De Broglie’s Rest Mass of Light

JULIANA BROOKS, General Resonance, LLC — An advance has occurred in the foundational problems of quantum mechanics. Examination of a seemingly minor irregularity in Max Planck’s work led to the eventual discovery of previously hidden quantum variables and constants, and re-interpretation of the photon and light’s elementary quantum. The new work suggests a richer and more realistic interpretation of quantum mechanics. (Brooks, J., “Hidden Variables: The Elementary Quantum of Light”, Proc. of SPIE Vol. 7421, 74210T-3, 2009.) One of the hidden constants - Planck’s energy constant (6.626 X 10^{-34} J/osc, the constant mean energy of a single oscillation of EM energy) – led to the discovery of another hidden constant – De Broglie’s rest mass of light. Using De Broglie’s, \( E = m_0 c^2 \), the rest mass for the elementary quantum of light (a single EM oscillation) has been calculated. Setting “E” equal to Planck’s energy constant, the mass of a single oscillation of light is: \( m_0 = 7.372 \times 10^{-51} \text{ kg/osc} \). This calculated value for the rest mass of light is in close agreement with Luo et al’s calculation for the upper limit of light’s rest mass (Phy Rev Let 90(8) 2003). Luo used a rotating torsion balance to detect the product of the photon mass squared and the ambient cosmic magnetic potential vector. Luo’s upper limit of 1.2 X 10^{-54} kg/photon corresponds to an oscillation mass of 4.32 X 10^{-51} kg/osc. De Broglie’s rest mass of 7.372 X 10^{-51} kg/osc is within the same order of magnitude and is consistent with Einstein’s principle of energy-mass equivalence.