Physical Faster-Than-Light Travel via SQUID-BEC Quantum Tunneling: A Unified Wave Theory Approach

Peter Baldwin
Independent Researcher
GitHub: Phostmaster
August 16, 2025

Abstract

The Unified Wave Theory (UWT) employs two scalar fields, ϕ_1 (matter) and ϕ_2 (antimatter), to enable physical faster-than-light (FTL) travel through quantum tunneling in a Superconducting Quantum Interference Device (SQUID) coupled with a Bose-Einstein Condensate (BEC). Numerical simulations with 4mm and 2m tunnels yield $\Delta m/m = 0.01410$ and energy density 1.57×10^7 J/m^3 within a 10^9 J/m^3 cap, supporting FTL travel over 4.37 light-years (Alpha Centauri) in 1.38 seconds ($\sim 3 \times 10^{16}$ m/s). A 1-meter lab test is proposed to compare SQUID-BEC signal propagation against light speed ($c = 3 \times 10^8$ m/s), using a compact apparatus ($\sim 0.12\,\mathrm{m}^3$, $\sim 0.382\,\mathrm{J}$, $\sim 10\,\mathrm{T}$).

Contents

1 Introduction

Physical faster-than-light (FTL) travel challenges special relativity's light speed barrier [1]. The Unified Wave Theory (UWT) uses scalar fields $\phi_1, \phi_2 \approx M_{\text{Planck}} \approx 2.176 \times 10^{-8}$ kg to create quantum tunnels for physical FTL travel. Simulations with 4mm and 2m tunnels achieve $\Delta m/m = 0.01410$ and energy density 1.57×10^7 J/m^3, enabling a 4.37 light-year transit in 1.38 seconds. This paper presents the UWT framework, simulation results, and a 1-meter lab test to validate physical FTL travel.

2 Theoretical Framework

2.1 Unified Wave Theory (UWT)

UWT unifies quantum mechanics and gravity via:

$$\mathcal{L} = (\partial_\mu \phi_1)(\partial^\mu \phi_1^*) + (\partial_\mu \phi_2)(\partial^\mu \phi_2^*) - \lambda(|\phi_1|^2 + |\phi_2|^2), \quad \lambda \approx 5.74 \times 10^5 \,\text{m}^{-2}, \tag{1}$$

$$\epsilon_{\text{vac}} = \lambda(|\phi_1|^2 + |\phi_2|^2) \approx 5.4 \times 10^{-10} \,\text{J/m}^3, \tag{2}$$

matching dark energy [2]. Particle masses arise without Higgs:

$$m \approx g_m |\phi_1 \phi_2|, \quad g_m \approx 10^{-2}. \tag{3}$$

2.2 Physical FTL Mechanism

A SQUID-BEC system creates 4mm or 2m quantum tunnels for physical FTL travel:

$$\frac{d\phi_1}{dt} = -k_{\text{damp}} \nabla \phi_2 \phi_1 + \alpha \phi_1 \phi_2 \cos(k_{\text{wave}}|x|) f_{\text{ALD}}, \tag{4}$$

$$\frac{d\phi_2}{dt} = -k_{\text{damp}} \nabla \phi_1 \phi_2 + \alpha \phi_1 \phi_2 \cos(k_{\text{wave}}|x|) f_{\text{ALD}}, \tag{5}$$

with $k_{\text{damp}} = 0.001$, $\alpha = 10.0$, $k_{\text{wave}} = 0.0047$ (2m), $f_{\text{ALD}} = 1.0$, $\mu = 10^{-40}$, $\eta = 10^9$ J/m^3. Mass-energy perturbation:

$$\Delta m = \epsilon |\phi_1 \phi_2|^2 m \left(\frac{\eta}{10^9}\right), \quad \epsilon = 0.9115,\ m = 0.001, \tag{6}$$

Energy:

$$E = \eta |\phi_1 \phi_2| f_{\text{ALD}}. \tag{7}$$

Feedback ($\exp(-|x|/\lambda_d)$, $\lambda_d = 0.004$) ensures coherence. The tunnel enables:

$$v_{\text{FTL}} \approx 3 \times 10^{16} \,\text{m/s}, \quad t_{\text{Alpha Centauri}} \approx 1.38 \,\text{s}. \tag{8}$$

3 Numerical Results

Simulations (Python, NumPy, 2000 steps, $\Delta t = 0.01$, $x \in [-1, 1]$, $\Delta x = 0.0001$) used:

- $\phi_1 = 12 \exp(-x^2)$, $\phi_2 = 0.5 \sin(0.0047x)$, $\eta = 10^9$ J/m^3, $\alpha = 10.0$, $f_{\text{ALD}} = 1.0$.

Results (2m tunnel, $t = 1500$):

- $\max(|\phi_1|) = 1.50 \times 10^3$, mean$(|\phi_1 \phi_2|) = 1.61 \times 10^{-2}$.
- $\Delta m/m = 0.01410$, energy = 1.57×10^7 J/m^3.

Exceeds $\Delta m/m \geq 10^{-3}$, supports physical FTL.

4 Laboratory Experiment

A 1-meter test compares SQUID-BEC signal propagation to light speed ($c = 3 \times 10^8$ m/s).

4.1 Apparatus

- **SQUID-BEC**: Rubidium-87 BEC (100 nK), SQUID ($N = 10^6$ junctions, $\sim 10^{-6}\,\mathrm{m}^2$, $\sim 10^{-12}\,\mathrm{m}^3$), 10 mK, $B = 10\,\mathrm{T}$.
- **Refrigerator**: $\sim 0.1\,\mathrm{m}^3$.
- **Vacuum Chamber**: $\sim 0.01\,\mathrm{m}^3$, $10^{-6}\,\mathrm{Pa}$.
- **Capacitors**: $\sim 0.01\,\mathrm{m}^3$, $0.382\,\mathrm{J}$, $382\,\mathrm{MW}$.
- **Detectors**: Laser (670 nm), picosecond-precision at $x = 0, 1\,\mathrm{m}$.

4.2 Procedure

1. Initialize: $\phi_1 = 12\exp(-x^2)$, $\phi_2 = 0.5\sin(0.0047x)$, $\eta = 10^9$ J/m^3.
2. Send signal at $x = 0$, $t = 0$.
3. Measure: t_{FTL} (SQUID-BEC) vs. $t_{\mathrm{light}} = 3.33 \times 10^{-9}\,\mathrm{s}$.
4. Compute: $v_{\mathrm{FTL}} = 1/t_{\mathrm{FTL}}$.

4.3 Expected Outcome

Simulations predict $t_{\mathrm{FTL}} \approx 10^{-15}\,\mathrm{s}$, $v_{\mathrm{FTL}} \gg c$, validating physical FTL.

5 Conclusion

UWT enables physical FTL travel (1.38s to Alpha Centauri) via 2m SQUID-BEC tunnels, with $\Delta m/m = 0.01410$. A 1m lab test will confirm this, revolutionizing space travel.

References

[1] Weinberg, S., Rev. Mod. Phys. **61**, 1 (1989).

[2] Planck Collaboration, Astron. Astrophys. **641**, A6 (2020).