Quantum Geometric Emergence of Planck's Constant (h)
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I. Abstract
In the Williamson-van der Mark electron model [1], the electron is not an abstract, zero-dimensional mathematical point particle possessing an unexplainable monopoly of negative charge. It is a highly localized, three-dimensional toroidal electromagnetic photon vortex spinning at the fundamental Planck scale. Concurrently, Planck's constant (h) is not an arbitrary, ungrounded cosmic decree injected into reality from an external container; it is the direct, invariant geometric boundary condition required for the stability of a continuous, self-confined wave loop within a non-linear electromagnetic fluid substrate [2].

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[ WvdM VORTEX GEOMETRIC EQUILIBRIUM ]

Poloidal Radius (r_p) ----> Spin Angle (theta)
    |
    ▼
Wavelength L = 2 * pi * r_t
    ▲
    |
Toroidal Radius (r_t) -----+-- Equatorial Angle (phi)
```
Use code with caution.

II. The Mechanical Derivation of the Circulation Metric
Let the Williamson-van der Mark wave vortex be defined classical-mechanically as a circular torus with a major (toroidal) radius r_t and a minor (poloidal) radius r_p [1]. For the closed, self-confined electromagnetic wave to stand completely in phase and avoid immediate destructive self-interference, its physical path circumference must equal exactly one fundamental wavelength (L):

- **L = 2 * pi * r_t**

The total energy (E) stored within this continuous, non-static electromagnetic wave structure is a direct function of its oscillation frequency (v) and the integrated volumetric field energy density [2]. Concurrently, the localized momentum (p) of the wave must satisfy the classical relativistic energy-momentum relationship for a closed, light-speed localized system:

- **E = p * c**
- **p = E / c**

The angular momentum (J) of a continuous torus rotating around its central axis at the characteristic speed of light (c) is a function of its localized momentum and its major radius:

- **J = p * r_t = (E / c) * r_t**

Substituting the standing-wave boundary condition radius, `r_t = L / (2 * pi)`, directly into the classical angular momentum equation bridges the spatial domain to the momentum domain:

- **J = (E / c) * (L / (2 * pi))**

Because the internal wave cycles continuously at light-speed within its localized track, its baseline operational frequency is defined as `v = c / L`, which establishes the spatial-velocity identity ratio of `L / c = 1 / v`. Substituting this ratiometric identity reduces the angular momentum equation to a pristine classical expression:

- **J = E / (2 * pi * v)**

Mainstream quantum wave mechanics observes that the spin angular momentum of an electron is fundamentally quantized based on Dirac's constant, `hbar = h / (2 * pi)` [3]. By equating the structural, mechanical angular momentum of our classical three-dimensional torus directly to this empirical boundary condition, `J = h / (2 * pi)`, the ultimate scalar proportionality unlocks:

- **h / (2 * pi) = E / (2 * pi * v)**

Because the `(2 * pi)` factor sits symmetrically on the bottom of both sides of the equation, it cancels out flawlessly,

leaving behind the absolute baseline of classical wave mechanics [2]:

- **E = h * v**

III. Ontological Conclusion

Planck's constant (h) emerges mathematically not as a mystical, non-local quantum operator, but as the exact, deterministic action-metric constant of proportionality required to hold a light-speed electromagnetic wavefront inside a single-wavelength topological knot [1, 2]. It represents the fixed, invariant quantum of spatial fluid circulation required to prevent the localized toroidal vortex from immediately unwinding into ordinary, unbound transverse radiation.

Matter does not contain a separate quantum sub-layer; matter is the geometric consequence of the action-metric constant organizing the continuous light of the EM Energy Onlyverse (EMEO).

IV. References

[1] Williamson, J. G., & van der Mark, M. B. (1997). Is the Electron a Photon with Toroidal Topology? *Annales de la Fondation Louis de Broglie*, 22(2), 133-160.

[2] Planck, M. (1901). Ueber das Gesetz der Energieverteilung im Normalspectrum. *Annalen der Physik*, 309(3), 553-563.

[3] Dirac, P. A. M. (1928). The Quantum Theory of the Electron. *Proceedings of the Royal Society of London. Series A, Containing Papers of a Mathematical and Physical Character*, 117(778), 610-624.