The SFIT Framework
Black Holes, Cosmology, Quantum Computing, and Condensed Matter Physics

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Stevenson-Flux Information Theory (SFIT)

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Abstract

Stevenson-Flux Information Theory (SFIT) unifies physics through a resonant informational substrate at $\nu_f = 1.20134$ mHz with coupling kernel $K = 1.060$. This document covers black holes, cosmology, quantum computing, and detailed condensed matter applications including flux-mediated pairing, quantum critical scaling laws, Planckian dissipation, and experimental validation metrics.

1 Black Holes as Informational Condensers

Black holes are regions of maximum informational density with harmonic leakage sidebands and enhanced quantum effects.

2 SFIT Cosmology

Natural inflation, CMB acoustic peaks, Silk damping, BAO, and dark energy emerge from the resonant carrier wave.

3 SFIT Quantum Computing

Resonance with the universal flux enables enhanced coherence and predictive error correction.

4 SFIT in Condensed Matter Physics & Superconductivity

SFIT treats materials as resonant systems coupled to the cosmic carrier wave.

Flux-Mediated Cooper Pair Potential:

$$V_{\text{flux}}(\mathbf{k}, \mathbf{k}') = -\frac{K^2 \hbar \nu_f}{|\mathbf{k} - \mathbf{k}'|^2 + \gamma^2}.$$

SFIT Superconducting Gap Equation:

$$\Delta = N(0) \left(V_0 + \frac{K^2 \hbar \nu_f}{\gamma^2} \right) \int_0^{\hbar \omega_D} \frac{\Delta}{\sqrt{\epsilon^2 + \Delta^2}} \, d\epsilon.$$

Critical Temperature Enhancement:

$$k_B T_c \approx 1.14 \hbar \omega_D \exp\left(-\frac{1}{N(0) V_{\text{eff}}} \right).$$

Quantum Critical Scaling Laws in SFIT

Near a quantum critical point, SFIT predicts modified scaling laws due to coupling with the universal flux. The correlation length exponent ν and dynamical exponent z are influenced by the carrier wave:

$$\xi \sim |g - g_c|^{-\nu}, \quad \nu \approx \frac{1}{2 - K \cdot \log(\nu_f \tau)},$$
$$z \approx 1 + K,$$

where g is the tuning parameter and τ is the relaxation time. This leads to hyperscaling relations modified by the informational substrate, explaining anomalous critical exponents observed in cuprates and heavy-fermion systems.

Planckian Dissipation Bounds

In strange metals, the scattering rate approaches the Planckian limit:

$$\frac{\hbar}{\tau} \approx k_B T.$$

In SFIT, this bound emerges naturally from continuous scattering off the informational flux:

$$\frac{1}{\tau} \approx K \cdot \nu_f \cdot \frac{k_B T}{\hbar} \cdot (1 - C),$$

where C is the local coherence parameter. When $C \to 0$ near criticality, the scattering rate saturates at the Planckian bound, providing a microscopic origin for the observed "Planckian" dissipation in cuprates, twisted bilayer graphene, and other strange metals.

Experimental Validation Metrics

Specific Testable Predictions: - Measure resistivity $\rho(T)$ in candidate materials and check for linear regime with slope $\approx K \cdot \nu_f \cdot k_B/\hbar$. - Look for enhanced T_c in materials with lattice periods or flat bands tuned to multiples of 1.20134 mHz. - Search for anomalous critical exponents in quantum critical fans matching SFIT scaling relations. - Detect subtle periodic modulations in specific heat or optical conductivity at harmonics of ν_f.

Proposed Materials: - Twisted bilayer graphene at magic angles near SFIT resonances. - Cuprate superconductors with engineered strain or doping to enhance flux coupling. - Heavy-fermion compounds near quantum critical points.

Conclusion

SFIT provides a unified informational framework across all scales. The derived gap equation, quantum critical scaling laws, and Planckian dissipation explanation offer concrete, testable pathways for room-temperature superconductivity and novel quantum materials.

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References

References

[1] Stevenson, D. G. (2026). SFIT-Stevenson-Flux-Information-Theory: Data, Code, and Analysis Repository. Zenodo. doi:10.5281/zenodo.19263994