

Title –

FINDING THE GLITTER IN DARK ENERGY AND DARK MATTER

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Abstract –

Beginning with the Moon's reflection in water, that reflection is then compared to physicist David Bohm's holographic universe and holographic brain, and merged with Albert Einstein's three universes in one cosmos. This results in Professor Max Tegmark's hypothesis of mathematical formulas creating reality, and the maths is converted into the physical reality of an infinite, steady-state universe made up of finite, "bubble" or "pocket" subuniverses that originate with big bangs (we live in one of these, and the conversion is achieved via "digital" string theory). It's concluded early on that all these subuniverses contain a 5th-dimensional hyperspace that allows time travel into the past, and a webpage by Dr Adam Riess (2011 Nobel prize in physics) is used to show how this hyperspace results in dark energy and dark matter. Along the way; Einstein's Unified Field is justified (with Professor Penrose's error being exposed), gravity is referred to as a repulsive force that causes attraction by pushing a falling apple to the ground (Isaac Newton's mathematical description remains intact), dark matter's role as the scaffold for normal matter is interpreted via fractal geometry, and the four forces are accounted for in a new way. The article is presented in the readable style of plain English, leaving the mathematics and scientific language to the above-mentioned scientists. I wonder if the Large Hadron Collider can achieve sufficiently high energies to observe phenomena that will give some support to the existence of another dimension, and therefore of the other concepts in this article.

Content –

The column "Secret Sky" in Astronomy magazine (September 2013) is about the Moon reflecting in the multitude of wavelets over a body of wavy water (the reflection's called a glitter path). The column says "If you could separate the multitude of wavelets and look at them in detail, you would see that each and every one of them reflects a complete, though distorted, image of the Moon ...". This reminds me of when the British quantum physicist David Bohm (1917-1992) asserted that the tangible reality of our everyday lives is really a kind of illusion, like a holographic image (<http://www.spaceandmotion.com/Physics-David-Bohm-Holographic-Universe>). He said our brains are smaller pieces of the larger hologram, 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".

The "glitter path" of the Moon over a body of wavy water looks nothing like the single, clear image of the Moon reflected in still water. However, the reflections in the multitude of wavelets would contain all the information necessary to produce

that clear image. We can compare the whole knowledge of the universe to the single, clear image of the Moon. Then the complete though distorted picture in each mind could be compared to the wavelets in the glitter path – and every brain would contain all the data necessary to completely understand the universe. If our present understanding of cosmology and quantum physics resembles the glitter path, we have a lot of work to do in correcting the distortions we've come to accept.

By the way – Bohm says objective reality is constructed by projections from another dimension, a deeper order of existence that is beyond both space and time. And Einstein calculated that 3 universes could exist in the cosmos (“Albert Einstein: Creator and Rebel” by Banesh Hoffman and Helen Dukas – Viking Press, 1972). Let's interpret Einstein to mean space, time, and a 5th-dimensional hyperspace make up the universe. Then Bohm's projections from this 5th dimension might, if they contain information that constructs space-time, take the form of base-2 mathematics* (the binary digits of 1 and 0 that computers use). Motion is the thing that causes the beautiful glitter path but also confused understanding of the universe. One way to simplify movement is to believe it's like the frames in a movie (frames could be created in the 5th dimension by binary digits and their very rapid display would be what we call motion, or projection).

* This agrees with cosmologist Max Tegmark's hypothesis that **mathematical formulas create reality**, <http://discovermagazine.com/2008/jul/16-is-the-universe-actually-made-of-math#.UZsHDalwebs> and <http://arxiv.org/abs/0704.0646>. How might the maths become reality? 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 (“Workings of the Universe” by Time-Life Books – 1991, p.84). We can visualize tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) forming 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. 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 the binary digits of 1 and 0 depicting pi, e, $\sqrt{2}$ etc.; and fermions being given mass by bosons interacting in matter particles' “wave packets” – into an infinite number of (possibly Figure-8) Klein bottles[^]. Slight imperfections in the way the Mobius loops fit together determine the precise nature of the binary-digit currents (the producers of space-time-hyperspace, gravitational waves, electromagnetic waves, the nuclear strong force and the nuclear weak force) and thus of exact mass, charge, quantum spin. They would also produce black holes - whose binary digits could, in the case of the sun, come from our star being compressed to 2.95 kms, in which case the pressure increase “shreds” the sun into its binary digits (its mass is relativistically converted into the energy of binary digits).

Referring to a Bose-Einstein condensate, the slightest change in the binary-digit flow (Möbius loop orientation) would alter the way gravitation and electromagnetism interact, and the BEC could become a gas (experiments confirm that it does).

^ Each one is a “subuniverse” (bubble or pocket universe) composing the physically infinite and eternal space-time of the universe. The infinite numbers make the cosmos 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 and has no room for expansion. Our own subuniverse has a limited size (and age of 13.8 billion years), is expanding from a big bang, and has warped space-time because it's modelled on the Möbius loop, which can be fashioned by giving a strip of paper a 180-degree twist before joining the ends. (It may have DOUBLE STRANDED, spiralling DNA because the universe is modeled on TWO twisted Möbius loops.) Referring to the universe's infinity - "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 – a) 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 b) 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.

It's tempting to regard the base-2 mathematics which is projected from the 5th dimension as being Dark Energy. Dr Adam Riess, co-discoverer of the universe's accelerating expansion, writes at <http://www.stsci.edu/~ariess/darkEnergy.htm> - "Indeed, all incarnations of energy with negative pressure are called dark energy". This means 5-D hyperspace and its projections could indeed be dark energy if hyperspace possesses negative energy.

Maybe hidden variables called binary digits (binary digits would be the hidden variables which Einstein said carry extra information about the world of quantum mechanics ... and complete it, eliminating probabilities and bringing about exact predictions) 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 5-D hyperspace that is translated 180 degrees to space-time, and could be labelled as negative or inverted. This means it would have negative energy, negative mass, negative distances and negative time – these things are impossible and meaningless in the universe we know, but are definitely possible and full of meaning in a universe based on mathematics. (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 .) 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.

Dr. Riess's webpage also says “Vacuum energy has negative pressure (you must do work to expand the Universe’s inventory of the vacuum), and it is this property which gives rise to repulsive gravity.” So the work of forming frames which is carried out by negative hyperspace produces repulsive gravity, which produces mass and matter when it's concentrated 10^{24} ** (a million billion billion) times. This agrees that 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 Of Matter?”, 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 a) gravitation would play a role not only in elementary particles and their masses but also in the constitution of the forces associated with those particles i.e. the nuclear strong force and the electroweak force (combination of electromagnetism and the weak nuclear force), and b) the warping of space-time that produces gravity means space-time itself plays a role in the constitution of elementary particles, their masses, and in the forces. Therefore, time is unified with the gravitational and electromagnetic fields (overcoming the 50-year-old objection to Einstein's Unified Field Theory which was put forth by England's Professor Penrose viz. the gravitational fields, if known everywhere but only for a limited time, do not contain enough information about their electromagnetism to allow the future to be determined, so Einstein's unified theory fails. If time is unified with the gravitational and electromagnetic fields, the gravitational fields are not known for only a limited time but do contain enough information and Einstein succeeded, just as John Wheeler and Charles Misner claimed in the journal “Annals of Physics” in 1957).

** 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 (the speed of light squared - $300,000 \text{ km/s} \times 300,000 \text{ km/s}$). Since we'll be dealing with numbers in the trillions of trillions, and since the many particles and atoms require varying amounts of gravity for their formation, a good approximation will be to round up the conversion factor to 10^{11} . When gravity forms mass (we can say space-time forms mass since gravity is merely space-time’s warping), it loses 10^{24} of its energy or strength. Though it starts with a strength of 10^{25} , it finishes with far less energy, a much longer wavelength, and a strength labeled “1” (is this energy decrease related to experiments stating that dark energy and gravity are unequal in strength viz. that dark energy is weaker than gravity?) After the matter is formed, following gravity waves retain their strength of 10^{25} . Looking at the example of astronomy's gravitational lensing, we can deduce that

the amplitudes of the succeeding gravity waves are magnified by the matter's density so they achieve EM's strength (10^{36} times gravity's strength) i.e. 10^{25} is multiplied by Einstein's conversion factor [10^{11}] and gives us 10^{36} . Just as visible light can be absorbed by interstellar dust and re-radiated at infrared wavelengths, the following gravity waves are absorbed by the matter and radiated as longer wavelengths than gravity waves (possibly gamma rays or microwaves).

What happens when gravity and electromagnetism interact within an atomic nucleus? If 10^2 gravitons interact with each photon (or 100 photons with each graviton), the strong force is produced (it's 10^{38} times gravity's strength). There are two ways to produce the weak force (10^{25} times as strong as gravity). It could be 1) the normal function of gravity in 10^{25} mode when acting over a distance of 10^{-18} metres (the weak force's range) i.e. the weak force IS gravity in 10^{25} mode, or 2) the result of electromagnetism's photons interacting with 10^{11} **anti**-gravitons i.e. 10^{36} would be divided by Einstein's speed-of-light conversion and give 10^{25} . Not only does 2) relate gravity and electromagnetism, but it suggests electromagnetism is converted retrocausally i.e. "backwards" (from 10^{36} to 10^{25}), and also plays a part in mass formation along with gravitation (as Einstein's 1919 paper stated).

Similarly, the work of forming frames which is carried out by negative hyperspace produces repulsive gravity which can produce negative mass and negative matter when it's concentrated 10^{24} times within hyperspace itself. This invisible, yet gravitational, mass could be called Dark Matter and would provide the scaffolding on which normal matter rests if the universe obeys the laws of fractal geometry.^{^^} Then gravity would account for repulsion and attraction not only on astronomical, but also on more familiar, scales (it would account for the dark energy pushing galaxy clusters apart as well as familiar concepts of gravity such as "attraction" of a falling apple to the ground). Remember – dark energy should not be considered purely as a gravitational phenomenon, but in terms of both gravitation and hyperspace's binary digits. And hyperspace wouldn't exist just on an astronomical scale alongside space-time. In accord with the previous reference to Einstein's Unified Field, it would exist as part of space-time. From the conclusions derived from his concept of gravitation constituting particles; we must now conclude that not only space-time, but also hyperspace, exists on the quantum scale (as part of matter). Again, the Unified Field puts matter and dark matter in the same place, enabling dark matter to be the scaffold on which matter congregates.

With a single extra dimension of astronomical size, gravity is expected to cause the solar system to collapse ("The hierarchy problem and new dimensions at a millimetre" by N. Arkani-Hamed, S. Dimopoulos, G. Dvali - Physics Letters B - Volume 429, Issues 3–4, 18 June 1998, Pages 263–272, and "Gravity in large extra dimensions" by U.S. Department of Energy - <http://www.eurekalert.org/features/doe/2001-10/dbnl-gil053102.php> However, collapse never occurs if gravity accounts for repulsion as well as attraction on

both subatomic and astronomical scales (is involved in the attractive strong force and repulsive weak force, responsible for emission of alpha particles/beta particles/gamma photons from the atomic nucleus in radioactivity – as well as being involved in dark energy and familiar concepts of gravity).

^ Benoit Mandelbrot developed this fractal geometry and coined the word fractal (a fractal is a shape such that, if you look at a small piece of the shape, then it looks the same as the original, just on a smaller scale – it is used to describe coastlines, mountain ranges, etc). The diminishing size of spheres may be seen as representing cosmic, galaxy cluster, stellar, quantum-particle scales.

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