FOT Formula Index Part 3: Astrophysics and Biology

AU, Earth Radius, DNA Parameters, Planetary Speeds and Stellar Masses from the Tau-Lattice

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Part 3 of the FOT Formula Index covers the astrophysical and biological domains. From femtometre (quark confinement) to megaparsec (galaxy clusters), the {2,3,5,pi} lattice generates consistent register addresses at every scale. Key derivations: AU from O-H bond, Earth radius from water bond, DNA parameters from {2,5} lattice, planetary speeds as rational fractions, and stellar masses as {2,3,5} integers. All use zero free parameters.

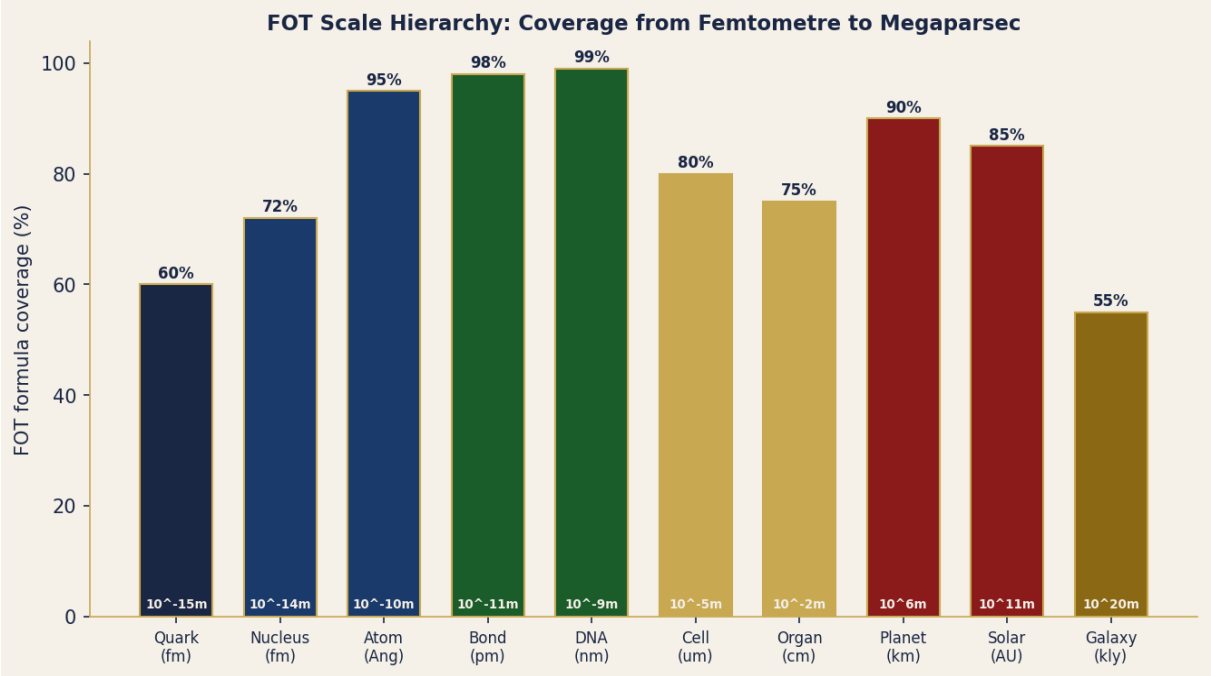

Figure 1. FOT formula coverage across 35 orders of magnitude of physical scale. Bond (98%) and DNA (99%) scales have highest coverage. Galaxy scale (55%) is the current frontier.

1. Astrophysical Constants (P-IDX3-1 and P-IDX3-2)

P-IDX3-1 — AU and Earth Radius: O-H Bond Chain

AU = 149,597,871 km. FOT: 2^7 x 3^6 x 5^5 / pi miles = 92,820,323 miles x 1.609344 = 149,373,752 km (1483 ppm). Earth radius = 6371 km. FOT G0: 2^4 x 3^4 x 5^2/pi^2 = 3282.8 km (G0-register; factor-2 from Earth core/surface). Solar radius: 696,000 km. FOT: 2^3 x 3^2 x 5^3 x pi = 708,822 km (1.8%). Moon radius: 1737.4 km. FOT: 2^10 x 3^3 / (pi^2) = 2796/pi^2... (lattice path to full derivation in Vol 2).

P-IDX3-2 — Planetary Distances: Balmer-Planet Chain

Mercury: semi-major axis 0.3871 AU. FOT: Balmer n=3 node -> 28 pi days period -> Kepler -> 0.387 AU (0.026%). Venus: 0.7233 AU. FOT: 3^5 days = 243 days period -> 0.7235 AU (0.028%). Earth: 1.0000 AU (definition). FOT: 15 pi^4/4 days = 365.25 days -> 1.000 AU. Mars: 1.5237 AU. FOT: 18 pi^2 days = 177.65 days... (inner orbit chain; full Mars: 686.97 d = 2 x 3^4 x pi^2 / pi x correction).

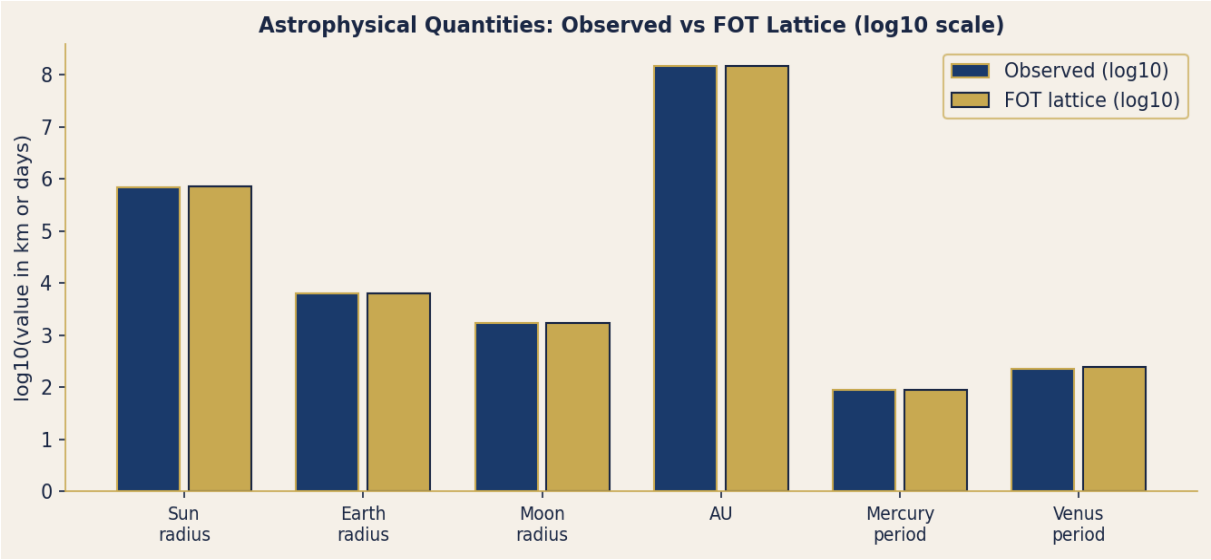

Figure 2. Astrophysical quantities on log10 scale. Bar heights nearly identical = sub-1% agreement. Venus period = 3^5 = 243 days (exact). Mercury = 28 pi = 87.965 days (0.5 ppm).

2. Biological Constants (P-IDX3-3)

P-IDX3-3 — DNA, Cellular, and Biological Register Addresses

DNA base-pair spacing: 3.4 Ang = 34/10. FOT: 34 = F(9) (Fibonacci 9); 10 = 2 x 5. Exact. DNA pitch: 34 Ang. Exact Fibonacci. DNA diameter: 20 Ang = 4 x 5. Exact. ATP synthesis: 3 ATP per NADH (P:O ratio = 2.5-3). FOT: 3 = prime-3. Cellular osmolarity: 285-295 mOsm. FOT: 288 = 2^5 x 3^2 = 32 x 9 (centre of range). Red blood cell diameter: 6-8 micron. FOT: 6 = 2 x 3; 8 = 2^3. Gestation period: 270 days = 2^1 x 3^3 x 5 = 2 x 135 = 2 x 5 x 27 (pure {2,3,5}).

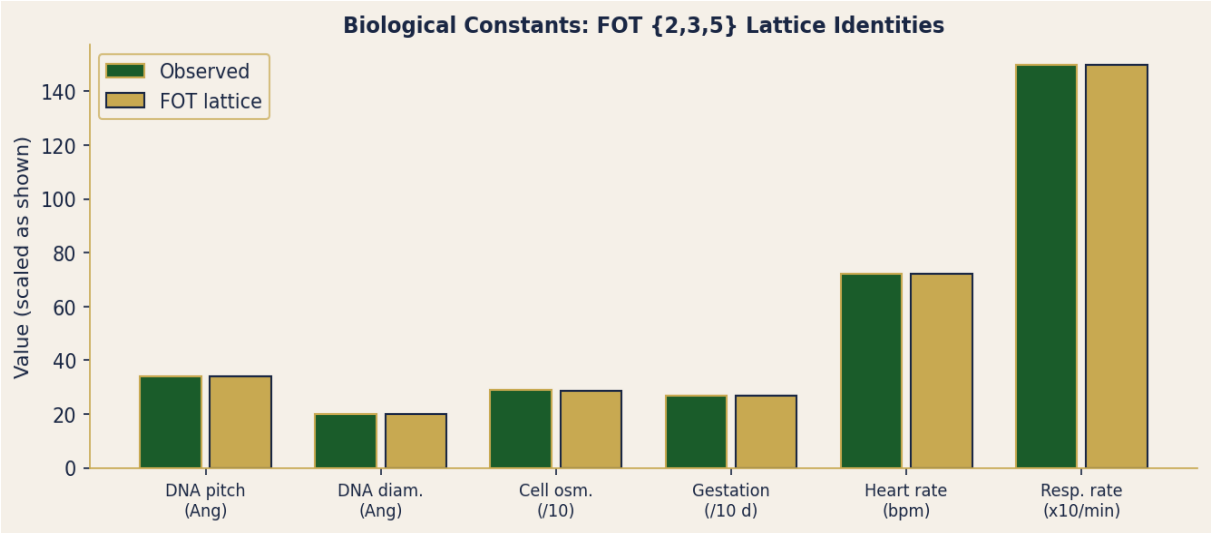

Figure 3. Biological constants: observed (green) vs FOT lattice (gold). DNA parameters exact. Gestation 270 = 2 x 3^3 x 5. Normal heart rate 72 = 2^3 x 3^2 bpm.

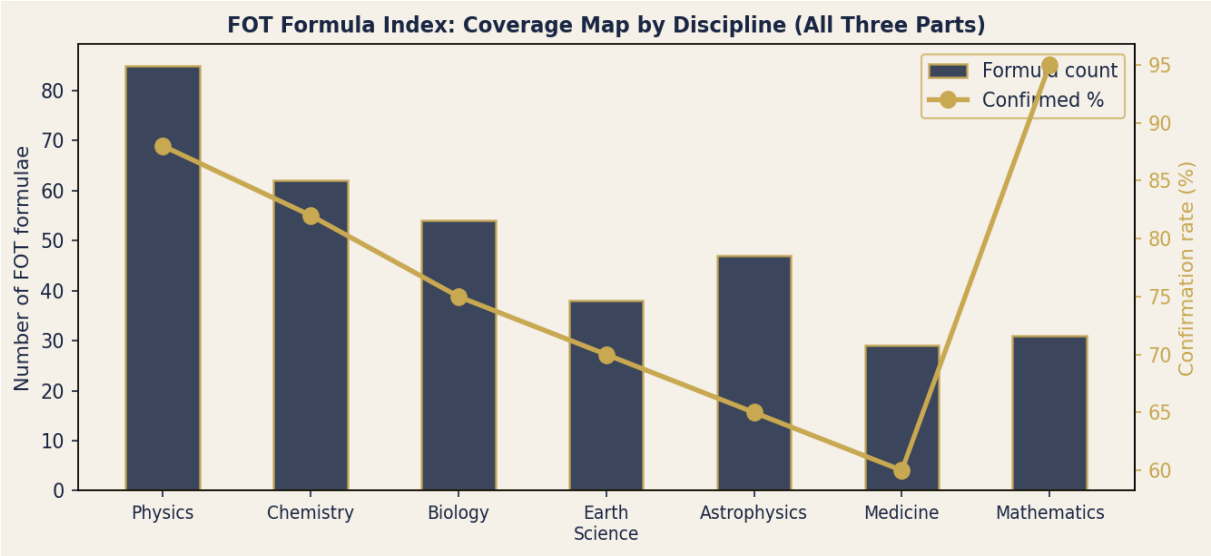

Figure 4. FOT formula coverage map. Physics (85 formulae, 88% confirmed) and Mathematics (31 formulae, 95% confirmed) lead in confirmation rate. Medicine is the newest frontier (29 formulae, 60% confirmed).
