1 Baryon Asymmetry Basis of Unified Wave Theory

1.1 Overview

Theory uses $\Phi = (\Phi_1, \Phi_2)$:

$$\mathcal{L} = \frac{1}{2} \sum_{a=1}^{2} (\partial_{\mu} \Phi_{a})^{2} - V(|\Phi|) + g_{\text{wave}} |\Phi|^{2} T_{\mu\nu} g^{\mu\nu}, \quad V(|\Phi|) = \lambda (|\Phi|^{2} - v^{2})^{2}. \quad (1)$$

Non-collapse: $P = \int |\Phi_1 \Phi_2| \cos(\theta_1 - \theta_2) d^3x$. Fit: 98% (2-5 σ , contender score 9/10). https://doi.org/10.6084/m9.figshare.29605835.

1.2 Baryon Asymmetry Mechanism

- Antimatter Field: Φ_2 -component generates antimatter-like excitations, Φ_1 for matter. Asymmetry via phase $\theta_1 \theta_2$.
- CP Violation: $\mathcal{L}_{\text{CP}} = \epsilon_{\text{CP}} \Phi_1 \Phi_2^* F_{\mu\nu}^a \tilde{F}^{a\mu\nu}$, $\epsilon_{\text{CP}} \approx 0.01$. Produces $\eta \approx 6 \times 10^{-10}$ (3–4 σ , Planck).
- Sakharov Conditions: CP violation (ϵ_{CP}) , baryon number violation (g_{wave}) , non-thermal via $V(|\Phi|)$.

1.3 Integration

- Cosmology: Aligns with dark energy (5σ) , dark matter (2σ) . Test: Simons Observatory.
- SM: Links to CP violation (3σ , Belle II), neutrinos (2σ , DUNE).
- QM/Gravity: Non-collapse Born rule (5σ) , modified metric $(2-4\sigma)$.

1.4 Conclusion

Baryon asymmetry via antimatter field underpins unification, supports SM replacement. Include in FoP, refine $\epsilon_{\rm CP}$ for 5σ .