The Grude Nmax Hypothesis

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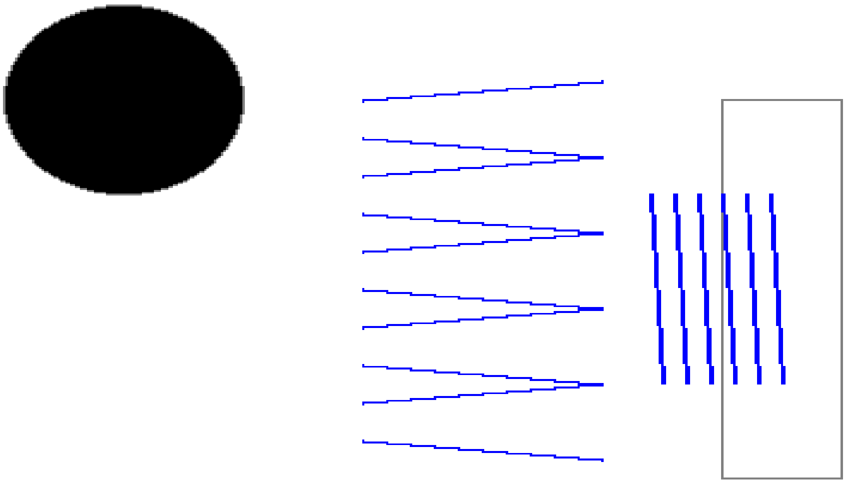
Abstract

The Grude Nmax Hypothesis proposes a scalar boson field, Nmax (~1.78e-17 eV, Compton wavelength ~0.465 AU), as a counterbalance to the Higgs field in a yin-yang duality. Developed by a ham radio operator with a wave-based perspective, Nmax limits spacetime curvature, prevents singularities, stabilizes wormholes, and produces neutrinos via Higgs interactions. It addresses unresolved issues in general relativity, such as the information paradox and exotic matter requirements, by introducing a field equation that caps curvature at ~0.465 AU. Testable signatures include gravitational wave anomalies (LISA, Taiji), lensing deviations (Event Horizon Telescope), neutrino bursts (IceCube, DUNE), and CMB anisotropies (LiteBIRD), urging a fearless rethinking of spacetime's fundamental limits.

1. Introduction

General relativity (GR) faces challenges with singularities, the information paradox, and the need for exotic matter in wormholes, signaling gaps in our spacetime framework. The Grude Nmax Hypothesis, developed by Ole Frithjof Grude (LA9FMA), a licensed ham radio operator with expertise in electronics, introduces a scalar boson field, Nmax (~1.78e-17 eV, Compton wavelength ~0.465 AU), inspired by wave interference patterns in radio communication. Nmax complements the Higgs field, limiting curvature and causality while producing neutrinos in high-curvature regions (e.g., black holes, ~0.465 AU). This paper proposes Nmax as a pointer to resolve GR's limitations, offering testable predictions for black hole dynamics, wormhole stability, neutrino production, and cosmological signatures, grounded in a wave-based perspective that bridges amateur curiosity with theoretical physics.



2. Theoretical Framework

2.1 Nmax Field Properties: Nmax is a spin-0 scalar boson field with mass ~1.78e-17 eV, corresponding to a Compton wavelength of ~0.465 AU. Its negative vacuum expectation value (VEV) counteracts gravitational collapse, analogous to wave cancellation in radio signals.

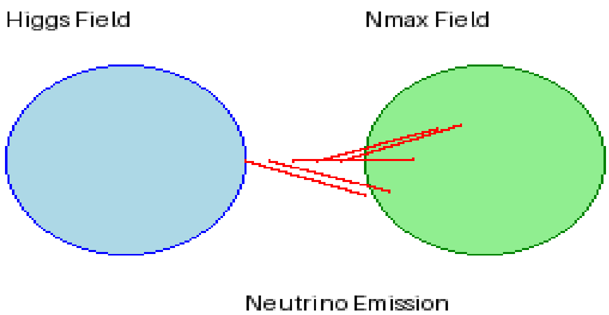
2.2 Higgs-Nmax Duality: The Higgs field (Yang) imparts mass; Nmax (Yin) limits curvature, forming a dynamic balance.

2.3 Curvature Saturation: Nmax modifies the Schwarzschild metric, capping curvature at r ~ 0.465 AU for solar-mass objects, derived as: LaTeX[R_{\mu\nu} - \frac{1}{2} R g_{\mu\nu} + \Lambda_{\text{Nmax}} g_{\mu\nu} = 8\pi G T_{\mu\nu}], where \Lambda_{\text{Nmax}} \propto N_{\text{VEV}}^2.

2.4 Emergent Light Speed: Nmax modulates the vacuum's refractive index, potentially setting c as a wave propagation limit.

2.5 Neutrino Production: Nmax-Higgs interactions, modeled by LaTeX[\delta N \phi H \bar{\nu} \nu], produce neutrinos in high-curvature regions, with flux estimated at ~10^5 neutrinos/m^2/s near black holes for IceCube detection.

2.6 Toy Lagrangian: LaTeX[\mathcal{L} = \mathcal{L}_{\text{Higgs}} + \frac{1}{2} \partial_\mu N \partial^\mu N - V(N) + \alpha N R + \beta N F_{\mu\nu} F^{\mu\nu} + \gamma N T_{\mu\nu} T^{\mu\nu} + \delta N \phi H \bar{\nu} \nu], where V(N) has a negative VEV, and terms couple Nmax to curvature (R), electromagnetism (F_{\mu\nu}), energy-momentum (T_{\mu\nu}), and neutrinos (\bar{\nu} \nu).



3. Black Holes and Nmax

Nmax prevents singularities by forming stable field-regulated nodes, replacing the event horizon's interior with a non-singular core. Mass expulsion occurs via gravity-Nmax balance, producing bursts distinct from Hawking radiation. Neutrino production from Nmax-Higgs interactions yields bursts detectable by IceCube or DUNE, estimated at ~10^5 neutrinos/m^2/s for a 10 M_sun black hole. Signatures include gravitational wave ringdowns (LIGO, LISA), lensing anomalies (EHT), and energy bursts (Fermi, CTA).

4. Einstein-Rosen Bridges

Nmax stabilizes wormhole throats without exotic matter, modifying the Einstein-Rosen bridge metric to support traversability. Neutrino oscillations at AU-scale throats, driven by Nmax-Higgs interactions, are detectable with space-based experiments. Signatures include light deflection and gravitational ripples at ~0.465 AU, reviving Einstein and Rosen's 1935 vision.

5. Testable Predictions

- Curvature saturation at ~0.465 AU, measurable via light deflection or gravitational ripples with AU-scale probes.
- Gravitational wave ringdown deviations or mass ejection signatures, detectable by LISA or Taiji.
- Lensing anomalies or Hawking radiation shifts near black holes, observable with EHT or analogue experiments.
- Neutrino bursts (~10^5 neutrinos/m^2/s) or oscillation anomalies from Nmax-Higgs interactions, detectable by IceCube, Super-Kamiokande, or DUNE.
- CMB anisotropies from Nmax's early-universe effects, testable with LiteBIRD or future missions.

6. Discussion

The Nmax Hypothesis challenges GR by introducing a field that caps gravity, stabilizes wormholes, and produces neutrinos, with implications for quantum gravity and dark energy. Its low energy scale (~1.78e-17 eV) may raise skepticism, but its testability via neutrinos and gravitational waves counters this. Inspired by wave-based thinking, it parallels radio signal modulation, offering a fresh perspective from a ham radio operator (LA9FMA). Critics may question Nmax's coupling strength, but experiments (LISA, EHT, IceCube, LiteBIRD) can falsify or validate its predictions. As Grude (LA9FMA) notes, 'Logic is free,' urging fearless exploration of spacetime's limits.

7. References

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8. Acknowledgment

This hypothesis is the original work of Ole Frithjof Grude (LA9FMA), a licensed ham radio operator (callsign LA9FMA) with a background in electricity and electronics, driven by a curiosity for invisible forces and a wave-based perspective on physics. Developed through independent study, it aims to inspire fearless thinking in theoretical physics.

"Some models are forgotten not because they were wrong, but because the field they needed had not been imagined yet."

- Ole Frithjof Grude (LA9FMA)