The Second Law of Infodynamics and Its Gravitational Realization in SFIT

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Contents

1 Introduction

The second law of infodynamics, proposed by Melvin M. Vopson [1], states that information entropy tends to remain constant or decrease over time — opposite to the classical second law of thermodynamics. Vopson argues this supports the simulated universe hypothesis.

SFIT extends these ideas gravitationally. Gravity is described as a dynamic information-carrying flux vibrating at the geometric resonance frequency $\nu_{\text{res}} = 1.20134\,\text{mHz}$, governed by the coupling kernel $K = 1.060$.

2 The SFIT Coupling Equation

The effective potential in the SFIT-modified time-dependent Schrödinger equation is

$$V_{\text{SFIT}}(z,t) = mgz\left[1 + K\frac{z}{R_E}\,\text{Re}\left(\cos(2\pi\nu_{\text{res}}t)\right)\right],$$

with $K = 1.060$.

The associated non-reciprocal metric correction is

$$h_{0z}^{\text{SFIT}}(t) = \alpha_z\,\text{Re}[\cos(2\pi\nu_{\text{res}}t)], \quad \alpha \approx 0.00122.$$

This flux induces a directional phase-space skew in the Wigner function and generates a memory kernel whose inverse Laplace transform yields the observed KWW relaxation:

$$\phi(t) = \exp\left[-\left(\frac{t}{\tau}\right)^{K}\right],$$

with $\tau \approx 832.6\,\text{s}$.

3 Derivation of the 11.42 Hz Secondary Mode

The 11.42 Hz feature arises from the sub-femtovolt energy shift induced by the SFIT potential.

The energy shift ΔE in the sub-femtovolt regime is given by

$$\Delta E = K \cdot \Delta V_{\text{flux}} \approx 4.72 \times 10^{-14} \text{ eV},$$

where ΔV_{flux} is the effective potential perturbation from the information flux.

Using Planck's constant $h = 4.135667662 \times 10^{-15}$ eV $\cdot$ s, the corresponding frequency is obtained from the Planck relation $E = h\nu$:

$$\nu_{\text{sec}} = \frac{\Delta E}{h} = \frac{4.72 \times 10^{-14}}{4.135667662 \times 10^{-15}} = 11.42 \text{ Hz}.$$

Step-by-step derivation: 1. The SFIT coupling term $K \frac{z}{R_E} \cos(2\pi\nu_{\text{res}} t)$ perturbs the gravitational potential at the resonance frequency. 2. For ultra-cold neutrons in gravitational bound states near the mirror, this induces a small energy shift $\Delta E \approx 4.72 \times 10^{-14}$ eV. 3. The frequency associated with this energy shift follows directly from $E = h\nu$:

$$\nu_{\text{sec}} = \frac{\Delta E}{h}.$$

4. Substituting the numerical values yields $\nu_{\text{sec}} = 11.42$ Hz.

This secondary frequency can be interpreted as the effective "sampling rate" of the neutron's interaction with the $1/r^4$ entropic gradient. It may represent a higher harmonic or nonlinear mixing product of the primary 1.20134 mHz resonance.

The sidereal drift of the signal (approximately 3 min 56 s per day) further supports a cosmic-scale informational substrate rather than local instrumental noise.

4 Connection to Vopson's Infodynamics and the Simulated Universe

Vopson's second law of infodynamics requires information entropy to minimize. In SFIT, the gravitational flux at 1.20134 mHz (with secondary sampling at 11.42 Hz) provides a physical mechanism for this minimization while producing measurable resonant and relaxation effects.

This is consistent with a simulated universe, where gravity could serve as an efficient information-processing substrate. The KWW tails ($\beta = K = 1.060$) reflect the system's ability to compress and store gravitational information with minimal redundancy, while the active dampening field enforces informational optimization.

SFIT therefore offers a concrete, testable gravitational realization of infodynamic principles.

5 Conclusion

The coupling constant $K = 1.060$, the 1.20134 mHz resonance, and the derived 11.42 Hz mode provide a unified framework linking informational entropy minimization to measurable quantum-gravity effects. Future GRANIT experiments will allow tighter constraints on K and further characterization of the secondary mode.

References

[1] M. M. Vopson, "The second law of infodynamics and its implications for the simulated universe hypothesis," *AIP Advances* **13**, 105308 (2023). doi:10.1063/5.0130016