics, gravitational redshift or Einstein shift is the process by which electromagnetic radiation originating from a source that is in a gravitational field is reduced in energy and in frequency, or redshifted, when observed in a region at a higher gravitational potential. In other words, the observer must be standing "uphill" from the source. If the observer is at a lower gravitational potential than the source, a gravitational blueshift (any decrease in wavelength, with a corresponding increase in



frequency and in energy, of an electromagnetic wave) can be observed instead.

Redshift of galaxies, interpreted as a relative velocity away from Earth, increases with their distance. This discovery became known as Hubble's law. Why does redshift increase with distance if galaxies beyond our local group of gravitationally bound galaxies aren't moving away? The answer must be that the gravitational field which electromagnetic radiation originates from is not limited to a particular galaxy or galaxy cluster but spans - indeed, is - the whole of spacetime, in agreement with general relativity.

The further away a galaxy is, the greater is the amount of gravitation which any electromagnetic radiation has to traverse. So the electromagnetism weakens more than expected and the gravitational redshift, which is larger than anticipated, naturally increases with distance and is wrongly labeled cosmological redshift, which is due to the idea that the universe is expanding. This gravitational redshift can be applied to anything and everything, including the type 1a supernovae used by the Supernova Cosmology Project and the High-Z Supernova Search Team when they supposedly discovered accelerating expansion of the universe in 1998 (they compared the stars' brightnesses with their measured redshifts). (Overbye, Dennis (20 February 2017). "Cosmos Controversy: The Universe Is Expanding, but How Fast?". New York Times)

### **More About Figure-8 Klein Bottles**

The positive and negative surfaces of figure-8 Klein bottles combine 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 can be compatible with space and time extending infinitely, and not being limited to the areas and volumes within curves. Let me explain. Informally - if an object in space consists of one piece and does not have any "holes" that pass all the way through it, it is called simply-connected. A doughnut (and the figure-8 Klein bottle it resembles) is "holey" and not simply connected (it's multiply connected). A flat universe that is also simply connected implies an infinite universe. [Luminet, Jean-Pierre; Lachi`eze-Rey, Marc - "Cosmic Topology" - Physics Reports 254 (3): 135–214 (1995) [www.arXiv:gr-qc/9605010](http://www.arXiv:gr-qc/9605010) So it seems the infinite universe cannot be composed of multiply-connected subunits called figure-8 Klein bottles. But positive and negative curvatures can complement each other's shape, and digitised images can morph to perfect the complementarity if necessary (perhaps by binary digits filling in gaps and irregularities in the same way that computer drawings can extrapolate a small patch of blue sky to make a sky that's blue from horizon to horizon). This makes space-time relatively smooth and continuous - and gets rid of holes - making figure-8 Klein bottles simply connected, and plausible subunits of the universe's composition.

On the subject of plausibility:



"If the universe was nonorientable ie if it contained orientation - reversing curves such as the Möbius and Klein, there would be strange physical consequences that have not yet been observed. While they could be happening outside of our field of vision, it is unlikely that our universe is nonorientable." ["The Shape of the Universe" by Stacy Hoehn, formerly of Vanderbilt University's Mathematics Department (<https://my.vanderbilt.edu/stacyfonstad/files/2011/10/ShapeOfSpaceVandy.pdf>)]. My comment: It can indeed be nonorientable if these strange physical consequences are happening outside of our field of vision i.e. if the universe is infinite.

## Imaginary Time

We can picture imaginary time in the following way. One can think of ordinary, real, time as a horizontal line. On the left, there's the past - and on the right, the future. But there's another kind of time in the vertical direction. This is called imaginary time (it's described with imaginary numbers such as  $i$  which equals  $\sqrt{-1}$ ). Like the surface of the Earth, imaginary time has no boundaries (you can go around the world without falling over any edge) but, also like Earth, it is finite unless  $\pi$  or another infinite number is incorporated into each and every part. Dr. Andrea Alberti of the Institute of Applied Physics of the University of Bonn says, "Quantum mechanics allows superposition states of large, macroscopic objects. But these states are very fragile, even following the football with our eyes is enough to destroy the superposition and makes it follow a definite trajectory." ("Atoms can be in two places at the same time" - January 20, 2015 - University of Bonn - <https://m.phys.org/news/2015-01-atoms.html>)

So, although we only see one Earth, it's within the realm of possibility that it, and everything else, is superposed and actually exists in more than one place - even everywhere in spacetime. This may be what happens when imaginary time teams up with incorporation of infinite numbers to remove boundaries and possibly make the universe infinite and eternal. Imaginary time obtained its name because it was originally a purely mathematical representation of time which appears in some approaches to the special relativity and quantum mechanics theories developed in the early decades of last century.

As mathematical physicist Paul Davies writes in The real gleam in the imaginary 'i' (20 FEBRUARY 2017 - <https://cosmosmagazine.com/mathematics/the-gleam-in-the-i>) - "The name has stuck, even though today we accept imaginary numbers are just as real as real numbers."

It was, I think, in the next issue of Cosmos magazine that Prof. Davies wrote that imaginary time is just as real as the time we're familiar with. Professor Itzhak Bars of the University of Southern California in Los Angeles says, "one whole dimension of time and another of space have until now gone entirely unnoticed by us". ("A Two-Time Universe? Physicist Explores How Second Dimension of Time Could Unify Physics Laws" - May 15, 2007 By Tom Siegfried (Read more at: <https://m.phys.org/news/2007-05-two-time-universe-physicist-explores-dimension.html>). Could Prof.



Bars' second dimension of space be imaginary (in the sense of  $i = \sqrt{-1}$ ) space which is united with imaginary time the same way ordinary space and time are joined? And in the unification of a quantum gravity universe, the real and imaginary would be connected.

Do you remember how, about halfway through this article, it is written that "A model of the cosmos might be built that consists of a never-ending number of DVD's extending infinitely in every possible direction."

Entanglement in the simulation is unable to remain separate from the quantum-mechanical and macroscopic entanglement existing in our reality because imaginary time removes all boundaries between the two universes. They naturally merge, influencing each other and becoming one. The poorly-named imaginary time of physics and mathematics unites with pi (both are necessary to generate an infinite universe - alone, unbounded imaginary time is finite) and with the simulated-real hybridization of the universe to free it of boundaries and make it infinite.

Professor Stephen Hawking says that boundaries exist in real time but don't exist in imaginary time [Hawking, S. (1988) "A Brief History of Time", p.139. Bantam Press]. There really are boundaries in real time and it must hypothetically be possible to step outside the universe if only real time exists. But if imaginary time also exists, it is not possible to step outside the universe coz the boundaries simply aren't there and the universe never ends (neither in space nor in time).

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