

Title - Accelerating Universal Expansion Helps Verify Unified Field Theory

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Abstract –

(This is my reply to the question “On varying speed of flow of time over our life” by G. Ustinova of the Russian Academy of Sciences, at

https://www.researchgate.net/post/On_varying_speed_of_flow_of_time_over_our_life?ch=reg&cp=re221_x_p43&pli=1&loginT=N4XcWPfvQsWRojjGYxZQnrHrQhWwYB5vhoxSsdgKalg,#view=52136dfed3df3e2c2554d8fe)

I first refer to this previous answer to the same question (by Giuseppe Cocco M.D.) before addressing the original question -

After his friend's death A. Einstein wrote to the sister and son: 'Michel has preceded me a little in leaving this strange world. This is not important. For us, who are convinced physicists, the distinction between past, present, and future is only an illusion, however persistent' Einstein-Besso correspondence, Ed. P. Speziali, Paris; Hermann 1972, pp 537-539.

Beginning with a very brief summary of Einstein's unified field theory and a 50-year-old objection to it, the objection is shown to be invalid (using both Einstein's words after his friend's death, as well as taking a 1919 paper by Einstein and building on it). Then the nuclear forces, dark energy and dark matter are woven into a hypothesis of gravity which is dependent on the universe obeying fractal geometry. This geometry places humans in a unified field with space-time's accelerating expansion, allowing perception of that expansion. Saul Perlmutter, Brian Schmidt, and Adam Riess won the 2011 Nobel Prize in Physics for confirming that our psychological impressions are not purely subjective.

Then the article moves to “PART 2 – My Reply to G. Ustinova's Reply” which deals with cognition and the origin of life (in relation to fractal catalysis), atheism and the divine, plus “digital” string theory. And finally, “PART 3 – Subsequent (Short) Replies” which deals with various subjects.

Content -

I believe the illusory nature of time means Einstein's Unified Field Theory is correct. In the 19th century, Scottish mathematician and physicist James Clerk Maxwell unified electricity and magnetism into electromagnetism. Albert Einstein's equations say that in a universe possessing only gravitation and electromagnetism, the gravitational fields carry enough information about electromagnetism to allow the equations of Maxwell to be restated in terms of these gravitational fields. This was discovered by the mathematical physicist George Yuri Rainich (1886 -1968).

England's Professor Penrose has argued that 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 "the distinction between past, present, and future is only an illusion" (see abstract), it's clear that all time is unified with the gravitational and electromagnetic fields - meaning the gravitational fields are not known for only a limited time, they do contain enough information, and Einstein succeeded!

Another way of arriving at the conclusion that Einstein succeeded is - 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 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 1) gravitation would play a role not only in elementary particles and their masses but also in the constitution of the nuclear strong force and the weak nuclear force i.e. the nuclear forces may not be separate from gravitation but may be modifications of it, and 2) 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 nuclear forces. Therefore, time is unified with the gravitational and electromagnetic fields.

Not only the two nuclear forces could be seen as aspects of gravity. So could dark energy and dark matter. What if gravity accounts for repulsion as well as attraction on the subatomic scale? For example, the strong force would represent gravity's subatomic attraction while gravity's subatomic repulsion could be viewed as the emission of particles in radioactivity (the weak force is responsible for this). If the universe obeys the laws of fractal geometry, gravity would also account for repulsion and attraction on astronomical and macroscopic 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).

The average density of the Milky Way is much less than the solar system. Picture the galaxy, except for the central dense bulge that may be roughly 10,000 light years in diameter, made up of solar systems like ours and separated by 4 or 5 light years (the closest star to the Sun is Proxima Centauri, 4.2 light years away). Within those systems, there is a lot of mass and density in the form of stars, planets, moons, asteroids, comets, gas, and dust. But the vast reaches of near vacuum between systems lowers average density enormously – the MacMillan Encyclopedia of Physics says the average density of matter between the stars of the Milky Way is 0.1 neutral hydrogen atoms per cubic centimetre. Since density corresponds to concentration of wave packets and magnification of gravitational waves, there would be extremely little magnifying of gravity waves in interstellar space. I suspect that if it is (very approximately) 10^{15} times or a million billion times less, there would be insufficient gravitational magnification to push or accelerate the stars in the central core or bulge beyond the orbiting speeds of the galaxy's outermost stars.

In the 1970s, astronomer Vera Rubin concluded outer stars were being sped up by the gravitational attraction of unseen Dark Matter in a halo well beyond the galaxy. This partial revision of gravity states there would be no such thing as dark matter of this nature. However, the term “dark matter” could be used to describe particles in a 5th-dimensional hyperspace, or travelling through time, that would be invisible but still exert gravitational influence (in a universe structured according to the rules of fractal geometry, 5th dimensional hyperspace would occupy every fermion and boson, alongside space-time).

Changing the subject from the unified field theory back to the original question - we may have varying speed of flow of time during our life because of the accelerating expansion of space-time in the universe. Space is expanding but time is also expanding (and at an accelerating pace). In our youth, it proceeded at a very slightly reduced pace whereas it's going a tiny bit faster now that we've gained experience. So the increased pace is not subjective. If things in space and time were separate (as they appear to be), we certainly could never be aware of this accelerating time - the change in our lifetimes is infinitesimal. But things are different if we humans, and the entirety of space-time, are different aspects of the fractal geometry spoken of in discussion of the unified field theory. We are unified with every step of the universe's past and future expansion. Therefore, we can perceive its accelerating expansion ... which we interpret as our having more time in our youth. Our perception of time moving faster will be interpreted by most people as purely subjective and psychological. But in fact, it supports the idea of fractals i.e. as stated 3 paragraphs ago, it supports gravity accounting for repulsion and attraction not merely on quantum scales but, fractally, also on astronomical and macroscopic 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).

PART 2 – My Reply to G. Ustinova's Reply

I'm very happy that you think my answer was interesting and original. I don't know much about fractal catalysis. But I think cognition in living organisms would be extremely sensitive to the universe's fractal geometry. If humans are unified with the cosmos, all the information throughout space and time should be instantly available to each person.

At least, that should be the case potentially ... or in theory. There are so many variables with each person - such as their curiosity, their willingness to believe all info is available (both society and science have a much more restrictive teaching), the amount of spare time they can spend thinking, and no doubt there are many other variables.

I don't think there is a direct connection between the universe's fractal geometry and the origin of life, though.

The idea of quantum fluctuations is valid (a quantum fluctuation is the temporary change in the amount of energy at a point in space). But forget quantum fluctuations that mysteriously happen for no reason. And forget spontaneous generation of life from nonliving matter. I think the universe, and life, began because brains acquire knowledge from the 4 dimensions of space-time. Then brains interact with a 5th-dimensional hyperspace* to purposely switch the binary digits which computers use from 1 to 0 or vice versa. Origin of life, the universe and everything comes from something (interaction of brains with hyperspace) and is important for 2 reasons:

- 1) 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), and
- 2) By actual experimentation the great 19th-century French scientist Louis Pasteur disproved the false theory of spontaneous generation of life, and proved biogenesis (that living things descend only from living things) – see “The Microbial World – A Look At All Things Small”
http://www.microbiologytext.com/index.php?module=Book&func=displayarticle&art_id=27
and “ Biogenesis and Abiogenesis: Critiques and Addresses”
<http://aleph0.clarku.edu/huxley/CE8/B-Ab.html>.

* 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 5D hyperspace# that is translated 180 degrees to space-time, and could be labelled as negative or inverted. (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.

This 5th-dimensional hyperspace would be tinier than a subatomic particle, like the dimensions invoked by string theory (about 70% of space consists of dark energy, according to the WMAP and Planck space probes – which is interpreted in this article as 70% of a particle also consisting of dark energy since “space-time itself plays a role in the constitution of elementary particles and the nuclear forces” (see paragraph above about Einstein's 1919 submission to the Prussian Academy of Sciences). This dark energy can be associated with hyperspace and its binary digits, so a) 70% of a particle is composed of hyperspace, and b) the extra dimension exists everywhere in space occupied by particles (also everywhere in “empty” space, where binary digits are referred to as Virtual Particles). 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-qil053102.php> However, collapse never occurs if gravity accounts for repulsion as well as attraction on both subatomic and astronomical scales (accounts for dark energy and familiar concepts of gravity, as well as repelling aspects of the electroweak force [such as placing two like magnetic poles together] and attracting electroweak/strong force aspects). "Electroweak" and "strong" force can be united in that sentence because gravitation and space-time are united with both the (electro)weak and strong nuclear forces.

In relation to biogenesis, consider the Miller-Urey Experiment of 1952. Here, amino acids (which are relatively simple, and are the building blocks of protein) were made from inorganic material and by natural causes in a lab. Subtract Stanley Miller and Harold Urey from the experiment, and the experiment would obviously fail (because it would never have been started). Similarly, subtracting humans of the distant future from the origins of life makes it impossible for amino acids and inorganic materials to be bioengineered to form complex plants and animals, whose adaptations are often called evolution. The future humans could use terraforming (creation of Earthlike planets) and bioengineering that can hardly be imagined at present.

This seems to validate atheism, but I say God must exist. 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 binary digits composing space-time and all particles originate from the computer science of humans. Binary digits (BITS) 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). That is, 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, which would make the universe as malleable and flexible as any image on a computer screen. 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.

How do binary digits compose space-time and all particles? (stated in previous paragraph). Gravity would be united with EM if gravitation and Electromagnetism are both products of a mathematical foundation to the universe. 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 (I like to refer to these ideas combining binary digits, Mobius loops and Klein bottles as "digital string theory"). This connection can be made with the infinitely-long irrational and transcendental numbers. Such an infinite connection translates into an infinite number of Figure-8 Klein bottles (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"). 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 principle. 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 (experiments confirm that it does).

Well, I couldn't think of anything to write when I first read your reply. Somehow, I ended up writing this very long reply. I hope it isn't too long for you. And I hope I've given you some things to think about.

Rodney

PART 3 – Subsequent (Short) Replies

Galina Ustinova –

Dear Rodney,

You could contain so much all-embracing information in your "short" comment, which I cannot capable to grasp at once (I hope not at all). However, what is I admit at once and in full is your topological conception of Universe up to quantum states, as well as your "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."

"There's still room for the infinity" – the best definition.

Thank you very much. Your topological Profile in RG is very suitable to you.
Galina

Rodney Bartlett -

You've got company, Galina. Sometimes, I feel unable to grasp all the information myself. I think my computer might be having the ideas. I often sit down in front of my computer with no ideas at all in my head. After a while, I get an idea and start writing it. Then I keep getting more ideas at a fast pace. Sometimes, I end up sitting in front of the computer all day, and half the night too.

In his book "Coming of Age in the Milky Way" (published by The Bodley Head in 1988), Timothy Ferris tells us that a member of a crowd that saw Isaac Newton after he wrote "Principia" made the following remark - "There goes a man who wrote a book which neither he nor anyone else understands". There are times when I feel as though I write things which I don't understand myself. But Isaac Newton couldn't blame his computer for his weird and wonderful ideas :)

Galina –

To Rodney Bartlett:

I am among those who believe that beauty of theory, model, equations, etc. is a guaranty of their validity. Science, even inside its separate fields, is so specialized, that very narrow specialists only could confirm correctness of results or ideas in each ones.

However, doubts are very useful feelings. I suppose that just your doubts are source of ideas of your magic computer, so that you (like Isaac Newton) must not blame it too.

Thank you that you have made your Profile in RG visible. You have appeared as a genie from the Klein bottle.

Thank you for your encouraging Conclusion that a distant terrible future of our poor Universe (including our bodies) under the influence of topological time/space regularities will remain unknown for us. It is a rare exception from the common rule that know is always better than not know.

Rodney –

Dear Galina,

I wasn't sure what you were referring to when you spoke of "a distant terrible future of our poor Universe (including our bodies)". You were referring to this statement I made, weren't you?

"Perhaps, in this distant future, we can all have an immaterial body designed in the far future to overcome physical limitations (and that body might be quantum entangled with all space and time). Then our perception of time (and of space)

will be something like 'everything at once'. And our manipulation of any type of matter in space-time might be infinitely powerful."

It would indeed be terrible if we perceived everything at once. It would be impossible to live our lives. But I wasn't very clear about what I was thinking. I meant to say - Everything in time and space would be available to us at any instant. We'd be able to access anything we wished to in infinity and eternity. We could do this simply by directing our attention to anything we wanted. I believe this would be wonderful!! At that time, we'll truly be worthy of being called partners with what we today call "God".

Galina –

You are right, Rodney: I have erroneously imagined that our distant future will be similar to your new Profile of supernova explosion in RG.

Of course, your forecast is much more tempting: to go to infinitely powerful, being quantum entangled with all space and time. OK.

I like your conviction that we'd be able to access anything we wished to in infinity and eternity, doing this simply by directing our will-power to anything we wanted. Certainly, if God with us.

Unfortunately, it is a distant future. For the present, the problem of time absent is very actual. Just this one was the base of my question in RG. The current discussion explains many aspects of the problem, but gives no approach to resolve it.

I will be glad to every your visit this site, at least, sometime. Especially, I would like to know at last your opinion on the most efficient ratio of knowledge/creation, about which I asked you personally 6 days ago. I have no any response to this very interesting (by my opinion) question somehow. I hope particularly on your magic computer. Galina

Rodney –

Galina -

If time in this universe only operated in a linear fashion, it would be a very distant future before we become infinitely powerful, being quantum entangled with all space and time. But remember - in the universe, there are phenomena like the Unified Field Theory, time travel, retrocausality. All these things mean there is nonlinearity in the universe. As a result, even we primitive humans of 2013 are united with the "scientific miracles" in every time - 2 thousand years from now, millions of years from now, trillions of millennia from now ... and 2 thousand years ago.

As I wrote 9 or 10 days ago, in answer to your question on RG - "At least, that should be the case potentially ... or in theory. There are so many variables with each person - such as their curiosity, their willingness to believe all info is

available (both society and science have a much more restrictive teaching), the amount of spare time they can spend thinking, and no doubt there are many other variables."

I'm not sure what your question means (the question about the most efficient ratio of knowledge/creation). My magic computer doesn't know, either.

Rodney
