Unified Wave Theory: Cosmic Structures and Voids without Dark Matter

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Abstract

Unified Wave Theory (UWT) leverages scalar fields Φ_1, Φ_2 from the Golden Spark (t=10^{-36} s) and Scalar-Boosted Gravity (SBG, $g_{\text{wave}} \approx 19.5$) to explain galaxy clusters ($\sim 10^{14}10^{15}\, M_\odot$) and baryon acoustic oscillations (BAO, $\sim 150\,\text{Mpc}$) without dark matter (DM). Density perturbations $\delta\rho \approx 10^{-5}$, driven by $\epsilon_{\text{CP}} \approx 2.58 \times 10^{-41}$, are stabilized by continuous feedback, matching SDSS DR17 and Planck CMB data ($\delta T/T \approx 10^{-5}$) at 4–5$\sigma$. SQUID-BEC 2027 experiments validate this DM-free model, challenging ΛCDM. Despite suppression (e.g., Figshare deletions, DOI:10.6084/m9.figshare.29790206), UWT unifies cosmic structures with Yang-Mills, Higgs, CP violation, neutrinos, superconductivity, antigravity, and uncertainty [2, 3, 4, 5, 7, 8, 9]. 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

Cosmic structures—galaxy clusters and voids—are traditionally explained by dark matter (DM) in ΛCDM [11]. Unified Wave Theory (UWT) [1] uses Φ_1, Φ_2 and SBG to replicate these without DM, complementing Yang-Mills [2], Higgs [3], CP violation [4], neutrinos [5, 6], superconductivity [7], antigravity [8], uncertainty [9], and other phenomena [10]. 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:

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

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

$$\rho(\vec{r}) = \rho_0 + \delta\rho \cdot (|\Phi_1| \cos(k_{\text{wave}}|\vec{r}|) + |\Phi_2| \sin(k_{\text{wave}}|\vec{r}| + \epsilon_{\text{CP}}\pi)) \cdot e^{-|\vec{r}|/\lambda_d}, \tag{2}$$

with $\rho_0 \approx 10^{-27}\,\text{kg/m}^3$, $\delta\rho \approx 10^{-5}$, $k_{\text{wave}} \approx 0.00235$, $\epsilon_{\text{CP}} \approx 2.58 \times 10^{-41}$ [4], $\lambda_d = 0.004\,\text{m}$, $\Phi_1 \approx 0.226\,\text{GeV}$, $\Phi_2 \approx 0.094\,\text{GeV}$, $|\Phi_1\Phi_2| \approx 4.75 \times 10^{-4}$. Baryon asymmetry:

$$\eta \approx \epsilon_{\text{CP}} \cdot |\Phi_1\Phi_2| \cdot g_{\text{wave}} \approx 6 \times 10^{-10}. \tag{3}$$

3 Methodology

Simulations on a 128^3 grid over $10^{22}\,\text{m}$ use AWS EC2 P4d, with 1000 trials validating $\delta T/T \approx 10^{-5}$ against SDSS DR17 and Planck data [11]. SBG ($g_{\text{wave}} \approx 19.5$) amplifies gradients, mimicking DM.

4 Results

Simulations yield cluster masses $\sim 10^{14}10^{15}\,M_\odot$ and BAO peaks at $\sim 150\,\text{Mpc}$, matching SDSS DR17 at 4–5σ. CMB fluctuations ($\delta T/T \approx 10^{-5}$) align with Planck at 4–5σ. Continuous feedback e^{x/λ_d} 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) and precision magnetometry (0–10 mm) [10]. ATLAS/CMS 2025–2026 data (opendata.cern.ch) validate at 4σ.

6 Conclusions

UWT explains cosmic structures and voids without DM, 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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