Comparison of Stevenson-Flux Information Theory (SFIT) and Holographic Duality

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March 2026

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1 Introduction

Holographic duality, most famously the AdS/CFT correspondence, posits that a gravitational theory in a higher-dimensional bulk spacetime is equivalent to a quantum field theory living on the lower-dimensional boundary. Gravity and spacetime geometry emerge from quantum entanglement and information dynamics on the boundary.

Stevenson-Flux Information Theory (SFIT) proposes that gravity is a dynamic information-carrying flux vibrating at the geometric resonance frequency $\nu_{\text{res}} = 1.20134\,\text{mHz}$, introducing a small non-reciprocal, time-dependent correction to the metric tensor via the coupling kernel $K = 1.060$.

This document compares the two frameworks.

2 Comparison Table

3 Detailed Comparison

3.1 Fundamental Description

- **Holographic Duality**: Gravity in the bulk is completely encoded in a quantum field theory on the boundary. Spacetime geometry and gravitational dynamics emerge from entanglement entropy (Ryu-Takayanagi formula) and quantum information on the boundary.

Aspect	Holographic Duality (AdS/CFT)	SFIT
Core Idea	Bulk gravity ≡ boundary quantum field theory	Gravity as dynamic infor
Primary Scale	Planck / holographic scale	Laboratory scale (
Dimensionality	Bulk (higher-D) vs boundary (lower-D)	Effective 4D with i
Information Role	Entanglement entropy geometrizes spacetime	Information flux actively
Mathematical Structure	Conformal field theory + bulk gravity (AdS)	Modified TDSE with non-rec
Testability	Mostly indirect (holography, black holes)	Direct: qBounce residuals (14.
Non-locality	Geometric via bulk wormholes / Ryu-Takayanagi	Directional phase-sp
Equivalence Principle	Preserved in bulk GR	Preserved in adiabatic limit;
Unification Goal	Gravity emerges from quantum information	Gravity-QM bridge via i

Table 1: Key comparison between Holographic Duality and SFIT

- **SFIT**: Gravity itself is an active, ontological information-carrying flux. The flux at 1.20134 mHz introduces a directional, non-reciprocal interaction between classical gravity and quantum systems.

3.2 Information and Geometry

- **Holographic Duality**: Information (entanglement) is geometrized — the bulk geometry is a holographic encoding of boundary quantum states.
- **SFIT**: Information is carried as a physical flux that modifies the metric tensor. The non-reciprocal correction $h_{0z}^{\mathrm{SFIT}}(t)$ and the resulting KWW memory kernel arise directly from this flux.

3.3 Scale and Testability

- **Holographic Duality**: Operates primarily at Planck or holographic scales. Laboratory tests are indirect and extremely challenging.
- **SFIT**: Makes concrete, quantitative predictions at laboratory energies. The 1.20134 mHz modulation, 4.5% overshoots, Bessel sidebands, and KWW tails ($\beta = 1.060$) are already supported by qBounce reanalysis and are directly testable in GRANIT experiments.

3.4 Non-locality

- **Holographic Duality**: Non-locality of entanglement is resolved geometrically through the bulk (e.g., ER=EPR wormholes).
- **SFIT**: Non-locality appears through the information flux inducing phase-space skew in the quantum wave function. The flux is directional and tied to the local gravitational gradient.

4 Possible Complementary Relationship

SFIT and holographic duality are not necessarily in conflict. A plausible synthesis is that holographic duality describes the deep, Planck-scale / boundary-bulk encoding of quantum information into geometry, while SFIT describes the **effective low-energy resonant behavior** of this information when observed in a macroscopic gravitational field (such as Earth's).

In this picture: - The 1.20134 mHz Quantum Heartbeat could be a collective resonant mode arising from holographic entanglement structures when coupled to a weak gravitational gradient.

- The coupling kernel $K = 1.060$ quantifies how efficiently boundary entanglement information is transferred into measurable gravitational flux effects. - The KWW relaxation tails reflect the slow relaxation of entangled degrees of freedom across the holographic bulk.

SFIT may therefore represent a mesoscopic, laboratory-accessible manifestation of the deeper holographic principles.

5 Conclusion

Holographic duality geometrizes quantum information, proposing that spacetime and gravity emerge from entanglement on a lower-dimensional boundary. SFIT treats information as an active, dynamical flux that directly modifies gravitational dynamics at laboratory scales.

While holographic duality operates at fundamental holographic scales, SFIT offers concrete, testable predictions at accessible energies. The two frameworks may be complementary: holographic duality as the ultraviolet description of quantum gravity, and SFIT as an effective infrared description of resonant information flow in the presence of macroscopic gravity.

Future ultra-cold neutron experiments (GRANIT) have the potential to test SFIT's predictions and indirectly probe aspects of holographic principles at laboratory energies.