

Title -

## *Catalyst - Einstein*

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Abstract -

On Tuesday, November 10, 2015

the ABC (Australian

Broadcasting Corporation)

showed the TV program

"Einstein's Extraordinary

Universe". It was a celebration of

Einstein's release of the General

Theory of Relativity 100 years ago this month, and was this week's edition of the ABC's program "Catalyst" (the presenter was Dr. Graham Phillips). This article is my own little way of celebrating Relativity's birthday. I had to limit my comment on the Catalyst website to 500 words, but I've expanded that here to nearly 2500 words.

Article -

A 1919 paper by Einstein\* makes me think matter may be concentrated gravitational waves.

\* A. Einstein, "Speilen Gravitationfelder in Aufbau der Elementarteilchen eine Wesentliche Rolle?" (Do gravitational fields play an essential role in the structure of elementary particles?), Sitzungsberichte der Preussischen Akademie der

Wissenschaften, (Math. Phys.),  
349-356 (1919) Berlin.

The paper mentions electrons,  
suggesting a possible  
connection with  
electromagnetism, and  
suggesting the following  
scenario to this reader -

The weak energy of gravitational  
waves combines with the  
 $10^{36}$ -times-stronger energy of  
electromagnetic waves to make

matter and mass. String theory says everything's composed of tiny, one-dimensional strings that vibrate. Replacing the word "strings" with "bits" (Binary digiT'S - 1's and 0's); translation of fluctuating, 1-D bits into matter could be via electromagnetic and gravitational waves being disturbances in fields.

These disturbances known as virtual particles are equivalent to

energy pulses that produce the binary digits of 1 and 0 encoding  $\pi$ ,  $e$ ,  $\sqrt{2}$  etc. (“Our Mathematical Universe” by cosmologist Max Tegmark – Random House/Knopf, January 2014 believes the universe has a mathematical foundation). Matter particles [and even bosons like the Higgs, W and Z particles] are given mass by the energy of electromagnetic and gravitational waves interacting in “wave packets” (interaction

within this term from quantum mechanics results in wave-particle duality).

This is how Dark Matter, which some scientists say shows Einstein's theory of general relativity and gravity to be incomplete, could also be concentrated gravitational waves -

There are 2 forms of spin - classical (e.g. a rotating top) and

quantum. The latter can't be explained classically but may possibly be explained by particles and space mutually affecting each other. According to General Relativity, matter causes a gravity field by its mass creating depressions in space that can be pictured as a flexible rubber sheet. Space could affect particles through its curvature (gravity) infiltrating particles, thus giving them quantum spin.



If space-time is curved as a result of being modeled on the twisted Mobius strip,\* particles of matter and antimatter would also be twisted up to 180 degrees. This gives them a non-rotating “quantum spin” which does not have unlimited values (as visualizing the continuous curvature of a Mobius strip might imply) but is restricted to certain values by the more fundamental operation

– that of the 1's and 0's (I'm suggesting that this more fundamental operation can replace descriptions using quarks).

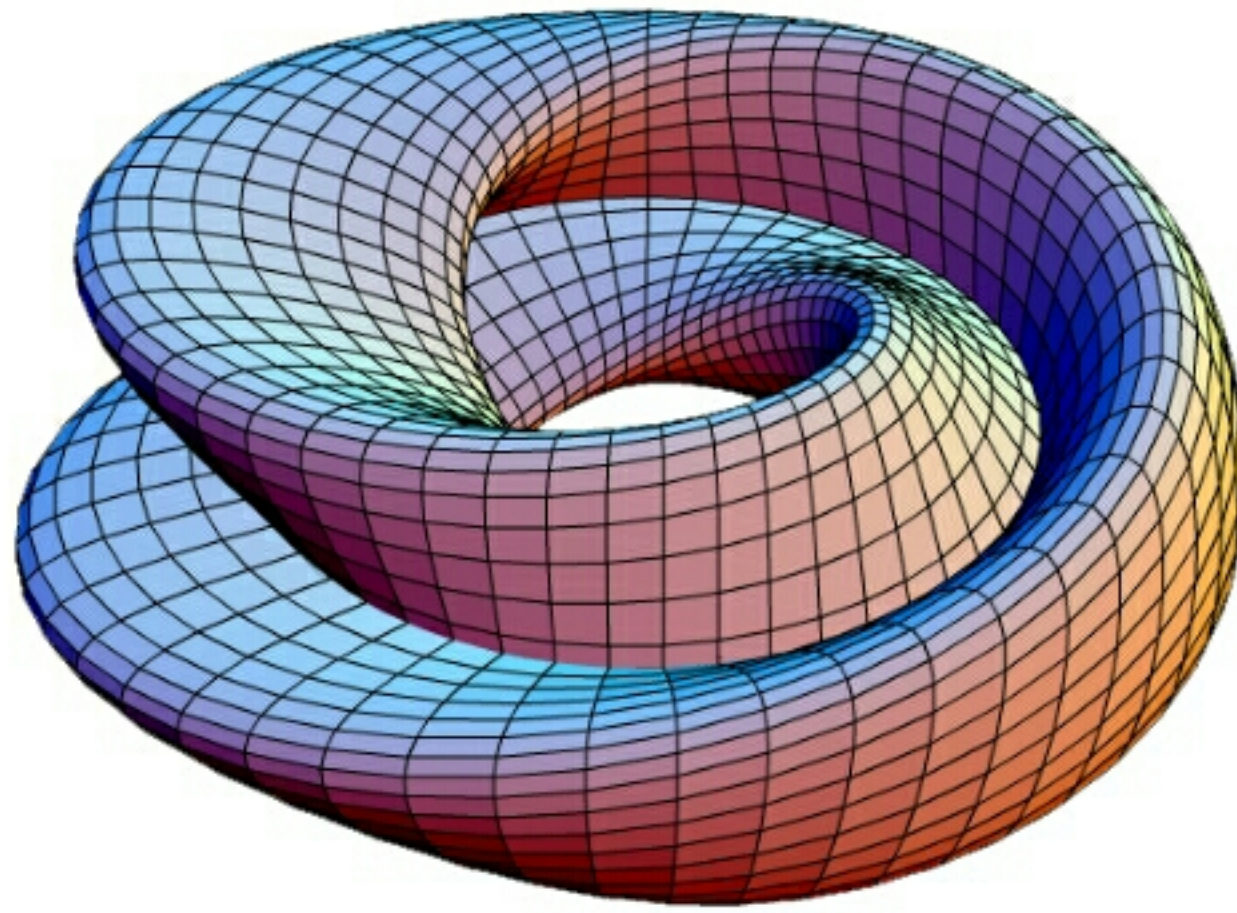
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\* String theory says everything's composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents. We can visualize so-called virtual

particles generating tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) that form currents in a two-dimensional program called a Mobius loop – or in 2 Mobius loops, clockwise currents in one loop combining with counterclockwise currents in the other to form a standing current. (The curving of what we call space-time sounds very strange, but I think it can actually be explained by modelling

space-time's construction on the Mobius strip that can be represented by giving a strip of paper a half-twist of 180 degrees before joining its ends.)

Joining two Mobius strips (or Mobius bands) forms a four-dimensional Klein bottle.



And each Klein bottle can become an observable (or "sub") universe (figure-8 Klein bottles - one is pictured above - resemble spiral galaxies, and appear to have the most suitable shape to form subuniverses). This

connection of the 2 Mobius strips can be made with the infinitely-long irrational and transcendental numbers. Such an infinite connection translates into an infinite number of TANGIBLE figure-8 Klein bottles which are, in fact, “subuniverses”. The infinite numbers make the cosmos as a whole\* physically infinite, the union of space and time makes it eternal, and it's in a static or steady state because it's already infinite.

\* (i.e. the cosmos beyond our 13.8-billion-year-old subuniverse, which is expanding from the energy of virtual particles/binary digits being converted into matter and displacing parts of the universe beyond)

For the note below on the figure-8 Klein bottle, I refer to –  
a) Bourbaki, Nicolas (2005). Lie Groups and Lie Algebras. Springer

b) Conway, John (1986).  
Functions of One Complex  
Variable I. Springer

c) Gamelin, Theodore (January  
2001). Complex Analysis.  
Springer

d) Joshi, Kapli (August 1983).  
Introduction to General Topology.  
New Age Publishers

e) Spanier, Edwin (December  
1994). Algebraic Topology.  
Springer

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). The universe appears to be infinite ("Infinite Universe" by Bob Berman - "Astronomy", Nov. 2012), being flat on the largest scales and curved on local scales (from far away, a scene on Earth can

appear flat, yet the curves of hills become apparent up close). 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) [arXiv:gr-qc/9605010](https://arxiv.org/abs/gr-qc/9605010)]. So it seems the infinite universe cannot be composed of subunits called figure-8 Klein bottles (flat universes that are finite in extent include the torus and Klein

bottle).

But gaps in, or irregularities between, subuniverses shaped like figure-8 Klein bottles are "filled in" by binary digits 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 these types of

Klein subunits feasible. The Klein bottle is a closed surface with no distinction between inside and outside. There cannot be other universes outside ours – there's only one universe).

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Remember, 1's and 0's need not only represent "on" and "off" – they can also represent "increase" and "decrease"; resulting in spins of 0, 1/2, 1, 3/2,

2, etc.) There would be the ordinary matter we see and touch, which could be labeled positive. At the extremity of 180 degrees; there would also exist an inverted, negative form of that matter. This would be as invisible to us as the curving of space, and only detectable through its gravitational effects. It would be referred to as Dark Matter existing in what can only be called a 5th-dimensional hyperspace.

If combined with the intense strength of electromagnetism (some  $10^{36}$  times more powerful), concentration of repelling gravitational waves might account for universal expansion, what is commonly called the gravitational "pull" of objects (actually gravitational push focused on that object\*), and the nature of black holes (their purely gravitational-electromagnetic

structure<sup>^</sup> gives them mass, spin and charge).

<sup>^</sup> According to a Letter to the journal Nature titled “Rapid formation of large dust grains in the luminous supernova 2010jl” (by Christa Gall, Jens Hjorth, Darach Watson, Eli Dwek, Justyn R. Maund, Ori Fox, Giorgos Leloudas, Daniele Malesani & Avril C. Day-Jones - published online on July 9, 2014 at <http://www.nature>.

[com/nature/journal/ ... 13558.](http://www.nature.com/nature/journal/.../13558.html)

[html](http://www.nature.com/nature/journal/.../13558.html)): A supernova blows off some material before exploding and this forms a slower moving, cooler shell which condenses into dust. Travelling at light speed, gravitational and electromagnetic radiation from the blast slams into that material. The lower temperature allows the energy of the gravitons to interact with that of the photons, producing mass in the form of dust. In the same way, waves



from deep space can produce graviton-photon interaction, forming collapsing clouds of dust and gas from which stars form. If there's no interaction as a result of higher temperatures, no matter is created and there is no cloud of gas and dust. A black hole – formed of noninteracting gravitational and electromagnetic waves - could be the result (supernovas can produce black holes, too).

Gravitational waves radiating from a supernova to its surrounding shell would push against the shell and be repulsive. Similarly, waves originating from warps far out in space and condensing into interstellar clouds would be repelling gravitational waves that might, especially if combined with powerful electromagnetic waves<sup>^^</sup>, conceivably account for the expansion of our observable portion of the

universe which was discovered in 1998. The 1's and 0's forming the waves would be candidates for explaining dark energy. The concentration of gravitational waves is greatest where the black hole, neutron star, solar mass, or any other object or subatomic particle exists. Any body of lesser mass (such as low-mass dust and gas spiralling into a high-mass black hole, or the smaller Moon orbiting the larger Earth) has a reduced

concentration compared to where the concentration of gravitational waves is greatest. This means it has less so-called attraction - is part of the same gradient, and is bound to the larger concentration which it orbits or falls onto or spirals into.

^^ The universe is the things in space and time and, since General Relativity says gravitation is the warping of space-time, the universe is a

giant gravity field. Gravity doesn't need to travel – the gravitational field already exists everywhere. Nevertheless, any disturbance (from the waving of your hand to explosion of a supernova) will send ripples called gravitational waves through the universe. Since gravity makes electromagnetism (pp. 39-45), the universe is also a giant electromagnetic field. Electromagnetism is ubiquitous and doesn't need to travel, but

any disturbance sends out  
electromagnetic waves.

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\* I believe an idea of partly  
revised gravity requires the idea  
of Newton and Kepler that the  
moon causes the tides, to be  
joined with Galileo's partly  
correct idea that the Earth's  
movements slosh its water.  
According to "Galileo's Big  
Mistake" By Peter Tyson -

Posted 10.29.02 (<http://www.pbs.org/wgbh/nova/earth/galileo-big-mistake.html>) - "(If a barge carrying a cargo of freshwater) suddenly ground to a halt on a sandbar, for instance, the water pushed up towards the bow then bounced back toward the stern, doing this several times with ever decreasing agitation until it returned to a level state. Galileo realized that the Earth's dual motion—its daily one around its

axis and its annual one around the sun—might have the same effect on oceans and other great bodies of water as the barge had on its freshwater cargo."

Gravity's apparent attraction can be summarized by the following - gravitation is absorbed into wave packets and the inertia of the gravitons (united with far more energetic photons) carries objects towards Earth's centre at 9.8 m/s or 32 ft/s. The mass of



the oceans on Earth is estimated at nearly 1.5 billion cubic kilometres [“Ocean Volume and Depth” – Van Nostrand’s Scientific Encyclopedia, 10th edition 2008]. All this water is being pushed towards Earth’s centre at 32 feet per second every second. But the seafloor prevents its descent. So there is a recoil, noticeable offshore (it is only where oceans and continents meet that tides are great enough to be noticed). This

recoil is larger during the spring tides seen at full and new moon because sun, Earth and moon are aligned at these times.

The rotating Sun bulges at its equator and therefore has a larger equatorial than polar diameter, and more mass at its equator. This means more gravitation has been diverted to that region. Planets are also made from gravity and electromagnetism interacting,

and must consequently lie in the path gravity waves took from the outer solar system to the solar equator (more gravitation was diverted here - so if planets are created by gravity and electromagnetism, it follows that they'd be created where the gravitational "current" is greatest). For simplicity, we say the Sun's gravitation is strongest at its equator and planets are compelled to orbit in the ecliptic plane. The previous

paragraph's alignment of Sun, Earth and moon therefore refers to their being lined up "where the gravitational current is greatest" and more of the gravitational waves travelling from the outer solar system being captured by solar and lunar wave packets, and less of them being available on Earth to suppress oceanic recoil (there are still enough to maintain the falling-bodies rate of  $32 \text{ ft/s}^2$ ). At the neap tides

of 1st and 3rd quarter; the sun, earth and moon aren't lined up but form a right angle and our planet has access to more gravity waves, which suppress oceanic recoil to a greater degree.

We can imagine the sun and moon pulling earth's water in different directions at neap tide. If variables like wind / atmospheric pressure / storms are deleted, this causes neap

tides which are much lower than spring tides.

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Imagine waves constituting a particle and its quantum spin being curved and twisted to a degree that exceeds the warping responsible for the particle's quantum spin, but is less than that responsible for dark matter. Then neither a particle of matter nor a particle of dark matter

would be in existence. Since gravitational waves can create electromagnetism\*, we'd have a particle whose electric charge could be the opposite of the original particle ie we could have a negative electron's antiparticle, the positive positron."

\* When Einstein penned  $E=mc^2$ , he used  $c$  ( $c^2$ ) to convert between energy units and mass units. The conversion number is 90,000,000,000 (light's velocity

of 300,000 km/s x 300,000 km/s)  
which approx. equals  $10^{11}$ .  
Gravity waves with a strength of  
1 are, via quantum gravitational  
lensing, concentrated  $10^{24}$   
times after they're focused to  
form matter (to  $10^{25}$ , weak  
nuclear force's strength - giving  
the illusion that a weak nuclear  
force\* that is not the product of  
gravitation exists). Waves are  
magnified by the matter's  
density to achieve  
electromagnetism's strength



( $10^{36}$  times gravity's strength) i.  
e.  $10^{25}$  is multiplied by  
Einstein's conversion factor  
[ $10^{11}$ ] and gives  $10^{36}$  (this  
gives the illusion of the  
existence of electric and  
magnetic fields that are not a  
product of gravitation). (The  
gluons that bind mesons would  
likewise be either products of  
gravitation or, like quarks,  
replaceable by the more  
fundamental 1's and 0's.) After  
absorption by atoms, the

depleted remnant of the gravity waves is re-radiated from stars, interstellar gas and dust, etc. It's radiated as gravitational waves (a Gravity Wave Background, challenging the idea that Cosmic Inflation was necessary to generate gravitational waves) which have lost most of their energy or strength during formation of forces (returning to a strength of 1). Since gravity can produce electromagnetism, it's also radiated as

electromagnetic waves –  
including an infrared background  
whose heat output exceeds that  
of the stars alone, in addition to  
a microwave background. The  
latter challenges the idea that  
existence of the cosmic  
microwave background proves  
the universe began with the  
traditional Big Bang (for a  
nontraditional Big Bang, see  
"Binary Digits and Topology  
Create Hybrid  
Big-Bang/Steady-State Universe

Unified as One Qubit" by R. Bartlett, July 2015, binary-digits-and-topology-create-hybrid-big-bang-steady-state591.html)

\* Remember, this is only one example: the so-called weak force's "strength isn't constant" and varies with distances ["The Strengths of the Known Forces" by theoretical physicist Matt Strassler [May 31, 2013] - <http://profmattstrassler>.

[com/articles-and-posts/particle-physics-basics/the-known-forces-of-nature/the-strength-of-the-known-forces/](https://www.ck12.org/physics-basics/the-known-forces-of-nature/the-strength-of-the-known-forces/) ].

The article "Matter and antimatter scrutinized" ( "Matter and antimatter scrutinized" by Klaus P. Jungmann (Nature 524 - 13 August 2015, pp.168-169) ) says science is still looking for "... any possible, but as yet unknown, differences between particles and antiparticles."

Gravitational "twisting" that produces matter, antimatter and dark matter as it varies in stages reaching  $180^\circ$  could account for these particle/antiparticle differences. The authors of "High-precision comparison of the antiproton-to-proton charge-to-mass ratio" (S. Ulmer et al, in Nature 524 13 August 2015, pp.196-199) have found no difference larger than 870 parts per billion in the way that protons and antiprotons interact

with gravity. But I believe that's sufficient to explain particle / antiparticle variation. The explanation seems especially plausible in light of "Constraints on the gravitational properties of antiprotons and positrons from cyclotron-frequency measurements" by R.J. Hughes and M.H. Holzschneider reporting on a possible gravitational anomaly acting on antimatter, expressed as  $\alpha g$ . (Phys. Rev. Lett. 66 854-857,

1991)

Explaining particle/antiparticle difference in terms of gravitational twisting also illuminates neutrinos/antineutrinos. All of the Standard Model fermions except the neutrino behave as Dirac fermions (particles that are not their own antiparticle - named after Paul Dirac, a British pioneer of quantum mechanics),



but the nature of the neutrino is not settled and it may be either Dirac or Majorana (a particle identical to its antiparticle - named after Italian theoretical physicist Ettore Majorana).

"Gravitational anomaly" in the antineutrino would decide the question - the neutrino must be a Dirac particle.

END