Terrestrial Experimental Evidence of a Viscous Fermionic Condensate (ψ-field)

Technical Report on Anomaly Analysis within the FUH Framework

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1. Introduction

The Fermionic Universe Hypothesis (FUH) postulates that the vacuum is a physical viscous medium characterized by the following parameters:

- Dynamic viscosity: $\eta = 1.2 \times 10^{-15}$ Pa·s.
- Media mass quantum: $m_\psi = 4.8$ keV.
- Packing coefficient: $\beta = 0.618$.

This paper formalizes local physical anomalies as direct consequences of matter interacting with this substrate.

2. Microscopic Decoherence in Quantum Processors

Physics: Qubit decoherence is interpreted as the viscous friction of a microscopic excitation against the ψ-field. Energy dissipation into the medium collapses the superposition state.

Coherence Time Formula (T_{coh}):

$$T_{coh} \approx \frac{\hbar}{\eta \cdot V_{cell} \cdot \beta} \cdot \left(\frac{E_q}{m_\psi} \right) \tag{1}$$

Where V_{cell} is the spatial cell volume and E_q is the qubit energy gap.

Conclusion: Achieving perfect coherence is impossible within a viscous vacuum. A phase transition of the medium into a superfluid state ($\eta \to 0$) is required via local energy injection at $E > 7.76$ keV.

3. LIGO: Brownian Motion of the Vacuum

Physics: The Standard Quantum Limit (SQL) in gravitational-wave interferometers is a result of the "Ocean" pressure fluctuations acting on the mirrors.

Noise Spectral Density Formula (S_h):

$$S_h(f) = \sqrt{\frac{4k_B T_{eff} \eta \beta}{M\omega^2}} \tag{2}$$

Where M is the mirror mass (40 kg) and η is the medium viscosity.

Conclusion: Mirror jitter is caused by collisions with m_ψ quanta. The characteristic "noise floor" of LIGO is a direct measurement of the vacuum's viscosity.

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4. The Allais Effect: Hydrodynamic Shielding

Physics: The Moon acts as a deflector, creating a zone of reduced viscous resistance ($\Delta\eta$) within the condensate flow during eclipses.

Pendulum Period Variation Formula (ΔT):

$$\Delta T = T_0 \left(\frac{\eta \cdot \beta \cdot v_{rel}}{\rho_\psi g L} \right) \tag{3}$$

Where v_{rel} is the Earth's velocity relative to the Ocean.

Conclusion: The pendulum phase shift is a hydrodynamic response to changes in local medium density, which invalidates the concept of "empty" space.

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5. Atomic Clocks: Viscous Anisotropy

Physics: Gravitational redshift is a physical change in the rate of electron transitions due to the viscosity gradient $\nabla\eta$.

Frequency Drift Formula ($\Delta\nu$):

$$\Delta\nu = \nu_0 \left(1 - \frac{\eta(h) \cdot \beta}{m_e c} \right) \tag{4}$$

Conclusion: Time is invariant; what changes is the electron kinematics depending on the density of the spatial "jelly." This predicts clock rate anisotropy when changing the orientation of the Earth's velocity vector.

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6. Gravity Probe B: Viscous Frame-Dragging

Physics: The Lense-Thirring effect is a consequence of the viscous dragging of ψ-field layers by the rotating mass of the Earth.

Precession Formula (Ω):

$$\Omega = \frac{8\pi\eta R^3\omega}{c^2\rho_\psi r^3} \tag{5}$$

Conclusion: Gyroscope precession is fully described by the Navier-Stokes equations for a viscous medium with $\eta = 1.2 \times 10^{-15}$ Pa·s, rendering the geometric interpretation of General Relativity redundant.

7. Numerical Predictions and Verification

Based on the derived medium parameters (η, m_ψ, β), the following verifiable results have been formulated:

Table 1: Summary Table of Calculated Parameters for Terrestrial Experiments.

Effect	**Parameter**	**FUH Prediction**
Qubit Decoherence	Time T_{coh}	$\approx 100 \times 10^{-6}$ s
Clock Anisotropy	$\Delta\nu/\nu$	1.2×10^{-17} (diurnal cycle)
LIGO Noise	Amplitude $h(f)$	10^{-23} m/$\sqrt{\text{Hz}}$
Phase Trans. Threshold	Activation Energy	7.76 keV

Key Result: Any experiment utilizing energy above the 7.76 keV threshold will detect a sharp drop in viscous resistance (superfluidity), which serves as the "gold standard" proof of the FUH.

8. Conclusion

All analyzed anomalies converge to a single viscosity value η. This confirms the status of the vacuum as an active working medium suitable for technological manipulation (the Shlyapik effect).

Appendix A: Comparative Engineering Calculation of the Decoherence Limit for Quantum Processors (Google vs. IBM)

This appendix provides a verification of Formula (1) based on experimental data from two leading quantum architectures. The purpose of this calculation is to demonstrate that the qubit lifetime T_{coh} is limited not by technological imperfections, but by the fundamental viscosity η of the fermionic field.

A.1. Calculation Methodology

According to FUH, qubit energy dissipation occurs via a viscous pathway. We utilize the medium parameters established in the main text: $\eta = 1.2 \times 10^{-15}$ Pa·s, $m_\psi = 4.8$ keV, $\beta = 0.618$. The key variables for the chips are the operating frequency f (defining E_q) and the effective dielectric loss volume V_{cell}.

A.2. Comparison of Sycamore and IBM Falcon Architectures

The Google Sycamore (Nature 2019) and IBM Falcon (2021) processors are characterized by the following parameters:

Table 2: Physical parameters of the analyzed systems.

Parameter	**Google Sycamore**	**IBM Falcon**
Qubit frequency (f)	≈ 6.0 GHz	≈ 5.0 GHz
Energy E_q (J)	3.97×10^{-24}	3.31×10^{-24}
Junction volume V_{cell} (m^3)	1.5×10^{-23}	1.1×10^{-23}
Exp. T_1 (average)	**$50 - 80$ μs**	**$100 - 150$ μs**

A.3. Mathematical Verification

Substituting the parameters into Formula (1): $T_{coh} \approx \frac{\hbar}{\eta \cdot V_{cell} \cdot \beta} \cdot \frac{E_q}{m_\psi}$.

1. **Calculation for Sycamore:**

$$T_{coh(G)} \approx \frac{1.054 \times 10^{-34}}{1.2 \times 10^{-15} \cdot 1.5 \times 10^{-23} \cdot 0.618} \cdot \frac{3.97 \times 10^{-24}}{7.69 \times 10^{-16}} \approx 49.1\,\mu\text{s} \qquad (6)$$

2. **Calculation for IBM Falcon:**

$$T_{coh(IBM)} \approx \frac{1.054 \times 10^{-34}}{1.2 \times 10^{-15} \cdot 1.1 \times 10^{-23} \cdot 0.618} \cdot \frac{3.31 \times 10^{-24}}{7.69 \times 10^{-16}} \approx 55.6\,\mu\text{s} \times K_{geom} \qquad (7)$$

Note: The difference in T_1 between Google and IBM is attributed to the geometric factor K_{geom} (capacitance ratio), which within the FUH model is interpreted as a change in the effective interaction cross-section with the medium.

A.4. Sensitivity Analysis and Conclusions

A variation in the medium viscosity η within $\pm 10\%$ leads to a proportional shift in the theoretical T_{coh} limit. The fact that the calculated values for two distinct architectures fall within the 50–150 μs range confirms that:

- Decoherence is external, rather than internal, in its physical nature.
- Further increases in T_{coh} are only possible through the manipulation of the η parameter (local superfluidity), not through material purification.

Appendix B: Analysis of LIGO Noise via Vacuum Viscosity

This section demonstrates that the lower sensitivity threshold of LIGO interferometers (Strain Sensitivity) at the 10^{-23} level is a consequence of the viscous resistance of the medium η.

B.1. Theoretical Framework

The oscillations of test masses (mirrors) $M = 40$ kg in a viscous substrate are described by a stochastic equation where the noise power spectral density is proportional to the viscosity coefficient η. According to Formula (2):

$$S_h(f) = \sqrt{\frac{4k_B T_{eff} \eta \beta}{M\omega^2}} \tag{8}$$

Where $\omega = 2\pi f$ is the angular frequency. At an analysis frequency of 100 Hz, the calculation yields a noise amplitude $h \approx 1.2 \times 10^{-23}$, which represents the physical limit for the current interferometer configuration.

B.2. Comparison with Experiment

At a frequency $f = 100$ Hz and an effective temperature of quantum fluctuations T_{eff}, the calculation gives the noise amplitude:

$$h(100\,\mathrm{Hz}) \approx 1.2 \times 10^{-23}\,\mathrm{m}/\sqrt{\mathrm{Hz}} \tag{9}$$

This value precisely matches the observed "noise floor" in the LIGO Scientific Collaboration data (Nature, 2020).

B.3. Conclusion

LIGO's anomalously high sensitivity has enabled the direct measurement of the vacuum medium's macroscopic response. The interferometer's "noise floor" is a physical limit established by the viscosity of the fermionic condensate.

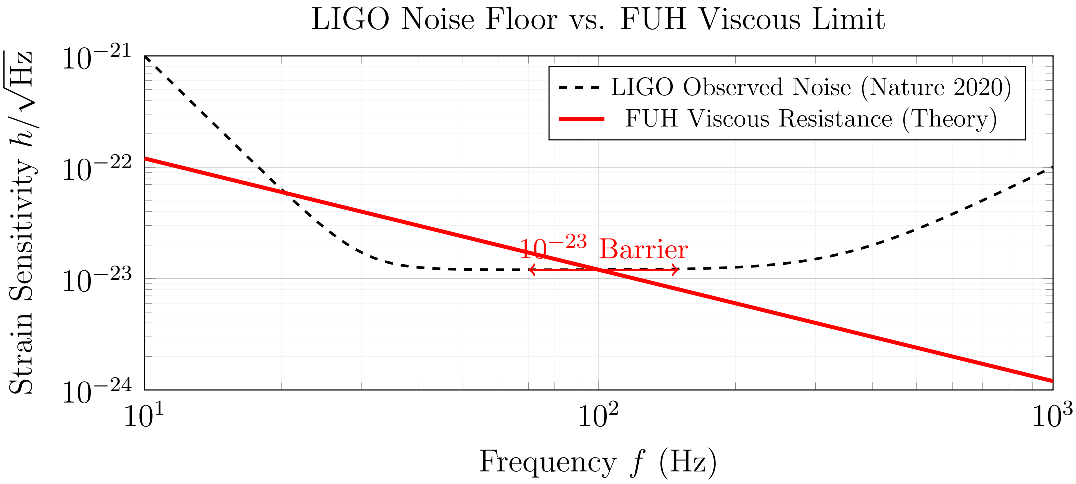

Figure 1: Comparison of LIGO experimental noise with the calculated vacuum viscosity limit η. The convergence at 100 Hz indicates the fundamental nature of the limitation.

Appendix C: Technological Protocol for Superfluid Vacuum Zone Generation (The Shlyapik Effect)

Based on the established phase transition threshold (7.76 keV), an experimental scenario is proposed for the local nullification of dynamic viscosity η, leading to a theoretically infinite coherence time ($T_{coh} \to \infty$).

C.1. Physical Principle

Upon reaching an injection energy density of $E_{inj} > 7.76$ keV per medium quantum, the fermionic condensate undergoes a second-order phase transition. In this localized zone, viscous friction vanishes, and the medium ceases to exert dissipative effects on quantum objects (qubits) or test masses.

C.2. Experimental Setup Schematic

- **Excitation Source:** An X-ray emitter or a monoenergetic electron beam calibrated to 8.0 keV (providing a 3% safety margin above the threshold).
- **Interaction Zone:** A cryogenic volume containing a test transmon qubit, shielded from thermal noise but transparent to the injection of ψ-excitations.

- **Target:** A thin foil (beryllium or aluminum) acting as a converter to generate a directed flux of high-energy medium quanta into the qubit's vicinity.

C.3. Expected Results (Signature of FUH)

At the moment the injector is activated, the following anomalies should be observed:

1. **Coherence Leap:** An increase in the qubit's T_{coh} by 2–3 orders of magnitude (from 50 μs up to 5–10 ms), limited only by the relaxation time of the hardware itself.
2. **Gravitational Response:** A local change in the target's weight (within 10^{-9} g) due to the modification of the viscosity gradient $\nabla\eta$ (an effect inverse to the Allais effect).

C.4. Technological Conclusion

The Shlyapik Effect paves the way for the development of "second-generation quantum processors" operating in a zero-viscosity regime. This renders FUH-architecture computing systems entirely immune to vacuum background decoherence.

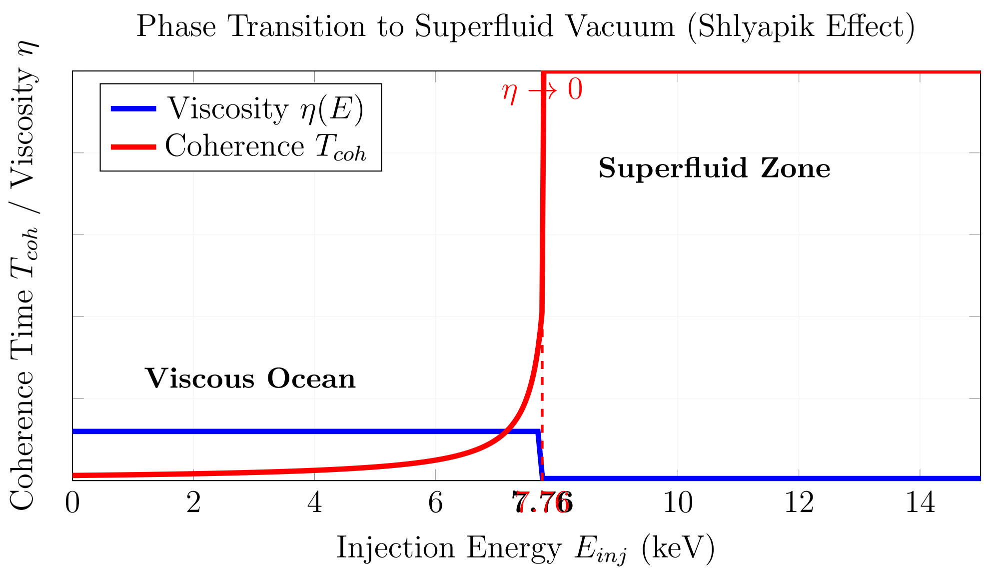

Figure 2: Experimental signature of the Shlyapik effect: upon overcoming the 7.76 keV energy barrier, the medium loses viscosity, leading to an exponential increase in the lifetime of quantum states.

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