The Second Law of Infodynamics and Its Gravitational Realization in SFIT

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1 Introduction

The second law of infodynamics, proposed by Melvin M. Vopson [1], states that the entropy of information in physical systems tends to remain constant or decrease over time — in contrast to the classical second law of thermodynamics. Vopson argues this informational minimization supports the simulated universe hypothesis: a simulated reality would optimize and compress information for computational efficiency.

Stevenson-Flux Information Theory (SFIT) extends these ideas into the gravitational domain. 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

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

where $K = 1.060$ quantifies the strength of the information flux coupling. This non-reciprocal correction is

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

The 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 primary resonance is $\nu_{\text{res}} = 1.20134\,\text{mHz}$. A secondary feature near 11.42 Hz emerges from the sub-femtovolt energy shift induced by the SFIT potential.

The energy shift in the sub-femtovolt regime is approximately

$$\Delta E \approx 4.72 \times 10^{-14}\ \text{eV}.$$

Dividing by Planck's constant $h = 4.135667662 \times 10^{-15}\ \text{eV} \cdot \text{s}$ gives the corresponding frequency:

$$\nu_{\text{sec}} = \frac{\Delta E}{h} \approx 11.42\ \text{Hz}.$$

Thus, the 11.42 Hz mode is a direct consequence of the SFIT coupling:

$$\nu_{\text{sec}} = \frac{K \cdot \Delta V_{\text{flux}}}{h},$$

where ΔV_{flux} is the effective potential perturbation from the information flux. This frequency acts as a "sampling rate" of the neutron's interaction with the $1/r^4$ entropic gradient near the mirror, consistent with the active dampening field and entropic force in SFIT.

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 provides a physical mechanism for this minimization: the information-carrying flux at 1.20134 mHz (with secondary sampling at 11.42 Hz) optimizes entropy flow 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, bridging Vopson's general law with laboratory-scale observations.

5 Conclusion

The second law of infodynamics and SFIT together suggest that information is not passive but an active driver of gravitational dynamics. The coupling kernel $K = 1.060$, 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, potentially offering empirical insight into both infodynamics and the simulated universe hypothesis.

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