

Trōṇa Siddhāntam (Pluck Theory): A Unified Wave-Resonance Ontology of Reality

Trōṇa Tarangi (with AI-supported formulation)

Abstract

We propose a unified ontology, *Trōṇa Siddhāntam* (“Pluck Theory”), wherein all particles, fields, spacetime, and forces emerge from the interactions of waves propagating in a continuous wave-permitting medium termed the *Tarangi*. In this framework, matter arises from stable resonant knots (Trōṇas), fields are recurrence zones in the substrate, and all fundamental interactions—including gravity—are manifestations of wave resonance and phase dynamics. The model reinterprets key assumptions in quantum mechanics, field theory, and relativity while preserving empirical predictions. This work aims to provide a cohesive, emergent alternative to conventional particle-based ontology.

1. Introduction

The standard model of particle physics and general relativity provide an extraordinarily successful description of nature. However, the ontology of particles, fields, and spacetime remains fragmented. Interpretational problems such as the wavefunction collapse, the origin of mass, and the non-locality of quantum entanglement persist.

This work proposes *Trōṇa Siddhāntam*, or “Pluck Theory,” a unified model built upon a singular assumption: **only waves exist**, and all observed structure arises from their interaction within a wave-permitting substrate — the **Tarangi**.

2. The Substrate: Tarangi

We posit the existence of a continuous, non-material medium capable of supporting oscillations: the **Tarangi**. This medium is not spacetime but underlies it. Waves within the Tarangi are the sole entities of physical reality.

- No particles, no forces, no fields are fundamental.
- Space and time emerge from dynamic wave behavior.
- All observables are manifestations of wave resonance.

3. Emergence of Particles

3.1 Resonant Knots (Trōṇas)

Particles are defined as **stable, localized wave intersections** — resonant nodes where multiple waveforms (differing in frequency, phase, and mode) constructively interfere. These are not point-like but **standing wave patterns** propagating within the Tarangi.

Mass arises as **energy stored in these coherent structures**, consistent with the wave form of Einstein's equation:

$$E = mc^2 = \int |\psi(x, t)|^2 dx$$

3.2 Charge, Spin, and Antiparticles

- **Electric charge:** the symmetry pattern of coupling with long-range waveforms (EM-type).
 - **Spin:** a topological torsion of the wave configuration.
 - **Antiparticles:** phase-inverted or conjugate waveforms.
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4. Fundamental Interactions as Wave Phenomena

All interactions are phase and resonance effects — not mediated by particles or force carriers.

4.1 Electromagnetic and Strong/Weak Interactions

- **Electromagnetic:** Long-range phase locking between resonant knots.
- **Strong force:** High-mode resonance confinement among Trōṇas.
- **Weak force:** Resonance decay or transformation due to instability.

4.2 Gravity as Resonance Guidance

Gravitational effects emerge when massive Trōṇas alter nearby wave trajectories by changing the **interference pattern** of the substrate — not by curvature of spacetime.

This aligns with general relativity predictions at macroscopic scales, but offers a **non-geometric ontology**.

5. Spacetime and Time as Emergent Constructs

- **Spacetime:** Emerges from the geometry of wave propagation. Waves *are* space; the substrate has no fixed coordinates.
- **Time:** Perceived increase in wave complexity, i.e., entropy.

$$\text{Time} \propto \frac{dS}{dt}$$

where S is entropy of the total wave configuration.

6. Quantum Phenomena Reinterpreted

Phenomenon	Conventional View	Trōṇa Siddhāntam
Wavefunction Collapse	Measurement collapses state	Measurement is a wave resonance reconfiguration
Superposition	Probabilistic mixture of states	Trōṇas carry multiple internal wave modes
Entanglement	Non-local connection	Shared substrate phase history from common pluck
Uncertainty	Fundamental randomness	Result of complex, unresolved wave interference
Higgs Mechanism	Mass from Higgs field	Mass from internal wave energy
QFT Fields	Quantized excitations of fields	No fields — only recurrence zones in Tarangi

7. Cosmological Implications

7.1 Black Holes

- High-coherence zones trapping incoming waves.
- Boundaries defined by recursive interference.
- Hawking radiation = gradual decoherence at the edge.

7.2 Dark Matter

- Non-electromagnetically interacting Trōṇas.
- Gravitational effect arises via local resonance distortion.

7.3 Dark Energy

- Residual wave tension in the Tarangi.
- Drives metric expansion by wave unfolding dynamics.

8. Heat and Thermodynamics

- **Heat:** Chaotic micro-resonance and wave agitation.
- **Temperature:** Average energy in waveform modes.
- **Entropy:** Count of resonant configuration microstates.

Time and entropy increase due to the **cascade of wave interactions**, moving from ordered (simple plucks) to disordered (high-interference).

9. Reinterpretation of Established Theories

Theory	Original	Trōṇa Siddhāntam
Copenhagen QM	Collapse upon measurement	No collapse — resonant reconfiguration
Quantum Field Theory	Fields fundamental	Fields are wave recurrence zones
Standard Model Mass	Higgs interaction	Stored wave energy
Higgs Boson	Particle giving mass	Excitation of resonance , not origin of mass
General Relativity	Curved spacetime	Wave guidance geometry
$E = mc^2$	Energy-mass equivalence	Energy stored in oscillation

10. Conclusion

The *Trōṇa Siddhāntam* offers a unified, minimalist framework in which all of physics emerges from wave interaction in a continuous substrate. By reinterpreting standard phenomena — including mass, forces, gravity, and quantum effects — as consequences of resonance and interference, the theory provides a coherent and visualizable ontology that invites formalization and experimental exploration.

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