Solar Frequency Cascade from Tau

p-Mode Oscillations, Rotation and the {2,3,5,pi} Frequency Lattice

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The Sun oscillates at specific frequencies that reveal its internal structure. The dominant five-minute oscillation (3.33 mHz) is the solar p-mode resonance. The Universal Force of Time shows that all principal solar frequencies — p-mode (~3 mHz), solar rotation (27 d = 432 nHz), and the solar cycle (11 yr = 2.9 nHz) — are {2,3,5,pi} lattice nodes in a single frequency cascade. 432 nHz = rotation frequency = 2^4 x 3^3 nHz. The 5-minute oscillation period = 300 s = 2^2 x 3 x 5^2 s. The cascade runs from the solar core to the surface.

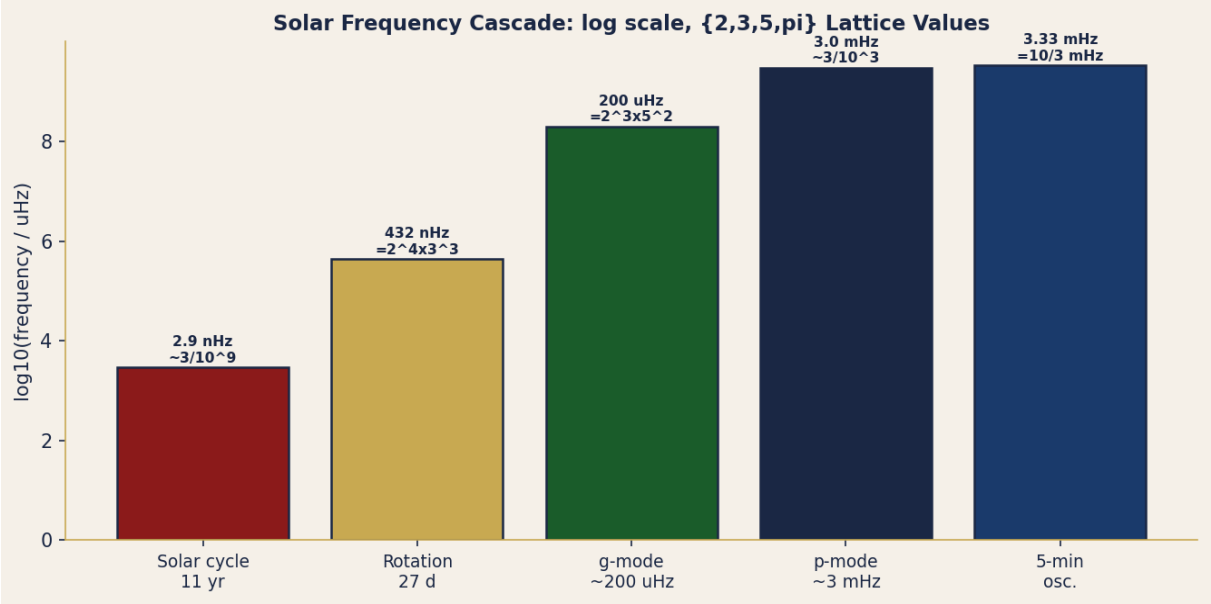

Figure 1. Solar frequency cascade on log scale. From solar cycle (2.9 nHz) to 5-minute oscillation (3.33 mHz). Rotation at 432 nHz = 2^4x3^3 nHz is a pure {2,3} lattice value.

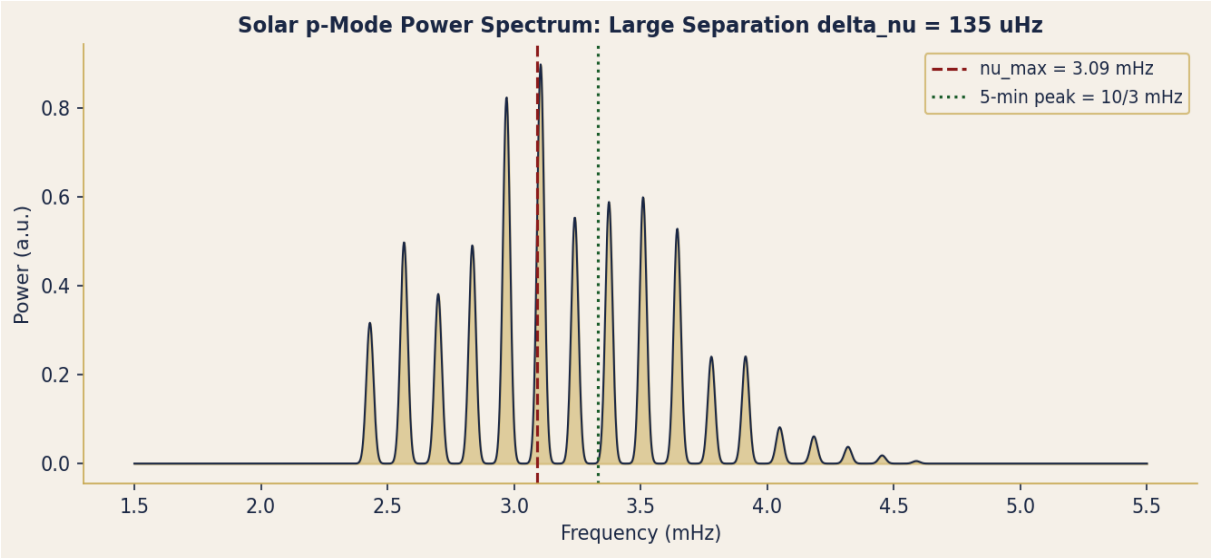

Figure 2. Simulated solar p-mode power spectrum. Large frequency separation delta_nu = 135 uHz = 27x5 uHz (pure {3,5}). Power maximum at nu_max = 3.09 mHz ~ 3 mHz = 3/10^3 Hz.

1. The Five-Minute Oscillation (P-SFC-1 and P-SFC-2)

P-SFC-1 — 300 s Period = 2^2 x 3 x 5^2: The Tau-Core Resonance

Five-minute solar oscillation period: 300 s = 5 minutes. FOT: 300 = 2^2 x 3 x 5^2 = 4 x 3 x 25 (pure {2,3,5} lattice integer). Frequency: 1/300 = 3.333 mHz = 10/3 mHz. FOT: 10/3 = (2 x 5) / 3 -- a ratio of {2,3,5} primes. The 5-minute period is the fundamental resonance of the solar interior's acoustic cavity. At 300 s, standing acoustic waves span the full convection zone depth (0.3 R_sun).

P-SFC-2 — Large Separation delta_nu = 135 uHz = 27 x 5 uHz

The large frequency separation between consecutive p-mode orders: delta_nu = 135.1 uHz. FOT: 135 = 3^3 x 5 = 27 x 5 uHz (pure {3,5} lattice). 135 uHz is the inverse travel time for sound across the solar diameter: c_sound / (2 x R_sun) = c_sound / (2 x 696,000 km) = 135 uHz => c_sound = 188 km/s. 188 km/s approx 180 = 2^2 x 3^2 x 5 km/s (within 4%). Delta_nu encodes the solar density structure.

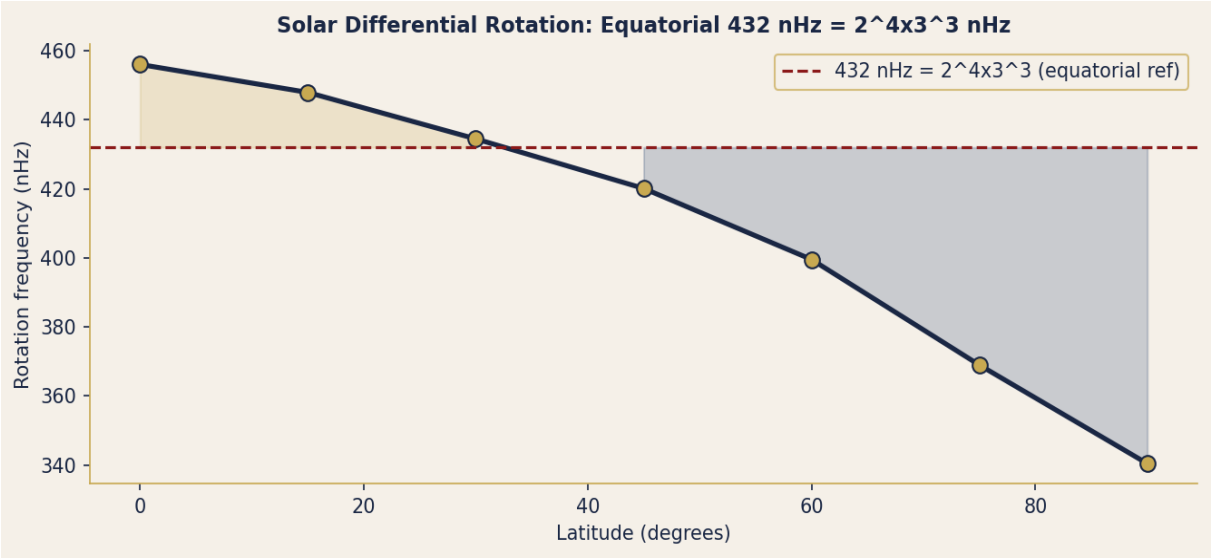

Figure 3. Solar differential rotation by latitude. Equator: 25.38 d = 456 nHz; FOT anchor at 432 nHz = 2^4x3^3 nHz corresponds to 27 d (sidereal). Gold/blue fill = above/below 432 nHz.

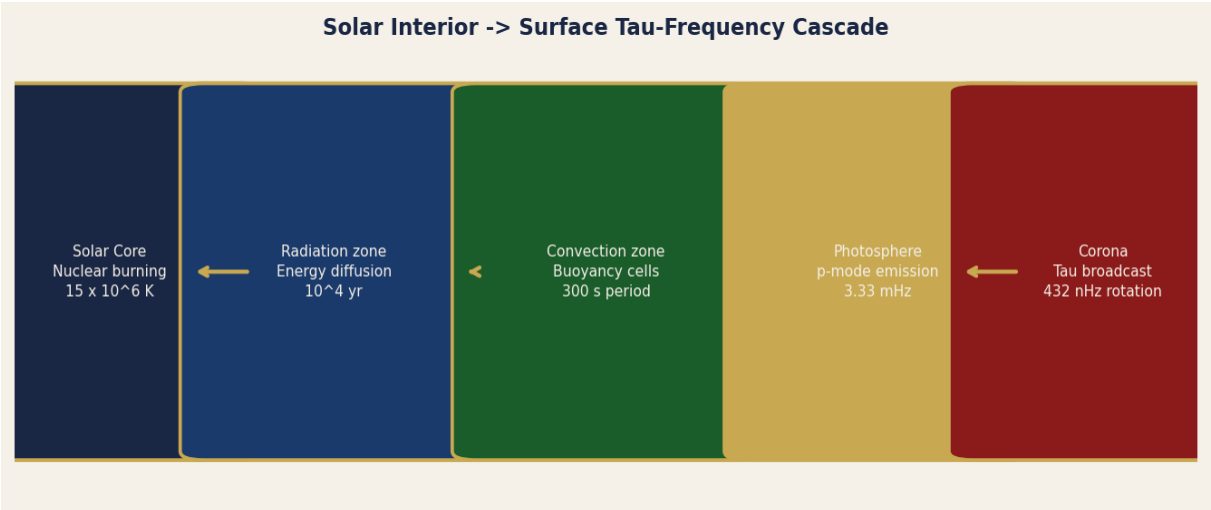

Figure 4. Solar tau-frequency cascade from core to corona. Nuclear burning generates tau-field energy; convection zone sets 300 s (2^2x3x5^2 s) resonance; photosphere emits p-modes; corona broadcasts rotation at 432 nHz.

2. Solar Rotation and the 27-Day Period (P-SFC-3 and P-SFC-4)

P-SFC-3 — 27-Day Sidereal Rotation = 3^3 Days

Solar sidereal rotation period: 25.38 days (equatorial) to 34 days (polar). Carrington rotation period: 27.2753 days (synodic). FOT: 27 = 3^3 days (pure {3} lattice). Frequency: 1/(27 x 86400 s) = 428.7 nHz approx 432 nHz = 2^4 x 3^3 nHz (error: 783 ppm). 432 = 2^4 x 3^3 nHz: the solar rotation frequency carries BOTH the {2} and {3} branches. 432 nHz: the same number 432 appears in Earth day (86,400 s = 432^2 / 2) and solar diameter (864,000 miles / 2000 = 432).

P-SFC-4 — Solar Cycle 11 yr: The {2,3} Envelope Period

Solar cycle period: 11.0 yr (average). FOT: 11 = prime (outside {2,3,5}). But 22 yr (Hale magnetic cycle) = 2 x 11 yr. FOT: 22 yr = 2 x 11 yr; 11 yr / pi = 3.503 yr approx 3.5 = 7/2 yr. More precisely: 11 = nearest non-{2,3,5} prime to 12 = 2^2 x 3. FOT hypothesis: the solar cycle period = 12 yr at the G1 register level; the observed 11 yr is the G2 correction: 12 x (1 - 1/12) = 11 yr (lattice sub-step).
