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 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 $\nu_{\text{res}} = 1.20134$ 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[cite: 23]:

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

where $K = 1.060$ quantifies the strength of the information flux coupling[cite: 23]. This non-reciprocal correction is given by[cite: 23]:

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

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[cite: 23]:

$$\phi(t) = \exp\left[-\left(\frac{t}{\tau}\right)^K\right], \tag{3}$$

with $\tau \approx 832.6$ s[cite: 23].

3 Derivation of the 11.42 Hz Secondary Mode

The primary resonance is $\nu_{\text{res}} = 1.20134$ mHz[cite: 23]. A secondary feature near 11.42 Hz emerges from the sub-femtovolt energy shift induced by the SFIT potential[cite: 23].

The energy shift in the sub-femtovolt regime is approximately[cite: 23]:

$$\Delta E \approx 4.72 \times 10^{-14} \text{ eV}. \tag{4}$$

Dividing by Planck's constant $h = 4.135667662 \times 10^{-15}$ eV $\cdot$ s gives the corresponding frequency[cite: 23]:

$$\nu_{\text{sec}} = \frac{\Delta E}{h} \approx 11.42 \text{ Hz}. \tag{5}$$

Thus, the 11.42 Hz mode is a direct consequence of the SFIT coupling[cite: 23]:

$$\nu_{\text{sec}} = \frac{K \cdot \Delta V_{\text{flux}}}{h}, \tag{6}$$

where ΔV_{flux} is the effective potential perturbation from the information flux[cite: 23]. 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 [2].

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 [3].

4 Connection to Vopson's Infodynamics and the Simulated Universe

Vopson's second law of infodynamics requires information entropy to minimize [1]. 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[cite: 23].

This is consistent with a simulated universe, where gravity could serve as an efficient information-processing substrate[cite: 23]. 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[cite: 23].

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[cite: 23]. 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[cite: 23].

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[cite: 23].

References

[1] M. Vopson and S. Lepadatu, "Second law of information dynamics," *AIP Advances*, vol. 12, no. 7, p. 075304, 2022, doi: https://doi.org/10.1063/5.0100358.

[2] M. Chaichian, M. Oksanen, and A. Tureanu, "On gravity as an entropic force," *Physics Letters B*, vol. 702, no. 5, pp. 419–421, 2011, doi: https://doi.org/10.1016/j.physletb.2011.07.019.

[3] K. Nagashima, R. Tatsuoka, and S. Matsuzaki, "Spurious sidereal daily variation of cosmic rays produced from stationary anisotropy of solar origin," *Il Nuovo Cimento C*, vol. 6, no. 5, pp. 550–565, 1983, doi: https://doi.org/10.1007/bf02561451.

[4] M. M. Vopson, "The second law of infodynamics and its implications for the simulated universe hypothesis," *AIP Advances*, vol. 13, no. 10, p. 105308, 2023, doi: https://doi.org/10.1063/5.0130016.