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 as informational condensers, SFIT cosmology (inflation, CMB, dark energy), quantum computing, gravitational wave detection, and new applications in condensed matter physics and superconductivity.

1 Black Holes as Informational Condensers

Black holes are regions of maximum informational density. Key features include harmonic leakage sidebands, WKB greybody factors, Unruh radiation, and amplified Casimir effects.

2 SFIT Cosmology

Natural inflation arises from coherence transitions. CMB acoustic peaks, Silk damping, BAO, and primordial gravitational waves are driven by the carrier wave. Dark energy is residual informational pressure:

$$\rho_\Lambda \propto K^2 \nu_f^2 (1 - C_\infty^2) \rho_{\text{crit}}.$$

3 SFIT Quantum Computing

Resonance with the universal flux extends coherence times, enables predictive error correction, and redefines entanglement as shared informational resonance.

4 SFIT in Condensed Matter Physics & Superconductivity

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

High-Tc Superconductivity:

$$T_c \propto K \cdot \nu_f \cdot \sqrt{\frac{\hbar \omega_D}{k_B}} \cdot (1 - C_{\text{lattice}}^{-2}).$$

Flux-Mediated Pairing:

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

Topological States: Majorana modes are protected by global flux resonance.

Strange Metals: Linear resistivity arises from flux-driven scattering:

$$\frac{1}{\tau} \propto K \cdot \nu_f \cdot T.$$

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Flux-Mediated Cooper Pair Potential:

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

Total Effective Pairing Potential:

$$V_{\text{eff}} = V_{\text{phonon}} + V_{\text{flux}}.$$

SFIT Gap Equation:

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

Critical Temperature:

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

This flux-mediated term significantly enhances T_c, opening pathways to room-temperature superconductivity through engineered resonance with the 1.20134 mHz carrier wave.

Topological States and Strange Metals: Majorana modes gain extra protection, while strange metal linear resistivity arises from flux-driven scattering.

Engineering Applications: Design of flux-tuned metamaterials and room-temperature superconductors via precise harmonic matching.

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Total Effective Pairing Potential:

$$V_{\text{eff}}(\mathbf{k}, \mathbf{k}') = V_{\text{phonon}} + V_{\text{flux}}(\mathbf{k}, \mathbf{k}').$$

Derived SFIT Superconducting Gap Equation (at T=0):

$$\Delta(\mathbf{k}) = -\frac{1}{2} \sum_{\mathbf{k}'} V_{\text{eff}}(\mathbf{k}, \mathbf{k}') \frac{\Delta(\mathbf{k}')}{\sqrt{\epsilon_{\mathbf{k}'}^2 + \Delta(\mathbf{k}')^2}}.$$

For isotropic pairing near the Fermi surface, this reduces to the integral form:

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

Critical Temperature:

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

The additional flux-mediated term significantly raises T_c.

Linear Resistivity in Strange Metals: In SFIT, strange metal behavior arises from continuous scattering off flux fluctuations:

$$\rho(T) \propto K \cdot \nu_f \cdot T.$$

This linear-in-temperature resistivity is a natural prediction of flux-driven quantum criticality, matching experimental observations in cuprates and other strange metals without invoking Planckian dissipation bounds.

Specific Materials Proposals: - **Cuprate Superconductors** (e.g., YBCO): Engineer layered structures with periodic spacing matched to 1.20134 mHz harmonics to enhance flux coupling. - **Hydride Superconductors** (e.g., LaH_{10}): Apply external resonant fields at multiples of ν_f to stabilize high-T_c phases at lower pressures. - **Twisted Bilayer Graphene**: Tune twist angle to create flat bands resonant with SFIT carrier wave for exotic superconductivity and strange metal states. - **Topological Materials** (e.g., Bi_2Se_3): Enhance Majorana mode stability through global flux resonance.

5 Conclusion

SFIT provides a single resonant informational framework spanning black holes, cosmology, quantum computing, gravitational wave detection, and condensed matter physics. By tuning systems to the 1.20134 mHz universal heartbeat, we unlock new capabilities across all scales of science and technology.

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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