

Title –

How ET, or an intelligent robot from the future, might interpret science and maths

Author – Rodney Bartlett

Abstract –

This suggests Lavoisier was correct to include heat and light in his list of the known elements. They aren't matter but they contribute to the formation of matter, according to quantum mechanics and the rewriting of Einstein's famous equation as $m=E/c^2$ (with our understanding of space-time being increasingly dominated by the Theory of Everything, it's important not to limit investigations to the material world but to consider matter's relation to energy ... and to the 4 fundamental forces).

As we'll see, this more integrated way of viewing the universe leaves no room for the Standard Model's version of the Higgs field and boson. As well, it requires us to take another look at cosmology's Steady State theory and to reconsider 1) electroweak unification, and 2) quarks (Stephen Hawking and Leonard Mlodinow wrote on p.49 of their book "The Grand Design", "It is certainly possible that some alien beings ... would make the same experimental observations that we do, but describe them without quarks." So I'll try to become a Little Green Man and describe quarks, and everything from quantum physics to the origin of life to cosmology, in a way that agrees with science's observations but is also "alien".)

The words "Supplementary Material" in the text refer to material which is in no way essential to this article but merely additional, non-required, reading. It's my earlier viXra submission "How the Pioneer anomaly refines Einstein's gravitation / space-time; and how equations he developed in 1919 show that the space warping in General Relativity extends to subatomic particles ..."

Content -

How did French chemist Antoine Lavoisier (1743-1794) classify elements known in his time? Did Lavoisier include anything in his classification scheme that we would not now consider an element? Two of his elements (heat and light) are not considered matter at all. Lavoisier anticipated that his list was necessarily limited to an 18th century perspective. At this point, we should adopt a 20th and 21st century perspective, by remembering Einstein's famous formula $E=mc^2$. If we divide both sides by c^2 , it becomes $m=E/c^2$. Suppose Einstein was correct when he said gravitation plays a role in the constitution of elementary particles (when he wrote "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 in which his equations say we cannot restrict ourselves to electromagnetic components). If "wave packets" of gravitation + electromagnetism compose matter, there would be no place for a Higgs field or boson in the generation of mass (G and EM could account for particles'

properties - and also account for the particles themselves, through warps which result in matter-forming gravitational-electromagnetic wave packets). Earth receives energy and matter not only from solar EM rays e.g. light but mostly from infrared rays associated with internal heat – this results from changing $E=mc^2$ to $m=E/c^2$. Pioneers of the Steady State theory, a former rival of the Big Bang – people like Fred Hoyle, Hermann Bondi and Thomas Gold - calculated that, to keep the universe in a “steady state”, new matter or energy has to be continually created at a rate equal to the mass of one hydrogen atom in each quart of space every half-billion years. I find it intriguing that I arrived at the similar mass of 5 protons. This is also intriguing because I mention how this article supports the Big Bang – and the continual creation (a better word might be “recycling”, to prevent conflict with the Law of Conservation which says matter and energy can be neither created nor destroyed) of matter and energy supports my idea of binary digits “creating” gravitation which plays a role in particles and their forces. Steven Weinberg, Abdus Salam and Sheldon Glashow shared the 1979 Nobel prize in physics for electroweak unification (of the weak force and electromagnetism). I wonder if it's possible for them to alter the physics and mathematics of their electroweak theory to accommodate the insights of a man called Einstein? And I wonder if the scientists who proposed quarks as elementary constituents of matter, George Zweig and Murray Gell-Mann, could also adapt their theories to fit Einstein's theories? After all, Stephen Hawking and Leonard Mlodinow wrote on p.49 of their book "The Grand Design", "It is certainly possible that some alien beings ... would make the same experimental observations that we do, but describe them without quarks."

"The Grand Design" informs us on page 125, "It is important to realize that the expansion of space does not affect the size of material objects such as galaxies, stars, apples, atoms or other objects held together by some sort of force." Pages 125-126 further state - "This is important because we can detect expansion only if our measuring instruments have fixed sizes. If everything were free to expand, then we, our yardsticks, our laboratories, and so on would all expand proportionately and we would not notice any difference."

Matter (along with the nuclear forces) may, as suggested at the beginning of this article, be formed by gravity's interaction with electromagnetism in wave packets (a wave packet is a short "burst" or "envelope" of wave action that travels as a unit, and is interpreted by quantum mechanics as a probability wave describing the probability that a particle will have a given position and momentum). Einstein said gravity is the warping of space - therefore, space itself would be a crucial ingredient in the formation of matter (as would time). If time is passing more rapidly, the hands of watches and clocks would move more rapidly. This increasingly rapid movement would be expected to be, if not noticeable to human perception, at least detectable by sophisticated scientific instruments.

The key word on page 126 of "The Grand Design" is "proportionately" since our watches and clocks must be expanding if space (gravity) is a crucial ingredient in

the formation of matter – as well as of energy, including light and heat. However, the expansion would not be detectable if gravity is in a compact arrangement with electromagnetism - and forming any kind of measuring instrument or material object. How does adding electromagnetism reduce matter's expansion? Electromagnetism is 10^{36} times as strong as gravitation. Gravity (strength of 1 or 10^0) combined with electromagnetism (10^{36} times as strong) equals 10^0+36 i.e. an increase of expansion by 10^{36} . However, if the latter's converted to anti-electromagnetism (antiphotons), gravity (strength of 10^0) times anti-electromagnetism (10^{-36}) = reduction of expansion by 10^{36} . This approximately agrees with the measurements of physics and means the expansion of, say, a timepiece would be a trillion trillion trillion times less – in an equal period - than the expansion of an equal volume of space in an environment which only has gravitation in its wave packets: the supplementary material suggests this is in black holes, whose EM properties come from the matter and radiation they swallow. This is many, many billions of times beyond the capabilities of today's best measuring instruments and, for all practical purposes, the timepiece is fixed in size (the same reasoning applies to planets etc. and accounts for their being apparently fixed in size).

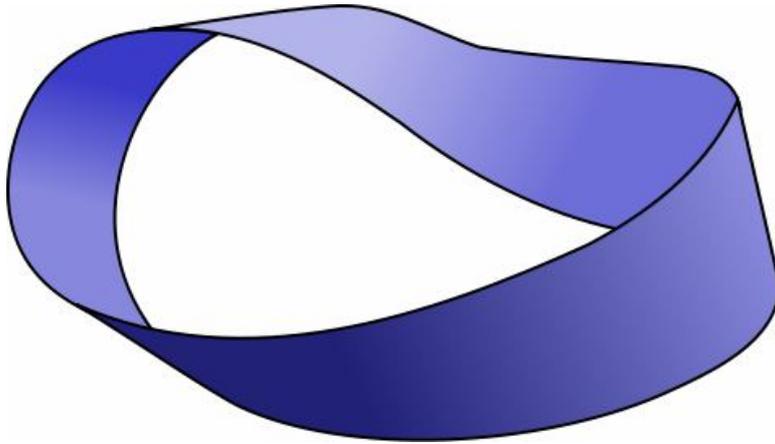
The supplementary material also says, "The weak force is 10^{25} (10 million billion billion) times gravity's strength because it's the product of the electromagnetic force combined with 100 billion anti-gravitons. That is, it's 10^{36} times the strength of gravity divided by 10^{11} ." Coupling anti-photons with anti-gravitons leads us to a limited aspect of supersymmetry. I don't believe the supersymmetry theories can provide a unified account of the 4 fundamental forces but we're reminded here of the theory's aspect which says every particle has a matching partner differing from it only in spin e.g. the photon and antiphoton, or the graviton and antigraviton. Supersymmetry attracts me because it's the child of hyperdimensionality (which is vital to my idea of binary digits originating in 5th-dimensional hyperspace and "creating" space-time). In 1919, German scientist Theodor Kaluza "... wrote to Einstein, proposing that Einstein's dream of finding a unified theory of gravitation and electromagnetism might be realized if he worked his equations in five-dimensional space-time. A few years after that, the Swedish physicist Oskar Klein published a quantum version of Kaluza's work. The resulting Kaluza-Klein theory ... turned out to be salutary in working on supersymmetry (in the 1970s)." (p.332 of "Coming of Age in the Milky Way" by Timothy Ferris – published by The Bodley Head, 1988)

"In the case of the force-carrying particles, the antiparticles are the same as the particles themselves." - p. 68 of "A Brief History of Time" (written by Stephen Hawking – published 1988 by Bantam Press) (antiparticles are identical in mass to matter particles – but opposite in one key property, such as electric charge). The following was also inspired by the illustrations and descriptions of particle spin on pp. 66-67 of that book)

(Undiscovered) gravitons are 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. They are anticipated to have spin 2 (quantum spin has mathematical similarities to familiar spin but it does not mean that particles actually rotate like little tops). And antigravitons would be described by so-called imaginary numbers that give negative results when multiplied by themselves e.g. i multiplied by itself gives -1 . If the graviton exists and is, as expected, massless and chargeless; it and its antiparticle could not be opposite in possessing positive and negative mass or positive and negative electric charge; but they could be opposite in that their math descriptions give positive and negative results. If supersymmetry is valid when it says “every particle has a matching partner differing from it only in spin” and the partners have an opposite property; one must have positive spin, 2, while the other has negative spin, -2. Force carrying particles called gravitons which are diverted towards the sun or into matter are said to be negative – as p.180 of “The Grand Design” puts it, “Because gravity is attractive, gravitational energy is negative ...” This is unlike the vast bulk of intergalactic gravity which is positive, repelling, and one expression of dark energy (the other being the 5th dimension’s hidden variables that are, in reality, binary digits – see supplementary material).

Look at the illustration below of a loop (in this case, a Mobius strip). The bottom of it looks like part of a circle while the top has a twist. This particular orientation can be referred to here as “spin 1” – it only looks the same if it’s turned round a complete revolution of 360 degrees, like the Ace of Spades card pictured in “A Brief History of Time”. A photon has spin 1 and when it interacts with a graviton in a wave packet* (gravitons have spin 2 and look the same if turned round 180 degrees or half a revolution, like the double-headed Queen of Spades in “A Brief History of Time”), the particles’ orientations can be the same i.e. they can both have their twist at the top.

* (A wave packet is a short "burst" or "envelope" of wave action that travels as a unit, and is interpreted by quantum mechanics as a probability wave describing the probability that a particle will have a given position and momentum). It acts like 2 hands coming together and catching a ball. Actually, photons are absorbed and emitted just as in laser cooling but instead of a laser beam slowing down atoms, the envelope slows (and traps) photons.



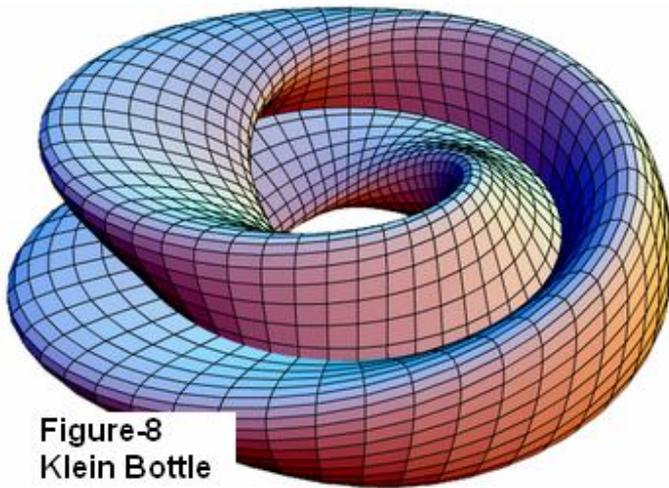
Mobius Loop

If oriented the same way, the electromagnetic and gravity waves forming the wave packets undergo constructive interference and reinforce to produce mass - a massive W^+ , W^- or Z^0 (the carriers of the weak force) that must be turned 360 degrees to look identical i.e. they have spin 1. Slight imperfections in the way the Mobius loops fit together determine the precise nature of the binary-digit currents and therefore of exact mass or charge. If oriented dissimilarly, they undergo destructive interference and partly cancel (there's little or no twist now - both top and bottom of the new Mobius resemble parts of a circle) to create masslessness - a massless, chargeless gluon (carrier of the strong force) that is identical if turned 360 degrees and similarly possesses spin 1. Quarks - in this interpretation, the gravitational and electromagnetic interference caused by a particular positioning of a Mobius strip - combine into protons, mesons and neutrons but are never found in isolation and cannot be observed directly. (In this explanation, the strong and weak nuclear forces have no existence independently of gravitation and electromagnetism. Since EM is modified gravitation according to this article, it's perfectly OK to simply say "independently of gravitation"). They could simply be products of graviton-photon interaction: the strong nuclear force - which is 10^{38} times gravity's strength - could be gravity "added to" electromagnetism while the weak nuclear force - 10^{25} times gravity's strength - could be gravity "subtracted from" electromagnetism [identical to the antigravitons of antigravity being added to electromagnetism]. The 2nd example assumes combining with 100 billion antigravitons while the 1st assumes the presence of 100 gravitons per electromagnetic photon, and I believe these "assumptions" are justifiable by photon-graviton oscillation or transmutation ...)

An antiphoton would be formed by the fitting together of a force-carrying, spin -2 antigraviton with a spin 1 photon. $(-2)+(+1) = -1$. If it's correct that "antiparticles are identical in mass to matter particles but opposite in one key property; we would expect the antiparticle of a massless, chargeless photon to have a spin of negative 1.

It has been shown how different spins can be orientations of the Mobius strip. One strip could be called the p (positive) Mobius and another the n (negative) Mobius. Both of these would be purely mathematical[^] in nature (after all, a strip is only 2-dimensional and cannot substitute for the physical world). In fractal fashion, they'd be reflected in the world we know as the p-type and n-type semiconductors resulting from the appropriate doping of silicon (adding impurities to alter electrical properties). This is what you'd expect in this electronics-based universe. But as the supplementary matter shows, the strips can be joined on their edges to form a 4-dimensional Figure-8 Klein Bottle. And each Bottle is the 3 space dimensions and 1 time dimension of one of the infinite number of subuniverses making up the cosmos (and also expressing things like 5th-dimensional hyperspace, cosmic wormholes and cosmic strings).

[^] 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 said, "Extremely speculative? Bah!" Then he reminded Tegmark that some of the original papers on quantum mechanics were also considered extremely speculative.



**Figure-8
Klein Bottle**

(2 Mobius loops – each one is 2 dimensional - joined along their edges can form a 4 dimensional Klein Bottle)

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