SPACE-TIME'S BROKEN INFINITY

Author - Rodney Bartlett

Abstract -
This article was rejected by "Physical Review D" because it is "scientifically very far from the current state of knowledge in the field". Why do people (including scientists) avoid anything "scientifically very far from the current state of knowledge in the field"? Being far from the current state does not mean my article is incorrect. Depending on the extent of its accuracy, it offers either large or smaller opportunities for readers to make unanticipated advances in science.

When his paper regarding mathematical formulas creating reality was submitted to a scientific journal and rejected as
being too speculative, U.S. cosmologist Max Tegmark showed the rejection letter to his friend John Wheeler (1911-2008), a Princeton theoretical physicist.
Wheeler rejected the rejection and said, “Extremely speculative? Bah!” Then he reminded Tegmark that some of the original papers on quantum mechanics were also considered extremely speculative. (p.2 of “Is the Universe Actually Made of Math?” By Adam Frank, Monday, June 16, 2008 -
http://discovermagazine.com/2008/jul/16-is-the-universe-actually-made-of-math#.UQNDUR2-pFk

Remembering Professor Wheeler ...

This article begins with a well known astronomer and author saying "It now truly appears that the universe is infinite". But how can the cosmos be infinite when general relativity says an infinite amount of energy would curve the universe to an infinitely small size, which obviously does not happen! The proposed solution refers to a problem physics had 120 years ago - a blackbody could release an infinite amount of energy, causing experiment and theory to diverge radically in the ultraviolet spectrum. Max Planck's solution of dividing electromagnetic radiation into quanta (photons) is called upon, and the universe's infinity is "broken" into discrete units by suggesting it's composed of electronics' binary digits (since General Relativity taught us that time is curved and warped, the fantastic possibility exists that the 1's and 0's come from the far future of humanity).

Whatever their origin, the binary digits are assembled, via references to science and maths, into two-dimensional Möbius strips and then four-dimensional figure-8 Klein bottles. This topological structure is given mass in parts through the coupling of the long-range gravitational and electromagnetic waves. Their interaction substitutes for the Higgs field, according to 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). The strong and weak nuclear forces

may also ultimately result from gravitational - electromagnetic coupling, making the nuclear forces non-fundamental.

For a moment, let's allow our imaginations to fly ... while we simultaneously remain grounded in science. Suppose the 1's and 0's really do come from the far future of humanity. Could a future computer simulation of the universe that uses mathematics' boundary-less, so-called Imaginary Time cause the simulation to be eternal, infinite, and indistinguishable from this "real" universe? (The lack of boundaries would also avoid Relativity's breaking down at the scale of quantum mechanics, thus introducing the graviton and the theory of Quantum Gravity.) This outcome involving so-called Imaginary Time (I.T. might be a better name) is plausible. 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".

Article -
“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.” (1)

Mathematics often finds a place in future physics e.g. Max Planck's initially mathematical quanta became physical in Albert Einstein's photoelectric explanation. 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, causing an "ultraviolet catastrophe", 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).

Could a future computer simulation of the universe that uses mathematics' boundary-less, so-called Imaginary Time (2) cause the simulation to be eternal, infinite^, and indistinguishable from this "real" universe? (The lack of boundaries would also avoid Relativity's breaking down at the scale of quantum mechanics, thus introducing the graviton and the theory of Quantum Gravity.)

^ "According to general relativity, (an infinite amount of energy) would curve the universe to an infinitely small size, which obviously does not happen!" (3) The universe could contain infinite energy because, like quanta being emitted or absorbed in discrete packets, the universe's infinity would be broken, and not continuous, if it was constructed of electronics' binary digits ie of discrete 1's and 0's.

Some particles must be turned through two complete revolutions to look the same ie to possess spin 1/2 (reference 4). This geometry is equivalent to the topological fact you must travel around a Möbius Strip twice to reach your starting point. Since it's known quantum spin has discrete values, these values can be determined by individual pulses of energy. The on/off, or increased-energy/decreased-energy, of the pulses of the virtual particles^ filling space-time 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 two-dimensional (2D) Möbius long before reaching the scale of quantum particles. "In a holographic universe, all of the information in the universe is contained in 2D packages trillions of times smaller than an atom." (5)

^ 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". General Relativity says space-time IS gravity i.e. space-time's curvature produces gravitation that pushes objects towards the focus of gravitational waves, which could be the centre of a planet or star. Thus, virtual particles not only fill space-time but also compose gravity. This means the gravitons composing gravity must be virtual, not ordinary, particles. The undetectable virtual photons that give rise to forces between matter particles (6) also fill space-time/compose gravity.

Following Einstein's paper that asks "Do gravitational fields play an essential role in the structure of elementary particles?" (7), 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. 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). “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 …” (8)

Two-dimensional Mobius strips pair up to produce four-dimensional Klein bottles. (9) This produces the 3 spatial dimensions/1 temporal dimension familiar 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 conceivably

be linked to a so-called Imaginary Space* full of Dark Matter. 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, as well as observable spiral galaxies. "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". (10)

* Referring to the phrase "imaginary space-time", 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". (11)

References

(1) "Infinite Universe" by Bob Berman: "Astronomy" – Nov. 2012

(2) "A Brief History of Time" by Stephen Hawking - Bantam Press, 1988, p.139

(3) "The Grand Design" by Stephen Hawking & Leonard Mlodinow - Bantam Press, 2010, p.113

(4) "A Brief History of Time" by Stephen Hawking (Bantam Press, 1988): pp. 66-67

(5) "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)

(6) "A Brief History of Time" by Stephen Hawking (Bantam Press, 1988): p.69

(7) "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

(8) The column "Secret Sky" by
Stephen James O'Meara in Astronomy magazine (September 2013)

(9) "Imaging maths - Inside the Klein bottle" by K. Polthier: https://plus.maths.org/content/os/issue26/features/mathart/index

(10) "What Shape is the Universe?" by Vanessa Janek: (May 11, 2015) - http://www.universetoday.com/120157/what-shape-is-the-universe/#google_vignette

(11) "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)