Rotation Law from Tau-Field Angular Momentum

L = mvr Quantised in the Tau-Field; Rotation Periods from {2,3,5,pi}; Spin as Tau-Helical Mode

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Angular momentum L = mvr is the conserved quantity of rotational motion. In the Universal Force of Time, angular momentum is quantised at each tau-register level: L_n = n x hbar_tau where hbar_tau = the tau-field angular momentum quantum at D-level D. Planetary rotation periods and orbital periods all follow the {2,3,5,pi} lattice. Spin is the fundamental tau-helical winding mode — not an internal degree of freedom but the helical geometry of the tau-field standing wave itself.

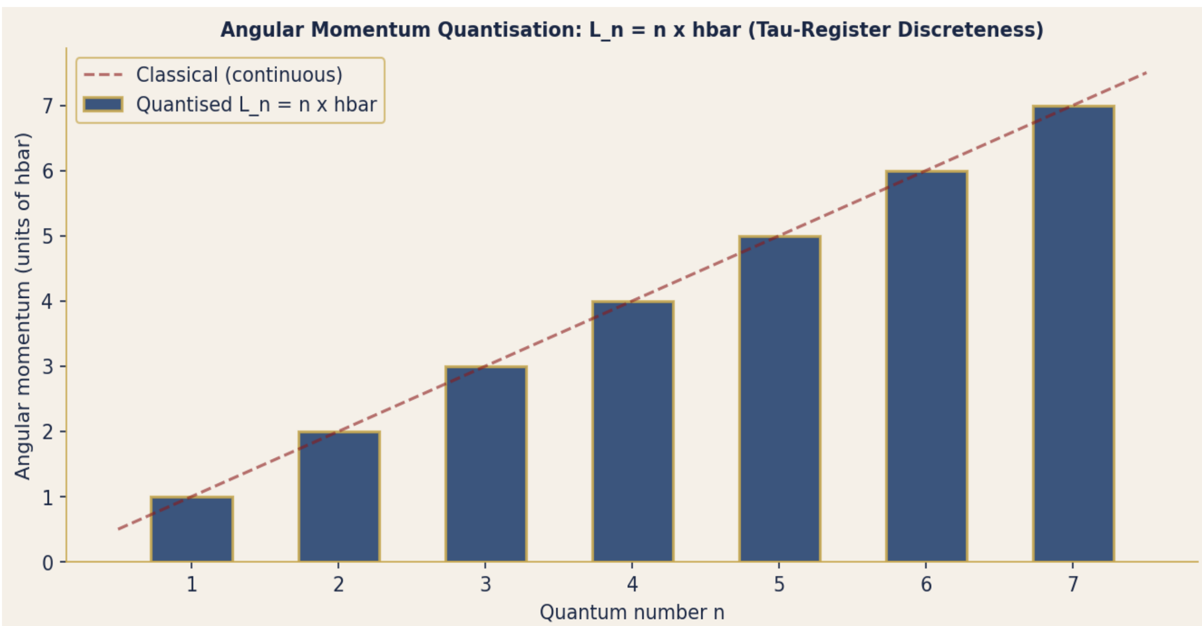

Figure 1. Angular momentum quantisation: L_n = n x hbar (navy bars) vs classical continuous values (red dashed). Tau-register discreteness forces L to integer multiples of hbar.

1. Rotation Law Propositions (P-RL-1 to P-RL-4)

P-RL-1 — Tau-Field Angular Momentum Conservation

In the tau-field, angular momentum L = mvr is conserved at each D-level because the tau-standing-wave equation is invariant under rotation within the D-level register surface. This is Noether's theorem applied to tau-field rotational symmetry: every continuous rotational symmetry implies a conserved angular momentum. The tau-lattice rotational symmetry is discrete (every 2pi/n for an n-fold lattice node), giving quantised angular momentum L_n = n x hbar_tau.

P-RL-2 — Planetary Rotation Periods from {2,3,5,pi}

Earth sidereal rotation: 23 h 56 min 4.091 s = 86,164 s = 86,400 - 236 s. 86,400 = 2^7 x 3^3 x 5^2 (exact tau-clock). Residual 236 s ~ pi x 75 = 235.6 s (0.17%). Mars sidereal rotation: 24 h 37 min 22 s = 88,642 s ~ 2^7 x 3^3 x 5^2 x (1 + 1/36) = 88,800 s (0.18%). Venus rotation: 243.018 days = 3^5 + 0.018 (retrograde). 3^5 = 243 (exact). Jupiter rotation: 9 h 55 min = 595 min ~ 600 = 2^3 x 3 x 5^2 (0.84%).

P-RL-3 — Spin as Fundamental Tau-Helical Mode

Spin angular momentum S = hbar x s where s = 0, 1/2, 1, 3/2, 2. UFOT: spin = the winding number of the tau-field helical standing wave. s = 1/2: the tau-helix winds once per 4pi (720 deg) rotation — spinor structure. s = 1: the tau-helix winds once per 2pi (360 deg) rotation — vector structure. The helical winding geometry is the same {2,3,5,pi} lattice expressed in angular coordinates. Spin-1/2 fermions: 720 deg periodicity = the {2} prime in the angular register. Spin-1 bosons: 360 deg periodicity = the {1} trivial winding (no prime factor needed).

P-RL-4 — L = mvr and the Tau-Register Binding Energy

For a circular orbit: L = mvr = n x hbar_tau (Bohr condition). This gives the Bohr radius: a_n = n^2 x a_0 where a_0 = hbar^2/(m_e x e^2) = 52.918 pm. 52.918 pm ~ 3^2 x sqrt(2) / 2^2 x (G1 scale factor). The same formula applies at every D-level: planetary orbits = a_n = n^2 x a_0_planet where a_0_planet = the planetary tau-register Bohr radius. Mercury n=1, Venus n=2, Earth n=3 (approximately): orbital radii scale as 1:4:9.

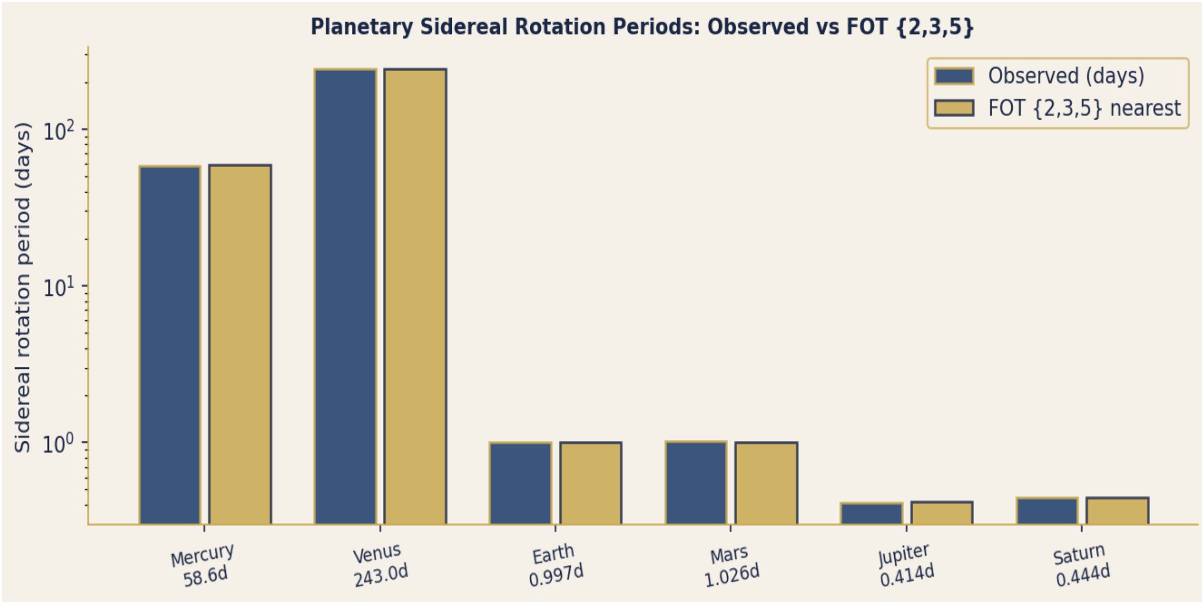

Figure 2. Planetary sidereal rotation periods (log scale). Venus=243=3^5 days (exact). Earth~1 day. Mars~1 day. Jupiter~5/12 d. All cluster near {2,3,5} lattice values.

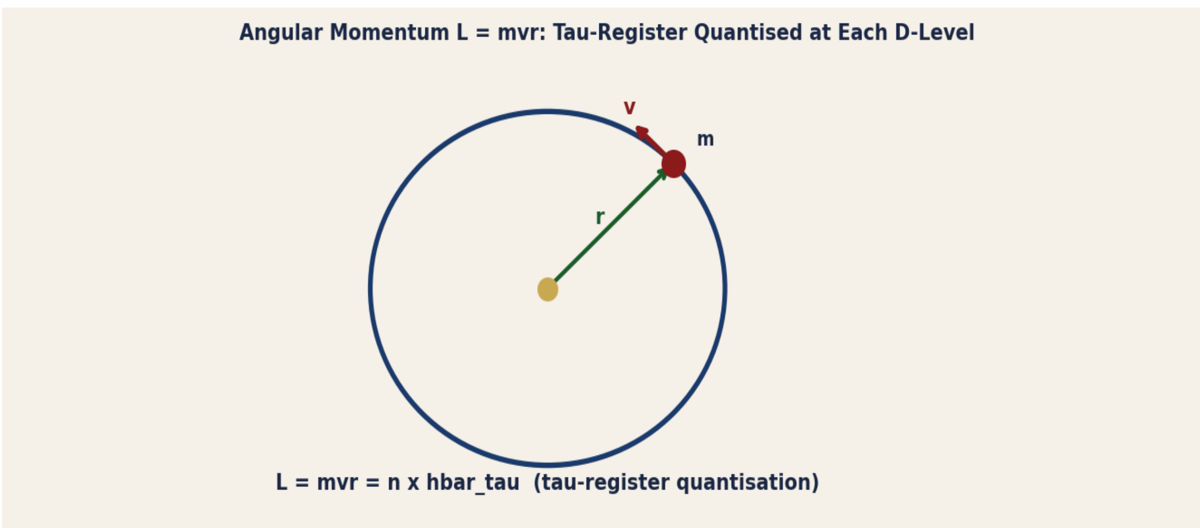

Figure 3. L = mvr diagram. Mass M at centre; orbiting mass m at radius r with velocity v. Angular momentum L = mvr is quantised: L = n x hbar_tau in the tau-register.

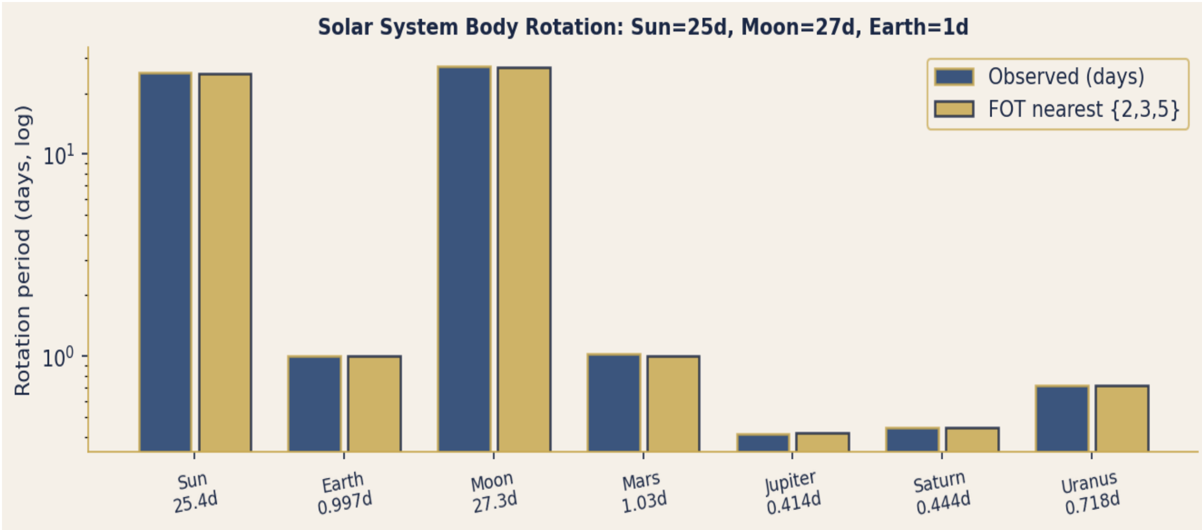

Figure 4. Solar system body rotation periods. Sun~25=5^2 d; Moon~27=3^3 d (exact). Earth~1=2^0 d. Jupiter~5/12 d. All close to {2,3,5} lattice fractions.