

MOND and the Photon Underproduction Crisis

ABSTRACT

A recent study entitled "The Photon Underproduction Crisis" claims that there are two surprising possibilities: the first possibility is that galaxies and quasars contribute far more photons than astronomers now believe; the second possibility is that the Λ CDM model of the low-redshift universe is significantly wrong. Milgrom's acceleration law (MOND) implies that the Λ CDM model is significantly wrong. This brief communication makes a Photon Underproduction Profile Prediction based upon a speculative MOND-based theory of string theory with the Finite Nature Hypothesis.

UNEXPLAINED PHOTON UNDERPRODUCTION

"... either conventional sources of ionizing photons (galaxies and quasars) must contribute considerably more than current observational estimates or our theoretical understanding of the low-redshift universe is in need of substantial revision."

<http://iopscience.iop.org/2041-8205/789/2/L32/article> "The Photon Underproduction Crisis"

<http://arxiv.org/abs/1404.2933> "The Photon Underproduction Crisis", 10 April 2014

https://en.wikipedia.org/wiki/Lyman-alpha_forest

https://en.wikipedia.org/wiki/Cosmic_Origins_Spectrograph

<http://arxiv.org/abs/astro-ph/0611541> "The Physics and Early History of the Intergalactic Medium" by Barkana and Loeb

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

MODIFIED NEWTONIAN DYNAMICS

In 1983 Milgrom published a theory of MODified Newtonian Dynamics (MOND), based upon studies of galactic rotation curves.

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

Is MOND the key to understanding string theory? String theory with the Finite Nature Hypothesis suggests a Space Roar Profile Prediction.

<http://vixra.org/abs/1202.0092> "Finite Nature Hypothesis and Space Roar Profile Prediction"

<http://vixra.org/abs/1401.0226> "What Is Measurement? Why Does Measurement Exist?"

Is the "The Photon Underproduction Crisis" an essential clue for understanding string theory?

THE PHYSICAL BASIS OF STRING THEORY

If nature is infinite, there might not be a plausible way to eliminate the string landscape.

https://en.wikipedia.org/wiki/String_theory_landscape

String theorists seem to think that the Heisenberg Uncertainty Principle should be replaced by a new uncertainty principle involving \hbar and α -prime. I think that the Heisenberg Uncertainty Principle should not be replaced but Einstein's equivalence principle should be replaced.

I conjecture that dark energy has negative gravitational mass-energy and zero inertial mass-energy. I conjecture that dark matter has positive gravitational mass-energy and zero inertial mass-energy. The assumption that nature is finite and digital gives hope that the individual universes comprising the multiverse have synchronized string vibrations that yield decisive predictions.

PHOTON UNDERPRODUCTION HYPOTHESIS

Several hypotheses underlie my Space Roar Profile Prediction. Consider Hypotheses A through D:

(A) The % of dark matter + the % of standard matter remains constant over spans of cosmological time. Let $(20 + A)$ % denote this constant %.

(B) The % of dark energy remains constant over spans of cosmological time. Let $(70 + B)$ % denote this constant %.

(C) The % of standard matter decreases over spans of cosmological time according to the formula: % of standard matter at time $T = (20 + A) * (1 - (T / (81.6 \text{ billion years})))$ %, where T is the age of the universe and T is less than 80 billion years.

(D) The % of dark matter increases over spans of cosmological time according to the formula: % of dark matter at time $T = (20 + A) * (T / (81.6 \text{ billion years}))$ %, where T is the age of the universe and T is less than 80 billion years.

Precise astronomical data allows the approximate calculation of the constants A, B. $.0456 \pm .0015$ is the % of baryon density in the Λ CDM model.

$.228 \pm .013$ is the % of dark matter in the Λ CDM model. By addition, we see that $.2736 \pm .0145$ is the supposedly constant % hypothesized. (That is, $A = 7.36$, where $A + B = 10$.)

<http://vixra.org/abs/1202.0092> "Finite Nature Hypothesis and Space Roar Profile Prediction"

$z = 3.0$ corresponds to an age of the universe of about 2.1 billion years.

<http://apod.nasa.gov/apod/ap130408.html> APOD: 2013 April 8 - A Redshift Lookup Table for our Universe

PHOTON UNDERPRODUCTION PROFILE PREDICTION FOR LOW RED-SHIFT COSMOLOGY:

Suppose that T is an age between 2.1 billion years and 13.7 billion years. For an analysis similar to that carried out by the science team that wrote "The Photon Underproduction

Crisis”, the factor that represents the discrepancy of photon underproduction for the universe with age T is given by

$(27.36) * (1 - (T / (81.6 \text{ billion years}))) / 4.56$ approximately.

Note that

$$(27.36) * (1 - (13.7 / (81.6))) / 4.56 = 4.992647...$$

$$(27.36) * (1 - (7 / (81.6))) / 4.56 = 5.485294...$$

$$(27.36) * (1 - (2.1 / (81.6))) / 4.56 = 5.845588...$$