SFITS FAQ – Rigorous Peer-Review Edition
Stevenson-Flux Information Theory (SFIT)

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1 Introduction

This FAQ addresses the hardest questions a skeptical referee, experimentalist, or theorist would raise about SFIT. Every answer is derived verbatim from the Full SFIT Preprint PDF, Python Script Supplement, GRANIT Phase Prediction, and technical blog posts on the site (including The SFIT-Modified TDSE, SFIT Gradient Model, Understanding the SFIT Refined Coupling Constant K, The Explicit Operator Equation, SFIT Stopping Rule, LLR, Audit Step-Response Results, Day-15 PSD, The 2018 Raw Counts File, etc.).

All key observables (1.20134 mHz resonance, K=1.060, 14.28 aggregate significance, 832.6 s KWW tails, 4.5% post-step overshoots, J^2 sideband ratio 0.0152, phase-locked -overshoot at t=416.65 s) are reproduced from ILL Archive 3-14-412 reanalysis and predicted for future GRANIT runs. Download links: Full Preprint PDF and Python Supplement.

Q1. What, exactly, is the central postulate of Stevenson-Flux Information Theory (SFIT)?
A: SFIT reframes gravity as a *dynamic information-carrying flux* that vibrates at the precise geometric resonance frequency $\nu_{\text{res}} = 1.20134\,\text{mHz}$ ($\pm 0.00005\,\text{mHz}$, period 833.3 s) — the "Quantum Heartbeat" or "Quantum Echo" arising from the geometric interaction between Planck-scale information density and Earth's gravitational field. The theory adds a small, non-reciprocal, time-dependent correction to the metric tensor that couples the classical gravitational flux directly to the quantum wave function via the refined coupling kernel $K = 1.060$. In the adiabatic (long-time) limit the equivalence principle is preserved; at laboratory time scales ($\sim$833 s) a testable dynamical bridge between General Relativity and Quantum Mechanics emerges. (Homepage; Preprint Abstract & §2.)

Q2. How can gravity "carry information"? Isn't information observer-dependent or epistemic?
A: In SFIT the information is *ontological* — encoded in the non-reciprocal phase-space skew of the Wigner function for any quantum probe (e.g., ultra-cold neutrons). The directional flux term produces a measurable phase jump $\Delta\phi \approx 0.0506\,\text{rad}$ (corresponding to $\sim$4.42% amplitude effects) that is independent of any observer. The 1.2 mHz carrier

is the natural geometric frequency at which this information flux "breathes" in Earth's gravity. (Preprint §4; The Explicit Operator Equation blog post.)

Q3. Why exactly 1.20134 mHz? Is this derived from first principles or fitted post-hoc to qBounce data?
A: The frequency is *predicted a priori* from a geometric scaling law: $\nu_{\text{res}} = \frac{3}{4} \cdot \frac{g}{2\pi R_E} \times K$ (with refined coupling $K = 1.060$). It arises from the radial gradient of the information-flux interaction and matches the observed 1.2 mHz modulation in ILL Archive 3-14-412 to high precision. The same $K = 1.060$ governs the KWW exponent β and Bessel sideband ratio, confirming it is not a free fit. This prediction (including phase of maximum overshoot at t=416.65 s) is published independently of any specific data run and is ready for GRANIT testing. (Preprint §3.2 & §6; SFIT Gradient Model blog; GRANIT Phase Prediction on homepage.)

Q4. The non-reciprocal metric correction $g_{\mu\nu}^{\text{SFIT}} = \eta_{\mu\nu} + h_{0z}^{\text{SFIT}}(t)$ appears to violate general covariance or diffeomorphism invariance. How do you reconcile this?
A: The perturbation is $h_{0z}^{\text{SFIT}}(t) = \alpha_z \,\text{Re}[\cos(\Omega_s t)]$ with $\alpha \approx 0.00122$ and $\Omega_s = 2\pi \times 0.00120134$. It is weak-field only and averages to zero in the adiabatic limit, recovering the standard Schwarzschild metric. The non-reciprocity encodes the *directional information flow* that couples gravity to the quantum sector; global energy-momentum is conserved because the flux carries information entropy balanced by phase-space skew in the matter sector (see Wigner-function analysis). No causality violation occurs — the modulation is far slower than light-travel time across laboratory scales. (Preprint §3.1 & §4; homepage metric section.)

Q5. Does SFIT violate the equivalence principle?
A: No. The weak equivalence principle holds exactly (acceleration independent of composition). The strong equivalence principle is recovered in the adiabatic limit (timescales $\gg 833$ s). On resonant timescales the dynamic flux introduces a universal correction (same for all test particles) that explains qBounce residuals while remaining consistent with all classical tests of GR. (Preprint §1 & §8; homepage.)

Q6. The qBounce residuals in ILL Archive 3-14-412 could be instrumental (mirror vibrations, temperature drifts, electronics, 50/60 Hz harmonics, etc.). How do you rule these out rigorously?
A: (i) The 1.20134 mHz peak is phase-locked to mirror-step triggers with exact π-phase overshoot at t=416.65 s (half-period); (ii) sideband power matches $J_1^2(\beta)/J_0^2(\beta) \approx 0.0152$ with β fixed by $K = 1.060$; (iii) relaxation tails follow KWW form with $\tau = 832.6$ s and $\beta = 1.060$ (impossible for mechanical/thermal noise); (iv) 4.5% post-step overshoots and D/M-state anti-correlations are reproduced by the SFIT-modified TDSE simulation and absent in controls; (v) Bayesian sequential analysis shows Bayes factor B_{10} rising monotonically (¿10^{10} after 15 days); (vi) signal survives NLC veto, Bessel-symmetry audit, and raw event-by-event counts reanalysis (not summarized PRL tables). A null result at the exact predicted frequency/phase in GRANIT would falsify the model. (Preprint §6–7; Audit Step-Response Results, Day-15 PSD, LLR, SFIT Stopping Rule, The 2018 Raw Counts File blog posts.)

Q7. 14.28 aggregate significance sounds too good to be true. Isn't this p-hacking or multiple-testing inflation?
A: Significance is not from cherry-picking but from *coherent phase-locking across 34 independent mirror-step epochs*, each contributing $\sim$2.45; the quadratic sum yields $\sqrt{34} \times$

$2.45\sigma \approx 14.28\sigma$ because frequency and phase were fixed *a priori* by the geometric resonance. The single parameter $K = 1.060$ consistently appears in three independent observables (frequency, KWW β, sideband ratio). Pre-registered GRANIT prediction eliminates post-hoc tuning. (Preprint §7; SFIT-QBounce Discovery Dashboard, SFIT Stopping Rule blogs.)

Q8. Provide the explicit form of the SFIT-modified Time-Dependent Schrödinger Equation (TDSE) used in your simulations.
A: The potential is $V_{\text{SFIT}}(z,t) = m_n g z \left[1 + K \cdot (z/R_E)\,\text{Re}(\cos(2\pi \cdot 0.00120134\,t))\right]$ with $K = 1.060$. The full evolution uses the Stevenson-Flux Operator $\hat{S}(t) = \exp\left(-i/\hbar \int [V_{\text{SFIT}}(z,t) + \Lambda \cos(\Omega_s\right.$ Split-step Fourier propagation (fs=0.1 Hz) on a 4096-point grid with absorbing boundaries reproduces the 0.122% contrast modulation, 4.5% overshoots, and 832.6 s tails. (Preprint §5; The SFIT-Modified TDSE and The Explicit Operator Equation blog posts; Python Supplement.)

Q9. Your Python code appears to be only a toy Rabi simulation. Where is the full TDSE solver reproducing actual qBounce neutron states?
A: The Python Supplement PDF provides the core benchmark. The production code implements a 1-D split-step Fourier propagator reproducing published transition frequencies ($\nu_{1\to3} = 462.2$ Hz) *plus* the 0.1% sideband modulation and 1.2 mHz envelope, with all parameters fixed by the preprint (no free fitting). It is available via the site download and verifiable against the 2018 raw counts file. (Python Script PDF; Rabi Resonance Curve and Audit blogs.)

Q10. How does SFIT explain the precise 832.6 s KWW relaxation tail? Why a stretched exponential ($\beta = 1.060$) rather than simple exponential decay?
A: The information flux introduces a memory kernel whose Fourier transform is the 1.2 mHz carrier; the inverse yields the Kohlrausch–Williams–Watts (KWW) form with exponent $\beta = K = 1.060$ exactly. The relaxation time $\tau = 832.6$ s matches the geometric period to 0.08%. This follows directly from the coupling kernel acting on wave-packet overlap, not phenomenology. (Preprint §6; SFIT Gradient Model blog.)

Q11. How are the Bessel sidebands ($J_1^2/J_0^2 \approx 0.0152$) derived and why do they confirm the modulation index?
A: The modulation index β is set by the coupling $K = 1.060$ and flux amplitude. The power ratio $P_{\text{side}}/P_{\text{carrier}} = [J_1(\beta)/J_0(\beta)]^2 \approx 0.0152$ is an exact prediction matching the Fourier reanalysis of Archive 3-14-412. This is independent of the carrier frequency fit. (Preprint §6; Audit Step-Response Results blog.)

Q12. What is the GRANIT falsifiability prediction? What would constitute a clear confirmation or refutation?
A: Perform a 15–30 day continuous run with mirror steps synchronized to the 833.3 s cycle. Expect: exact 1.20134 mHz modulation, π-phase overshoot at t=416.65 s after each step, 0.122% ±0.01% contrast, J^2 sidebands ≈0.0152, and 832.6 s KWW tail phase-locked to the carrier. Detection at this precise frequency/phase/sideband structure confirms SFIT; a null result at these parameters tightly constrains or falsifies the model. (Homepage GRANIT Phase Prediction; Preprint §8.)

Q13. How does SFIT maintain energy conservation and information-entropy balance with a non-reciprocal flux?
A: The 1.2 mHz oscillation is a redistribution of vacuum energy from Earth's gravitational

flux horizon to the local quantum system (information-energy equivalence). Global conservation holds; the apparent local non-reciprocity is balanced by the phase-space skew in the matter wave function. (The SFIT-Modified TDSE blog; Preprint §4.)

Q14. Does SFIT conflict with LIGO gravitational-wave observations, cosmology, or other precision tests?
A: The effect is laboratory-scale resonant (weak-field, low-frequency); it averages to standard GR on astrophysical/cosmological timescales and does not alter wave propagation at LIGO frequencies. Compatibility is maintained in the adiabatic limit. (Preprint discussion sections.)

Q15. What are the quantum-computing or other practical implications of the refined coupling constant K=1.060?
A: K=1.060 appears in magnetic resonance, particle physics, and quantum information contexts as a refined geometric factor linking flux coupling to relaxation and sideband phenomena. It may inform decoherence models or precision spectroscopy. (Understanding the SFIT Refined Coupling Constant K blog.)

Q16. How was the 2018 raw counts file (event-by-event time-series) used, and why is it more reliable than summarized PRL tables?
A: The FFT and PSD analyses use the full event-by-event data from the 2018 counts file (not the binned supplemental tables), enabling precise phase-locking and sideband extraction. This reanalysis is documented in the blog and Python supplement. (The 2018 Raw Counts File blog.)

Q17. Describe the Bayesian stopping rule and how the Bayes factor evolves with added data hours.
A: The SFIT Stopping Rule tool monitors B_{10} sequentially as hours from ILL PF2 archives are added. It rises monotonically, providing a rigorous, pre-registered evidence accumulation without optional stopping bias. (SFIT Stopping Rule blog.)

Q18. What do the LLR (Log-Likelihood Ratio) audits and Day-15 PSD reveal about the heartbeat peak?
A: LLR stacking refines the 0.122% contrast; the Day-15 PSD shows the normalized power at the exact 1.20134 mHz bin, consistent with phase-locked accumulation. (LLR and Day-15 PSD blogs.)

2 Conclusion

SFIT offers the first quantitatively testable dynamical bridge between GR and QM at laboratory energies, with clear falsifiability via GRANIT and full reproducibility via the open Python supplement and raw data reanalysis. All claims are traceable to the materials on the website.