

Title –

Equation Describing the Universe

Author –

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Abstract –

Originally, I planned to call this article $H_u = BEc^{e^\infty}$, or $1 = 1^\infty$. But my computer won't let me save that name – so I've changed the title to "Equation Describing the Universe". This equation looks like the one physicists are hoping will be printed on T-shirts in the middle of this century as a description of the Universe. Normally, I'd leave development of this equation in the capable hands of Isaac Newton or Albert Einstein. They aren't here right now ... and it'll be quite a while before they return. However, they instructed me to send you this message on their behalf.

H is for the Hamiltonian, representing the total energy of a quantum mechanical system. The subscript u stands for "universe" and H_u means the universe operates quantum mechanically (quantum effects operate macroscopically as well as microscopically, and this unification is symbolized by the first 1). BEc is for Bose-Einstein condensate, a finite form of matter that is the first known example of quantum effects becoming apparent on a macroscopic scale (represented by the second 1). Borrowing a couple of lines from the more complete explanation in the Content – "The infinite cosmos could possess this absence of distance in space and time, via the electronic mechanism of binary digits. To distinguish this definition from "the universe going on and on forever", we can call it "electronic infinity or e^∞ " (not E_8). When the macroscopic quantum effects of the BEc are magnified by e^∞ , those effects are instantly translated into all space-time operating quantum mechanically. In other words, you can multiply a BEc (the second 1) an infinite number of times – but no matter how many (or how few) times you do it, you'll always end up with 1 (the macroscopic universe's time and space operating quantum mechanically). Consequent to this operation is the inevitable quantum entanglement of everything (matter, energy, forces); making all space and all time a unification.

The second part of this article addresses the scientific reasons for believing that a whole universe can be created from nothing. (See p.180 of Stephen Hawking's/Leonard Mlodinow's book "The Grand Design"). It reinterprets these reasons in terms of hyperspace and entanglement, to conclude - more than two-thirds of any part of the universe requires no assembly at all. It seemingly appears from nothing, but actually uses the brain's positive energy which interacts with the negative energy in 5th-dimensional hyperspace (negative energy requires no work at all, according to "The Grand Design"). The remaining third is entangled with the no-work two-thirds and similarly only needs personal interaction with hyperspace (since

every atom in the universe contains hyperspace, interactions can be physical e.g. manufacturing and engineering). Thus, the whole universe appears to be created from nothing but is really produced from something.

Content –

"The universe IS something" ("Astronomy" magazine – March 2013, p.66) is interesting. This letter and its reply continue on from Bob Berman's article "Infinite Universe" ("Astronomy" – Nov. 2012) which says, "The evidence keeps flooding in. It now truly appears that the universe is infinite" and "Many separate areas of investigation – like baryon acoustic oscillations (sound waves propagating through the denser early universe), the way type 1a supernovae compare with redshift, the Hubble constant, studies of cosmic large-scale structure, and the flat topology of space – all point the same way." Support for the article - (after examining recent measurements by the Wilkinson Microwave Anisotropy Probe, NASA declared "We now know that the universe is flat with only a 0.4% margin of error." - http://map.gsfc.nasa.gov/universe/uni_shape.html); and according to "The Early Universe and the Cosmic Microwave Background: Theory and Observations" by Norma G. Sánchez, Yuri N. Parijskij [published by Springer, 31/12/2003], the shape of the Universe found to best fit observational data is the infinite flat model).

Thinking about a finite cosmos makes my head hurt (if the cosmos is finite, what exists outside it? If there's something, that something must be part of the universe. If there's absolutely nothing, how can that be? Nothing doesn't exist.) But I can't really picture an infinite cosmos that never ends. A new definition of infinity is needed. The inverse-square law states that the force between two particles becomes infinite if the distance of separation between them goes to zero. Remembering that gravitation (associated with particles) partly depends on the distance between their centres, the distance of separation only goes to zero when those centres occupy the same space-time coordinates (not merely when the particles' or objects' sides are touching i.e. infinity equals the total elimination of distance). The infinite cosmos could possess this absence of distance in space and time, via the electronic mechanism of binary digits. To distinguish this definition from "the universe going on and on forever", we can call it "electronic infinity or $e\infty$ ".

1's and 0's would make the bosons of gravity and electromagnetism which would interact in Wave Packets to produce matter. All matter in the universe then has the potential to behave like a Bose-Einstein condensate (a state of matter composed of bosons cooled close to absolute zero in which atoms fall or condense into the lowest accessible quantum state, at which point quantum effects become apparent on a macroscopic scale). The bosons composing gravity and EM can all have the same properties e.g. position, velocity, magnetism and spin (force-carrying particles, or bosons, defy Pauli's exclusion principle). The matter we know obeys Pauli's exclusion principle. So how is it different from a Bose-Einstein condensate. To exhibit Bose-Einstein

condensation, the fermions (particles of matter) must "pair up" (not in the normal manner of sharing electrons) to form compound particles that are bosons. This "pairing-up" may be achieved by using e-infinity to delete distance. This leads to a photon (such as from the Sun) experiencing the whole universe – including BECs, gravitons, and other photons - in its existence.

It's impossible to point to the 4th dimension of time, so this cannot be physical. Since the union of space-time is well established in modern science, we can assume the 4th dimension is actually measurement of the motions of the particles occurring in the 3 dimensions of length, width, and height. The basic standard of time in the universe is the measurement of the motions of photons - specifically, of the speed of light. This is comparable to the 1960's adoption on Earth of the measurement of time as the vibration rate of cesium atoms. At lightspeed, time = 0 (it is stopped). Below 300,000 km/sec, acceleration or gravitation causes time dilation (slowing of time as the speed of light is approached). If time's 0, space is also 0 because space and time coexist as space-time whose warping (gravity) is necessarily 0 too. Spacetime/gravity form matter/mass, so the latter pair can't exist at lightspeed and photons are massless (even when not at rest).

Suppose Albert Einstein was correct when he said gravitation plays a role in the constitution of elementary particles (in "Do Gravitational Fields Play An Essential Part In The Structure of the Elementary Particles?" – a 1919 submission to the Prussian Academy of Sciences). And suppose he was also correct when he said gravitation is the warping of space-time. Then it is logical that 1) gravitation would play a role in constitution of elementary particles and also in the constitution of the nuclear forces, and 2) the warping of space-time that produces gravity means space-time itself plays a role in the constitution of elementary particles and the nuclear forces. Gravity, being united with EM and the nuclear forces, is therefore the ultimate physical source of all repelling and attracting. Mass increase at increasing accelerations is inevitable because the object is encountering more spacetime and gravity (the producers of mass; which also confer mass's equivalent [energy] on cosmic rays that travel far enough through space, turning them into ultra-high-energy cosmic rays). But mass increase cannot become infinitely large since space-time, gravity and mass don't exist at lightspeed. The object is converted into energy which means mass and energy must be equivalent and Energy must equal Mass related to the Speed of Light ($E=mc^2$, in the words of Albert Einstein).

Since there is zero, or no, spacetime at light speed; infinity exists in that state - all distances are totally eliminated and a photon experiences the whole universe – as well as all time – in its existence). "Physics of the Impossible" by Michio Kaku (Penguin Books 2008, p.227) says, "... whenever we naively try to marry these two theories (general relativity and quantum theory), the resulting theory makes no sense: it yields a series of infinite answers that are meaningless." We see that infinite answers are supposed to be arrived at because light is important

in Relativity and “infinity (in the sense of total elimination of distance) exists at light speed”. Infinity and infinite answers are not barriers to uniting general relativity and quantum theory. When we realize that $c=\infty$ (infinity exists at light speed), those infinite answers can yield not nonsense but real meaning.

With all distances deleted and a photon experiencing the entire universe in its existence (including gravity and the nuclear forces – carried by the gravitons, gluons, W^+ , W^- and Z^0 particles), the cosmos has become finite (even subatomic or quantum sized). The “pairing up” of particles by e-infinity i.e. by the electronic binary digits of 1 and 0 permits matter we know to defy the exclusion principle and act as though it was buried at the centre of a planet. No gravity-EM interactions in wave packets occur at the planet’s centre; meaning there is no mass[1] and, agreeing with conclusions from Isaac Newton's theories, (hypothetical) objects weigh nothing. Also, “pairing up” of particles by e-infinity means quantum effects become apparent on a large macroscopic scale. This permits a “distant” event to instantly affect another (exemplified by the quantum entanglement of particles separated by light years), or permits effects to influence seemingly separate causes (exemplified by the retrocausality or backward causality promoted by Yakir Aharonov and others). This means quantum processes wouldn’t be confined to tiny subatomic scales but would also occur on the largest cosmic scales.

[1] According to the Lagrangian – the L of a dynamical system which summarizes the dynamics of the system – fermions should be massless, and the common view is that it’s the Higgs field/boson coupled to them that gives them their masses. There are several explanations for the creation of mass – Einstein’s gravitational / electromagnetic interaction being used here.

Why do fermions obey the exclusion principle if e-infinity (binary digits) pairs them up to exhibit Bose–Einstein condensation and quantum effects becoming apparent on a macroscopic scale? It must be because of temperature. The slightest interaction with the outside world can be enough to warm fragile BECs (they’re normally very near absolute zero or -273.15 degrees C), forming a normal gas. Remembering that our world’s average temperature is almost 290 degrees C above that, it’s no surprise that the vibration from the heat splits the paired particles apart and causes them to obey the exclusion principle. Since this article refers to the 1’s and 0’s of base 2 mathematics (the binary system), physical explanation (heat splitting particles apart) isn’t enough and a mathematical explanation (at least in a limited context) is desirable.

Let’s borrow a few ideas from string theory’s ideas of everything being ultimately composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents in a four-dimensional looped superstring. We can visualize tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) forming currents in a Mobius loop – or in 2 Mobius loops, clockwise currents in one loop combining with counterclockwise currents in the other to form a

standing current. Combination of the 2 loops' currents requires connection of the two as a four-dimensional Klein bottle. This connection can be made with the infinitely-long irrational and transcendental numbers. Such an infinite connection translates - via bosons being ultimately composed of 1's and 0's depicting pi, e, $\sqrt{2}$ etc.; and fermions being given mass by bosons interacting in matter particles' "wave packets" – into an infinite number of Figure-8 Klein bottles.[2] Slight imperfections in the way the Mobius loops fit together determine the precise nature of the binary-digit currents (the producers of gravitational waves, electromagnetic waves, the nuclear strong force and the nuclear weak force) and thus of exact mass, charge, quantum spin, and adherence to Pauli's exclusion. Referring to a Bose-Einstein condensate, the slightest change in the binary-digit flow (Mobius loop orientation) would alter the way gravitation and electromagnetism interact, and the BEC could become a gas.

[2] Each one is a "subuniverse" composing the physically infinite and eternal space-time of the universe (our own subuniverse is 13.7 billion years old). We don't have to worry about accelerating cosmic expansion – the result of more space, forces, energy and matter being continually produced by binary digits - leaving our galaxy alone in space. As "dark energy" causes known galaxies to depart from view, more energy and matter can replace them (since the universe obeys fractal geometry, gravity is the source of repelling and attracting not only on a quantum scale but on a cosmic scale, too i.e. it accounts for dark energy – it accounts for dark matter and Kepler's laws of planetary motion, too [but that's a long explanation best left in <http://vixra.org/abs/1303.0218>]). The Law of Conservation says neither matter nor energy can be created or destroyed (though the quantity of each can change), so a better phrase might be "binary digits recycle spacetime" (when matter changes into energy or energy becomes matter, we commonly say matter or energy has been created). As well, other expanding subuniverses can collide with ours and their galaxies enter our space to keep our galaxy company. (see "Cosmic evolution in a cyclic universe" by Paul Steinhardt and Neil Turok - Phys. Rev. D 65, 126003 (2002) [20 pages] – also see <http://discovermagazine.com/2009/oct/04-will-our-universe-collide-with-neighbor-one#.UY3YTKL-Gbs> that speaks of the "axis of evil", an unexpected alignment of cold and hot [denser and less dense] spots in the cosmic microwave background; one of the possible explanations of this being collision with another universe [other proposals are that the universe's inflation wasn't perfectly symmetrical, and that the entire universe is rotating])

To take two examples, matter and dark energy are ultimately composed of gravity. Gravity is ultimately composed of binary digits, and these digits are produced in 5th-dimensional hyperspace (see below). This means hyperspace can be identified with the universe we know (matter, dark matter, dark energy, gravity, etc.)

If, as has been suggested, frames are created in the 5th dimension by bits and their very rapid display results in the macroscopic motion we see; what causes the microscopic motion of bits switching on and off in order to display frames? Maybe the switching on and off of bits, and thus building of the universe, is not accomplished entirely by application of the positive energy familiar to our lives in space-time. Maybe it relies on the brain's using positive energy that interacts with the negative energy in 5th-dimensional hyperspace.[3] "Physics of the Impossible" by Michio Kaku (Penguin Books, 2008) says on p.205, "Traditionally, physicists have dismissed negative energy and negative mass as science fiction. But we now see that they are indispensable for faster-than-light travel, **and they might actually exist**" (my emphasis using bold type). On p.179 of "The Grand Design" by Stephen Hawking and Leonard Mlodinow (Bantam Press, 2010) it's stated "One requirement any law of nature must satisfy is that it dictates that the energy of an isolated^ body surrounded by empty space is positive, which means that one has to do work to assemble the body." Page 179 also says "... if the energy of an isolated body were negative ... there would be no reason that bodies could not appear anywhere and everywhere." Could the sleeping, and consequently less distracted by events in our daily space-time, brain engage in feedback with negative hyperspace and easily create the universe without doing very much traditional work? Fractal geometry states that every particle in space-time contains hyperspace (about 70% of space consists of dark energy, according to the WMAP and Planck space probes) – so more than two-thirds of the universe requires no assembly at all. It seemingly appears from nothing, but actually uses the brain's positive energy which interacts with the negative energy in 5th-dimensional hyperspace (negative energy requires no work at all, according to "The Grand Design"). (A universal intelligence[*] would necessarily combine positive and negative energy in itself – or, since consciousness and personality are parts of the cosmos, should we say herself or himself - i.e. space-time combines with hyperspace.) The remaining third is entangled with the no-work two-thirds and similarly only needs personal interaction with hyperspace (since every atom contains hyperspace, interactions can be physical e.g. manufacturing and engineering). Thus, the whole universe appears to be created from nothing.

^ (note by R.B. – nothing can be truly isolated when we consider the universe as a unification caused by 1's and 0's, but our physical senses and scientific instruments don't register binary digits and they thus reinforce the illusion of isolation)

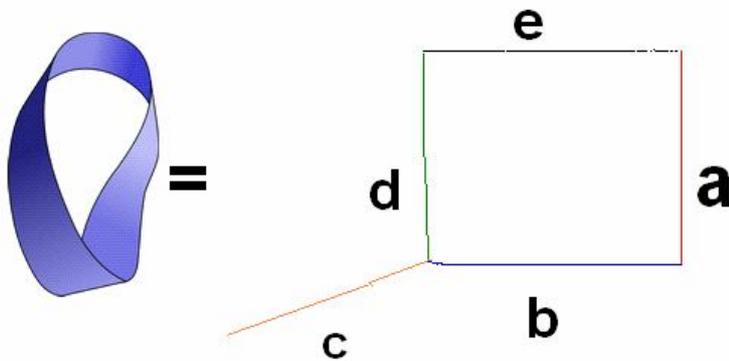
This sounds totally impossible at first, but it accounts for scientific theories hypothesizing that a whole universe can be created from nothing. (See p.180 of Stephen Hawking's/Leonard Mlodinow's "The Grand Design" – but remember, this article shows the cosmos is really produced from something). In appearance from nothing, the origin of the universe depends

on vacuum fluctuations, or quantum fluctuations (a quantum fluctuation is the temporary change in the amount of energy at a point in space). There is scientific support for spontaneous creation. It speaks of the uncertainty principle (formulated in 1926 by German scientist Werner Heisenberg, this says one can never be exactly sure of both the position and velocity of a particle); and also speaks of both the value of a field and its rate of change never being exactly zero at the same time, which means space cannot remain empty.

[*] God's existence cannot possibly be scientifically comprehended in the current non-unified understanding of the cosmos. Thus, many scientists need to invoke the existence of an unlimited number of parallel universes having limitless combinations of the laws of physics (so one of those universes would produce all the correct laws that enable beings such as ourselves to exist). A non-supernatural God is proposed via the inverse-square law's infinite aspect coupled with eternal quantum entanglement, but Einstein taught us that time is warped. Warped time is nonlinear, making it at least possible that the BITS composing space-time and all particles originate from the computer science of humans - (Binary digITS) only suggest existence of the divine if time is linear. The inverse-square law states that the force between two particles becomes infinite if the distance of separation between them goes to zero. Remembering that gravitation partly depends on the distance between the centres of objects, the distance of separation between objects only goes to zero when those centres occupy the same space-time coordinates (not merely when the objects' sides are touching i.e. infinity equals the total elimination of distance – the infinite cosmos could possess this absence of distance in space and time, via the electronic mechanism of binary digits). Zero separation is the case in quantum-entangled space-time and physicist Michio Kaku says in his book "Physics of the Impossible" that modern science thinks the whole universe has been quantum-entangled forever. This means there's still room for the infinity known as God. God would be a suprapantheistic union of the universe's spatial, temporal, hyperspatial, material and conscious parts; forming a union with humans in a cosmic unification, and forming a universal intelligence. Science's own Law of Conservation says the total mass (or matter) and energy in the universe does not change, though the quantity of each varies (I interpret this Law as saying – to get matter and energy, you have to start with matter and energy; which means that time must be warped). So what happens if we subtract humans of the distant future - with their ability to travel into the past and use incomprehensibly-advanced cosmogenesis, terraforming and biotechnology (cosmos, Earth-like planet, and life-generating abilities) from the origins of life? It becomes impossible for inorganic materials – and referring to the creation of amino acids in the laboratory by Harold Urey and Stanley Miller in 1952, relatively simple amino acids - to be assembled into complex plants and animals, whose adaptations are often called evolution.

[3] Maybe hidden variables called binary digits could permit time travel into

the future by warping positive space-time. And maybe they'd allow time travel into the past by warping a 5D hyperspace that is translated 180 degrees to space-time, and could be labelled as negative or inverted.[4] (The space-time we live in is described by ordinary [or "real"] numbers which, when multiplied by themselves, result in positive numbers e.g. $2 \times 2 = 4$, and -2×-2 also equals 4. Inverted "positive" space-time becomes negative hyperspace which is described by so-called imaginary numbers that give negative results when multiplied by themselves e.g. i multiplied by itself gives -1 . [Supporting info from Stephen Hawking's "A Brief History of Time" – Bantam Press 1988, p.134]) The past can never be changed from what occurred, and the future can never be altered from what it will be. Both are programmed by the 1's and 0's.



[4] Width a is perpendicular to the length (b or e) which is perpendicular to height c . How can a line be drawn perpendicular to c without retracing b 's path? By positioning it at d , which is then parallel to (or, it could be said, at 180 degrees to) a . d (the spaceship) is already at 90 degrees to length b and height c . To be at right angles to length, width and height simultaneously (the state equivalent to time travel); it has to also be perpendicular to (not parallel to) a . This is accomplished by a twist, like on the right side of the Möbius loop pictured above, existing in a . Then part of a is indeed at 180 degrees to d , but part of a is at 90 degrees to d . This situation requires a little flexibility or "fuzziness" which allows the numbers to deviate slightly from their precise values of 90 and 180. The fuzziness is represented in nature by past, present, future, space, time, and hyperspace existing everywhere rather than being confined to particular locations. Thus, $90+90$ (the degrees between b & c added to the degrees between c & d) can equal 180, making a & d parallel. But $90+90$ can also equal 90, making a & d perpendicular. (Saying $90+90=90$ sounds ridiculous but it has similarities to the Matrix [of mathematics, not the action-science fiction movie] which is an array of numbers placed in rows and columns. It was

worked out in the mid-nineteenth century by British mathematician Arthur Cayley, matrix mechanics is a version of quantum mechanics discovered by Werner Heisenberg in 1925, and matrices say X multiplied by Y does not always equal Y times X . In this paragraph, the first 90 plus the second 90 does not always equal the second 90 plus the first 90 because $90+90$ can equal either 180 or 90.) If the universe is composed of an infinite number of subuniverses shaped like two 2-D Mobius loops joined to form a 4-D figure-8 Klein bottle, in each subuniverse there would be 2 perpendicularities to the twist (one lot of $90+90$, then another $90+90$). $180+180$ could equal 360 – represented in physics as a subuniverse, galaxy, black hole, subatomic particle (or a spherical wave that spreads to its destination instantly, translating space by 90 degrees i.e. [in a union of cause and effect] being the product of quantum entanglement). $180+180$ could also equal 180 – represented in physics by two spherical waves instantly arriving from opposite directions and their simultaneous quantum entanglement producing inversion of space (translation by 180 degrees - i.e. making length, width and height simultaneously perpendicular; which allows travelling in time) which permits the spaceship to enter hyperspace and journey into the past.

In hyperspace, assembling bodies requires no work because expending negative energy in inverted hyperspace means no energy – in fact, less than no energy – is expended. Traversing 700 light years in the 5th dimension instantly would be meaningless. In hyperspace, time would be travelling backwards for the light beam and we could only ever travel into the past i.e. instantaneously traverse -700 light years.