Lestone's Heuristic String Theory and Eternal Cosmological Inflation

ABSTRACT

In a 2007 publication Lestone suggested that at the Planck scale there might be a model of the electron consisting of 3 vibrating strings confined to a 2-sphere. Lestone's heuristic string theory suggests that, at the Planck scale, among the fundamental particles of the Standard Model massive bosons might be 1-spheres, leptons might be 2-spheres, and quarks might be 3-spheres. I have conjectured that the Koide formula and Lestone's heuristic string theory are essential for understanding the foundations of physics. I have also conjectured that contrived brane interactions can allow string theory and eternal cosmological inflation to explain any plausible or implausible physics. String theory with the infinite nature hypothesis might imply the string landscape, superpartners, and eternal cosmological inflation. String theory with the finite nature hypothesis might imply that the multiverse has a big bang that recurs every 81.6 ± 1.7 billion years, that the Fernández-Rañada-Milgrom effect is empirically valid, and that the inflaton field emits electromagnetic radiation according to the Space Roar Profile Prediction. From the data for the Lambda-CDM model, for the total observed mass-energy, the fraction of dark energy is .728±.016. String theory with the finite nature hypothesis might explain why (1 – .728)/.728 is approximately 3/8 (= 27/72). In this brief communication there is a discussion of the compatibility of Lestone's heuristic string theory with eternal cosmological inflation.

LESTONE'S HEURISTIC STRING THEORY AND THE INFLATON FIELD

"The Standard Model does not contain gravity, and it has many arbitrary features for which we would like to find a deeper explanation. … At accessible energies, interactions of the string theory graviton agree with the graviton in General Relativity." — John Schwarz

http://scgp.stonybrook.edu/archives/9805 "String Theory: Past, Present, and Future" by Dr. John H. Schwarz, March 25, 2014, Simons Center for Geometry and Physics

"When trying to explain or calculate the value of the fine structure constant, it is difficult to separate reasonable assumptions from assumptions that are chosen to give a result close to the known desired value." — John P. Lestone

http://arxiv.org/abs/physics/0703151 "Physics based calculation of the fine structure constant" by J. P. Lestone, 2009

"… inflation has been remarkably successful in explaining many important qualitative and quantitative properties of the universe." — Alan H. Guth

http://arxiv.org/abs/hep-th/0702178 "Eternal inflation and its implications", Guth, 2007

"The inflaton field corresponds to the distance between branes in Calabi-Yau space. Historically, this was the first class of string inflation models." — Andrei Linde

http://www.mpa-garching.mpg.de/lectures/Biermann_07/ Eternal inflation and string landscape (lecture 3), Biermann lectures by Andrei Linde, 2007

http://physicsworld.com/cws/article/news/2014/mar/17/bicep2-finds-first-direct-evidence-of-cosmic-inflation

Is Lestone's heuristic string theory in any way incompatible with eternal cosmological inflation and/or the string landscape? Because eternal cosmological inflation and the string landscape can make use of huge numbers of different string vacua, the answer to the preceding question seems unclear. In the Standard Model of particle physics, are there 3 generations of fermions because string vibrations are confined to 3 copies of the Leech lattice?

http://en.wikipedia.org/wiki/Leech_lattice

What might be the implications of the following 3 assumptions: (1) nature is finite and digital; (2) at the Planck scale quarks are 3-spheres; and (3) string vibrations are confined to 3 copies of the Leech lattice?

(1 – .728)/.728 – 3/8 = –.0013736… Does the preceding numerical estimate have a meaning in terms of cosmology?

According to data for the Lambda-CDM model, for the total observed mass-energy, the fractions of dark energy, dark matter, and baryonic matter are given by .728±.016; .227±.014; .0456±.0016, respectively.

https://en.wikipedia.org/wiki/Lambda-CDM_model

Note that (1 – .728+.016)/(.728+.016) – 3/8 = .012 approx. and

(1 – .728–.016)/(.728–.016) – 3/8 = –.015449 approx.

Suppose that dark energy is represented by string vibrations in 3 copies of the Leech lattice and that (dark matter + baryonic matter) is represented by string vibrations in vibrating strings confined to 3-spheres in 3 distinct copies of the Leech lattice. Given the preceding supposition, there might be an empirically valid string model in which the number 72 might approximately represent dark energy and the number 27 might approximately represent the quark vibrations at the level of string theory.

STRING THEORY AND THE MEASUREMENT OF TIME

"... the relation between the mathematical parametric time t in the equations of dynamics and the physical dynamical time σ that is measured with clocks is more complex and subtle than usually assumed." — A. Fernández-Rañada and Alfredo Tiemblo-Ramos

http://arxiv.org/abs/1106.4400 "The dynamical nature of time", Antonio F. Rañada & A. Tiemblo, 2011

Does Einstein's equivalence principle depend upon the assumption that astronomical time is the same as atomic time? Have string theorists unjustifiably assumed that the equivalence principle is 100% correct?

MILGROM, DARK MATTER, THE EQUIVALENCE PRINCIPLE, AND DARK ENERGY

According to Kroupa, Pawlowski, and Milgrom, "Understanding the deeper physical meaning of MOND remains a challenging aim. It involves the realistic likelihood that a major new insight into gravitation will emerge, which would have significant implications for our understanding of space, time and matter."

http://arxiv.org/pdf/1301.3907v1.pdf "The failures of the standard model of cosmology require a new paradigm", Jan. 2013

"Everything happens as if MOND were the effective force law." — Stacy McGaugh

http://www.astro.umd.edu/~ssm/mond/burn1.html "The MOND pages, Why Consider Mond?"

On 14 March 2014 Kroupa wrote, "The falsification of the standard model of cosmology (to be more precise, of the existence of cold or warm dark matter particles) is very robust indeed. It is completely consistent with all existing data."

http://www.scilogs.com/the-dark-matter-crisis/2013/11/22/pavel-kroupa-on-the-vast-polar-structures-around-the-milky-way-and-andromeda/

What might be the best argument in favor of the Fernández-Rañada-Milgrom effect?

http://vixra.org/abs/1203.0036 "Does the Fernández-Rañada-Milgrom Effect Explain the Flyby Anomaly?"

I have attempted to convince string theorists that the main problem with string theory is that string theorists fail to realize that Milgrom is the Kepler of contemporary cosmology. My guess is that the inflation theories of Guth, Linde, et al. are falsified by 2 empirical facts: (1) Milgrom's acceleration law and (2) the space roar; however, eternal cosmological inflation can be salvaged by hypothetical brane interactions of immense complexity. According to Kroupa, the empirical evidence supports Milgrom's acceleration law and there is now empirical proof that the Lambda-CDM model is significantly wrong. The results of Milgrom, Kroupa, Pawlowski, and McGaugh indicate that either (1) Newton-Einstein gravitational theory is 100% correct but appears to be slightly wrong for some unknown reason, or (2) Newton-Einstein gravitational theory really is significantly wrong.

Is there a plausible theory of quantum gravity that explains Milgrom's acceleration law?

http://vixra.org/abs/1401.0226 "What is measurement? Why does measurement exist?"

Why have physicists ignored or rejected Milgrom's acceleration law? My guess is that physicists have been convinced that Newton-Einstein is 100% correct according to the empirical evidence (but with a flaw in reasoning in interpreting the evidence). The flawed reasoning is as follows: The equivalence principle has been verified to 14 decimal places, Einstein's general relativity theory is the mathematical expression of the equivalence principle, and therefore general relativity theory has been verified to 14 decimal places of accuracy. The preceding reasoning is false. I conjecture that the equivalence principle is 100% true for measured mass-energy and 100% false for non-measured mass-energy; dark matter is mass-energy with positive gravitational energy and zero inertial mass-

energy; dark energy is mass-energy with negative gravitational energy and zero inertial mass-energy. If the preceding conjecture is wrong then what? If the equivalence principle is 100% correct for dark matter, then there might no satisfactory alternative to eternal cosmological inflation. There might be 2 basic alternatives: (1) there exists a multiverse with eternal cosmological inflation, or (2) there exists a multiverse with boundary and interior that allows inflation to be explained by the escape of gravitons from the boundary into the interior.

NEWTON-EINSTEIN INFLATION VERSUS MILGROM INFLATION

"The sum of the energy of matter and of the gravitational energy is equal to zero". — Andrei Linde

http://www.mpa-garching.mpg.de/lectures/Biermann_07/LindeLecturesMunich1.pdf

"It is possible that the total energy of the entire universe is exactly zero, with the positive energy of matter completely canceled by the negative energy of gravity." — Alan Guth

http://science.mit.edu/news/3-questions-alan-guth-new-insights-'big-bang' 3 Questions: Alan Guth on new insights into the 'Big Bang' - MIT News Office

According to empirical evidence, our universe is remarkably flat in terms of net gravitational curvature. Therefore it seems plausible that the big bang originated from a quantum fluctuation in a previous universe of remarkable flatness. The most likely alternate explanation might be that the big bang originated from a nearly instantaneous quantum collapse of a previous universe of remarkable flatness. I argue that the quantum fluctuation idea best represents Newton-Einstein inflation and that the quantum collapse idea best represents Milgrom inflation. By "Newton-Einstein inflation" I mean inflation that is 100% compatible with Newton-Einstein gravitational theory. By "Milgrom inflation" I mean inflation that is compatible with Milgrom's acceleration law. What does Milgrom's acceleration really mean in terms of the foundations of physics? What are the best clues for reformulating the foundations of physics?

"We claim that our observations add a new twist to discussions concerning the interpretation of quantum mechanics, which we call the cellular automaton (CA) interpretation." — G. 't Hooft

http://arxiv.org/abs/1207.3612 "Discreteness and Determinism in Superstrings", 2012 by Gerard 't Hooft

"String theory clearly appears to be strikingly coherent. What seems to be missing presently, however, is a clear description of the *local* nature of its underlying physical laws. In all circumstances encountered until now, it has been imperative that external fields, in- and outgoing strings and *D*-branes are required to obey their respective field equations, or lie on their respective mass shells. Thus, only effects due to external perturbations can be computed when these external perturbations obey equations of motion. To me, this implies that we do not understand what the *independent* degrees of freedom are, and there seems to be no indication that these can be identified. String

theoreticians are right in not allowing themselves to be disturbed by this drawback."

http://www.staff.science.uu.nl/~hooft101/lectures/stringnotes.pdf "Introduction to String Theory", version 14-05-04, Gerard 't Hooft

"Even though my work is here sketched as "not even wrong", I will avoid any glimpse of hostility, as requested; I do think I have the right to say something here in my defense (One positive note: "Not even wrong" sounds a little bit better than "Wrong wrong wrong" on another blog …). First, I agree that cellular automata doesn't sound very sexy; those who have seen Wolfram's book will certainly be discouraged. But I want to stress as much as I can that I am striving at a sound and interesting mathematical basis to what I am doing; least of all I would be tempted to throw away any of the sound and elegant mathematics of quantum mechanics and string theory. Symmetries, representation theory, and more, will continue to be central themes. I am disappointed about the reception of my paper on string theory, as I was hoping that it would open some people's eyes. Perhaps it will, if some of my friends would be prepared to put their deeply rooted scepsis against the notion of determinism on hold. I think the mathematics I am using is interesting and helpful. I encounter elliptic theta functions, and hit upon an elegant relation between sets of non-commuting operators p and q on the one hand, with integer, commuting variables P and Q on the other. All important features of Quantum Mechanics are kept intact as they should. I did not choose to side with Einstein on the issue of QM, it just came out that way, I can't help that. It is also not an aversion of any kind that I would have against Quantum Mechanics as it stands, it is only the interpretation where I think I have non-trivial observations. If you like the many world interpretation, or Bohm's pilot waves, fine, but I never thought those have anything to do with the real world; my interpretation I find far superior, but I just found out from other blogs as well as this one, that most people are not ready for my ideas. Since the mud thrown at me is slippery, it is hard to defend my ideas but I think I am making progress. They could well lead to new predictions, such as a calculable string coupling constant g_s, and (an older prediction) the limitations for quantum computers. They should help investigators to understand what they are doing when they discuss "quantum cosmology", and eventually, they should be crucial for model building." — G. 't H.

http://www.math.columbia.edu/~woit/wordpress/?p=5022 't Hooft on Cellular Automata and String Theory | Not Even Wrong, Aug. 13, 2012; quotation from 't Hooft's comment posted Aug. 13, 2012 at 6:24 PM

CAN ETERNAL COSMOLOGICAL INFLATION BE REFUTED?

"The question arises, of course, of how these quantum field theories are to be constructed. ... The starting point is always the choice of an appropriate Langrangian, which is the integral of a local functional of appropriate fields. ... The towering puzzle in contemporary theoretical physics is—at least from my standpoint—the puzzle of finding the geometrical context in which string theory should be properly formulated and understood." — Edward Witten

http://www.ams.org/samplings/math-history/hmbrowder-witten.pdf "Geometry and quantum field theory", Proceedings of the AMS Centennial Conference, 1988

Is there an empirically valid quantum theory of gravity with a Lagrangian that explicitly involves the Planck length or alpha-prime? Does such a theory exist if and only if Heisenberg's uncertainty principle should be replaced by a new uncertainty principle involving both h-bar and alpha-prime? If X is to string theory as Kepler's laws are to Newtonian theory then what is X?

If string theory can be satisfactorily formulated within quantum field theory, then the main problem of string theory might be to find the correct theory of geometrized Feynman diagrams. If string theory cannot be satisfactorily formulated within quantum field theory, then the main problem of string theory might be to find the correct replacement for quantum field theory. There might be 3 basic alternatives for the foundations of physics: (1) nature is infinite and non-digital, (2) nature is infinite and digital, or (3) nature is finite and digital. If nature is infinite, then string theory might have severe ambiguities in the theory of its fundamental geometry.

I have suggested that eternal cosmological inflation is unlikely to provide satisfactory explanations for Milgrom's acceleration law and the space roar. However, there might be a way of introducing a fifth force with associated dark matter particles to approximately explain Milgrom's results and the space roar. If the theory of the fifth force is unsatisfactory, then a sixth force with new associated dark matter particles might provide a better approximation, and so on to an nth force, where n increases without limit.

"It is always possible to fit a dark matter model to data." — Stacy McGaugh, 2 Dec. 2013 at 5:12 PM

http://www.scilogs.com/the-dark-matter-crisis/2013/11/22/pavel-kroupa-on-the-vast-polar-structures-around-the-milky-way-and-andromeda/ The Dark Matter Crisis