The Second Law of Infodynamics and Its Gravitational Realization in SFIT

Douglas G. Stevenson
stevensonfluxinformationtheory.com

March 2026

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 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 $K = 1.060$.

This flux produces a non-reciprocal metric correction

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

and drives KWW relaxation tails with $\tau \approx 832.6\,\text{s}$ and $\beta = K = 1.060$.

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.

Step-by-step derivation:

1. The SFIT coupling term introduces a small perturbation to the gravitational potential experienced by ultra-cold neutrons near the mirror.

2. The magnitude of this energy shift in the sub-femtovolt regime, based on the calibrated SFIT potential and neutron bound-state data, is

$$\Delta E = (4.72 \pm 0.08) \times 10^{-14} \text{ eV}.$$

3. The frequency ν_{sec} associated with this energy shift follows from the Planck relation $E = h\nu$:

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

where Planck's constant is $h = 4.135667662 \times 10^{-15}$ eV $\cdot$ s.

4. Substituting the central value:

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

Uncertainty propagation:

$$\delta\nu_{\text{sec}} = \frac{\delta(\Delta E)}{h} = \frac{0.08 \times 10^{-14}}{4.135667662 \times 10^{-15}} \approx 0.19 \text{ Hz}.$$

Thus, the derived frequency is

$$\nu_{\text{sec}} = 11.42 \pm 0.19 \text{ Hz}.$$

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.

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.

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