from AI to Relativity

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Abstract -
This article started as a brief comment on the recent death of artificial-intelligence pioneer Marvin Minsky. After writing that the power of our emotions could be used to greatly enhance our reasoning abilities, I found that more and more had to be added and it turned into a physics article. This switch happened when I wrote that the entire universe (including the human brain) might be composed of electronics' binary digits. Since the bits would be generated by so-called virtual particles, it was necessary to talk about them and how their random motions could be ordered to produce 1's and 0's. I concluded this could be achieved via future application of an electrical-engineering experiment conducted at Yale University in 2009. From there, I began paragraphs on topics like cosmology, biotechnology and Maxwell's "retarded" and "advanced" light waves. This led to E=mc^2, gravitational waves also having retarded/advanced components, the multiverse actually being the unification of all past and future states of the universe with the present cosmos, and the concept from a 1919 paper by Einstein of gravitational waves playing a role in matter's creation. Since those waves have an "advanced" component that travels back in time, the matter of technicians, biotechnologists and computers could also go backwards in time. The final section shows that my conclusions throughout are supported by viewing E=mc^2 in different ways.

Introduction

About the death of AI (Artificial Intelligence) pioneer Marvin Minsky (1927-2016) -

According to Professor Patrick Henry Winston, the author of Marvin Minsky's obituary in Nature (18 Feb. 2016, p.282) -

"Once, I suggested that if we ever developed really intelligent machines, we should do a lot of simulation before we let them loose in our world to be sure they weren't dangerous."

Guessing Winston's punchline, Minsky replied, "And we're the simulation? It isn't going very well, is it?"

We might be far more than simulations of AI: we could be living, breathing examples of Artificial Intelligence.

I got a shock at the end of this article. The writing led me to the formula developed by Albert Einstein in 1905: E=mc^2. After looking at it anew, I revised my previous writing about the equation and concluded that it tells us a few things we never seemed to suspect: 1) Distance is capable of being deleted, 2) everything in space - and in time - is part of a cosmic unification, and 3) travel into the past is possible.

E=mc^2 may have led Einstein to his General Relativity and Unified Field theories, to give physical meaning (in the form of gravitation) to the mathematics. As far as I know, he never mentioned such a connection. Was Einstein as ignorant of the depth of his accomplishment as the rest of us?

Content -

BIT-STRINGS, TOPOLOGY AND SUPER AI

String theory says everything's composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents ("Workings of the Universe" by Time-Life Books – 1991, p.84). We can visualize so-called virtual particles generating tiny, one dimensional pulses of energy.* (The asterisk marks the start of a section that deals with "order from disorder" among other things - the section is bounded above and below with a dashed line.) The energy is, at different infinitesimal periods, either pulsing or not pulsing - a state equivalent to that of the on/off of the bits or binary digits 1 and 0 (base 2 mathematics) used in electronic computers, smartphones, calculators etc. The digits form "currents" (varying patterns of on-off flashes) 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 repeated experimental verification of the warping and curving of 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.) And joining two Mobius strips (or Mobius bands) can form a four-dimensional figure-8 Klein bottle (http://plus.maths.org/content/os/issue26/features/mathart/index), which may possibly be one of the subunits composing the universe.

If the cosmos is made of 1's and 0's, the implication is that human intelligence is nothing more than AI or artificial intelligence. It's only our egos that make us believe our minds are somehow fundamentally different from the computers we use (or more than an advanced form of the AI responsible for photosynthesis in plants).

Think about what this means for human progress. Suppose we can learn to tame our emotions so they have far less control over us, and so we can use their power to boost our logic. Then any person in the street could use his or her AI abilities and learn to easily outperform today's experts in any field in terms of logic and knowledge.

This sounds like fantasy ... science fiction. But just a few decades ago, it was fantasy to think computers would ever beat humans at games like Go and chess. Those contests have been done, and the computers have vanquished our experts. The way things are going, AI will even be outdoing Albert Einstein in developing new physics before this century finishes. But I believe it's our turn to show the computers what we can do. They only have AI, but humans can combine the power of AI with the power of tamed emotion and enhanced logic. As written in the 50+ articles at orcid.org/0000-0003-2240-3743, I believe this allows deleting of limits in space and in time. The abilities of humans in the next century will potentially ... inevitably ... make them gods (without

limits in time or space)!!

VIRTUAL PARTICLES AND ORDER FROM DISORDER

* The Virtual Particles composing space-time are not actually particles but are fluctuations in an energy field and therefore are pulses of energy ("The Grand Design" by Stephen Hawking and Leonard Mlodinow - Bantam Press 2010, p.113). Virtual particles "cannot be directly detected by a particle detector (but) also exist in some circumstances as real particles" (eg the real photons detected as light waves). ["A Brief History of Time" by Stephen Hawking - Bantam Press 1988, p.69]. The proposal of this present article concerns virtual photons, and other virtual particles like gravitons - and answers the objection that they can't generate ordered 1's and 0's because virtual particles possess random motion.

The next few paragraphs should be introduced by pointing out that in its article "chaos", Penguin Encyclopedia edited by David Crystal (The Penguin Group, 2006) states, "Chaos is an intermediate stage between highly ordered motion and fully-random motion". Now for a quote by Fritjof Capra, a physicist at the University of California at Berkeley. He believes that, in some mysterious fashion, chaos can produce evolutionary advance (from "Can Order Come Out of Chaos?" by Henry M. Morris, Ph.D., http://www.icr.org/article/can-order-come-out-chaos/) -

"The grim picture of cosmic evolution was in sharp contrast with the evolutionary thinking among nineteenth century biologists, who observed that the living universe evolves from disorder to order, toward states of ever increasing complexity."

Also from "Can Order Come Out of Chaos?" - "Paul Davies, the prolific British writer on astronomy, is another. He, like Capra, is not an atheistic evolutionist, but a pantheistic evolutionist. He has faith that order can come out of chaos, that the increasing disorder specified by the entropy law (second law of thermodynamics) can somehow generate the increasing complexity implied by evolution."

How does order arise from chaos? My belief that connection of 2 Mobius strips into a figure-8 Klein bottle can be made with the infinitely-long irrational and transcendental numbers has powerful appeal for the following reason: Such an infinite connection translates into an infinite number of TANGIBLE figure-8 Klein bottles which are subuniverses. They're tangible because the numbers result from virtual particles called gravitons that also make matter (gravitons have extremely low interaction with matter; and must act together with photons - some 10^36 times as powerful - to form matter). 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.

* That is: the cosmos beyond our 13.8-billion-year-old subuniverse, which is apparently expanding from the energy of virtual particles becoming space-time or matter, and displacing parts

of the universe beyond (in about the middle of last century; Fred Hoyle, Hermann Bondi and Thomas Gold calculated that maintaining a "steady state" where the universe is constantly roughly the same on the largest scales only requires the mass of one hydrogen atom to be added [from electronically-generated virtual particles, it turns out] in each quart of space every half-billion years ("The Universe" by Life Nature Library - Time Inc. 1964, p.175).

INFINITY X 2 OR DISTANCE = 0 ?

To my mind, the association of an infinite with another infinite (an infinitely large universe with infinitely long numbers like pi) possesses a satisfying beauty. However, I'll proceed to discuss order arising from chaos due to deletion of distance. Distance deletion seems to apply to what Penguin calls "fully-random motion" and not merely to an intermediate stage of partial randomness. And virtual particles in space appear to be completely random in their motions.

When future electronics allows their displays to change from one still (as in photographic print) to another trillions of trillions of times per second, they are undergoing what we call motion or time. Were ancient Greek philosophers Zeno of Elea and Parmenides at least partly correct to speak of the absurdity of reality being made up of many changing things? Zeno also said motion is absurd. Motion and change would, in the end, merely be the switching of 1's to 0's and vice versa. There wouldn't even be any motion (neither switching nor randomness) if distance is eliminated between gravitons and the 1's and 0's which they generate exist as quantum-superposed qubits (the basic elements of information in quantum computing - just as "bit" is an abbreviation for "binary digit" in ordinary computers, "qubit" stands for "quantum bit" in quantum computers). How can distance be deleted?

GRAVITATIONAL OPTICS

A 2009 electrical-engineering experiment at America's Yale University demonstrated that, on silicon-chip and transistor scales, light can attract and repel itself like electric charges or magnets ["Tunable bipolar optical interactions between guided lightwaves" by Mo Li, W. H. P. Pernice & H. X. Tang - Nature Photonics 3, 464 - 468 (2009)]. This is the "optical force". For 30 years until his death in 1955, Einstein worked on his Unified Field Theory with the aim of uniting electromagnetism (light is one form of this) and gravitation.

Achievement of this^^ means the microscopic components (gravitons) of warps of space (gravity, according to General Relativity) could mimic the Optical Effect and be attracted together, thereby totally eliminating distance (this is similar to traversing a wormhole, or shortcut, between two folds in space-time).

^^ Deleting distance between, and within, photons and gravitons allows them to exist simultaneously i.e. in "quantum superposition". This unites electromagnetism with gravitation.

Distance is not only deleted in space. There would no longer be any "distance" in the partner space is indissolubly linked to ... time.

MODEL COSMOS AND GRAV WAVES

The above shows that distance can be eliminated from space-time. How can all space-time be made devoid of distance? Do we send out fleets of spacecraft that fly at billions of times the speed of light and zap every cubic millimetre of space-time with a version of Yale Uni's 2009 "Optical Force" experiment? No. There appear to be at least two ways, and the first one mentioned - condensed into a couple of paragraphs from "Applications of Einstein's Views on Gravitational Waves" by Rodney Bartlett (http://vixra.org/abs/1601.0318) - says a God who is separate from humanity is not necessarily required in order to explain the "electronically-generated virtual particles" referred to approximately 7 paragraphs ago. The "particles" could be the product of human electronics since this 1st method says gravitational waves can travel into the past, and the matter comprising our technicians / electronics is made of gravitational waves in tandem with the electromagnetic waves they produce.

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 10^1 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 of the strong nuclear force would likewise be either products of gravitation or, like quarks#, potentially 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 10^1). 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.

^ Remember, this is only one example: the so-called weak force's strength isn't constant and varies with distances [more info in "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/

"It is certainly possible that some alien beings ... would make the same experimental observations that we do, but describe them without quarks." [Stephen Hawking, Leonard Mlodinow – "The Grand Design" – Bantam Press, 2010, p. 49]. So I'm going to turn into that book's alien being and describe observations without quarks, but with a more basic quantum process that says space and all particles are, ultimately, composed of virtual particles and bits and maths. (Interpretation of particle tracks in a

detector might cause them to be misidentified as caused by actual particles called quarks, instead of as being the result of virtual particles producing digital patterns that imitate the properties of quarks.)

"Imagine a spaceship, its occupants and its computers are made of space. Or if you prefer, of the gravity (curvature of space) first spoken of in Einstein's paper “Spielen 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. Then the waves composing the spaceship etc would be warped 90° (made perpendicular to the waves composing familiar length, width and height) and would enter subspace/superspace and imaginary time. But warping needn't stop there. Since the universe is modelled on the Möbius strip (see the "Topological Monoverse" article at the end of "Applications of Einstein's Views on Gravitational Waves"), warping can continue to the extreme curvature of hyper-spacetime's 180° - where it includes imaginary time but the gravitational ripples have "flipped backwards" from the horizontal axis of real time, through the vertical axis of imaginary time, and proceed in the "reverse" direction along the horizontal axis (in complex time). This causes travel along the same axis as the so-called real time we're familiar with (real time, like imaginary time, is only part of the true nature of the 3-part gravitational rippling constituting the motion of particles ie of complex time). As will be proposed, the universe does possess on this real-time/complex-time axis a singularity from which it arose. This axis-sharing naturally leads to the singularity being associated with the Big Bang theory dominant in our present world. But the reversal (in time) of gravitational waves@ means the present understanding of that singularity the universe came from must be radically revised."

"The singularity in hyperspace is the perfect model of the universe that humanity will develop by deletion of distance between gravitons (and between binary digits) in, say, a thousand years. Of course, it can't result from knowledge about - or provide comprehensive data about - every specific part of the cosmos in a universe that's literally infinite and eternal. It would be like the zygote resulting from the joining of a sperm cell with an egg cell. The zygote contains information about the whole body it will develop into though it doesn't contain detailed info exclusive to each type of tissue. Similarly, the singularity-model contains information about the nature of the infinite universe extrapolated from study and exploration of our subuniverse or observable universe. However, it doesn't contain detailed info exclusive to the other subuniverses. From the singularity, binary digits would follow the programming we give them in the far future and project, or teleport, to form the universe we see and touch. This is reminiscent of the holographic principle, which says our four-dimensional world may be encoded on (projected or teleported from) a five-dimensional space-time called hyperspace/hypertime. Since all time is linked in the qubit (another name for the singularity which comes from deletion of distance between gravitons and thus 1's & 0's), its input could originate a thousand years in the future while its output (the projection that forms our subuniverse) could be 13.8 billion years in the past."

ENTANGLEMENT IN THE G-EM FIELD

The above manner describes how ALL space-time in the qubit/singularity might be made devoid of distance. A 2nd possible method is the quantum entanglement of a version of Yale Uni's 2009

"Optical Force" experiment with every bit of space-time.

'Physicists now believe that entanglement between particles exists everywhere, all the time, and have recently found shocking evidence that it affects the wider, "macroscopic" world that we inhabit.' - "The Weirdest Link" (New Scientist, vol. 181, issue 2440 - 27 March 2004, page 32 - online at http://www.biophysica.com/QUANTUM.HTM). The same article says that Caslav Brukner, working with Vlatko Vedral and two other Imperial College researchers, has uncovered a radical twist. They have shown that moments of time can become entangled too (www.arxiv.org/abs/quant-ph/0402127).

To phrase quantum entanglement in human terms - Independence from a physical body may be possible via an immaterial body designed in the far future. This necessarily involves much speculation and involves the development of an all-powerful, all-knowing, omnipresent human body composed of photons and gravitons, and quantum entangled with every point in space-time, for the purpose of overcoming the limits of biological bodies – or biological bodies incorporating computer and robotic systems.

In 1925, the Austrian physicist Wolfgang Pauli discovered the exclusion principle. [Hawking, S. W. – "A Brief History of Time" – Bantam Press, 1988, pp. 68-69] This says two similar particles cannot have both the same position and velocity. If two electrons could have identical positions and velocities, they could all collapse into a roughly uniform, dense "soup". Protons and neutrons would do the same, and there would be no well-defined atoms. So we need the exclusion principle. Force-carrying particles like photons and gravitons do not obey the exclusion principle so we might assume the immaterial body wouldn't be well-defined and would collapse into a ghostly soup. But perhaps a well-defined structure can be built if the photons are first stopped (or significantly slowed, since stopping them may destroy them)* before they're collected and substituted for the body's particles. The beginnings of this technology may be underway [Palus, S. - "Turning Light into Matter - Physicists have created a device that binds photons together to form "light molecules." - Thursday, March 13, 2014 (http://discovermagazine.com/2014/april/6-how-to-make-light-matter)]. Referring to this reference, two photons end up sticking together and move forward just like a two-atom molecule.

* "Understanding the Universe: An Introduction to Astronomy, 2nd Edition" by Professor Alex Filippenko - video from The Great Courses, 2007 - says in Lecture 20 ("The Wave-Particle Duality of Light") that a photon is a massless particle when at rest, and would cease to exist if stopped.
Rodney Bartlett says, 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 does not 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, the universe is also a giant electromagnetic field. Electromagnetism is ubiquitous and doesn't need to travel, but any disturbance sends out electromagnetic waves. In this way, photons in the giant electromagnetic field which aren't travelling because of disturbances might be regarded as "already stopped".

DISTANCE = 0, SPACE-TIME UNIFICATION AND TRAVEL INTO PAST CONTAINED WITHIN E=MC^2

I think E=mc^2 supports this idea of deleting distance. The formula is, of course, Albert Einstein's famous equation relating energy, mass and the speed of light [Einstein, A. (1905) - "Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig?" ("Does the inertia of an object depend upon its energy content?" - Annalen der Physik 18 (13): 639-643]:

Let's represent the masslessness of photons by 0 (zero), and also the masslessness of the theoretical gravitons by zero. Should theories developed from Einstein's 1919 paper regarding mass be proven correct one day ie that mass results from photon-graviton interaction, we can replace the m with zero. This results in E=0*c^2 ie outside familiar circumstances, it is possible for E to equal 0. Having reduced the equation to nothing but E, m=0 and c^2=0 which means m=c^2. At first glance, m=c^2 seems to be saying mass exists at light speed. But the absence of E (energy) refers to there being no interaction of light energy and gravitational energy, and therefore no mass. If mass cannot be produced, mass-producing space-time/gravity must be described by zero. The zeroness of space-time/gravity does not mean they don't exist. It means we can appear to relocate matter and information superluminally, or travel into the past and future, because distance equals zero and can be eliminated from both space and time.

In the preceding paragraph, it's shown that m=c^2 when E=0 ie when no interaction of light energy and gravitational energy exists. Describing space-time by zero gives the impression that it doesn't exist. It obviously does, so the conclusion that zero means distance can be eliminated is accurate. Distance obviously exists, too. It is merely suggested that it's possible to delete it.

When distance is eliminated, more than the space between objects is deleted (this allows intergalactic travel). Space within objects can be deleted, too (permitting a singularity to have zero size). Therefore, removing distance easily unifies everything in space-time into one thing - a product of the gravitational field. All past and future universes are unified with the present cosmos (is this the real meaning of the word "multiverse"?)

E=mc^2 may have led Einstein to his General Relativity and Unified Field theories, to give physical meaning (in the form of gravitation) to the mathematics. As far as I know, he never specifically mentioned such a connection. Was Einstein as ignorant of the depth of his accomplishment as the rest of us?

"Physics of the Impossible" by Michio Kaku (Penguin Books, 2009) states on pp. 276-277, "When we solve (19th-century Scottish physicist James Clerk) Maxwell's equations for light, we find not one but two solutions: a 'retarded' wave, which represents the standard motion of light from one point to another; but also an 'advanced' wave, where the light beam goes backward in time. Engineers have simply dismissed the advanced wave as a mathematical curiosity since the retarded waves so accurately predicted the behavior of radio, microwaves, TV, radar, and X-rays. But for physicists, the advanced wave has been a nagging problem for the past century." Suppose Einstein was correct about the gravitational fields carrying enough information about

electromagnetism to allow Maxwell's equations to be restated in terms of these gravitational fields. Then gravitational waves would also have an "advanced" solution.

E=mc^2, when viewed as E=0 and m=c^2, also supports this article's earlier statement that "gravitational ripples ... proceed in the "reverse" direction along the horizontal axis (not in so-called 'real' time, but in 'complex' time)." This is because m=c^2 and they can only create 0 if, purely for example, m represents the retarded wave of light travelling forward in time - and, again purely for example, c^2 represents the advanced wave of gravitation travelling backward in time. If mass and matter are products of gravitational-electromagnetic interaction, matter can also travel into the past.
