

# Dual-Sector Expansion Framework

## PHOTON SECTOR

$$\beta_\gamma < 1.4 \times 10^{-6}$$

$$H_0 = 67.4 \text{ km s}^{-1} \text{ Mpc}^{-1}$$

- CMB acoustic scale
- No decoherence
- Planck measurements

Sector Separation

$$\frac{\beta_\gamma}{\beta_m} < 8.5 \times 10^{-6}$$

## MATTER SECTOR

$$\beta_m = 0.157 \pm 0.029 \text{ (growth)}$$

$$\beta_{\text{distance}} \approx 0 \text{ (geometry)}$$

$$H_0 = 72.5 \text{ km s}^{-1} \text{ Mpc}^{-1}$$

- Gravitational decoherence
- Structure formation

## INFORMATIONAL ACTUALIZATION

Decoherence → Information

Horizon Encoding → Pressure

Structure Drives Expansion

*Dark Energy = Info Production*

## TYPE Ia SNe (This Work)

☒ Reject  $H_0 = 67.4$  (photon)

☒ Accept  $H_0 = 73.04$  (matter)

☒ Maintain  $\Lambda$ CDM distances

*Validates sector separation*

*Hubble Tension Resolution: Both measurements correct—they probe different sectors*

Planck (photon) =  $67.4 \text{ km s}^{-1} \text{ Mpc}^{-1}$  • SH0ES (matter) =  $73.04 \text{ km s}^{-1} \text{ Mpc}^{-1}$