ABSTRACT

Is the space roar an essential clue for understanding dark energy, dark matter, and the inflaton field? Is there a quantum theory of gravity that explains dark energy and dark matter in a convincing way? Are dark energy, the inflaton field, dark matter, and the space roar closely related natural phenomena? What is the explanation for the space roar? Does the space roar represent new physics or does it have some more mundane explanation? What are the implications of the space roar for string theory and supersymmetry? Do superpartners occur in nature if and only if nature is infinite? Are there decisive empirical tests for the finite nature hypothesis? Does M-theory have a satisfactory computational method if and only nature is finite? Do the monster group and the 6 pariah groups enable M-theory to have a computational method? If X is to string theory as Kepler's laws are to Newtonian mechanics then what is X? Is Milgrom the Kepler of contemporary cosmology?

THE SPACE ROAR

What might be plausible explanations for the space roar?

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

http://vixra.org/abs/1312.0193 "Is the Space Roar an Empirical Proof that the Inflaton Field Exists?"

What might be the best challenge to the empirical validity of the space roar?

http://arxiv.org/pdf/1305.7060.pdf "Is there an unaccounted excess Extragalactic Cosmic Radio Background?", 2013 by Subrahmanyan and Cowsik

According to a Dec. 18, 2013 email I received, a member of the ARCADE2 science team is working on a response or rebuttal to the 2013 publication of Subrahmanyan and Cowsik.

THE EVIDENCE BACKS MILGROM.

Is the space roar relevant to Milgrom's MOND? Does Milgrom's MOND indicate an impending revolution in the understanding of cosmology?

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

"The current standard model of cosmology (SMoC) requires The Dual Dwarf Galaxy Theorem to be true ... the Dual Dwarf Galaxy Theorem is falsified by observation and dynamically relevant cold or warm DM cannot exist." — Pavel Kroupa
http://arxiv.org/abs/1204.2546 "The dark matter crisis: falsification of the current standard model of cosmology", 2012

According to McGaugh and Milgrom, "MOND appears to be in good agreement with the observed velocity dispersions of the dwarf spheroidals of M31."
http://arxiv.org/pdf/1301.0822v2.pdf "Andromeda Dwarfs in Light of MOND", Feb. 2013

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?"

http://www.astro.umd.edu/~ssm/mond/moti_bullet.html Milgrom's perspective on the Bullet Cluster

"I was quite happy with the CCM, as everyone else ..." — Pavel Kroupa
http://www.astro.uni-bonn.de/~pavel/kroupa_cosmology.html Pavel Kroupa: Dark Matter, Cosmology and Progress

KROUPA'S CONCLUSIONS

"The dual dwarf galaxy theorem is violated and thus the standard model of cosmology is violated:

Dynamically relevant dark matter cannot exist in galaxies (The search for it will be fruitless).

Effective dynamics is scale-invariant/Milgromian (i.e. "dark matter" must be mathematically equivalent to Milgromian dynamics)." — Pavel Kroupa

http://www.youtube.com/watch?v=UPVGDXNSBZM "Pavel Kroupa - The vast polar structures around the Milky Way and Andromeda", Nov. 18, 2013 (for quote see 54:14 of 1:12:57)

IMPLICATIONS OF MOND

According to the work of Milgrom, McGaugh, and Kroupa, there are 2 possibilities:

(1) Newton-Einstein gravitational theory is 100% correct but appears to be slightly wrong for some unknown reason.

(2) Newton-Einstein gravitational theory really is significantly wrong.

In case (1) I think there might be dark matter fermions which exhibit bizarre Fermi pairings across alternate universes.

In case (2) what is the simplest way that general relativity theory can fail? In the standard form of Einstein's field equations replace the -1/2 by -1/2 + dark-matter-compensation-constant.

http://vixra.org/abs/1202.0083 "Anomalous Gravitational Acceleration and the OPERA Neutrino Anomaly"

One of the main issues is whether the 4 super-accurate gyroscopes in the Gravity Probe B mission functioned to within design specifications.

http://vixra.org/pdf/1207.0049v1.pdf "Gravity Probe B and the Rañada-Milgrom Effect"

Is it possible to use Wolfram's mobile automaton to perform string theoretical calculations? What are string theory's empirical predictions?

SUPERPARTNERS AND THE INFINITE NATURE HYPOTHESIS

"Because there are so few string theories, the general framework of string theory makes certain general predictions that are out of reach without string theory: 1. Gravity ... 2. Nonabelian Gauge Symmetry ... and 3. Supersymmetry ..." —Edward Witten

http://www.sns.ias.edu/~witten/papers/mmm.pdf "Magic, Mystery, and Matrix", 1998

"One day we may understand what string theory really is." — Edward Witten

http://www.sns.ias.edu/~witten/papers/Unravelling.pdf "Unravelling string theory", 2005, E. Witten

If superpartners do not occur in nature, then might we assume that some drastic hypothesis should be added to string theory? Consider the following (rather bizarre) hypothesis: Nature is finite if and only if the monster group and the 6 pariah groups enable M-theory to have a computational method if and only if there exist precisely 64 fundamental particles if and only if the multiverse has an empirically valid representation as a 72-ball.

http://vixra.org/abs/1301.0045 "Does Each Superstring Have 24 D-Brane Charges?"

FUZZY ENERGY TENSOR CONJECTURE

The quantized metric tensor has 16 dimensions of uncertainty with respect to itself. Each of the 16 dimensions has 4 dimensions of uncertainty with respect to the energy tensor. Spacetime and energy emerge from the explicit or implicit measurement of the 64 dimensions of quantum uncertainty. The 64 dimensions of quantum uncertainty are mapped into operations on 3 copies of the Leech lattice. Symmetries within this hypothetical mapping generate 1 dimension of matter time, 1 dimension of antimatter time, 3 dimensions of linear momentum, and 3 dimensions of angular momentum. Symmetries within the hypothetical mapping thus yield 64+8 = 72 fundamental dimensions for the 72-ball representing the multiverse. All multiverse measurement occurs on the 71-sphere which is the boundary of the 72-ball. All nonmeasured mass-energy occurs in the interior of the 72-ball. For each explicitly or implicitly measured point in spacetime with an energy density, there exists some 64 by 64 matrix with eigenvalues representing the frequencies of the 64 fundamental particles at that particular point; for each fundamental particle, the

frequency is zero if and only if that type of particle does not occur at that particular point of spacetime.

MAGNETIC MONOPOLES

Note that if magnetic monopoles occur in free space, then the so-called “Fuzzy Energy Tensor Conjecture” is falsified.

"In 2009 ,,, three experimental teams all reported evidence of magnetic monopoles in quick succession." — 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 are predicted by some theories, and normally require a huge mass. Their mass is predicted to be in the range of milligrams, which is huge for a single particle. This is because the Universe would have to focus a lot of energy at a single point to create a source of magnetic field out of the vacuum." — Jonathan Morris

http://www.drillingsraum.com/magnetic_monopole/magnetic_monopole.html "Magnetic Monopole - Modern Physics, Interview with Jonathan Morris", 2010

Spin-ice magnetic monopoles do not, in and of themselves, falsify the “Fuzzy Energy Tensor Conjecture”. Also, the Koide formula and Lestone’s heuristic string theory might be essential for understanding the foundations of physics even if magnetic monopoles occur in free space.

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

http://vixra.org/abs/1312.0038 “Does Lestone's Heuristic String Theory Lead to Effective Worldsheet Calculations?”

Is it impossible to empirically refute the string landscape, supersymmetry, and/or eternal cosmological inflation?

SIMPLICITY AND QUANTUM GRAVITY

“La semplicità è la massima raffinatezza.” (Simplicity is the ultimate sophistication.) — Leonardo da Vinci

http://artezza.altervista.org/la-citazione-del-giorno-17/

“If you can’t explain it simply, you don’t understand it well enough.” — Einstein

What is quantum gravity all about? Photons and gluons can’t escape from the universe in which they are located. Gravitons travel at the speed of light on average. A statistically significant few gravitons travel slower than the speed of light. These slow gravitons cause the Fernández-Rañada-Milgrom effect. A statistically few gravitons travel faster than the speed of light and escape from the boundary of the multiverse into the interior of the multiverse. These fast gravitons cause the nonzero cosmological constant and the inflaton

field. Electromagnetic radiation from the inflaton field shows up as the space roar. If the fast gravitons never escaped from the universe in which they are located, then the slow gravitons and the fast gravitons would average out, yielding Einstein's field equations with cosmological constant = zero and dark-matter-compensation-constant = zero. Is the preceding scenario a mélange of nonsense?

Is M-theory the only plausible path to a mathematical model for the multiverse? Does M-theory provide a way of explaining the flyby anomaly?

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

Are there at least 2 decisive empirical tests for NKS Chapter 9?

http://vixra.org/abs/1312.0193 "Is the space roar an empirical proof that the inflaton field exists?"
http://quantumfrontiers.com/2013/11/05/fundamental-physics-prize-prediction-green-and-schwarz/#comments (refs. 5, 6, 7)

On 12/20/13 5:17 AM, David Brown wrote:
Prof. Witten: Do you have an opinion concerning the comments posted for?
http://quantumfrontiers.com/2013/11/05/fundamental-physics-prize-prediction-green-and-schwarz/
— D. Brown

On Fri, Dec 20, 2013 at 3:54 AM, Edward Witten wrote:
I am generally sympathetic with these observations
Edward Witten