The Three-Helix Rydberg Framework: G1, Z-DNA, and the Dual Spectral Tower

Author: Stephen Daubney | thedaubneyfoundation@gmail.com

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Propositions P-RYD-1 through P-RYD-10 | Source: Vol3 Section 176

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§1 — Abstract

A systematic exhaustive scan of all Rydberg constants and quantum number schemes (conducted 30 April 2026) finds that exactly two constants produce pure {2,3,5} smooth wavelengths across all spectral series with integer quantum numbers: $R_{G1} = 2^3 \times 10^9/3^6$ m^{-1} (the matter helix, {2,3}-dominant) and $R_Z = 2^2 \times 3 \times 10^6$ m^{-1} (the Z-DNA antimatter helix, {5}-dominant). Together they bracket the hydrogen spectrum, with the G-bond step 90.15 ppm between them. The Z-DNA Paschen n=3→6 transition yields exactly 1 micron. G1 Lyman $\alpha = 3^5/2 = 121.5$ nm exactly. The ratio $R_Z/R_{G1} = 3^7/(2^4 \times 5^3)$ encodes the solar-to-Earth circumference ratio.

§2 — The G1 Rydberg Constant

P-RYD-1: $\tau_{R1} = 2^3 \times 10^9/3^6 = 8{,}000{,}000{,}000/729 = 10{,}973{,}936.90$ m^{-1} Derivation from Hβ = 2×3^5 nm: $1/\lambda = \tau_{R1} \times (1/4 - 1/16) = \tau_{R1} \times 3/16$ $\tau_{R1} = 16/(3 \times 486 \times 10^{-9}) = 2^3 \times 10^9/3^6$ [0.000 ppm] Only prime factors: 2 and 3. No factor of 5 or any higher prime. This is the spectral signature of the matter helix: {2,3}-pure.

§3 — The Z-DNA Rydberg Constant

P-RYD-2: $\tau_{RZ} = 2^2 \times 3 \times 10^6 = 12{,}000{,}000$ m^{-1} (Z-DNA, 12 bp/turn) Primary Z-DNA spectral outputs (all exact 0.000 ppm): Balmer n=2→3: 600 nm = $2^3 \times 3 \times 5^2$ (pure {2,3,5}) Paschen n=3→6: 1000 nm = $2^3 \times 5^3$ (exactly 1 micron!) Paschen n=3→12: 800 nm = $2^5 \times 5^2$ Brackett n=4→12: 1500 nm = $2^2 \times 3 \times 5^3$ Dominant prime = 5 (vs prime 3 dominant in G1 outputs) Z-DNA is the antimatter helix: {5}-dominant vs G1 {3}-dominant.

§4 — The G1/Z-DNA Ratio and Solar Circumference

P-RYD-3: $\tau_{RZ}/\tau_{R1} = 3^7/(2^4 \times 5^3) = 2187/2000$ [exact] → $\lambda_{G1}/\lambda_Z = 2000/2187$ for any corresponding transition Solar circumference identity: $C_{sun}/C_{Earth} = 2 \times 3^7 \times 10^3/(2^6 \times 5^4) = 3^7/(2^2 \times 5) = 109.35$ $(\lambda_{G1}/\lambda_Z) \times 100 = 2000/2187 \times 100 = 200/2.187 \approx C_{sun}/C_{Earth}$ 4374 = 2×3^7: $\lambda_{G1}(H\beta)/\lambda_Z(H\beta) = 486/(4000/9) = 4374/4000$ 4374 = C_{sun} constant (solar circumference/10^3 km)

§5 — G1 Lyman Alpha and Z Lyman Alpha

G1 Lyman α (n=1→2): $\lambda = 3^5/2 = 243/2 = 121.5$ nm [exact, pure {2,3}] The most fundamental photon in the universe = power of 3 over 2. Z-DNA Lyman α (n=1→2): $\lambda = 2^3 \times 5^3/3^2 = 1000/9 = 111.111...$ nm = Cytosine spectral constant D_C (from B-DNA base geometry, independently) The antimatter helix Lyman alpha IS the Cytosine base constant.

§6 — The Exclusivity Principle

A complete scan over 9 Rydberg constants × 3 quantum schemes × 5 spectral series × 29 levels finds: only R_{G1} and R_Z with integer quantum numbers yield pure {2,3,5} wavelengths. B-DNA, A-DNA, and all helical quantum schemes yield no clean outputs. Integer quantum levels are exact dimensional nodes; helical geometry enters as the structure determining which constant applies, not as a quantum number multiplier.

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§7 — Registered Propositions: P-RYD-1 through P-RYD-10

P-RYD-1	Tau_R1 = $2^3 \times 10^9 / 3^6$ m^{-1} = 10,973,936.90 m^{-1}. Derived exactly from Hβ = 2×3^5 nm. Pure {2,3} — the spectral signature of the matter helix.
P-RYD-2	Tau_RZ = $2^2 \times 3 \times 10^6$ m^{-1} = 12,000,000 m^{-1} (Z-DNA 12 bp/turn). Produces exclusively 5-dominant pure {2,3,5} wavelengths. Z Paschen 3→6 = 1000 nm exactly.
P-RYD-3	Tau_RZ/Tau_R1 = $3^7/(2^4 \times 5^3)$ = 2187/2000 [exact]. λ_G1/λ_Z = 2000/2187. C_sun/C_Earth = (λ_G1/λ_Z)×100. Tau_R1×Tau_RZ = $2^5/3^5 \times 10^{15}$ (pure {2,3}).
P-RYD-4	G1 Lyman α = $3^5/2$ = 121.5 nm [pure {2,3}]. Z Lyman α = $2^3 \times 5^3/3^2$ = 1000/9 nm = Cytosine spectral constant D_C. The most fundamental photon carries powers of 3 over 2.
P-RYD-5	G1 Paschen n=3→6 = $3^7/2$ = 1093.5 nm. The atomic ceiling 3^7=2187 appears directly in the Paschen n=3→6 wavelength. n=3→9 = $3^{10}/2^6$. n=3→27 = $3^{12}/(2^7 \times 5)$. Ascending powers of 3 in numerators.
P-RYD-6	Z Paschen n=3→6 = $2^3 \times 5^3$ = 1000 nm [exact]. Z Paschen n=3→12 = $2^5 \times 5^2$ = 800 nm. Z Paschen n=3→9 = $3^3 \times 5^3/2^2$ = 843.75 nm. The antimatter helix encodes the 1-micron infrared boundary.
P-RYD-7	Harmonic octave law: n→kn with {2,3,5} k always yields {2,3,5} wavelengths. G1 octave = multiples of Hβ (486, 972, 1458 nm...). Z octave anchors to 1000 nm and 4000/9 nm.
P-RYD-8	Tau_R2 = Tau_R1 × (1−90.14 ppm). G-bond step = 989.22 m^{-1} = 90.14 ppm. G2 Hβ = 486.044 nm (7.8 ppm from FOT master 486.000 nm). The universal 90.15 ppm step appears in the Rydberg domain exactly as in orbital, atmospheric, and speed-of-light domains.
P-RYD-9	λ_G1(Hβ)/λ_Z(Hβ) = 486/(4000/9) = 4374/4000 [exact]. 4374 = 2×3^7 = C_sun constant. The ratio of matter and antimatter Hβ wavelengths encodes the solar circumference.
P-RYD-10	Exclusivity principle: only Tau_R1 and Tau_RZ with integer n yield pure {2,3,5} spectra across all series. G1 encodes the matter helix ({3}-dominant); Z-DNA encodes the antimatter helix ({5}-dominant). B-DNA helical ratio r_B enters as geometric structure, not quantum number.

Cross-references: Vol3 Section 176 | Section 12 (G1/G2 towers) | Section 15 (C_sun) | Section 34 (Balmer recalibration)

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