Tinana Labs Preprint

Temporal Lensing — Working Hypothesis

Author: Frank Tinana (with research assistant Lyra)

Abstract

This preprint introduces the concept of **Temporal Lensing Theory**, where time dilation effects are analyzed in the presence of dark matter halos. Using an NFW (Navarro-Frenk-White) profile for dark matter distribution, we explore whether additional corrections to standard General Relativity lensing can account for observed anomalies. The framework emphasizes falsification: applying the model to strong lensing clusters (e.g., MACS J0138), black hole reverberation datasets, and gravitational wave residuals. Early results suggest the ratio fails under certain datasets, highlighting limits of the model and refining the scope for future investigation.

1. Introduction

We propose that dark matter density may influence local time dilation, thereby altering the effective strength of gravitational lensing. This idea builds upon General Relativity while incorporating a correction term linked to ρ_s and r_s of an NFW profile. Our goal is not confirmation but falsification — to rigorously test whether this correction survives real datasets.

2. Methods and Processes

- Extract NFW parameters (ρ_s, r_s) from observational cluster data (e.g., MACS J0138). - Apply corrections to lensing profiles, compare to observed θ_E and $\kappa(R)$. - Extend framework to BH reverberation-mapped masses and GW residual datasets. - Document results, noting where the hypothesis fails.

3. Datasets

- **MACS J0138** (HST/MAST cutouts; lensing arc + SN host at $z_S \sim 1.95$). - **Black hole datasets** (reverberation mapping, SDSS-RM catalog). - **Gravitational wave datasets** (event timing, proxy residuals). All datasets are openly accessible and reproducible.

4. Results (Early)

Initial ratio analysis shows near-zero explanatory slope when confronted with real cluster residuals. Signed proxy residuals on BH and GW datasets indicate model limitations, suggesting falsification

under current assumptions.

5. Conclusion and Next Steps

The Temporal Lensing correction is a useful testable hypothesis. Its partial failure under real data highlights important limits and refines the boundaries of possible DM–time interactions. Next steps include expanding datasets, publishing results on arXiv, and exploring alternative DM profiles beyond NFW.