Galaxy Redshift by Cosmic Dust

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In 1929, Edwin Hubble formulated a law that the velocity of a receding galaxy is proportional to its distance to the earth. This meant that a galaxy moving away from us twice as fast as another galaxy is twice as far away. Hubble based his law on Doppler's effect whereby the wavelength of light from the galaxy is redshift if the galaxy is moving away from us. Thus, by measuring the redshift of known spectral lines, Hubble claimed to estimate the recession velocity of the galaxy relative to the Earth.

Today, astronomers [1,2] take Hubble's Law as proof the Universe is expanding based on the redshift of supernova light. If, however, the redshifts could be shown to have a non-Doppler origin, the Universe need not be expanding. Redshift without an expanding Universe is of utmost importance because many of the outstanding problems in cosmology would be simply resolved by Newtonian mechanics.

In this regard, redshift of galaxy light is shown to be occur [3] upon absorption in submicron cosmic dust particles (DPs) by the mechanism of QED induced EM radiation. QED stands for quantum electrodynamics and EM for electromagnetic. Only single galaxy photon absorption is required. Scattering is inconsequential. QED induced redshift may be understood by treating the absorbed photon as EM energy confined within the DP by total internal reflection (TIR).

TIR confinement is a consequence of the submicron DPs having high surface to volume ratios. The absorption of the galaxy photon is therefore almost entirely confined to the DP surface corresponding to the TIR mode. TIR confinement is only momentary during the absorption of galaxy photon. Since quantum mechanics precludes conservation of the absorbed galaxy photon by an increase in DP temperature, conservation proceeds by the QED induced creation of a redshift photon depending on the DP material and geometry. QED does not create blue shift photos because the energy required is greater than that of the absorbed galaxy photon. Correcting for the reduced speed of light in the solid DP by its refractive index n_r, the photon created is observed at wavelength λ_o,

$$\lambda_o = 2Dn_r = 4an_r \tag{1}$$

where, D is the DP diameter, and a = D/2 is the DP radius. The redshift Z is,

$$Z = \frac{\lambda_o - \lambda}{\lambda} \tag{2}$$

where, λ is the wavelength of the galaxy or supernova light. From [4], the DP radius varies from a = 0.005 to 0.25 microns, Fig. 1 shows the redshift Z of Lyman-alpha (Ly_α) lines for amorphous silicate DPs having n_r = 1.45. At the upper bound DP radius of 0.25 microns, the Ly_α lines are redshift to Z ~ 10 corresponding to NIR photon having λ_o = 1.45 microns. Smaller DPs redshift the Ly_α photon to the VIS, e.g., in a DP radius of 0.1 microns, QED creates a green photon having λ_o = 0.58 microns and Z ~ 3.75. All QED induced redshift occurs without an increase in DP temperature.

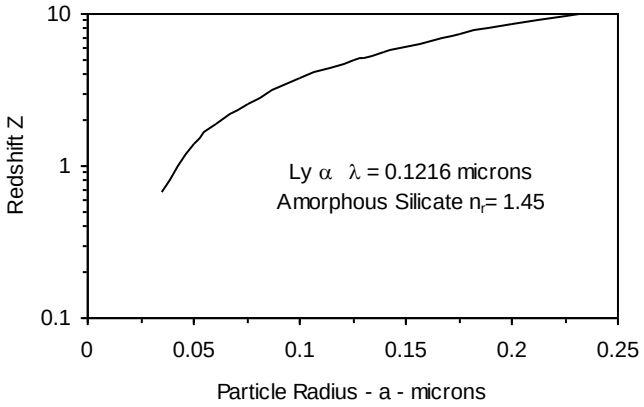

Fig. 1 Cosmic dust induced redshift of Ly_α Line

The QED induced redshift is caused solely by the absorption of the galaxy photon in DPs and has nothing to do with an expanding Universe. Given that galaxy and supernova light is unequivocally absorbed by DPs on its way to the Earth, the Hubble redshift Z is highly likely not related to an expanding Universe. It therefore follows that an accelerating Universe expansion by dark energy [1] based on redshift is unphysical. What this means is the Universe may still be expanding and dark energy may still exist, but Universe expansion cannot be proven from redshift measurements of Supernovae light.

But QED induced redshift has further consequences. Indeed, DPs hold in question the Hubble redshift as proof the Universe began in the Big Bang suggesting the notion once proposed by Einstein of a static Universe in dynamic equilibrium is a far more credible cosmology. Other consequences of redshift in cosmic dust are:

Dark Energy not needed to explain a Universe that is not expanding
Period-luminosity relation qualified in Cepheid stars
Dark Matter not source of Gravitational Lensing
Galaxy Rotation Problem resolved without Dark Matter
No need for MOND to explain Galaxy Rotation Problem
Tolman Surface Brightness reduction corrected to (1 + Z)
Explain the Independence of Redshift in Sunyaev-Zeldovich Effect
Light Curve dilation in Supernovae Explosions

References

[1] Riess, A.G., et al., "Type Ia Supernova Discoveries at Z >1 from the Hubble Space Telescope Evidence for Past Deceleration and constraints on Dark Energy Evolution," ApJ, 607, 665, 2004.
[2] Corasaniti, P.S., "The Impact of Cosmic Dust on Supernova Cosmology," MNRS, February 2008.
[3] Prevenslik, T.V., "Einstein's Universe and Cosmic Dust," at www.nanoqed.org ,2009
[4] Weingartner, J.C. and Draine, B.T., "Dust Grain Size Distributions and Extinction in the Milky Way, large Magellanic Cloud, and Small Magellanic Cloud," AsJ, 548, 296. 2001.