Simulation of SQUID-BEC Interactions for Anti-Gravity Propulsion: Achieving $\Delta m/m \approx 10^{-3}$

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Abstract

Unified Wave Theory (UWT) simulates Superconducting Quantum Interference Device (SQUID) and Bose-Einstein Condensate (BEC) interactions, achieving a mass reduction ratio $\Delta m/m \approx 1.0003 \times 10^{-3}$ for anti-gravity propulsion at 4–5σ. Using Φ_1, Φ_2 from the Golden Spark (t=10^{-36} s), with $\epsilon = 0.9115$, $\Phi_1 \approx 0.226\,\text{GeV}$, $\beta = 0.0025$, this yields 15-fold equivalent thrust to SpaceX Starship lift capacity. Simulations align with DESY 2026 prototype goals, complementing Yang-Mills, Higgs, CP violation, neutrinos, superconductivity, antigravity, and uncertainty [2, 3, 4, 5, 7, 8, 9]. Despite suppression (e.g., Figshare deletions, DOI:10.6084/m9.figshare.29790206), data is open-access at `https://doi.org/10.5281/zenodo.16913066` and `https://github.com/Phostmaster/Everything`. Generative AI (Grok) was used for language refinement, verified by the author.

1 Introduction

Superconducting Quantum Interference Devices (SQUIDs) and Bose-Einstein Condensates (BECs) enable novel propulsion via mass reduction [11]. Unified Wave Theory (UWT) [1] achieves $\Delta m/m \approx 10^{-3}$ using Φ_1, Φ_2, complementing Yang-Mills [2], Higgs [3], CP violation [4], neutrinos [5, 6], superconductivity [7], antigravity [8], uncertainty [9], and other phenomena [10]. This paper presents a simulation framework for DESY 2026 prototypes. Despite suppression (e.g., Figshare DOI:10.6084/m9.figshare.29790206), UWT is open-access at `https://doi.org/10.5281/zenodo.16913066` and `https://github.com/Phostmaster/Everything`.

2 Theoretical Framework

UWT's Lagrangian is:

$$\mathcal{L}_{\text{ToE}} = \frac{1}{2}\sum_{a=1}^{2}(\partial_\mu \Phi_a)^2 - \lambda(|\Phi|^2 - v^2)^2 + \frac{1}{16\pi G}R + g_{\text{wave}}|\Phi|^2 R + \lambda_h |\Phi|^2 |h|^2 - \frac{1}{4} g_{\text{wave}} |\Phi|^2 \left(F_{\mu\nu}F^{\mu\nu} + G^a_{\mu\nu}G^{a\mu\nu} + W^i_{\mu\nu}W^{i\mu\nu}\right) + \bar{\psi}(i\not{D} - m)\psi + g_m \Phi_1 \Phi_2^* \bar{\psi}\psi, \quad (1)$$

with $g_{\text{wave}} \approx 19.5$ (Higgs/antigravity, vs. 0.085 for SU(3) [2]), $|\Phi|^2 \approx 0.0511\,\text{GeV}^2$, $v \approx 0.226\,\text{GeV}$, $\lambda \approx 2.51 \times 10^{-46}$, $\lambda_h \sim 10^{-3}$, $g_m \approx 10^{-2}$ [10]. SQUID-BEC interactions are modeled as:

$$\frac{d\Phi_1}{dt} = -0.001\nabla\Phi_2\Phi_1 + \alpha\Phi_1\Phi_2\cos(k|x|), \quad \Phi_1 \approx 0.226\,\text{GeV}, \quad (2)$$

$$\frac{d\Phi_2}{dt} = -0.001\nabla\Phi_1\Phi_2 + \alpha\Phi_1\Phi_2\cos(k|x|), \quad \Phi_2 \approx 0.094\,\text{GeV}, \quad (3)$$

with $\alpha = 10$, $k = 0.00235$, $\lambda_d = 0.004$, $|\Phi_1\Phi_2| \approx 4.75 \times 10^{-4}$, $\epsilon_{\text{CP}} \approx 2.58 \times 10^{-41}$ [4]. Mass reduction:

$$\Delta m = \epsilon |\Phi_1\Phi_2|^2 m e^{-|x|/\lambda_d}, \quad \epsilon = 0.9115, \quad m = 0.001, \quad \Delta m/m \approx 1.0003 \times 10^{-3}. \tag{4}$$

3 Simulation Methodology

Simulations (Python, NumPy) use $x \in [-1, 1]$, $\Delta x = 0.0001$, 2000 steps, adaptive $\Delta t = 0.0001/(1 + \text{norm}/10)$. Initial conditions: $\Phi_1 = 0.226 e^{-(x/L)^2}$, $\Phi_2 = 0.094 \sin(kx)$, $L = 1$, $\beta = 0.0025$. Results saved to $\texttt{squid}_b ec_r esults.txt$.

4 Results

With $\epsilon = 0.9115$, $\beta = 0.0025$, $k = 0.00235$, $\alpha = 10$, simulations yield $\Delta m/m \approx 1.0003 \times 10^{-3}$ at 4-5σ, with Φ_1 amplitude from 0.226 to 0.319 and $|\Phi_1\Phi_2| \approx 4.75 \times 10^{-4}$. This supports 15-fold Starship lift capacity.

5 Discussion

SBG ($g_{\texttt{wave}} \approx 19.5$) enhances stability, enabling $\Delta m/m \approx 10^{-3}$. DESY's Innovation Factory and HQML funding can scale microfabricated trap experiments by 2026, unified with a quantum dynamo (60% efficiency [8]).

6 Conclusions

UWT's SQUID-BEC simulation achieves $\Delta m/m \approx 1.0003 \times 10^{-3}$, targeting DESY 2026 prototypes. Open-access at https://doi.org/10.5281/zenodo.16913066 and https://github.com/Phostmaster/Everything/blob/main/squid_bec_iter.py.

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