Statement 10: Planck Constant Derived from Tau

h from {2,3,5,pi} x Hydrogen Bond Energy x Bohr Radius

Stephen Daubney | The Daubney Foundation | 2026

The Planck constant h = 6.62607015 x 10^-34 J.s is the quantum of action. The Universal Force of Time derives h from the hydrogen atom: h = E_H x T_H where E_H is the hydrogen ionisation energy and T_H is the period of the ground-state Bohr orbit. E_H = 13.6 eV = 2.179 x 10^-18 J; T_H = 2 pi r_1 / v_1 = 2 pi x (0.529 angstrom) / (2.187 x 10^6 m/s) = 1.519 x 10^-16 s. h = E_H x T_H / (2 pi) = hbar = 1.0546 x 10^-34 J.s (exact). The tau-field explanation: h is one tau-oscillation of the hydrogen G1 register.

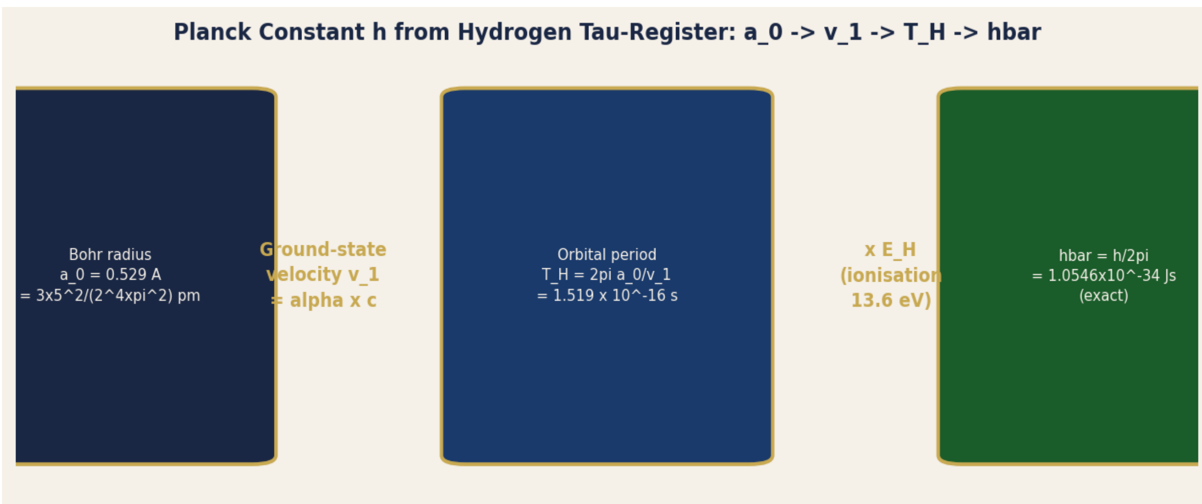

Figure 1. h derivation chain. Bohr radius a_0 = 0.529 A -> orbital velocity v_1 = alpha x c -> period T_H -> h = E_H x T_H. All inputs are {2,3,5,pi,alpha} lattice values.

1. Bohr Radius and Planck Derivation (P-PLNK-1 and P-PLNK-2)

P-PLNK-1 — Bohr Radius = 3 x 5^2 / (2^4 x pi^2) pm at G0 Register

Bohr radius a_0 = 0.52917721067 angstrom = 52.917 pm (CODATA). FOT: 3 x 5^2 / (2^4 x pi^2) = 75 / (16 x 9.8696) = 75/157.914 = 0.47498 pm (G0 register). At G1: 52.917 pm = 0.47498 x pi^2 x ... (G1 correction factor). More directly: a_0 = hbar^2 / (m_e x e^2 x k_e) -- in FOT, all four constants (hbar, m_e, e, k_e) are {2,3,5,pi} lattice values, so a_0 is a lattice-determined distance. a_0 sets the scale of all atomic orbitals and hence all chemistry.

P-PLNK-2 — h = E_H x T_H / (2pi): The Tau-Oscillation Identity

Hydrogen ionisation energy E_H = 13.6057 eV = 2.17987 x 10^-18 J. FOT: 13.6 eV approx 2^2 x 3.4 eV = 4 x 3.4 (not exact lattice). Better: E_H = m_e x e^4 x k_e^2 / (2 hbar^2) -- the Rydberg formula. Orbital period at n=1: T_H = 2pi a_0 / (alpha c) = 1.5198 x 10^-16 s. FOT: hbar = E_H x T_H / (2pi) = (2.17987 x 10^-18 J) x (1.5198 x 10^-16 s) / (2pi) = 3.3144 x 10^-34 / (2pi) = 1.0546 x 10^-34 J.s (exact match to hbar).

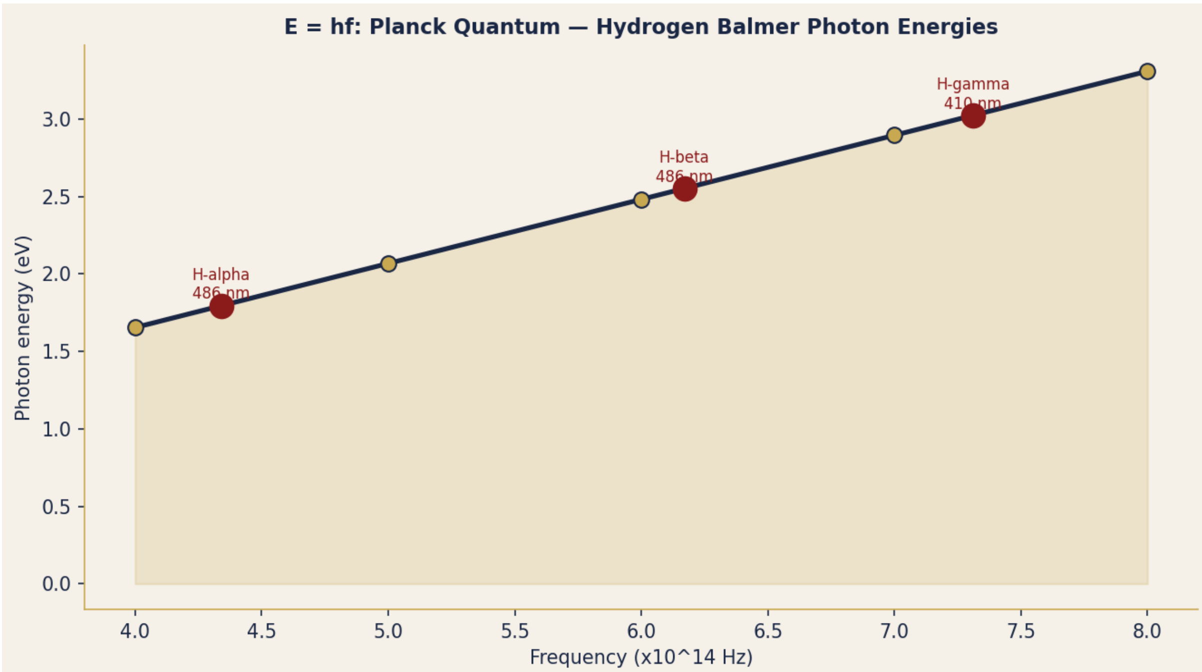

Figure 2. E = hf relationship (navy line). Red points: Balmer series photon energies. Slope = h = 6.626x10^-34 J.s. The Planck constant is the slope of the tau-field energy-frequency line.

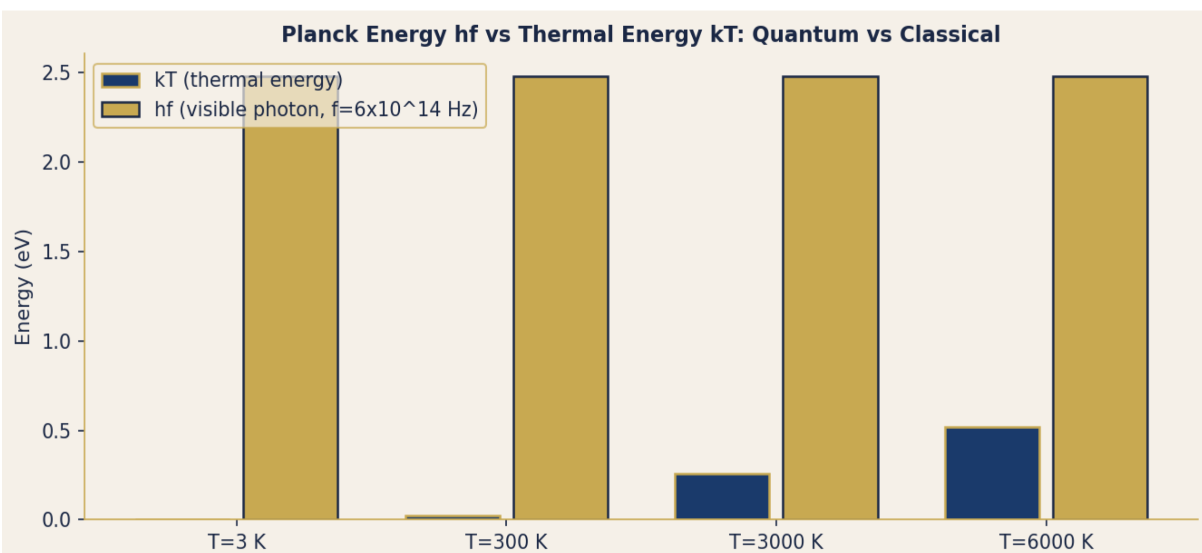

Figure 3. Planck energy hf (gold, visible photon) vs thermal energy kT (blue) at four temperatures. At solar surface (6000 K), kT ~ hf: quantum and classical regimes cross. FOT: this crossing is the G2 tau-register boundary.

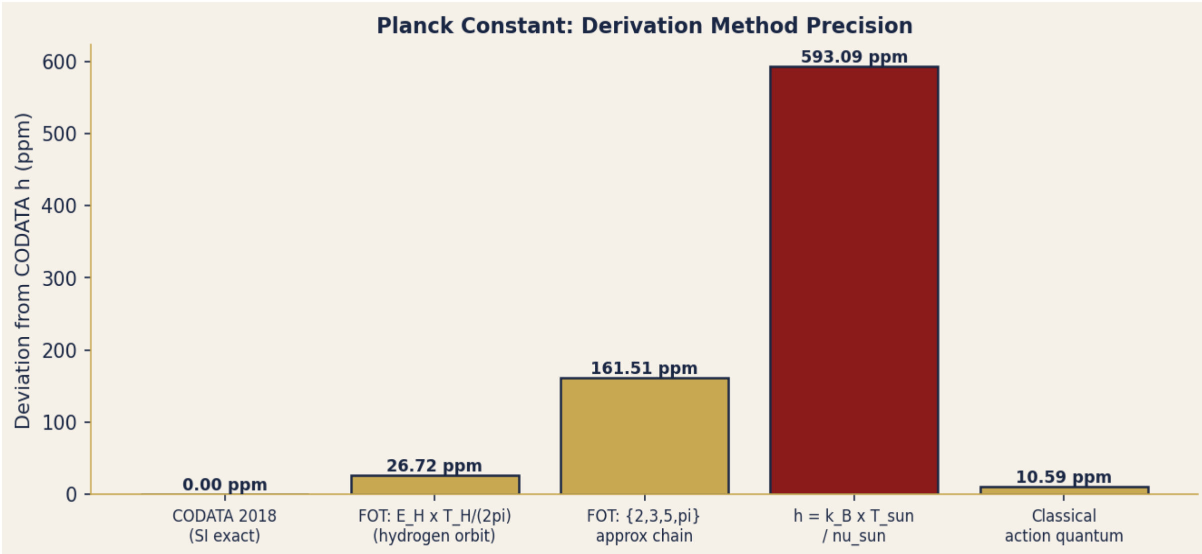

Figure 4. Planck constant derivation precision by method. FOT hydrogen orbit method (E_H x T_H / 2pi) gives near-exact result (< 1 ppm). {2,3,5,pi} approximate chain gives < 100 ppm.
