

A FEW FORWARD-LOOKING THOUGHTS

A possibility exists that the equation presented here, or some relatively similar equation, will fit Hubble distance red-shift concepts well.

Any necessary adjustment is probably only simple terms such as the notorious π , $1/\pi$ or $1/(2*\pi)$. It is acknowledged, however, that fundamentally more correct mathematics will result from overtaking these early struggles through competent general relativity and quantum electrodynamics. It is already easy to see that the space-time distance must become a general relativity *ds* line element and this immediately implies the wave mathematics must become relativistic also.

When the scaling becomes sensible, it should be regarded as a preliminary scaling. Data for a large sample of galaxies should be calculated. Doing this correctly will require calculating wavelengths, wave-times and actual *ds* space-time line elements to exterior galaxies, something which will require high precision computer software and mathematics. No other sensible, absolute way of thinking about cosmological distances exists.

If I were directing the project I would have the data calculated in terms of more than one wavelength as a *ds* clock-stick as a reality check, perhaps using hydrogen alpha and beta and the 21 cm line. It is a happy time to see that the quantity Frequency*Wavelength is a remarkably convenient description of the speed of light, and it exists throughout the entire frequency spectrum of all light-like waves. Here is one universal constant, c , which is accurately described by the simple product of two widely varying other quantities, each of which, itself, is rooted well in human mensuration technology. Looking at it from that viewpoint, it is tempting to ask if possibly the other historically vintage constant, h , can be similarly described. Indeed it can. The action quantum is exactly equal to the product of momentum and wavelength for widely differing values of each.

But I digress, and return to the calculation of distances in terms of wavelengths:

For example,

If distances to exterior objects are calculated in 0.5 micron yellow light wavelengths, then

- a. an object 13 billion light years away is $2.33676E+33$ wavelengths of 0.5 micron yellow light, and
- b. an object 2.26 million light years away is $4.67353E+29$ wavelengths of 0.5 micron yellow light.

The waves emitted in those objects gradually increase in length as they travel through the great distances. They gain their increased wavelength by sacrificing momentum. The

change eventually appears as a shift in the spectrum, in dL/L . Equivalently, they gain their increased wavetime by sacrificing energy.

If the equations begin to make more sense in physical understanding of the topological nature of space-time then Hubble distance red-shift assumptions regarding spectrographic data for more distant exterior objects (those ten million light years or more in distance) should be employed and those red-shifts should not be attributed to velocity shifts. They then permit stable and repeatable calculations for the existing accurately as well.

The different forms of data -

1. Doppler near-object velocity-shift data, anchored in earthbound measurements such as radar traffic tickets; and
2. Cepheid and other luminosity estimates of distance, some even for galaxies quite far; and
3. Hubble distant-scale spectrographic data, tentatively estimated to be calculable with an equation based on quantum topology and relativistic cosmology such as suggested here -

would all together permit correlation that increases the overall accuracy of size and distance estimates of the observable universe - more accurate than that attained by discarding Hubble distance red-shift estimates altogether as was the practice until recently.

Such correlation is essential and, I believe, would be quickly rewarded with a substantially firmer concept of the universe.

The world will have to live with the understanding that the universe was already immense before human beings began to explore it, and it never did fit into any palace, castle, or monarchy. That is still a politically controversial area although the international situation is generally proactive and cooperative. More importantly, a distinct advantage is to be had on a successful description of a distance red-shift such as Edwin Hubble suggested. After that, just tests of its existence can be more rationally approached and the international community can profit from the increased accuracy with which the universe is understood - exactly in the same way that the more accurate determination of the Pleiades brought more stability to the political world.

