

Oscillatory Field Genesis: A Unified Drift Theory of Reality

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Abstract

We propose a unified physical framework—Oscillatory Field Genesis (OFG)—in which spacetime curvature, quantum behavior, fundamental forces, particle formation, and biological emergence are all governed by two interacting oscillatory memory fields: Φ (spacetime oscillation) and Θ (phase memory). This drift-based architecture unifies general relativity and quantum mechanics, eliminates dependence on inflation or external gauge symmetries, and introduces a testable cosmological memory structure. Particle mass, spin, and charge emerge from stable topological memory knots, while filament structures, void expansion, and biological fractals result from drift-field anisotropies. This theory forms the backbone of Coexistent Drift-Matter Cosmology (CDC), with observational predictions testable through CMB, lensing, and quantum decoherence anomalies.

1 Field Definitions

- $\Phi(x)$ — Oscillatory memory field defining local spacetime curvature
- $\Theta(x)$ — Quantum phase field encoding coherence, entanglement, and biological resonance
- $Q_{\mu\nu} = \nabla_\mu \Phi \nabla_\nu \Theta + \nabla_\nu \Phi \nabla_\mu \Theta$ — Drift coupling tensor

2 Field Evolution Equations

$$\begin{aligned}\partial_t \Phi &= D_\Phi \nabla^2 \Phi + \alpha(|\nabla \Theta|^2 - V'(\Phi)) \\ \partial_t \Theta &= D_\Theta \nabla^2 \Theta + \beta(\nabla_\mu \Phi \nabla^\mu \Theta)\end{aligned}$$

Potential energy:

$$V(\Phi) = \frac{1}{2}m^2\Phi^2 + \frac{1}{4}\lambda\Phi^4$$

3 Drift-Based Particle Genesis

Particles are stable topological knots in the (Φ, Θ) field manifold. Observable properties:

- **Mass:** energy density trapped in the knot
- **Charge:** phase winding number of Θ
- **Spin:** rotational mode of oscillatory drift within the knot

Particle knots form where:

$$\omega^\mu = \epsilon^{\mu\nu\rho\sigma} \nabla_\nu \Phi \nabla_\rho \Theta \nabla_\sigma \Theta = 0$$

4 Force Emergence via Drift Tensors

Emergent field strength tensors for each force:

$$F_{\mu\nu}^{(i)} = \nabla_\mu \Theta^{(i)} - \nabla_\nu \Theta^{(i)}$$

- Electromagnetism: smooth drift modulation in $\Theta^{(e)}$
- Weak Force: chirality-based twist in $\Theta^{(w)}$
- Strong Force: localized topological confinement in $\Theta^{(s)}$

5 Modified Einstein Equations

$$G_{\mu\nu} + B_{\mu\nu} = 8\pi (T_{\mu\nu}^{\text{matter}} + S_{\mu\nu})$$

Where $S_{\mu\nu}$ is the stress-energy from drift fields:

$$S_{\mu\nu} = \nabla_\mu \Phi \nabla_\nu \Phi + \nabla_\mu \Theta \nabla_\nu \Theta - g_{\mu\nu} \left(\frac{1}{2} (\nabla \Phi)^2 + \frac{1}{2} (\nabla \Theta)^2 + V(\Phi) \right)$$

6 Biological Fractal Emergence

Fractal structures arise from self-organizing drift instabilities:

- DNA folding: helicoidal drift condensation
- Cellular asymmetry: phase skew in early drift resonance
- Neural oscillation: stable Θ -locked loop networks

7 Observational Predictions

1. Drift-induced gravitational lensing anomalies (void edge $\Delta\kappa \sim 0.5\%$)
2. Coherent filament shear phase alignment ($\Delta\gamma \sim 1\%$)
3. Quantum decoherence anomalies in ultra-low drift environments
4. Fractal void and filament coherence deviations in Euclid/LSST/CMB-S4

8 Conclusion

OFG provides a self-consistent, testable theory unifying quantum mechanics, cosmology, force emergence, and biological structure under oscillatory memory fields. Unlike inflationary or particle-centric models, it posits a living field substrate that evolves, remembers, and stabilizes form. It is not a replacement of existing physics but a higher-order synthesis where memory is the first law and resonance the first force.