The Speed of Light as a Pure {2,3,5,π} Closed Form: Three Registers, One Lattice

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Propositions P-CLIGHT-1 through P-CLIGHT-4 | Source: Vol3 Section 156

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§1 — Abstract

This paper presents the first closed-form derivation of the speed of light from a pure prime number lattice. $c_{G1} = 2^3 \times 3^5 \times 5^6 \times \pi^2$ m/s = $30{,}375{,}000\pi^2$ m/s requires no measurement inputs — only the prime numbers {2,3,5} and π. The Speed-Coupling Identity $c_{G1} \times \alpha_{FOT} = 2^3 \times 3^7 \times 5^3 = 2{,}187{,}000$ is algebraically exact. The G-bond step $\delta_G = 90.15$ ppm connects c_{G1} to c_{G2} and unifies the spectral, orbital, atmospheric, and gravitational domains through one universal step.

§2 — The Closed Form

P-CLIGHT-1: $c_{G1} = 2^3 \times 3^5 \times 5^6 \times \pi^2$ Numerical: $2^3 = 8$ $3^5 = 243$ $5^6 = 15{,}625$ $8 \times 243 \times 15{,}625 = 30{,}375{,}000$ $30{,}375{,}000 \times \pi^2 = 299{,}789{,}233.68$ m/s Stored FOT value: $c_{G1} = 299{,}789{,}233.7$ m/s Gap: −0.06 ppb (limited by π precision only — formula is algebraically exact) Alternate: $c_{G1} = 30{,}375{,}000\pi^2 = 3^5 \times 5^6 \times 2^3 \times \pi^2$ m/s

§3 — The Speed-Coupling Identity

P-CLIGHT-2: $c_{G1} \times \alpha_{FOT} = 2^3 \times 3^7 \times 5^3 = 2{,}187{,}000$ [exact] Derivation: $c_{G1} = 2^3 \times 3^5 \times 5^6 \times \pi^2$ $\alpha_{FOT} = 3^2/(5^3\pi^2)$ $c_{G1} \times \alpha_{FOT} = 2^3 \times 3^5 \times 5^6 \times \pi^2 \times 3^2/(5^3\pi^2) = 2^3 \times 3^7 \times 5^3$ The π^2 cancels perfectly: $2^3 = 8$ (cubic spatial) $3^7 = 2187$ (atomic Tau-ceiling) $5^3 = 125$ ({5} cubic bridge) The planetary speed domain and atomic fine structure domain are locked to the same {2,3,5} lattice by the cancellation of π^2.

§4 — The Register Chain: G0, G1, G2

P-CLIGHT-3: $c_{G1} = 3^7 \times 10^3 / \alpha_{FOT}$ = atomic ceiling × inverse coupling × cubic precision bridge = $2187 \times 1000 \times 137.0778 = 299{,}789{,}233.7$ m/s [exact] P-CLIGHT-4: $c_{G2} = c_{G1} \times (1 + \delta_G)$ $\delta_G = 90.15$ ppm (G-bond orbital year step) $c_{G2} = 299{,}789{,}233.7 \times 1.00009015 = 299{,}816{,}259.7$ m/s Stored value: 299,816,259.9 m/s Gap: 0.00 ppm (within precision of δ_G) G-bond step $\delta_G = 90.15$ ppm unifies: c_{G1}/c_{G2} ratio | G1/G2 orbital years | Rydberg R_{G1}/R_{G2} Atmospheric masses | Fraunhofer cluster steps

§5 — Registered Propositions: P-CLIGHT-1 through P-CLIGHT-4

P-CLIGHT-1	$c_{G1} = 2^3 \times 3^5 \times 5^6 \times \pi^2$ m/s = $30{,}375{,}000\pi^2$ m/s. Pure {2,3,5,π} closed form. −0.06 ppb from stored FOT value. First closed-form derivation of the speed of light from prime lattice constants alone. The metre emerges as the unit in which the {2,3,5,π} architecture expresses G1 propagation exactly.
P-CLIGHT-2	Speed-Coupling Identity: $c_{G1} \times \alpha_{FOT} = 2^3 \times 3^7 \times 5^3 = 2{,}187{,}000$ exactly. π^2 cancels between c_{G1} and α_{FOT}. The product $3^7 \times 10^3$ = the atomic Tau-ceiling elevated to the planetary scale. The speed of light and the fine structure constant are not independent.

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P-CLIGHT-3	c_G1 = $3^7 \times 10^3$ / α_FOT. G1 speed = atomic ceiling × inverse coupling × cubic bridge. The speed of light is not a free parameter — it is the unique Tau-propagation speed satisfying c × α_FOT = $3^7 \times 10^3$ with 3^7 the atomic ceiling integer.
P-CLIGHT-4	c_G2 = c_G1 × (1+δ_G), δ_G = 90.15 ppm. Both G-speeds anchored to the same {2,3,5,π} base. G2 Hβ = 486.044 nm — the NIST observation-domain line. G1 = the true nodal value. The G-bond step is universal: same 90.15 ppm in orbital years, Rydberg constants, atmospheric masses, and both c values.

Cross-references: Vol3 Section 156 | P-FSC-2 (Speed-Coupling Identity derivation) | P-RYD-8 (G-bond step in Rydberg domain)

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