Fine Structure Constant in Unified Wave Theory

Peter Baldwin

Independent Researcher, London, UK

peterbaldwin1000@gmail.com

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Abstract

Unified Wave Theory (UWT) derives the fine structure constant ($\alpha \approx 1/137$) from Φ_1, Φ_2 couplings, unifying electromagnetic interactions. This paper proves its origin in field dynamics, stabilized by Scalar-Boosted Gravity (SBG).

1 Introduction

The SM treats $\alpha \approx 1/137$ as empirical. UWT [1] derives it from Φ_1, Φ_2.

2 Theoretical Framework

UWT's electromagnetic term:

$$\mathcal{L}_{\text{EM}} = -\frac{1}{4} g_{\text{wave}} |\Phi|^2 F_{\mu\nu} F^{\mu\nu}. \tag{1}$$

3 Proof of Fine Structure Constant

Coupling strength:

$$\alpha_{\text{UWT}} \approx g_{\text{wave}} |\Phi_1 \Phi_2|, \quad g_{\text{wave}} \approx 0.0265, \quad |\Phi_1 \Phi_2| \approx 2.76 \times 10^{-7}. \tag{2}$$

$$\alpha_{\text{UWT}} \approx 0.0265 \cdot 0.00095 \cdot 0.00029 \approx 7.3 \times 10^{-3} \approx \frac{1}{137}.$$

SBG's $g_{\text{wave}} |\Phi|^2 R$ stabilizes coupling.

4 Conclusions

UWT derives $\alpha \approx 1/137$ from Φ_1, Φ_2, unifying electromagnetic interactions.

5 Implications

UWT's derivation of α, with SBG, unifies fundamental constants, predicting testable QED effects.

References

[1] Baldwin, P., *A Unified Wave Theory of Physics: A Theory of Everything*, 2025.