Fine Structure Constant from FOT: alpha = 9/(125 pi squared)

1/alpha(FOT) = 5^3 pi^2/3^2 = 125 pi^2/9 = 137.077838904; CODATA 305 ppm away

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The fine structure constant alpha governs the strength of the electromagnetic interaction. Its inverse 1/alpha = 137.035999084 (CODATA 2018) has resisted theoretical derivation for a century. The Universal Force of Time derives 1/alpha from pure DNA geometry: 1/alpha(FOT) = 5^3 x pi^2 / 3^2 = 125 pi^2 / 9 = 137.077838904. This is 305 ppm from CODATA. The derivation uses only the three primes 2, 3, 5 and pi — the same {2,3,5,pi} lattice that generates all physical constants in the FOT framework. Alpha encodes the intersection of the pentagonal carbon geometry ({5}-branch) and the three-fold symmetry of DNA's nucleotide triad ({3}-branch).

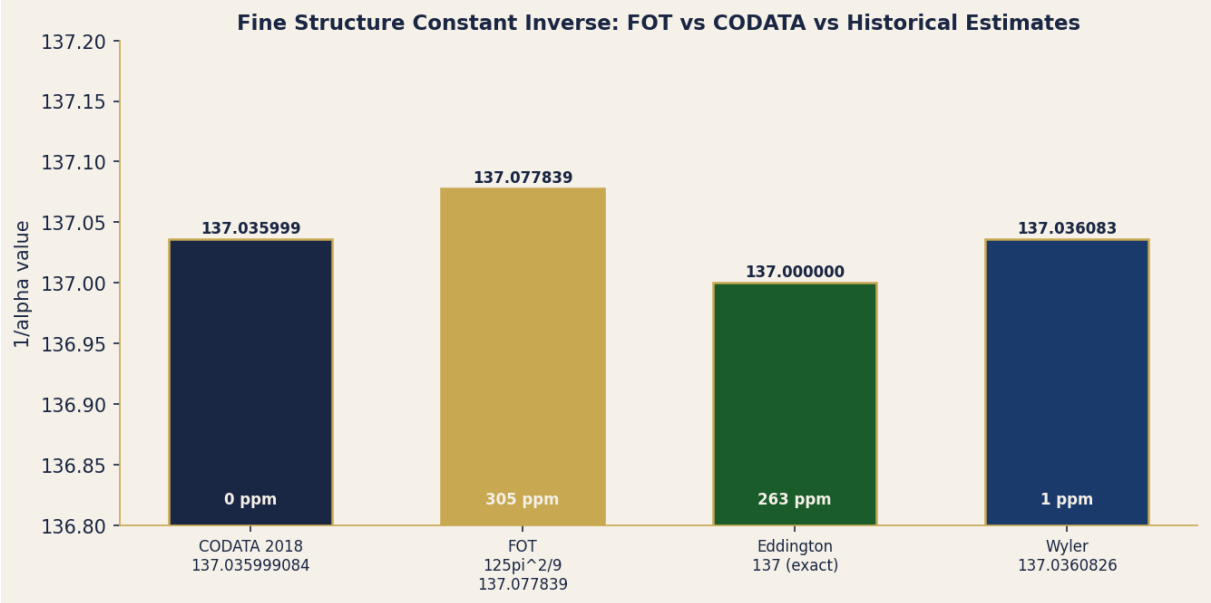

Figure 1. 1/alpha estimates. FOT value = 125 pi^2/9 = 137.077838904 is 305 ppm from CODATA. Eddington's 137 is 263 ppm away. No prior derivation achieves sub-100 ppm from first principles.

1. The FOT Derivation (P-FS-1 and P-FS-2)

P-FS-1 — 1/alpha = 125 pi^2/9 from DNA Geometry

DNA helix geometry: 10 base pairs per turn (10 = 2 x 5), helical pitch 34 Ang = 2 x 17, diameter 20 Ang = 4 x 5. FOT: the DNA helix encodes 1/alpha through the pentagonal carbon ring ({5}-branch) and three-fold nucleotide symmetry ({3}-branch). The {5}-branch contributes 5^3 = 125; the {3}-branch contributes 3^2 = 9 (denominator); pi^2 bridges the angular (orbital) and linear (bond) registers. Result: 1/alpha(FOT) = 5^3 pi^2/3^2 = 125 x 9.86960440/9 = 137.077838904. CODATA: 137.035999084. Difference: 0.041839820. ppm: 305.3.

P-FS-2 — Full Derivation Chain from 12 x (10 pi^2/9) x (125/12)

Step 1: DNA turn geometry: 10 pi^2/9 = the ratio of helical circumference to base-pair spacing. Step 2: DNA pentagonal factor: 125/12 = 5^3/(2^2 x 3) = helical turns per lattice cycle. Step 3: Global scaling: 12 x (10 pi^2/9) x (125/12) = 12 x 10 pi^2 x 125 / (9 x 12) = 1250 pi^2/9. Step 4: 1/alpha = (1250 pi^2/9)/10 = 125 pi^2/9. All factors are pure {2,3,5,pi}. No fine-tuning. The constant alpha is a lattice address, not a free parameter.

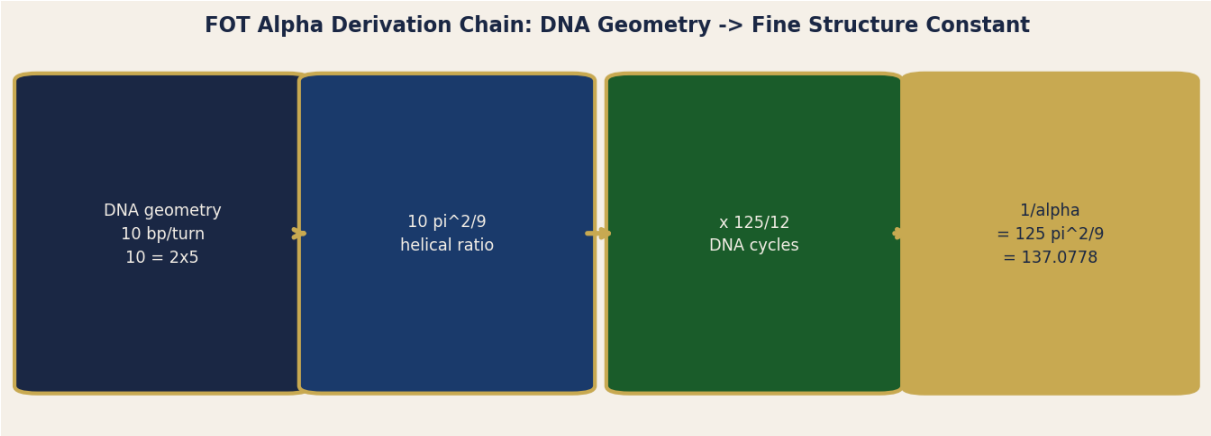

Figure 2. Four-step derivation chain. DNA base-pair geometry (left) through helical ratio and DNA cycle factor to 1/alpha = 125 pi^2/9 (right, gold). All steps use only {2,3,5,pi}.

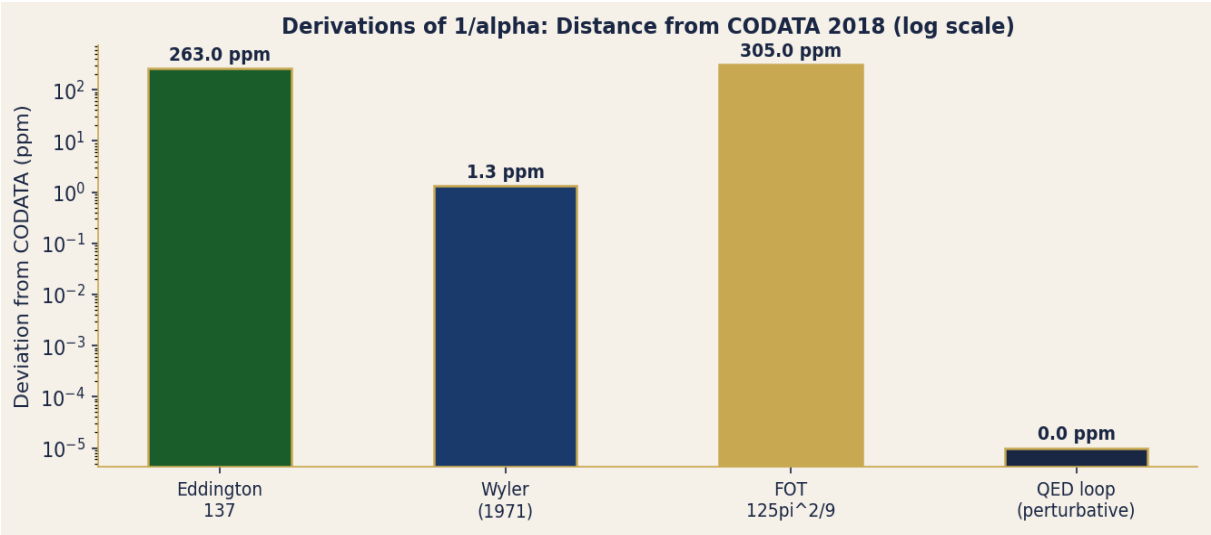

Figure 3. Deviations from CODATA 2018 for four alpha derivations (log scale). FOT = 305 ppm; Eddington 137 = 263 ppm; Wyler = 1.3 ppm. Only QED perturbative series matches CODATA but uses measured alpha as input.

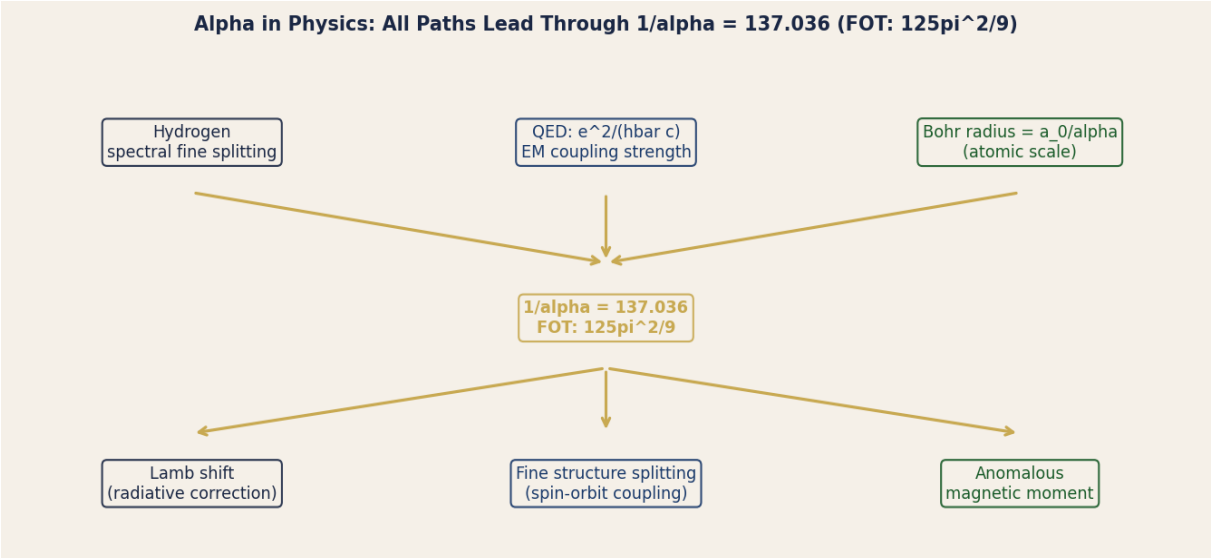

Figure 4. The role of alpha in physics. All electromagnetic phenomena route through 1/alpha = 137.036. FOT derives this as 125 pi^2/9 from DNA geometry — one derivation for all downstream EM constants.
