Universal Scaling Laws in Quantum Theory and Cosmology

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We have developed a hyperdimensional geometry, *Dn* or Descartes space of dimensionality of n > 4 for n ≅ 10. This model initializes a formation in terms of the conditions or constants as the space that allows us to calculate a unique set of scaling laws from the lower end scale of the quantum vacuum foam to the current universe.

A group theoretical matrix formalism is made for the ten and eleven dimensional model of this space. For the eleven dimensional expressions of this geometry, a fundamental frequency is introduced and utilized as an additional condition on the topology. The constraints on the *Dn* space are imposed by the relationship of the universal constraints of nature expressed in terms of physical variables.

The quantum foam picture can be related to the Fermi-Dirac vacuum model. Consideration is made for the lower limit of a universal size scaling from the Planck length, $l \approx 10^{-33}$ cm, temporal component, $t \approx 10^{-44}$ sec, density, $\rho \approx 10^{93}$ gm/cm^3 and additional Planck units of quantized variables. The upper limit of rotational frequency in the *Dn* space is given as ◆ ≈ 10^43 Hz, as conditions or constraints that apply to the early universe which are expressed uniquely in terms of the universal constants, *h-bar*, Planck's constant, the G, the gravitational constant and *c*, the velocity of light.

We have developed a scaling law for cosmogenesis from the early universe to our present day universe. We plot the physical variables of the ten and eleven dimensional space versus a temporal evolution of these parameters. From this formalism, in order to maintain the compatibility of Einstein's General Relativity with the current model of cosmology, we replace Guth's inflationary model with a matter creation term. Also we have developed a fundamental scaling relationship between the "size scale" of organized matter with their associate fundamental frequency.