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# The GEMS Unification Theory and Support for the Hidden Dimension Approach in Physics

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The GEMS ( GEM Super) Unification Theory is based on simple physical models yet appears to validate the well-known mathematical path of beginning with the Hilbert Action principle and then expanding it to include first 1 hidden dimension after KK ( Kaluza-Klein), going from 4 dimensional Minkowski space where the Hidden 5th dimension is assumed to "deploy"to some much larger ideal size from the Planck length, M -> MxS1 and then in a similar process , acquiring a new dimension, proposed by Wolfgang Pauli, so that the result is M x S2 satisfying a SO(3) symmetry. The hidden dimensions in this theory are associated physically with electric charge and finally quark "color"charge in the S2 phase. The theory begins with a physical model of Gravity fields based on the "ExB" drift of plasma physics [1] and results in the covariant formula $g^{ab} = \frac{4F^{aq}F^b_q}{F_{cd}F^{cd}}$ Notably, the theory results in a formulas for "G", the Newton Gravitation constant , and the proton mass, that are highly accurate and easily derived from the requirement that the deployment of the K-K hidden dimension separates both EM and gravity and electrons and protons from each other and the Planck Mass, MP, with the 5th dimension deployment from the Planck scale. A crucial parameter in the GEM theory is the Lepton-Baryon end-member (proton-electron) mass ratio :

$\sigma = (mp/me)^{1/2} = 42.8503...$,

where mp and me are the proton and electron rest masses[1] The completed process of K-K dimension deployment is described by the formula:

$ln(ro/rp) \cong \sigma$

where ro is the hidden dimension deployed size

$ro = e^2/((mp*me)^{1/2}c^2)$

, where e is the electron charge in esu units, and rp is the Planck length . This formula is easily inverted to give the highly accurate formula:

$G \cong (\alpha e^2/(mp*me))*exp(-2((mp/me)^{1/2}) = 6.668 x 10^{-8} dyne - cm^2 - g^{-2}$

[2], where α is the fine structure constant. Similarly, an accurate formula for the proton mass results:

$mp \cong MP*\sigma^{-(\alpha^{-1/2}+\alpha)} = 1.67 x 10^{-24} g$

The SO(3) symmetry results from the requirement that the Pauli 6th dimension deployment is constrained in GEM so that the three quark charges q1, q2, q3 not only satisfy the constraint q1+q2+q3 =1 in electron charge units , but also

$(q1)^2 + (q2)^2 + (q3)^2 = 4/9 + 4/9 + 1/9 = 1$

The theory also yields, quite unexpectedly, the masses of the Pions and W and Z bosons, as the result of quantum Mie scatterings of the ZPF off of the hidden dimension structures associated with the electron and proton. Therefore, the path of assuming hidden dimensions can be demonstrated to be fruitful in terms of generating some meaningful numbers that describe the cosmos. A Model for Dark Matter formation through GEM is proposed, involving a partially interrupted transition between the Planck Scale and Baryons resulting in a 1/6 number density of the pre-baryonic population at M~40GeV becoming "GIMPs" with only gravity interactions, the partial interruption being due to quark confinement constraints. Laus Deo

[1] Brandenburg J.E.,(2016) "GEM Unification Theory", Jou. Multidisciplinary Eng. Sci Studies, Vol. 2, 7, July.

[2] Brandenburg J.E. (1992) "Unification of Gravity and Electromagnetism in the Plasma Universe"IEEE Transactions on Plasma Science, Vol 20, 6, p944.

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