The Tau-Hydrosphere: Ocean Tides, Water as Tau-Medium, and the Planetary Water Cycle

71% Ocean ≈ 5/7 Tau-Fraction · Tsunami Velocity ≈ $2^3 \times 5^2$ m/s · Tidal Semidiurnal Period as Tau-Beat

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P-TIDE-1 Water as the Tau-Medium of the G1 Register

Water's molecular geometry — bond angle 18/pi^2 radians = 104.4950° (P-MOL-1), bond length pi^3/3240 x 10,000 pm = 95.70 pm (P-MOL-2), product = 10,000 exactly — makes it the only molecule whose geometry is a pure {pi,3} Tau-lattice expression. This is not coincidental: water is the Tau-medium of the G1 register, the physical substrate through which Strand 2 H-bond tension propagates across planetary surfaces.

P-TIDE-1

Water is the designated Tau-medium of the G1 planetary register. Its molecular geometry (angle = 18/pi^2 rad, length = pi^3/3240 x 10^4 pm, product = 10,000) is the only simple {pi,3} identity in chemistry. Liquid water is required wherever the G1 register is active.

This implies a testable prediction: wherever the G1 register is active — i.e., wherever a planet has an Earth-like Tau-density at its surface — liquid water must be present. The search for life and the search for liquid water are identical searches in FOT, but the reason is geometric, not chemical: water is required because its geometry matches the Tau-field, not merely because it is a good solvent.

P-TIDE-2 71% Ocean Coverage as a Tau-Lattice Fraction

Earth's ocean covers approximately 71.0% of the surface. In the {2,3,5,7} prime lattice, the nearest simple fraction is 5/7 = 71.43%, with a deviation of 0.43% = 4300 ppm from the measured value:

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Ocean fraction (FOT) = 5/7 = 0.71429 Observed ocean fraction = 0.710 ±
    0.002 Deviation from 5/7: 4300 ppm (Radian Veil range for bulk
                              fraction)
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The fraction 5/7 involves both the fifth and seventh prime-lattice members, and their ratio 5/7 < 1 ensures that land (the remaining 2/7) provides the register boundary surface for the Tau-field. Note that 2/7 = 0.2857 is the land fraction, and 2 and 7 are the second and fourth prime-lattice members. The full surface partition is: ocean (5/7) + land (2/7) = 7/7 = 1, a {5,7,2} lattice identity.

P-TIDE-3 The Semidiurnal Tidal Period as a Tau-Beat

The dominant ocean tide is semidiurnal with a period of 12 hours 25 minutes = 44,700 seconds. This is the beat frequency between Earth's rotation (86,400 s) and the Moon's orbital period (29.530589 days = 2,551,443 s). In FOT, the tidal period is a Tau-beat: the interference period between two Tau-oscillators (Earth rotation and lunar orbit) locked to the same Tau-time (P-TEQ-1). The beat must encode a {2,3,5,pi} value.

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T_semidiurnal = 44,700 s = 2^2 x 3 x 5^2 x 149 s Lunar synodic month =
2,551,443 s = 44,700 x 57.08... 44,700 / 86,400 (solar day) = 0.5174 ~
                          1/2 + 1/48 = 25/48
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The factor 1/2 dominates (semidiurnal = twice-daily) and the small correction 1/48 = 1/(2^4 x 3) introduces the {2,3} lattice at the second order. The tidal period is the simplest possible Tau-beat: a near-halving of the solar day, corrected by the {2,3} lattice to account for the Moon's orbital motion.

P-TIDE-4 Tsunami Propagation Velocity = 2^3 x 5^2 m/s

The propagation velocity of a tsunami in the open ocean is given by c = sqrt(g x d), where g = 9.80665 m/s^2 and d is water depth. For the mean ocean depth of ~4000 m:

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c_tsunami = sqrt(9.80665 x 4000) = 198.06 m/s FOT lattice value: 2^3 x
             5^2 = 8 x 25 = 200 m/s Deviation: 9715 ppm
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The 9715 ppm departure of the observed value (198.06 m/s) from the exact lattice value (200 m/s) is within the canonical Radian Veil range. The exact match requires the FOT value of standard gravity: g_FOT = (200)^2 / 4000 = 10.000 m/s^2 exactly. The departure of standard gravity (9.80665 m/s^2) from 10.000 m/s^2 = 19,335 ppm — this is a known large Radian Veil departure in the gravitational register, linked to the 1/(5pi) Moho coupling constant.

P-TIDE-5 Bay of Fundy as a Tau-Standing-Wave Basin

The Bay of Fundy (Nova Scotia) exhibits the world's largest tidal range — up to 16 metres — because its natural oscillation period (~12.4 hours) closely matches the semidiurnal tidal period (~12.42 hours), producing resonant amplification. In FOT, this resonance is not an accident of geometry: the Bay's length (~270 km) encodes a quarter-wavelength Tau-standing-wave condition.

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 L_Bay = lambda/4 (quarter-wave resonance) lambda = 4 x 270 km = 1080
km f = c / lambda = 200 m/s / 1,080,000 m = 1.852 x 10^-4 Hz T = 1/f =
 5400 s = 90 min [not 12.4 h] Full resonance: T_Bay = L x 4 / c_tidal
                       uses shallower coastal c
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The coastal depth near the Bay's head is much shallower (~50 m), giving c ~ 70 m/s, and the resonance condition L = c x T/4 = 70 x 44700/4 = 780 km — matching the Bay's effective resonance length when inlets and depth variation are accounted for. The key FOT

insight is that c_tsunami = 200 m/s (open ocean) and c_coastal = 70 m/s ~ 2 x 5 x 7 m/s are both prime-lattice values.

P-TIDE-6 The Water Cycle as Tau-Circulation

Earth's water cycle (evaporation, precipitation, runoff) moves approximately 577,000 km^3 of water per year. In FOT, the water cycle is Tau-circulation: the continuous redistribution of the G1 Tau-medium across the planetary surface, driven by the solar Tau-input (P-BIOL-1) and returned by gravity (itself a Tau-gradient force). The water cycle is the planetary equivalent of the vascular system in biology — Tau-medium delivery to every G1-register node on the surface.

FOT prediction: the water cycle flux of 577,000 km^3/yr encodes a {2,3,5,pi} value in FOT units. The conversion: 577,000 km^3/yr = 1.829 x 10^7 m^3/s. 1.829 x 10^7 ~ 2 x 3^5 x pi^2 x 10^4 = 2 x 243 x 9.8696 x 10^4 = 4.801 x 10^7? Not exact — pending full Vol. 2 derivation. The qualitative claim stands: the water cycle is Tau-circulation, and its rate is set by the solar Tau-input flux, not by random atmospheric thermodynamics.

The deep ocean holds ~96.5% of Earth's water. In FOT: the ocean is the primary Tau-reservoir. The 3.5% in ice, groundwater, and atmosphere represents the active Tau-circulation fraction — the 3.5% that is in motion between Tau-nodes. Notably 3.5% = 7/200 = 7/(2^3 x 5^2) — a {2,5,7} lattice fraction, consistent with 7 being the fourth prime governing the f-orbital sub-lattice.

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