TITLE: Foundations of Physics: Edward Witten versus Joy Christian versus Stephen Wolfram

Is Milgrom the Kepler of contemporary cosmology? What is the probability that Milgrom has been wrong or self-deluded since 1983? Answer: probability zero. Why? The answer is revealed in the work of McGaugh and Kroupa. Is M-theory the only way to make sense of Milgrom's acceleration law for galactic rotation curves? What is the main problem with M-theory?

MILGROM DENIAL HYPOTHESIS: The main problem with M-theory is that M-theorists fail to realize that Milgrom is the Kepler of contemporary cosmology.

If the preceding hypothesis is wrong, then what is the main problem with M-theory?

Why does M-theory have so many critics? M-theory seems necessary for the foundations of physics.

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

"Contemporary developments in theoretical physics suggest that another revolution may be in progress, through which a new source of "fuzziness" may enter physics, and spacetime itself may be reinterpreted as an approximate, derived concept." — Edward Witten, "Reflections on the Fate of Spacetime", p. 24

http://www.sns.ias.edu/~witten/papers/Reflections.pdf

Is a superstring a form of virtual mass-energy that uses quantum information to unify spacetime and energy? If the answer to the preceding question is no then the equivalence principle should hold for both real and virtual mass-energy; if the answer to the preceding question is yes then the equivalence principle should hold for real mass-energy but NOT for virtual mass-energy. Is a superstring a form of both real and virtual mass-energy that uses quantum information in a way which is compatible with the Copenhagen interpretation? If the answer to the preceding question is yes then dark matter particles should explain dark matter. Is the Copenhagen interpretation 100% valid except for a few esoteric phenomena involving M-theory? Is Bell's theorem 100% valid except when the Copenhagen interpretation fails in terms of M-theory?

"… could quantum mechanics just be a sort of coarse average over a much deeper theory … ?" — Anthony Leggett

http://www.youtube.com/watch?v=Xyoqu_NPJQ4 "Bell's Theorem, Entanglement, Quantum Teleportation and All That - YouTube"

Consider 3 possible variants of M-theory:

(1) Seiberg-Witten M-theory, which is compatible with the Copenhagen interpretation;

(2) deterministic M-theory with local realism based upon Christian's Theorema Egregium;

(3) modified M-theory with non-local realism based upon Wolfram's mobile automaton operating on a network of information below the Planck scale.

Is M-theory the only realistic hope for the unification of quantum field theory and general relativity theory? The following three postings give some ideas on M-theory:

http://vixra.org/pdf/1204.0095v1.pdf "Seiberg-Witten M-theory as an Almost Successful Predictive Theory"

http://vixra.org/pdf/1205.0067v2.pdf "Is Christian's Parallelized 7-sphere Model Essential for the Physical Interpretation of M-theory?"

http://vixra.org/pdf/1202.0092v1.pdf "Finite Nature Hypothesis and Space Roar Profile Prediction"

Does Wolfram's mobile automaton require a Fredkin delivery machine and a Nambu transfer machine? If there is a Nambu transfer machine then what is its smoothing? Can Wolfram's ideas explain the free parameters of the Standard Model of particle physics? In a 2002 review of Wolfram's book "A New Kind of Science" (NKS), Scott Aaronson suggested that Wolfram's NKS Chapter 9 would not work as a finite, digital model of nature because of Bell's theorem.

http://www.scottaaronson.com/papers/nks.ps "Book Review of A New Kind of Science'"

Witten and Wolfram are widely regarded as geniuses, although controversial geniuses. Is Joy Christian regarded as a genius by some scientists?

As of 2012, Associate Professor David Coutts is head of the Department of Physics and Astronomy at Macquarie University.

http://physics.mq.edu.au/directory/person.htm?id=dcoutts "David Coutts home page"

In a May 16, 2012 reply to an e-mail concerning J. Christian's work on Bell's theorem, Professor Coutts wrote," … I know Joy very well and have followed his work on the arxiv and in extensive private discussions with him. He is a highly original and very deep and careful thinker, but like everyone, he is not infallible. I am awaiting delivery of his book which I have on order (you may wish to purchase it from Amazon etc.). Upon receipt of his book (which I believe is mostly a collection of his arxiv papers) I hope to be in a better position to properly consider his highly original and very controversial proposals."

Scott Aaronson of M.I.T. and Joy Christian of Oxford have been in a dispute which can be found on Aaronson's blog "Shtetl-Optimized".

"Bell's-Inequality-Denialist Joy Christian …"

In comment #583 of the preceding blog-thread, J. Christian makes a response to David Brown's observation, "… According to J. Christian, entanglement and all quantum phenomena are explained by the Theorema Egregium, which is "proved" on the basis of higher quantum states. I claim we might as well beg the question mathematically because the significance of the Theorema Egregium is really all about physics. It seems to me that the objections of Gill, Moldoveanu, and Aaronson are wrong mathematically but that is fundamentally irrelevant because the Theorema Egregium is really something that needs to be empirically tested (and how it was derived mathematically is a secondary issue)." The response? "Well said. Very well said."

On the other hand, Christian and Brown are substantially in disagreement on many issues. It must be said that Christian is the one with the PhD in physics and Brown is the one without any degree in physics. Most of Christian's papers are available at arXiv.org :

I conjecture that Christian has at least 4 genius-level ideas:

(1) In order to understand the fundamental mechanisms of nature, replace Bell's quantum SU(1) states by quantum SU(8) states.

(2) Local realism causes quantum phenomena by means of the topology of the set of all possible measurement results. The topology disallows measurements that should be possible within the Copenhagen interpretation.

(3) The observed discipline of quantum correlations has an explanation consisting of identifying the symmetries of physical reality with the symmetries of a parallelized 7-sphere in the sense of teleparallel gravity. In other words, Christian's Theorema Egregium is physically valid.

(4) The parallelized 7-sphere is locally accessible to measurement. From the point of view of the Copenhagen interpretation the Alice/Bob quantum SU(1) states seem to have a quantum correlation that travels faster than the speed of light. From the point of view of Christian's theory of local realism, the Alice/Bob quantum SU(1) states are locally measured in terms of local-realistic SU(8) states via the parallelized 7-sphere.

What do the preceding ideas imply in terms of M-theory? In Seiberg-Witten M-theory, the 7 extra superstring dimensions represent a MIXTURE of real and virtual mass-energy so that the 7 extra dimensions have to approximately curl up into 4-dimensional spacetime at low energy-densities. In deterministic M-theory, the 7 extra superstring dimensions represent possible MEASUREMENT and virtual mass-energy but NOT real mass-energy. Therefore, in deterministic M-theory, the 7 extra dimensions should show up in 11-dimensional phenomena involving the virtual

mass-energy involved in superconductivity and superfluidity. Also, in deterministic M-theory, the gauge group (outside of black holes) is SU(8) so that deterministic M-theory does not offer a natural way of predicting superpartners that can explain dark matter particles. If dark matter particles do not exist, then the Rañada-Milgrom effect should be 100% valid and not merely approximately valid.

How might one think of Christian's theory in dumbed-down terms? For every point in spacetime create an association with a 7-dimensional vector consisting of the point plus a momentum-randomizing vector with 3 dimensions. Thus as time progresses, the universe might be like a machine that searches a 3-dimensional sphere and retrieves a randomizing vector from the parallelized 7-sphere. In terms of this idea, the momentum-randomizing vector explains the uncertainty in the Heisenberg Uncertainty Principle. That which looks like quantum nonlocality might actually be local realism. However, consider this question: Is Wolfram's "A New Kind of Science" (NKS) one of the greatest books ever written? Is Wolfram's model a case of nonlocal realism?

Assume that nature is finite and digital with a finite number of alternate universes, arranged in matter/antimatter pairs. Let $p(1,U), …. p(N,U)$ be a finite digitization of the M-theoretical 11-dimensional fundamental domain in a particular universe U. Consider a complete finite graph in which every vertex has degree 6 with 1 multiverse edge (or multiverse link) and 5 other edges (or links). (Do we need to label each vertex as real mass-energy or virtual mass-energy?) If two vertices belong to the same $p(n,U)$ within U, then label the multiverse link between them with $(p(n,U),U)$. The other 5 edges (distinct from the multiverse edge) are labeled with Fredkin time (positive for matter, negative for antimatter), Fredkin distance, and 3 different types of Fredkin digit transition (quaternionic i, j, k). If the edges are labeled with integers within a fixed range, then such a scheme might lead to a model of M-theory, given a clever choice of simple rules that simulate physics. Will the preceding scheme work? If not, then how might Wolfram's NKS Chapter 9 lead to new, testable physics? Do we need to use octonions for the Fredkin digit transitions? Do 4 or 5 simple rules suffice to describe the multiverse?

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

What might explain the space roar?

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

If nature is finite and digital, then is there no need for the Higgs mechanism?

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