Abstract

We present a quantitative case study of the "Governance Conflict" within massive galaxy clusters. By modeling a Coma-like cluster potential ($10^{15} M_\odot$) within the ISL framework, we derive a deterministic suppression radius. Our analysis indicates that satellite galaxies within 300 kpc of a massive core undergo a "Phase Collapse" ($\alpha \to 0$), recovering purely Newtonian dynamics. This provides a physical mechanism for the observed absence of "Dark Matter" signatures in certain cluster-centric Ultra-Diffuse Galaxies (UDGs).

The Environment of Suppression: Quantitative Analysis of Cluster Satellite Governance

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1 Introduction

A central anomaly in modern astrophysics is the bifurcation of Ultra-Diffuse Galaxies (UDGs). While many (e.g., Dragonfly 44) exhibit massive dark matter signatures, others (e.g., NGC 1052-DF2) appear purely Newtonian. We investigate whether this discrepancy is governed by cluster-centric distance and the resulting "Governance Conflict."

2 The 300 kpc Barrier

Using the `suppression_calculator.py` engine, we tracked the effective gravitational boost α as a function of radial distance from a $10^{15} M_\odot$ cluster core.

Distance	**Effective α**	**Observed State**
100 kpc	0.006	Newtonian (Suppressed)
300 kpc	0.175	Transitional
600 kpc	0.349	Laminar (DM-Heavy)

Table 1: Suppression Radius predictions for a Coma-like cluster.

3 Mechanism: Governance Conflict

In the Phase Geometry framework, the "authority" of a high-Re_G environment overrides the internal modularity of a satellite. The high velocity dispersion of the cluster host forces the spacetime kernel into a turbulent phase, stripping the satellite of its extra modularity overhead.

4 Agreement with Observation

The predicted 300 kpc barrier aligns with observed UDG density drop-offs in the Coma Cluster core. This suggests that the "Missing Mass" shortfall is a predictable environmental effect rather than a random characteristic of the galaxy itself.

5 Conclusion

This paper substantiates the ISL framework with a quantitative, testable barrier. The 300 kpc radius represents the definitive edge of "Dark Matter" for satellites of massive clusters.