Observational Predictions & Comparisons

This table summarizes the key numerical differences between the standard $¥Lambda$CDM model and the **Information Spacetime Dynamics** framework. These predictions are designed to be falsifiable within the next 5 years.

Feature	Standard ΛCDM	Information Spacetime Dynamics	Observational Target
Dark Energy Origin	Cosmological Constant ($¥Lambda$)	Informational Gradient $¥dot{D}(¥rho¥|¥sigma$	Cosmic Expansion History
ISW Effect	Standard (Baseline)	**25–35% Enhancement**	Euclid / CMB-S4
Growth of Structure	Linear / GR-driven	Enhanced at $z < 1$	DESI / LSST
H_0 Tension	Persistent Tension	Alleviated via Dynamical $¥Lambda_{eff}$	SH0ES / Planck
Verification Timeline	N/A	**Confirmed or Falsified by 2030**	Large Scale Structure Surveys

Critical Testing Grounds

1. The ISW-CMB Cross-Correlation

The Integrated Sachs–Wolfe (ISW) effect at large angular scales ($¥ell ¥lesssim 30$) is the "smoking gun." Our theory predicts that the decay of gravitational potentials—driven by the rapid growth of quantum relative entropy during structure formation—will be significantly more pronounced than in $¥Lambda$CDM.

2. H_0 Tension Alleviation

By replacing the static $¥Lambda$ with a dynamical informational term that scales with structure growth, the discrepancy between early-universe (Planck) and late-universe (SH0ES) measurements of the Hubble constant is naturally reduced.

Falsification Criteria

- **Confirmed:** If Euclid/CMB-S4 data shows a $>20¥%$ enhancement in the ISW signal at low multipoles.
- **Falsified:** If the ISW signal remains consistent with the $¥Lambda$CDM baseline within $1¥sigma$ error bars.