

# A Return of Cosmology to Newtonian Mechanics?

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**Abstract** Dark matter thought to explain the high velocities of stars in our galaxy and cluster galaxies including gravitational lensing in the Bullet cluster does not exist, but rather is an illusion caused by the redshift in cosmic dust that overstates astronomical velocities beyond that given by Newtonian mechanics suggesting cosmology should return to the static and dynamic Universe once proposed by Einstein.

## Introduction

In the 1930's, the orbital velocities of stars in our galaxy, and the speed of galaxies in the Coma cluster inferred from redshift were found far greater than expected by Newtonian mechanics suggested the presence of dark matter. In the 1960's, gravitational lensing in the Bullet cluster based on redshifts of source and lens also hypothesized the presence of dark matter. To date, experiments have not yet verified the hypothesis that dark matter does indeed exist.

In this regard, MOND is currently proposed as an alternative if the dark matter hypothesis is not experimentally verified. MOND stands for Modified Newtonian Dynamics and is based on the argument that the laws of gravity need to be modified in the very weak field regime to explain the high velocities inferred from optical redshifts. Indeed, the purpose of the instant *Dark Matter & Modified Gravity Conference* is to choose between the research programs of Dark Matter and Modified Gravity, and also in choosing between different models within each program.

## Purpose

The purpose of this paper is to propose the Dark Matter research program include Newtonian mechanics as the limit of Einstein's general relativity at small velocities to describe the dynamics of the Universe. Standard lambda-CDM and Modified Gravity models are not necessary because astronomical velocities inferred from are highly overstated redshifts by cosmic dust. Alternatively, if velocities are corrected for dust redshift, galaxy dynamics may be described by traditional Newtonian mechanics.

## Background

In 1926, Hubble's discovery of redshift of light from distant galaxies changed the long-standing paradigm of a static and infinite Universe governed by Newtonian mechanics to a finite and expanding Universe following Einstein's general relativity. However, the Universe is permeated with cosmic dust comprising quantum sized particles. Hubble assumed a dust free Universe and did not consider the light from a receding galaxy to undergo additional redshift by dust on its way to the Earth. Since optical redshift is significantly overstated by cosmic dust, high velocities do not occur and galaxy dynamics need not be based on the lambda-CDM or Modified Gravity models. Instead, galaxy dynamics follows the low velocity Newtonian limit of Einstein's general relativity.

The redshift in cosmic dust went unnoticed for almost a century because the light-matter interaction of galaxy light with dust was assumed to follow classical physics allowing the heat capacity of the atoms in nanoscopic dust particles to conserve light by an increase in temperature. But the heat capacity of the atom given by the Planck law of QM is not scale invariant being finite at the macroscale while vanishing at the nanoscale. QM stands for quantum mechanics. Conservation of the galaxy photon is therefore only possible by a non-thermal mechanism proposed here to be simple QED.

## Theory

Simple QED relies on the high surface-to-volume ratios of cosmic dust where the galaxy photon is absorbed almost entirely in the dust surface. Dust atoms are thereby placed under the high EM confinement necessary for the atomic heat capacity to vanish without an increase in temperature. Since the surface heat cannot be relieved by thermal expansion, non-thermal standing EM radiation is created within the dust having half-wavelength  $\lambda_0/2 = d$ , where  $d$  is the dust diameter. In effect, a redshifted galaxy photon having wavelength  $\lambda_0$  is created inside the dust particle depending on its dimensions, i.e., the energy of the galaxy photon adjusts within the EM confinement defined by the dimension between opposing dust surfaces. The speed of light  $c$  corrected for the refractive index  $n$  of the dust gives the Planck energy  $E$  of the redshifted galaxy light,  $E = h(c/n)/\lambda_0$ . On Earth, the galaxy light is observed to have wavelength  $\lambda_0$  with redshift  $z = (\lambda_0 - \lambda)/\lambda$ , where  $\lambda_0 = 2nd$ . Once the Planck energy of the galaxy photon is absorbed in the dust surface is expended in forming the redshifted photon, the EM confinement vanishes allowing the redshifted photon to freely travel to the Earth.

## Application

Dust redshifts the galaxy light beyond that given by the true recession redshift thereby overstating velocities to the extent that to hold the galaxies together dark matter is thought to exist. In M31, redshift  $z$  was limited  $< 0.001$ , and therefore only redshifts near the NII line at 658.3 nm were measured. Typically, silicates of cosmic dust have refractive index  $n = 1.3$  over a range of diameters  $d < 500$  nm. For small fluctuations about  $z = 0.001$ ,  $d = 253.44$  nm. What this means is a flat rotation curve near  $z = 0.001$  is observed because dust having diameters near 253.44 nm are assumed uniformly distributed along the radius of the galaxy. Dust redshifts  $z > 0.001$  occur, say in the NIR, but were not reported for M31 because the NIR redshift was out of the range of the expected NII line measurement.

## Conclusions

Because of the ubiquity of cosmic dust in the Universe all astronomical redshift measurements including galaxy rotation curves and gravitational lensing that infer the existence of dark matter are questionable as respective redshifts are overstated, the consequences of which suggest galaxy dynamics is governed by Newtonian mechanics and not the lambda-CDM or Modified Gravity models.

Newtonian mechanics should be included in the *Dark Matter & Modified Gravity Conference* as an alternative research program to Dark Matter and Modified Gravity.