Solutions of Decay Equation for Decay Rate, h and c

Solutions of the observed Hubble (or cosmological) Red Shift Decay Equation are possible for the decay rate, the action quantum h, and the speed of light c and are easy to obtain. These solutions are important for they show the understanding is internally consistent and part of a closed mathematical system. It is valuable to be certain of that when attempting to describe a phenomenon which may have no upper limit on distance and time. The near-infinities involved still remain within the reasoning of Russell, and do not go beyond the limits suggested by Godel. They do not require the transfinite concepts of Aleph Null and others introduced by George Cantor. One suspects they are even compatible with the ideas of Hegel, though it goes somewhat beyond the dialectical contradictions and unity of opposites.

These derivations of the constants c and h are practical and common-sensical. They can be comprehended within a finite scope in real numbers and permit discussion with a finite, even though large, range. From the original equation the quantity d phi/dt will be derived:

$$\nabla^2\phi = \frac{1}{c^2}\left[\frac{1}{h}\frac{\partial\phi}{\partial t} + \frac{\partial^2\phi}{\partial t^2}\right]$$ Equation 1

$$c^2\nabla^2\phi = \frac{1}{h}\frac{\partial\phi}{\partial t} + \frac{\partial^2\phi}{\partial t^2}$$ Equation 2

$$\frac{1}{h}\frac{\partial\phi}{\partial t} = c^2\nabla^2\phi - \frac{\partial^2\phi}{\partial t^2}$$ Equation 3

$$\frac{\partial\phi}{\partial t} = h\left[c^2\nabla^2\phi - \frac{\partial^2\phi}{\partial t^2}\right]$$ Equation 4

This is the decay rate. At any one time its values depend only on the values immediately preceding it, not on any distant time in the past. This is plainly reminiscent of the Wavefront Reconstruction Principle, named after the famous seventeenth century Dutch astronomer Christian Huygens. It also resembles a mathematical construct called a

Markov Chain, in which "given the present, the future is conditionally independent of the past." See Wolfram Research's wonderful on-line reference mathworld.wolfram.com

The term in square brackets is simply the four-space {x,y,z,-ct} version of the unbounded wave equation. At first glance the dimensionality seems odd; there is a two-space second derivative, and a second derivative in time which appears related through the constant c^2, with the e whole term reducing to a three space that is dreadfully reminiscent of Cartesian 3-space. Four dimensions are actually present; two are orthogonal to the path of the wave, and two appear in the second time derivative. The wave is in four dimensions, of which two are spatial, orthogonal to the path, and two are time, also orthogonal to the path. Meanwhile the dimensions of the velocity of the wave simply cancel along the path; this is more visible when the wave is considered in Gaussian coordinates.

The solution for h is easy; it is

$$h = \frac{\frac{\partial \phi}{\partial t}}{c^2 \nabla^2 \phi - \frac{\partial^2 \phi}{\partial t^2}}$$

Equation 5

This is, so to speak, a piece of the action. This is a crucial point in the whole development, and is not a trick. Human beings, through Max Planck, discovered the constant ratio of energy to frequency in photoelectric field waves, and the constant is also derived here by me for the first time from the wave decay equation, which I wrote that describes the decay process that causes the observed Hubble Red Shift. I'm updating the web page to the sound track from "Lord of the Rings." Have at it, Hobbits. All physics is yours.

The solution for c is scarcely more complicated.

$$c^2 = \frac{\frac{1}{h}\frac{\partial \phi}{\partial t} + \frac{\partial^2 \phi}{\partial t^2}}{\nabla^2 \phi}$$

Equation 6

$$c = \sqrt{\frac{\frac{1}{h}\frac{\partial \phi}{\partial t} + \frac{\partial^2 \phi}{\partial t^2}}{\nabla^2 \phi}}$$ Equation 7

With the photon decay equation thus self-consistent, it becomes more likely a viable candidate for the simplest possible explanation for the observed Hubble Red Shift found in the spectral plates of distant exterior galaxies. If so, this explanation is much simpler than the so-called "Big Bang" and "Expanding Universe" solutions which are intricate and contrived.

It is not possible to determine, from a single stream of photons of identical wavelength at some particular, observed frequency, whether the frequency and wavelength are from a far away source emitting very much shorter waves, or a nearby source emitting only slightly shorter wavelength. Neither the decay rate nor the absolute frequency (wavelength, etc) depend on any kind of integral over the path from the source to the observation. In practice, the Red Shift interpretation as distance makes sense, though only when an entire spectrum is found, so that many different terms, recognizable in the spectral envelope, are found to have been shifted the same amount.

It is not suprising this work emerges slowly. I've followed a question about the Physical Constants for over forty years: Do the known physical constants come anywhere close to forming a complete basis for the real world? This led me to conclude that many pairs of observable constants will behave peculiarly at the limits of their ratios, and if they do that at one end of their range, then they probably are also peculiar at the other end of their range. This kept leading right back to the problem of the Planck action quantum, with the other end of the range of wavelengths being redshift distances, and that led right into the wave equation again. It required numbers that are not terribly large, some equalled by radioactivity and by molecular constants like Avogadro's Number. It is comforting to see the problem closing with derivation of the constants again.

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