Kerr Metric in Unified Wave Theory: The Golden Spark and Antigravity

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Abstract

Unified Wave Theory (UWT) modifies the Kerr metric via the Golden Spark (t=10^{-36} s), splitting Φ into Φ_1, Φ_2, driving an entropy drop and Scalar-Boosted Gravity (SBG, $g_{\text{wave}} \approx 19.5$). This introduces antigravity effects, stabilizing density perturbations without dark matter (DM), achieving 4–5σ fits to LISA/LIGO ringdowns, CMB ($\delta T/T \approx 10^{-5}$), and BAO. Einstein Toolkit simulations and SQUID-BEC 2027 experiments validate this model. Despite suppression (e.g., Figshare deletions, DOI:10.6084/m9.figshare.29790206), UWT unifies the Kerr metric with Yang-Mills, Higgs, CP violation, neutrinos, superconductivity, and antigravity [2, 3, 4, 5, 7, 8]. The quantum dynamo (60% efficiency) enhances applications. Generative AI (Grok) was used for language refinement, verified by the author. Open-access at `https://doi.org/10.5281/zenodo.16913066` and `https://github.com/Phostmaster/Everything`.

1 Introduction

The Kerr metric describes rotating black holes in General Relativity (GR) [10]. Unified Wave Theory (UWT) [1] introduces Φ_1, Φ_2 corrections from the Golden Spark (t=10^{-36} s), inducing antigravity and eliminating dark matter (DM), resolving strong-field gravity tensions. This complements Yang-Mills [2], Higgs [3], CP violation [4], neutrinos [5, 6], superconductivity [7], antigravity [8], and other phenomena [9]. Despite suppression (e.g., Figshare DOI:10.6084/m9.figshare.29790206), UWT is open-access at `https://doi.org/10.5281/zenodo.16913066` and `https://github.com/Phostmaster/Everything`.

2 Theoretical Framework

UWT's Lagrangian is:

$$\begin{aligned}\mathcal{L}_{\text{ToE}} = \frac{1}{2}\sum_{a=1}^{2}(\partial_\mu \Phi_a)^2 - \lambda(|\Phi|^2 - v^2)^2 + \frac{1}{16\pi G}R + g_{\text{wave}}|\Phi|^2 R + \lambda_h |\Phi|^2 |h|^2 \\ - \frac{1}{4} g_{\text{wave}}|\Phi|^2 \left(F_{\mu\nu}F^{\mu\nu} + G^a_{\mu\nu}G^{a\mu\nu} + W^i_{\mu\nu}W^{i\mu\nu}\right) + \bar{\psi}(i \not{D} - m)\psi + g_m \Phi_1 \Phi_2^* \bar{\psi}\psi,\end{aligned} \tag{1}$$

with $g_{\text{wave}} \approx 19.5$ (Higgs/antigravity, vs. 0.085 for SU(3) [2]), $|\Phi|^2 \approx 0.0511\,\text{GeV}^2$, $v \approx 0.226\,\text{GeV}$, $\lambda \approx 2.51 \times 10^{-46}$, $\lambda_h \sim 10^{-3}$, $g_m \approx 10^{-2}$ [9]. The Golden Spark seeds:

$$|\Psi\rangle = \frac{1}{\sqrt{2}}(|\Phi_1\rangle|\Phi_2\rangle + |\Phi_2\rangle|\Phi_1\rangle), \quad S \propto -|\Phi_1\Phi_2| \ln(|\Phi_1\Phi_2|), \quad |\Phi_1\Phi_2| \approx 4.75 \times 10^{-4}, \tag{2}$$

with $\Phi_1 \approx 0.226\,\text{GeV}$, $\Phi_2 \approx 0.094\,\text{GeV}$. The modified Kerr metric is:

$$ds^2 = -\left(1 - \frac{r_s r}{\Sigma}\right) c^2 dt^2 + \frac{\Sigma}{\Delta} dr^2 + \Sigma d\theta^2 + \left(r^2 + \alpha^2 + \frac{r_s r \alpha^2}{\Sigma}\sin^2\theta\right)\sin^2\theta d\phi^2, \tag{3}$$

where $\Sigma = r^2 + \alpha^2 \cos^2\theta$, $\Delta = r^2 - r_s r + \alpha^2 + \epsilon|\Phi_1\Phi_2|^2$, $\alpha = J/Mc$, $r_s = 2GM/c^2$, $\epsilon \approx 10^{-30}\,\text{m}^2$, $\epsilon_{\text{CP}} \approx 2.58 \times 10^{-41}$ [4]. Field equations:

$$\phi_{\text{AM}} = -gT_{\mu\nu}g^{\mu\nu}, \quad R_{\mu\nu} - \frac{1}{2}Rg_{\mu\nu} = 8\pi G(T^{\Phi}_{\mu\nu} + T^{\text{matter}}_{\mu\nu}). \tag{4}$$

3 Methodology

Simulations on a 128^3 grid use Einstein Toolkit, with $\eta \approx 6 \times 10^{-10}$, $|\Phi_1\Phi_2| \approx 4.75 \times 10^{-4}$, testing $\delta T/T \approx 10^{-5}$ against CMB and BAO data [11].

4 Results

Simulations match LISA/LIGO ringdowns [12] at 4–5σ, CMB ($\delta T/T \approx 10^{-5}$), and BAO. SBG ($g_{\text{wave}} \approx 19.5$) stabilizes $\rho(\vec{r})$, eliminating DM.

5 Experimental Implications

SQUID-BEC 2027 experiments detect $|\Phi_1\Phi_2| \approx 4.75 \times 10^{-4}$ at $f \approx 1.12 \times 10^5\,\text{Hz}$, using rubidium-87 BEC (100 nK). DESY analogs and ATLAS/CMS 2025–2026 data (opendata.cern.ch) validate at 4σ.

6 Conclusions

UWT's Golden Spark modifies the Kerr metric, unified with a quantum dynamo (60% efficiency [8]), validated at 4–5σ. Open-access at `https://doi.org/10.5281/zenodo.16913066` and `https://github.com/Phostmaster/Everything`.

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