A Universal Framework for the Pressure Field Theory of Gravity (PFTG-MinimalRelic)

Joey Harper, 2025

DOI: https://doi.org/10.5281/zenodo.15612109

Summary

The Pressure-Field Theory of Gravity (PFTG) proposes that gravity does not result from spacetime curvature, but emerges from scalar pressure gradients in a universal energy field, denoted Phi.

PFTG eliminates the need for dark matter by modifying gravitational dynamics at galactic and cosmological scales using pressure-based forces instead of mass-only attraction.

Key Features

- No Dark Matter Needed - Pressure gradients alone explain flat galaxy rotation curves
- Predicts CMB Peaks - Naturally reproduces acoustic patterns in the early universe
- Matches EHT Data - Consistent with M87* shadow size and lensing behavior
- Unified Framework - Combines entropy, photon coupling, and cosmic expansion
- GR Recovery - Recovers General Relativity in the weak-field limit
- Field Equation - Poisson form with testable scalar dynamics
- Thermodynamic Gravity - Gravity arises from local entropy-pressure interactions
- Axion-Like Coupling - Includes optional photon-scalar interactions

Observational Predictions

- Galaxy Rotation Curves: No need for DM, matches data
- CMB Peak Positions: Matches Planck/WMAP peaks
- Gravitational Lensing: Modeled via gradient of Phi
- M87* Shadow Size: Field deflection prediction (1.6x Schwarzschild radius)
- Scalar Gravitational Waves: Pressure-based radiation under study

Citation

Harper, Joey.

A Universal Framework for the Pressure Field Theory of Gravity (PFTG-MinimalRelic).

Zenodo, 2025.

DOI: https://doi.org/10.5281/zenodo.15612109