

A QUANTUM CONNECTION ?

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The exponential expansion of the universe raises a question regarding the expansion on smaller scales. A quantum expansion of matter and space must occur concurrently with macroscopic expansion. If the universe is an XPXP, the same must be true on the quantum level. It is proposed that an exponential mathematical link between quantum physics and cosmological physics exists.

Such a link suggests a “THEORY OF EVERYTHING”, wherein XPXP governs both. Using known quantum expressions:

Schroedinger’s equation:

$$\mathbf{H} \cdot [\psi(t)] = i\hbar \cdot \partial/\partial t [\psi(t)]$$

Has the form of the H/L law for universal expansion, where H (the Hamiltonian) coincidentally corresponds to the exponential coefficient H. \hbar and i are constants.

$$\mathbf{H} \cdot [\psi(t)] = i\hbar \cdot \partial/\partial t [\psi(t)]$$

Rearranging: $\mathbf{H}/i\hbar \cdot (\partial t) = (1/[\psi(t)]) \cdot \partial[\psi(t)]$

integration: $\mathbf{H}/i\hbar \cdot (t) = \ln ([\psi(t)] / [\psi(0)])$
where $[\psi(0)]$ is the operator at t=0

exponentiation: $[\psi(t)] = [\psi(0)] \cdot e^{(\mathbf{H}/i\hbar (t))}$

This is an exponential growth equation which shows the state of the system at some starting time, t=0, and after some time interval t.

The equation is somewhat recognizable, and corresponds to the Hubble/LeMaitre law when H_0 is constant:

$$\mathbf{R} = \mathbf{R}_0 \cdot e^{\mathbf{H}_0 t}$$

This correspondence promises a deeper understanding of quantum physics.