Solving the Redshift Equation for the Action Quantum

by

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It was not anticipated without the tranquility that comes with the passage of time that the equation derived for the redshift in terms of a quantum that evolves slowly during the long path through space-time from distant Galaxies can be solved for the action itself.

Almost everything has been stripped from the physics except for the speed of light and the action quantum; the algebra; and our topological dimensionality. These were chosen because they are the most important two physical constants known and their importance derives from the fact that they were the target goals of three thousand years of research. They are vintage philosophy, just as computers evolved from logic itself married to electricity, are vintage technology. We start with a stable form of the existing equation:

$$\nabla^2\phi - \frac{1}{h}\frac{\partial\phi}{\partial t} - \frac{\partial^2\phi}{\partial t^2} = 0$$

Photon Evolution Equation

In a few steps the terms of the equation are rearranged so the 'unknown' action h is on the left side of the equation. This simple approach moves known variables, concepts and dimensions to the right hand side so that things become clearer. The equation can be then solved for this "unknown" h in terms of observed variables, physical and topological dimensionality and algebra's mathematical form so that the equation is ready for use in understanding. This is valuable because physical phenomena-such as cell electrolyte balance, neural activity and connection, signal to noise ratio and others-having to do with quantum scale activity are present that can obscure signals, information and patterns.

Here in plain font are six of the steps:

C^2 del^2 phi = 1/h * phi dot + phi dot dot
C^2 del^2 phi = 1/h phi dot + phi dot dot
C^2 del^2 phi – phi dot dot = 1/h * phi dot
c^2 del^2 phi – phi dot dot) / phi dot = 1/h
phi dot / (c^2 del^2 phi – phi dot dot) = h
h = phi dot / (c^2 del^2 phi – phi dot dot)

$$h = \frac{\dot{\phi}}{Hz^{\,2}\lambda^2\nabla^{\,2}\phi - \ddot{\phi}}$$

Figure 4

With the equation in this form, the next thing is to do something about c, since it is dependent on two human constructions which are the ruler or distance scale for measuring length, and the clock for measuring time. For the clock it is useful to substitute a frequency meter, which measures the phenomenon itself. A clock alone requires one to traverse a distance and then look at the clock to see how far one has traveled. One must have also measured the distance, etc – all too complicated for every neuron in the brain. Signals which are not persistent cannot be true.

For the speed of light c, let us use the idea that the speed of light is equal to the frequency of light times its wavelength: c = Hertz * wavelength, or c = Hz * lambda. Using nu instead of Hz for frequency,

$c = \lambda * \nu$ which when squared is $c^2 = \lambda^2\nu^2$

The resulting equation for the action in terms of the Hubble Red Shift is

$$h = \frac{\dot{\phi}}{\lambda^2\nu^2\nabla^2\phi - \ddot{\phi}}$$

Action quantum in terms of Hubble Red Shift

This must be understood rather abstractly at first. The action quantum is now defined in terms of two observable variables, which are simultaneously true for a given light wave, and three mathematical operators having to do with topological variables normally mapped to time and distance and to a magnitude component of some property phi of the wave itself that is not specified exactly. The three mathematical operators are the variable phi itself, the first time derivative of phi, and the second time derivative of phi. The action quantum is directly proportional to the first time derivative or time rate of change of the variable phi, and inversely proportional to the difference between the scale adjusted second spatial derivative of phi and the second time derivative of phi.

The scale adjustment is the relation necessary to relate the two observable variables to the empirically discovered speed of light, which is measured in terms of the two fundamental dimensions of length and time.

It is hoped that by these simple means, the description of the magnitude of h can be premised on the simplest, most fundamental and most trusted terms possible. By this is meant the distance and time measures, the variable wave phi, and the mathematical operators of differentiation and second derivative.

It should be noticed in this equation that the linear, positive, direct variable is the first, an odd derivative of the wave. The two divisor variables are even derivatives, suggesting a kind of parity. A possibility is to reform the equation to include an *integral* in one of the lower terms. The numerator variable would be undifferentiated; one of the two lower terms would be an integral, and the other of the two lower terms would be a derivative. But this would prevent visualizing the wave's magnitude as changing, which is not the goal here. The author balks at that.

The redshift is such a slow function relative to time and distance, and it was so recently discovered, that it is likely more new consequences of its nature will be unfolding for at least centuries. Inquiry by more persons is more than welcome; it is vital even apart from the author's own feelings. The problem presented by Hubble Red Shift is more than merely ephemeral; it is a problem in fundamental physics. It is the kind of problem which cannot be attacked with high energy approaches that tend to introduce more convolution and turbulence than paths and solutions into the result. It is a question not likely to be heavily funded, and is suitable as a background problem that should rarely be allowed to intrude on other business. In other words, it is more like a very slow puzzle than a problem. In the author's experience, years can go by before a next step is encountered.

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