

Comments on “Intergalactic Dust Could Be Messing Up Observations, Calculations”
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COMMENTS

Fst states that “redshift is caused by intergalactic dust and maybe the universe is not expanding at all” but was countered by *Ethan Siegal* who stated that dust is an “extremely minor correction to measurements.” *Astrofiend* summarizes:

- (1) “Redshift and ‘reddening’ are two different things...there is a theory flying about that redshift could be caused by interstellar gas and dust, but almost no astronomer or physicist believes it”, and
- (2) Reddening is caused by Rayleigh scattering. Dust “scatters bluer light, leaving redder light to pass through less hindered...the net effect is that the light we see from any object beyond the dust will appear dimmer and redder due to the bluer light being scattered out of our line of sight”...It is important to note that in this effect, the spectral lines that make up the light do not get ‘shifted’ to the red - they stay right where they should be, given the distance to the object. Rather, objects appear redder and dimmer due to the action of removal of blue light from the stream of photons that we eventually see”, and
- (3) “The separate phenomenon of ‘redshift’ ...is where actual spectral lines of atoms - the ‘light fingerprint’ that they emit is shifted to the red end of the spectrum by the direct action of the expansion of the universe i.e. the wavelength of the light of a given frequency when emitted is subsequently stretched by the expansion of space-time itself. The net effect of this is not really a reddening of such objects in visible light, because as blue light gets shifted down to red, so UV light gets shifted down into the blue and so on. Rather, The spectral lines move to the red end of the spectrum, and hence do not appear where they should be. This is a direct indication of the action of the expansion of the universe.”

DISCUSSION

Fst’s comment that redshift may be caused by intergalactic dust particles (DPs) suggests the Universe is not expanding. But *Siegal*’s statement that dust only causes a minor correction to measurements of expansion is typical of astronomers promoting dark energy while *Astrofiend* does not name the sources that claim (i) redshift occurs in DPs, and (ii) almost no astronomer or physicist believes it.

One argument that intergalactic dust produces the redshift of Supernova light without Universe expansion was proposed by Prevenslik See www.nanoqed.org at “Einstein’s Universe”, 2008. Quantum mechanics (QM) precludes DPs having heat capacity and specific heat, and therefore single absorbed Supernova photons cannot be conserved by an increase in temperature. Conservation may only proceed by the Supernova photon having wavelength λ undergoing frequency down-conversion to the EM confinement frequency of the DP by quantum electrodynamics (QED).

The QED process follows creating photons of wavelength λ_0 by supplying EM energy to the proverbial QM box having sides separated by $\lambda_0/2$. For a spherical DP of radius a , $\lambda_0 = 4an_r$ where n_r is the refractive index to correct for the reduced speed of light in the solid DP. The QED induced photon upon emission has wavelength λ_0 and is redshift Z relative to wavelength λ of the Supernova photon by,

$$Z = \frac{\lambda_o - \lambda}{\lambda} \text{ and } \lambda_o = 4 a n_r$$

For amorphous silicate DPs having $n_r = 1.45$ and radii from $a = 0.005$ to 0.25 microns, the H_α and Ly_α lines are shown to have a maximum redshift Z of about 1 and 10, respectively. Ibid, "Dark Energy and Cosmic Dust," 2009.

In QED theory, reddening and redshift are not different things as stated by *Astrofiend*. Consider a 280 nm ($a = 0.14$ micron) amorphous silicate DP absorbing Supernova photons having wavelengths shorter the red photon at 810 nm. All such Supernova photons are redshift by QED to produce one or more red 810 nm photons which would be indistinguishable from those produced by scattering. Hence, this is consistent with *Collin* who states:

"I can't seem to reconcile the difference between the *appearance* of reddened and redshifted light. How would we know which is which? The perception of red is just the wavelength of light that hits our lenses so what would be the difference of light that came in at red wavelengths due to redshifting or reddening?"

Absorption by DPs is far smaller than by scattering, and therefore reddening by redshift of Supernova photons is not expected to be significant. However, redshift measurements of an expanding Universe are significantly affected by DPs. Indeed, redshift may be computed on visual observations of reddening everywhere in the sky. If reddening given by the red photon at 810 nm is treated as the redshift of the Ly_α line at 0.1216 microns from a Supernova, the redshift $Z = 5.7$. Hubble theory would suggest rapid expansion of the Universe when in fact the redshift was caused by absorption in DPs. *Aodhhan* agrees:

Reddening is throwing off the accuracy of redshift measurement. How about that?

Jerry concludes:

Supernova researchers have concluded, or at least assumed, that most of the reddening they observe is due to relativistic effects, not dust.

However, Supernova researchers cannot be unprejudiced in their conclusions. The unequivocal fact that DPs redshift Supernova light shows the Hubble redshift based on Doppler's effect must be held in question. Also held in question are alternative proofs of an expanding Universe such as gravitation lensing that indirectly depends on distance measurement given by Hubble redshift.

CONCLUSIONS

Clearly, DPs preclude the proof that the Universe is expanding based on redshift measurements, i.e., the Universe may be expanding, but cannot be proven by redshift measurements. What this means measurements other than Hubble's redshift are necessary to prove the Universe is expanding before the existence of dark energy may be justified. Indeed, absent an expanding Universe there is no need for dark energy.

In the alternative, the Supernova researchers would have to show the Universe is void of DPs to justify a new paradigm in cosmology based on dark energy. But this is futile because the vivid colors observed throughout the Universe are proof that DPs are everywhere at play in the redshift of galactic light including that of Supernovas. Perhaps, a return to or at least reconsideration of Einstein's notion of a static Universe in dynamic equilibrium is in order at this time.