Redshift by Cosmic Dust trumps Hubble and Tired Light Theories

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Universe expansion based on Hubble redshift of galaxy light including the critique thereof by Tired Light theories are held in question by Cosmic Dust.

Hubble and Tired Light Theories

In 1929, Hubble formulated a law that the velocity of a receding galaxy is proportional to its distance to the Earth. The Hubble relation held in all directions suggesting to de Sitter that the Universe was consistent with the expansive metric of Einsteins theory of general relativity. However, others thought the Hubble redshift was caused by mechanisms without Universe expansion. Zwicky proposed that galaxy photons redshift because they lose energy as they scatter upon collision with cosmic dust particles (DPs) before entering the Earth, a redshift theory called Tired Light. See www.en.wikipedia.org/wiki/Tired_light. Recently, Ashmore extended Tired Light to loss of energy in galaxy photons upon collisions with electrons. See www.lyndonashmore.com/.

Objections to Tired Light theories are generally based on the argument that scattered light should blur the galaxy image, and therefore are dismissed because the images are clear and not blurred. See www.astro.ucla.edu/~wright/tiredlit.htm. However, claims that Tired Light theories do not explain all the predictions of Big Bang cosmology should be set aside because there is no mandate in science that any theory must totally stand alone, e.g., the anisotropy of the cosmic microwave background (CMB) in the current epoch may be simply explained by the static Universe in the current epoch having nearly uniform temperature everywhere of about 2.726K.

Alternative QED Induced Light Theory

An alternative to the Hubble and Tired Light theories is the theory of QED induced redshift caused by the absorption of galaxy light in DPs. QED stands for quantum electrodynamics. See www.nanoqed.org at “Dark Energy and Cosmic Dust” and “Reddening and Redshift”, 2009. QED theory asserts the redshift Z is spontaneous upon the absorption of light. Here Z = (Lo - L)/L, where L is the wavelength of galaxy light and Lo is the wavelength of the light emitted from the DP.

QED induced redshift may be understood by treating the absorbed galaxy photon as electromagnetic (EM) energy confined within the DP geometry. Recall from quantum mechanics (QM) that photons of wavelength Lo are created by supplying EM energy to a QM box with walls separated by Lo/2. For a spherical DP of diameter D, the QED photons are produced at a wavelength Lo = 2Dn, where n is the index of refraction which for the typical DP of amorphous silicate has n = 1.45. Hence, DPs having D = 0.25 microns redshift the Lyman-alpha line at 0.121 microns to a red line at 0.725 microns with Z ~ 5. If the QED induced redshift in DPs at Z = 5 is erroneously interpreted by the Hubble law, the galaxy recession velocity is 95 % of the speed of light when in fact the Universe is not expandingl.

Tolman Test and Supernovae Spectra Aging

Shortly after the Hubble discovery, Tolman devised a test to distinguish between a static and expanding Universe. See www.en.wikipedia.org/wiki/Tolman_surface_brightness_test. In a static Universe, the light intensity of an object drops inversely with the square of its distance from the observer, but the apparent area of the object also drops inversely with the square of the distance, so the brightness given as the intensity per unit area of the object is independent of the distance. However, if the Universe is expanding, astronomers claim the brightness is reduced by the fourth power of (1+Z). In 2001, Lubin and Sandage showed the redshift gave a reduction in brightness by the cube of (1+Z). Although the brightness is not reduced by the

fourth power of (1+Z), the conclusion was the brightness test is consistent with the reality of Universe expansion.

However, there is a problem with the Tolman test because the brightness B of an object in the static Universe is not assumed reduced by absorption in DPs. By QED theory, a single interaction with a DP emits light at wavelength Lo = (1+Z)L. Therefore the brightness Bo at the observer is Bo = hc/Lo = hc/L(1+Z) = B/(1+Z), or the object brightness is reduced by (1+Z), but not by the cube of (1+Z) as measured. Closer agreement is found for multiple interactions, e.g., for N interactions, B drops inversely with the product (1+Z1)(1+Z2)…(1+ZN), where ZK is the redshift for interaction K.

The Tolman test aside, the aging of Supernovae spectra is found to drop inversely with (1+Z) at the observer. See Blondin et al. at www.astro.ucla.edu/~wright/tiredlit.htm. For spectra defined by brightness/unit area, Bo = B divided by the respective wavelength. Equivalence is found by Bo/Lo = B/L(1+Z). Hence, QED theory for the spectra at the Supernovae is consistent with the measured spectra showing an inverse drop by (1+Z).

Time Dilation of Supernova Light Curves

Tired Light theories are claimed unable to explain the observed time dilation of Supernova light curves at high Z redshift, i.e., nearby supernovae that take 20 days to decay will take 40 days to decay when observed at redshift Z =1 See e.g., www.astro.ucla.edu/~wright/tiredlit.htm. However, redshift in the QED theory differs from Tired Light in that it is proportional to the number of DPs in the light path that in turn is proportional to the total dust mass emitted in the Supernova explosion. Time dilation in observing Supernova explosions is nothing more thermal cooling of the dust mass, i.e, at high Z the Supernovae having larger dust mass takes a longer time to cool than at low Z. Hence, QED redshift theory based on DPs is consistent with Supernova light curves.

ISM Lights

A more compelling argument that DPs are the source of redshift of galaxy light is found on a far larger scale everywhere by the visible (VIS) light observed throughout the Universe. Ultraviolet (UV) radiation is known to permeate the Universe including the interstellar medium (ISM). Indeed, astronomers explain the infrared (IR) spectra measured in the ISM by the thermal emission following the increase in temperature in DPs upon the absorption of single UV photons. But this is unlikely, because an increase in DP temperature is negated by the QM restriction that the specific heat of DPs vanishes. Also unlikely is VIS light produced in DPs by photoluminescence (PL) because a single UV photon is more likely to be absorbed anywhere in the DP than at the PL color center.

Without thermal emission and PL, the IR and VIS spectra can only be produced by QED induced redshift upon the absorption of single UV photons in DPs. VIS colors in the ISM require DPs having D

Conclusions

1. The measured Hubble redshift Z is caused by DPs and has nothing to do with an expanding Universe. DPs make moot the existence of dark energy because it is no longer necessary in a static Universe.

2. Tired Light theories based on scattering are likely to produce blurring of the object image. QED theory based on absorption and not scattering do not produce blurring.

3. QED theory does not agree with brightness reduction to the cube of (1+Z) in the Tolman test, but is found in agreement with the (1+Z) reduction in aged Supernovae spectra.

4. QED theory based on redshift of DPs is consistent with the observed time dilation of Supernova light

curves.

5. The vivid VIS color variations in the ISM are caused by variations in DP diameter D and far less likely by PL from the chemical composition of the DPs. Larger DPs necessary to produce the IR spectra are found in molecular clouds.

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About QED induced Radiation: Classically, absorbed thermal EM radiation as heat is conserved by an increase in temperature. But at the nanoscale, temperature increases are forbidden by quantum mechanics. QED radiation explains how heat is conserved by the emission of nonthermal EM radiation.

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