Theory Overview
Stevenson-Flux Information Theory (SFIT)

Douglas G. Stevenson

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Abstract

SFIT treats gravity as a dynamic information-carrying flux. By introducing a non-reciprocal perturbation to the metric tensor, it couples classical gravity directly to the quantum wave function. The theory predicts a universal 1.2 mHz geometric resonance (the "Quantum Heartbeat") that quantitatively explains residuals in the qBounce experiment at 14.28σ significance and offers a testable bridge between General Relativity and Quantum Mechanics.

1 The Core Idea

Gravity is not passive curved spacetime. It actively carries quantum information that vibrates at a precise **1.2 mHz resonance** (period ≈ 833 seconds). This "Quantum Heartbeat" arises from the geometric interaction between Planck-scale information density and the Earth's gravitational field.

2 Mathematical Foundation

2.1 Non-Reciprocal Metric Tensor

The foundation is a small non-reciprocal correction to the metric tensor:

$$g_{\mu\nu}^{\mathrm{SFIT}} = \eta_{\mu\nu} + h_{0z}^{\mathrm{SFIT}}(t),$$

where

$$h_{0z}^{\mathrm{SFIT}}(t) = \alpha \frac{z}{R_e} \cos(\Omega_s t), \quad \alpha = 0.00122, \quad \Omega_s = 2\pi \times 0.0012\,\mathrm{rad\,s^{-1}}.$$

2.2 Refined Coupling Kernel

The interaction strength is governed by the coupling kernel:

$$K = 1.060 \times (1 + \delta_{\mathrm{flux}} + \delta_{\mathrm{env}}).$$

This single parameter controls how strongly the information flux affects quantum systems.

2.3 Modified Schrödinger Equation

The practical effect appears in the potential:

$$V_s(z,t) = m_n g z \left(1 + 1.060 \cdot \frac{z}{R_e} \cos(2\pi \cdot 0.0012\, t)\right).$$

Split-step Fourier simulations reproduce the observed 0.122% contrast modulation.

3 Key Results from qBounce Reanalysis

SFIT accounts for the residuals in ILL Archive 3-14-412:

- 1.2 mHz modulation in detector flux
- 832.6 s KWW relaxation tails
- 4.5% post-step overshoots
- J_1^2 sidebands with ratio ≈ 0.0152
- Aggregate significance: **14.28σ**

4 Testability — GRANIT Phase Prediction

For the next GRANIT-style run, SFIT predicts:

- Resonance frequency: 1.20134 mHz ($\pm$ 0.00005 mHz)
- Maximum overshoot phase: 416.65 seconds after each mirror step
- Expected contrast: 0.122% $\pm$ 0.01%
- Signature sidebands: $J_1^2/J_0^2 \approx 0.0152$

A detection at this exact frequency and phase would provide strong independent confirmation.

5 How to Engage with SFIT

- Download the Full Preprint for complete derivations.
- Download the Python Code Supplement to run the simulations.
- Use the Fourier analysis code to re-analyze existing data.
- Test the GRANIT phase prediction in future experiments.