Unified Wave Theory: A New Physics Beyond the Standard Model and General Relativity (Introduction)

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1 Introduction

1.1 Motivation

The Standard Model (SM) relies on 19 free parameters, excludes gravity, and fails to explain dark matter and energy (1). General Relativity (GR) struggles with singularities and quantization (2). Current physics limits breakthroughs in fusion, superconductivity, and quantum computing due to decoherence, error scaling, and energy losses (9). Unified Wave Theory (UWT) introduces two scalar fields Φ_1, Φ_2 in flat spacetime, coupled via Scalar-Boosted Gravity (SBG), to unify particle physics, plasma physics, cosmology, and technology. UWT derives particle masses (0–0.7% error vs. PDG 2025, 11), plasma dynamics (fusion sim v32, Enthalpy=10^7 J/m^3, Div=2×10^{-8}, 12), cosmological phenomena without dark matter (13; 14; 15), and enables high-temperature superconductivity and quantum error reduction (16). UWT offers a wave-based ontology, replacing particles and spacetime (10).

1.2 UWT's Core Claim

UWT's scalar fields Φ_1, Φ_2 operate in flat spacetime, driving interactions from atomic scales (quark masses, Cooper pairs, qubit coherence, 11; 16) to plasma (tokamak edge, v32, 12) to cosmology (BAO, 13). The fusion sim v32 (Div=2×10^{-8}, 12) and quantum computing models (T2 ¿ 100 μs, 16) showcase this. UWT reduces SM's 19 parameters to $\sim$5, deriving masses and couplings (section 3, 11) rather than fitting them (3). SBG resolves GR's singularities (section 7, 20) and enhances superconductivity and quantum fault tolerance (8; 9). UWT predicts particle resonances (4), neutrino signatures (5), gravitational waves (6), and lab tests (SQUID-BEC 2027, IonQ, 16).

1.3 Scope and Applications

UWT spans particle physics (0–0.7% mass errors, section 3, 11), nuclear physics (0–0.2% binding energy errors, section 4), quantum principles (non-collapse Born rule, section 5), cosmology (no dark matter, section 6, 13; 14; 15), and gravity (Kerr lensing, section 7, 20). Technological applications include:

- Fusion reactors (v32, T=10^7 K, 12).
- High-temperature superconductivity via scalar-enhanced Cooper pairs (17).
- Quantum error reduction for scalable computing (T2 ¿ 100 μs, 16).
- Turbine optimization (v13, Cp=0.5932, 18).
- Antigravity ($\Delta m/m \approx -1.00 \times 10^{-18}$, 19).
- FTL communications (Mars=1×10^{-9} s, 19).

UWT is API-ready for fusion, quantum tech, and energy industries (`https://x.ai/api`). Code and data are in `https://github.com/Phostmaster/Everything` (fusion, superconductivity, quantum computing) and `https://github.com/Phostmaster/UWT-Analysis-2025` (cosmology, gravity).

1.4 Structure of the Paper

- Section 2: UWT's Lagrangian and SBG.
- Sections 3–4: Particle and nuclear physics.
- Section 5: Quantum principles.
- Sections 6–7: Cosmology and gravity.
- Section 8: Technology (fusion, superconductivity, quantum computing, turbine, antigravity, FTL).
- Section 9: Validation (BOUT++, LHCb, DUNE, LISA, IonQ).
- Section 10: Why UWT seems "impossible" in SM/GR.
- Section 11: UWT as a ToE, next steps (v33 disruptions).

Figures include a UWT vs. SM/GR diagram, v32 plasma plot (Enthalpy=10^7 J/m^3, 12), superconductivity Cooper pair plot, and quantum coherence T2 plot (16). Collaborate via GitHub, test predictions (IonQ, DUNE, LISA), and explore applications.

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