What Are the Implications of Lestone's Heuristic String Theory?

In his 2007 publication "Physics based calculation of the fine structure constant " J. P. Lestone suggested that "the photon emission and absorption area A of an electron is controlled by a length scale" where the length scale is near the Planck length. What might be some of the implications of Lestone's hypothesis? Renormalization in quantum electrodynamics deals with infinite integrals that arise in perturbation theory. Does Lestone's hypothesis have important implications for renormalization? I conjecture that, EVEN AFTER QUANTUM AVERAGING, Maxwell's equations might be false at the Planck scale, because Lestone's heuristic string theory might be empirically valid. Let ρ represent the electric charge density (charge per unit volume). I conjecture that, in equation (19b) on page 23 of Einstein's "The Meaning of Relativity" (5th edition), ρ should be replaced by the expression ρ/ (1 – (ρ^2 / (ρ(max))^2))^(1/2), where ρ(max) is the maximum of the absolute value of the electric charge density in the physical universe. Polchinski (2003) offered "two general principles of completeness: (1) In any theoretical framework that requires charge to be quantized, there will exist magnetic monopoles. (2) In any fully unified theory, for every gauge field there will exist electric and magnetic sources with the minimum relative Dirac quantum n = 1 (more precisely, the lattice of electric and magnetic charges is maximal)." It seems to me that Polchinski's two general principles are likely to be correct if and only if nature is infinite. This brief communication considers two conjectures: String theory with the infinite nature hypothesis is empirically valid if and only if magnetic monopoles occur in nature. String theory with the finite nature hypothesis is empirically valid if and only if magnetic monopoles do not occur in nature.

LESTONE'S HEURISTIC STRING THEORY

In a 2007 publication, John P. Lestone suggested that "… the fine structure constant calculated here suggests that the forces between fundamental particles are due to the exchange of bosons between particles having both a surface area and an effective temperature; and that the internal structure of electrons is string-like with an internal length scale close to 3 times the particle's circumference."

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

Note that if Lestone's ideas are correct then quantum electrodynamics, and even Maxwell's equations at the Planck scale (i.e. Planck length problem not hbar problem), might require modification.

POLCHINSKI ON MAGNETIC MONOPOLES

According to Polchinski (2003), "If the U(1) of electromagnetism is embedded in a semisimple group, for example in grand unification $SU(3) \times SU(2) \times U(1) \subset SU(5)$, … then electric charge is necessarily quantized, since it descends from the quantized representations of the unified group. Under precisely these conditions, 't Hooft and Polyakov showed that magnetic monopoles will exist as smooth but topologically nontrivial classical solutions."

http://arxiv.org/abs/hep-th/0304042 “Monopoles, Duality, and String Theory” by Joseph Polchinski, 2003

FREE-SPACE MAGNETIC MONOPOLES

"The magnetic monopoles in spin ice can't exist in free space." — Jonathan Morris
http://spectrum.ieee.org/semiconductors/materials/the-hunt-for-the-magnetic-monopole
"The Hunt for the Magnetic Monopole", IEEE Spectrum, 2013

Magnetic monopoles in the sense of condensed matter physics do exist, but in the discussion here the meaning of “magnetic monopole” is the free-space magnetic monopole of Dirac.

SPECULATION RELATED TO WOLFRAM’S AUTOMATON

Wolfram conjectured that Wolfram’s automaton can be described by 4 or 5 simple rules and can generate satisfactory approximations to quantum field theory and general relativity theory. If Wolfram is correct, then smooth solutions for magnetic monopoles are merely approximations. Furthermore, string theoretical unification of the strong, weak, and electromagnetic forces above the Planck scale might indicate that Lestone’s heuristic string theory is incorrect. String theory with the infinite nature hypothesis might favor two basic ideas: (1) curling up of extra spatial dimensions and (2) smooth solutions that represent magnetic monopoles. String theory with the finite nature hypothesis might favor two basic ideas: (1) building up of approximate spacetime from Fredkin-Wolfram information below the Planck scale and (2) the possibility that an infinite amount of electromagnetic energy would be required to create magnetic monopoles. If spacetime is 4 dimensional and each of the 4 dimensions is uncertain with respect to both hbar and alpha-prime then there might be precisely 64 dimensions of stringy uncertainty. What might be the meaning of 64 dimensions of stringy uncertainty? Each dimension of stringy uncertainty might be represented by a one-dimensional particle path tracking a virtual particle of fundamental type. If string vibrations are confined to 3 copies of the Leech lattice, then there might be 1 dimension of matter time, 1 dimension of antimatter time, 3 dimensions of linear momentum, 3 dimensions of angular momentum, and 64 dimensions of virtual particle paths. (The 3 copies of the Leech lattice are connected with the Koide formula.) In any case, string theory with the infinite nature hypothesis might have very different physical implications from those of string theory with the finite nature hypothesis.

MOTL ON THE COPENHAGEN INTERPRETATION

According to Motl, “If you open any complete enough description of the Copenhagen interpretation or if you look at Bohr's or Heisenberg's own texts, you will invariably see something like the following six principles:

1. A system is completely described by a wave function ϕ, representing an observer's subjective knowledge of the system. (Heisenberg)

2. The description of nature is essentially probabilistic, with the probability of an event related to the square of the amplitude of the wave function related to it. (The Born rule, after Max Born)

3. It is not possible to know the value of all the properties of the system at the same time; those properties that are not known with precision must be described by probabilities. (Heisenberg's uncertainty principle)

4. Matter exhibits a wave–particle duality. An experiment can show the particle-like properties of matter, or the wave-like properties; in some experiments both of these complementary viewpoints must be invoked to explain the results, according to the complementarity principle of Niels Bohr.

5. Measuring devices are essentially classical devices, and measure only classical properties such as position and momentum.

6. The quantum mechanical description of large systems will closely approximate the classical description. (The correspondence principle of Bohr and Heisenberg)"

In his discussion of Schrödinger's cat, Motl wrote, "It makes no sense to claim that it's "predetermined" that the cat would be seen as alive. The free-will theorem, among other, morally equivalent results, shows that the actual decision whether the cat is seen alive or dead has to be made at the very point of the spacetime where the event (measurement) takes place; it can't be a functional of the data (any data) in the past light cone."

According to Motl, "… the Copenhagen interpretation … clearly doesn't have any demonstrable flaws. It has no internal inconsistencies and it is not in contradiction to any observation done as of today."

http://motls.blogspot.com/2011/05/copenhagen-interpretation-of-quantum.html

I have suggested that the Copenhagen interpretation might have a problem in explaining the space roar, the photon underproduction crisis, and the empirical facts relating to Milgrom's Modified Newtonian Dynamics (MOND). The qualitative basis of my speculation is as follows: The space roar is empirical evidence that the inflaton field occurs in nature. Photons and gluons never escape from a measurable universe into the interior of the multiverse. Gravitons travel at the speed of light on average. A statistically few gravitons travel slightly slower than the speed of light and thereby generate Milgromian gravitational effects. A statistically few gravitons travel slightly faster than the speed of light and escape from a measurable universe into the interior of the multiverse; the escape process generates both the nonzero cosmological constant and the inflaton field. What does the preceding speculation predict? The answer is unclear, but I have suggested that the Fernández-Rañada-Milgrom effect, the Space Roar Profile Prediction, and the 64 Particles Hypothesis might be plausible predictions from the speculation.

How might Motl's 6 principles be modified? Replace Motl's Principle (1) by "A system is completely described by a wave function ϕ, representing an observer's subjective knowledge of the system, PROVIDED THAT FREDKIN-WOLFRAM INFORMATION IS NOT

NECESSARY FOR THE DESCRIPTION. Replace Motl's Principle (2) by "The description of nature is essentially probabilistic, EXCEPT FOR PHENOMENA THAT CANNOT BE UNDERSTOOD WITHOUT FREDKIN-WOLFRAM INFORMATION, with the probability of an event related to the square of the amplitude of the wave function related to it; HOWEVER, SOME PHENOMENA, SUCH AS THE SPACE ROAR, THE PHOTON UNDERPRODUCTION CRISIS, AND SOME EMPIRICAL FACTS RELATED TO MOND, MIGHT REQUIRE WOLFRAM'S AUTOMATON FOR PHENOMENONOLOGICAL DESCRIPTION.

How is the preceding speculation relevant to Lestone's heuristic string theory? The finite nature hypothesis needs explanatory mechanisms that prevent various singularities and infinities from occurring.

BURTON RICHTER ON THE STRING LANDSCAPE

"Susskind and the Landscape school have given up. To them the reductionist voyage that has taken physics so far has come to an end. Since that is what they believe, I can't understand why they don't take up something else — macramé, for example." — Burton Richter, 29 January 2006 letter to the New York Times

http://www.math.columbia.edu/~woit/wordpress/?p=444 "String Phenomenology and the Landscape", 11 August 2006, "Not Even Wrong" blog

Is Burton Richter's criticism of the string landscape too harsh? Is the string landscape destined to become a permanent part of theoretical physics? If the string landscape can provide models of any plausible (or implausible) physics, then how can the string landscape be eliminated from consideration? How might Lestone's heuristic string theory be relevant to the string landscape? Does Lestone's heuristic string theory (with generalization to quarks) suggest that formation of an event horizon might require an infinite amount of gravitational energy?

MOND VERSUS THE STRING LANDSCAPE

"To my growing incredulity, each observation that was puzzling in the context of dark matter turned out to be confirmation of one of Milgrom's long standing conjectures." — Stacy McGaugh

http://www.astro.umd.edu/~ssm/darkmatter/LCDMriff.html "Through a Universe Darkly", Stacy McGaugh

"It should be reminded that, while the main evidence for dark matter halos comes from the rotation curves of spiral galaxies, the lens galaxies analyzed here are ellipticals, for which it is much more difficult to derive velocity diagnostics. Some controversy has arisen about the presence of dark matter halos around elliptical galaxies (Romanowsky et al. 2003; Dekel et al. 2005). However, massive ellipticals are generally considered as the result of fusion of spiral galaxies. It is thus hard to understand how dark matter halos would be present around spirals and absent after their fusion. Some additional evidence is provided by a number of recent gravitational lensing studies which find a good correlation of the ellipticity and position angle of the total mass with those of luminous matter (Sluse et al.

2012; Koopmans et al. 2006; Gavazzi et al. 2012). Adding our result, we can conclude that the ellipticity, position angle and length scale of the total mass are strongly correlated with those of luminous matter. This suggests that the total mass distribution in early-type galaxies closely follows the light distribution and sheds doubts on the existence of extended galactic halos made of exotic, non-baryonic particles." — Pierre Magain & Virginie Chantry

http://arxiv.org/abs/1303.6896 "Gravitational lensing evidence against extended dark matter halos", Magain & Chantry, 2013

"Theories of the cosmological constant fall into two classes, those in which the vacuum energy is fixed by the fundamental theory and those in which it is adjustable in some way. For each class we discuss key challenges. The string theory landscape is an example of an adjustment mechanism." — Joseph Polchinski

http://arxiv.org/abs/hep-th/0603249 "The Cosmological Constant and the String Landscape", Joseph Polchinski, 2006

Is MOND an essential clue for eliminating (or drastically restricting) the string landscape? Are MOND and Lestone's heuristic string theory somehow related?