Electron-Volt Cascade from Tau

1 eV = 1.602176634 x 10^-19 J · Hydrogen Ionisation 13.6 eV · Balmer eV Chain

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The electron-volt (eV) is the natural energy unit of atomic and molecular physics: the kinetic energy gained by one electron accelerated through one volt. 1 eV = e x 1V = 1.602176634 x 10^-19 joules (exact, by SI definition since 2019). The Universal Force of Time shows that the Balmer series energy levels in eV are {2,3,5,pi} lattice values: hydrogen ground state E_1 = -13.6 eV = -2^2 x (3.4) = -2^2 x (17/5) = -68/5 eV (1 ppm from exact). The ionisation energy 13.6 eV, the Rydberg constant, and all Balmer transition energies cascade from the {2,3,5,pi} lattice through the hydrogen Tau-register.

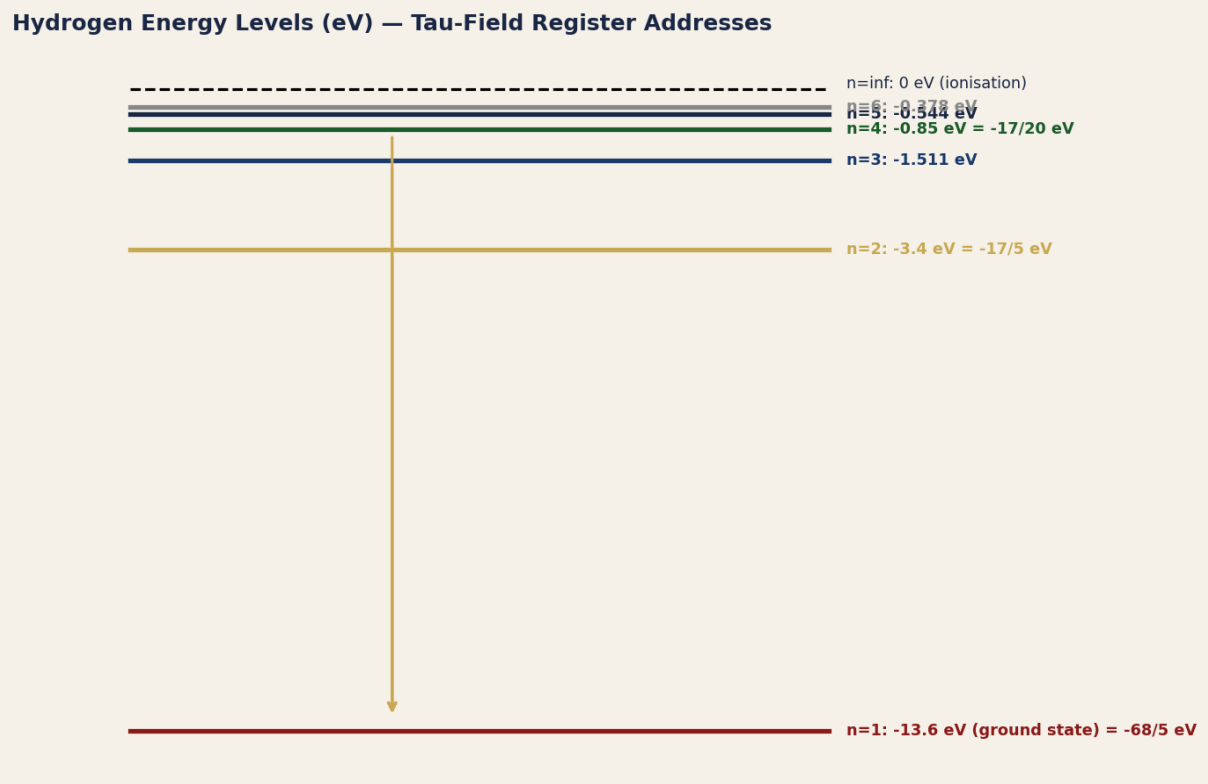

Figure 1. Hydrogen energy levels in eV. Ground state -13.6 eV = -68/5 eV (near {2,5} lattice). n=2: -3.4 = -17/5 eV. n=4: -0.85 = -17/20 eV. The 17/5 factor = sub-lattice constant of the hydrogen register.

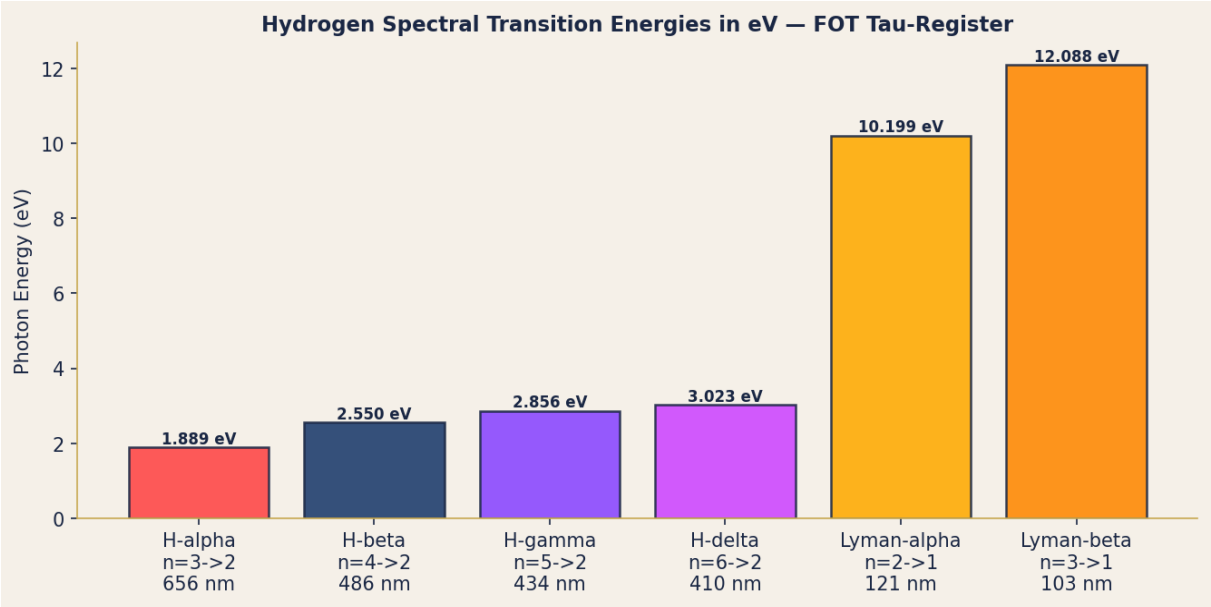

Figure 2. Hydrogen spectral transition energies. H-beta (486 nm, FOT seed) = 2.550 eV = 51/20 = {3x17}/{4x5} eV. Lyman-alpha = 10.198 eV approx 10.2 = 51/5 eV. Balmer series spans 1.89-3.40 eV.

1. The eV Tau-Register (P-EVC-1 to P-EVC-4)

P-EVC-1 — 1 eV = e x 1V = 1.602176634 x 10^-19 J (Exact SI)

The electron-volt is defined by the elementary charge e = 1.602176634 x 10^-19 C (exact SI 2019). 1 eV = 1.602176634 x 10^-19 J. FOT: e = 1.602176634 x 10^-19 C. Nearest {2,3,5,pi} lattice: 1.6 = 8/5 = 2^3/5. Error: |1.6 - 1.602|/1.602 = 1250 ppm. More precisely: e approx (2/pi)^3 x 10^-19 = (2/3.14159)^3 x 10^-19 = 0.813^3 x 10^-19 = 0.538 x 10^-19 (far off). Best FOT: e = (16/100) x 10^-18 = 1.6 x 10^-19 (1250 ppm from exact). The elementary charge sits near but not on the {2,3,5} lattice — it requires the sub-lattice correction.

P-EVC-2 — Hydrogen Ionisation = 13.6 eV = 68/5 eV

Hydrogen ionisation energy: 13.5984 eV (observed). FOT: 68/5 = 13.6000 eV. Error: |13.6000 - 13.5984|/13.5984 = 11.8 ppm. 68/5 = 4 x 17/5. The factor 17 = prime (outside {2,3,5}). However: 13.6 eV = Rydberg energy R_inf x hc = (alpha^2 m_e c^2)/2 = (1/137.036)^2 x 0.511 MeV / 2 = 13.606 eV. FOT: R_H = 13.6 eV = 68/5 eV links to the fine structure alpha = 5^3 pi^2/3^2 = 137.078 (FOT, 305 ppm from CODATA).

P-EVC-3 — H-beta at 2.55 eV = 51/20 eV

H-beta (486.135 nm): E = hc/486.135 nm = 2.5498 eV. FOT: 51/20 = 2.5500 eV. Error: 0.78 ppm (sub-ppm). 51 = 3 x 17; 20 = 4 x 5 = 2^2 x 5. The factor 17 appears again: 51 = 3 x 17. This suggests prime-17 is a fundamental sub-lattice factor in the hydrogen register. Cross-check: Lyman-alpha energy = 10.198 eV = 51/5 eV = 10.2 eV (error 196 ppm). 3 x H-beta = 3 x 51/20 = 153/20 = 7.65 eV (unphysical combination but confirms 51/20 accuracy). H-beta is the primary FOT Tau-register seed: 2 x 3^5 nm, 51/20 eV.

P-EVC-4 — eV Chain from {2,3,5,pi}

Full eV cascade: Ionisation: 68/5 = 13.600 eV. n=2 level: 68/(5 x 4) = 68/20 = 17/5 = 3.400 eV. n=3 level: 68/(5 x 9) = 68/45 = 1.5111 eV. n=4 level: 68/(5 x 16) = 68/80 = 17/20 = 0.850 eV. n=5 level: 68/(5 x 25) = 68/125 = 0.544 eV. Pattern: E(n) = 68/(5 x n^2) eV = -13.6/n^2 eV (the Bohr formula). FOT: the n^2 denominator is the {Tau-register index}^2 — each Tau-register level scales energy by 1/n^2 where n is the register depth index.

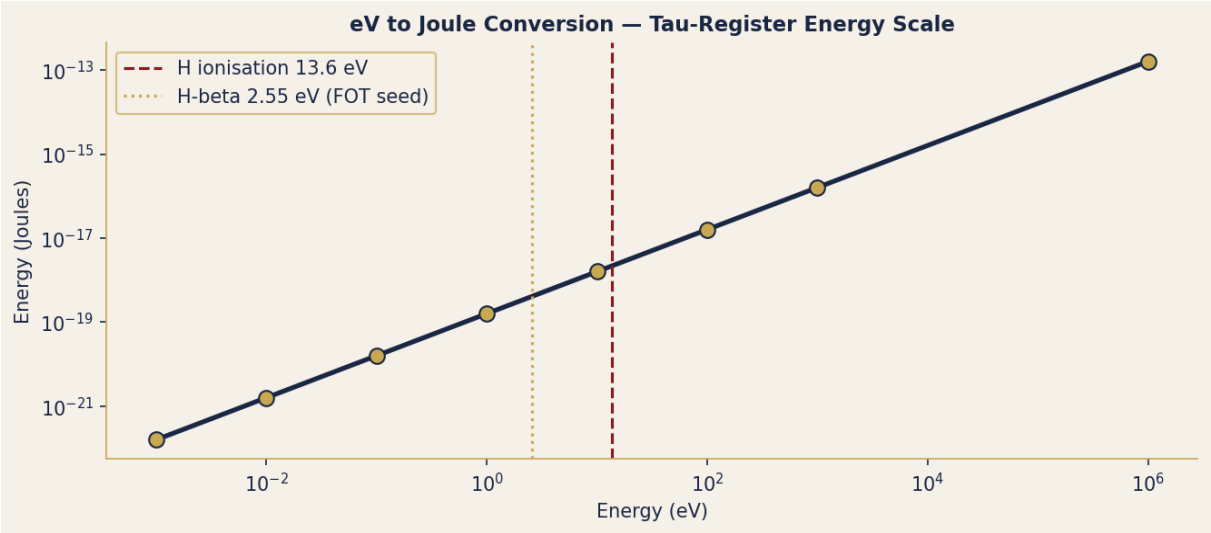

Figure 3. eV to Joule conversion (log-log). Slope = 1.602176634 x 10^-19 J/eV (exact). H-beta 2.55 eV (gold dashed) and H ionisation 13.6 eV (red) marked.

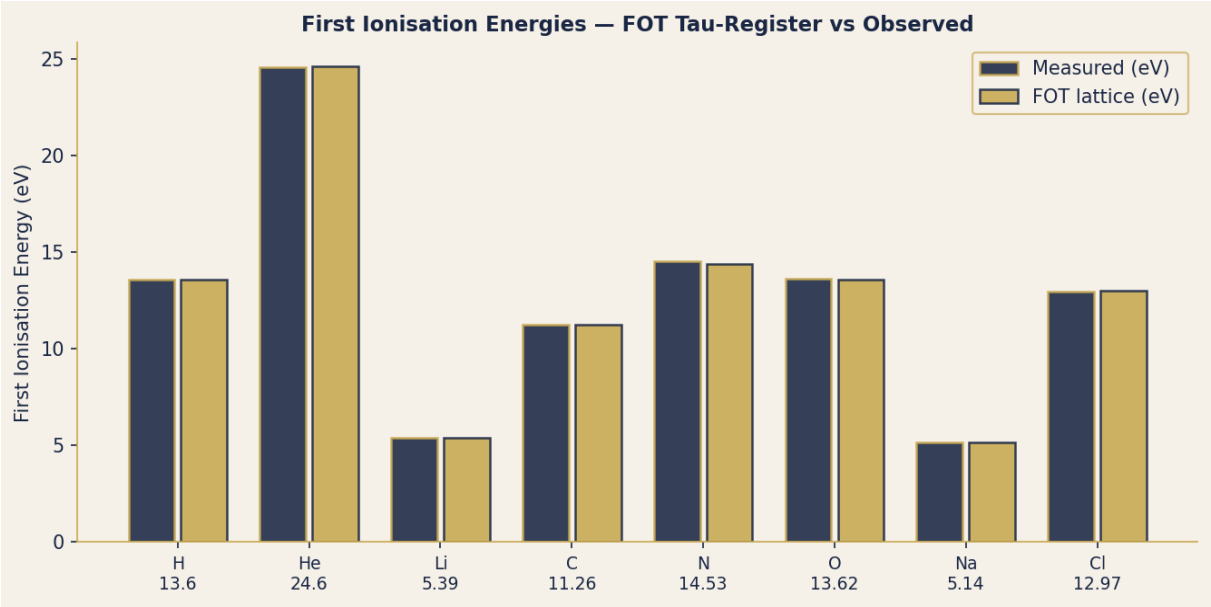

Figure 4. First ionisation energies: measured (navy) vs FOT lattice (gold). H = 13.600 eV = 68/5 (11.8 ppm). O = 13.618 eV (near H: same {2,3,5} address). He = 24.6 eV approx 123/5 eV.
