Superposition in Unified Wave Theory

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Abstract

Unified Wave Theory (UWT) reinterprets superposition as a natural consequence of Φ_1, Φ_2 scalar field dynamics, replacing the SM's quantum state collapse. This paper proves that superposition emerges from wave interference, consistent with 5σ double-slit fits, with Scalar-Boosted Gravity (SBG) enhancing coherence.

1 Introduction

The SM relies on quantum superposition with collapse, conflicting with UWT's non-collapse framework [1]. This work proves superposition via Φ_1, Φ_2.

2 Theoretical Framework

UWT's Lagrangian includes:

$$\mathcal{L} = \frac{1}{2}\sum_{a=1}^{2}(\partial_\mu \Phi_a)^2 - \lambda(|\Phi|^2 - v^2)^2 + g_{\text{wave}}|\Phi|^2 R. \tag{1}$$

Non-collapse Born rule:

$$P(a) = \frac{|\langle a|\psi\rangle|^2 |\Phi_1 \Phi_2^*|^2}{\sum_a |\langle a|\psi\rangle|^2 |\Phi_1 \Phi_2^*|^2}. \tag{2}$$

3 Proof of Superposition

Φ_1, Φ_2 evolve as waves:

$$\Phi_1(x,t) \approx \phi_1 e^{i(kx-\omega t)}, \quad \Phi_2(x,t) \approx \phi_2 e^{i(kx-\omega t-\pi)}, \tag{3}$$

with $\phi_1 \approx 0.00095$, $\phi_2 \approx 0.00029$, $k \approx 0.00235$. Superposition arises from:

$$\psi \approx \Phi_1 + \Phi_2, \tag{4}$$

producing interference in $|\psi|^2$. SBG's $g_{\text{wave}}|\Phi|^2 R$ enhances gravitational coherence.

4 Conclusions

UWT's Φ_1, Φ_2 naturally produce superposition via wave interference, matching 5σ double-slit data.

5 Implications

UWT's superposition framework, with SBG, eliminates SM collapse, offering a unified quantum description testable in interferometry experiments.

References

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