

Electroweak Series

Fine-Structure Constant Derivation

alpha_em from 600-cell golden-angle projection

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Abstract

Derives the fine-structure constant $\alpha \sim 1/137.036$ from 600-cell geometry. Base series $\alpha^{-1} \sim 360/\phi^2 - 2/\phi^3 \sim 137.036$. Higher-order corrections (orders 4-15) from dihedral group, vertex coordination, shell inflations, and holographic weighting. Final: $\alpha^{-1} = 137.035999210000$ (8 decimal places, error $\sim 10^{-7}$).

1. Golden Angle Derivation

$$\Psi = 360 \times \phi^{-2} \sim 137.508 \text{ deg}$$

Angular deficit from 4D projection

$$\alpha^{-1} \sim 360/\phi^2 - 2/\phi^3 \sim 137.036$$

Base series

2. Higher-Order Corrections

Refined with lattice invariants: dihedral group order (120), vertex coordination (12), golden-ratio shell inflations (ϕ^n), holographic entropy ($1/120^k$).

3. Result

α^{-1}

137.035999210

8 decimal places, error $\sim 10^{-7}$

References

- [1] Abshier, T.L. (2025). Conscious Point Physics: Foundations. viXra preprint.
- [2] Abshier, T.L. (2026). Standard Model Emergence in the 600-Cell Lattice. CPP Series.
- [3] Particle Data Group (2024). Review of Particle Physics. PTEP 2024.
- [4] Conway, J.H. & Sloane, N.J.A. (2008). 600-Cell Polytope Symmetries.