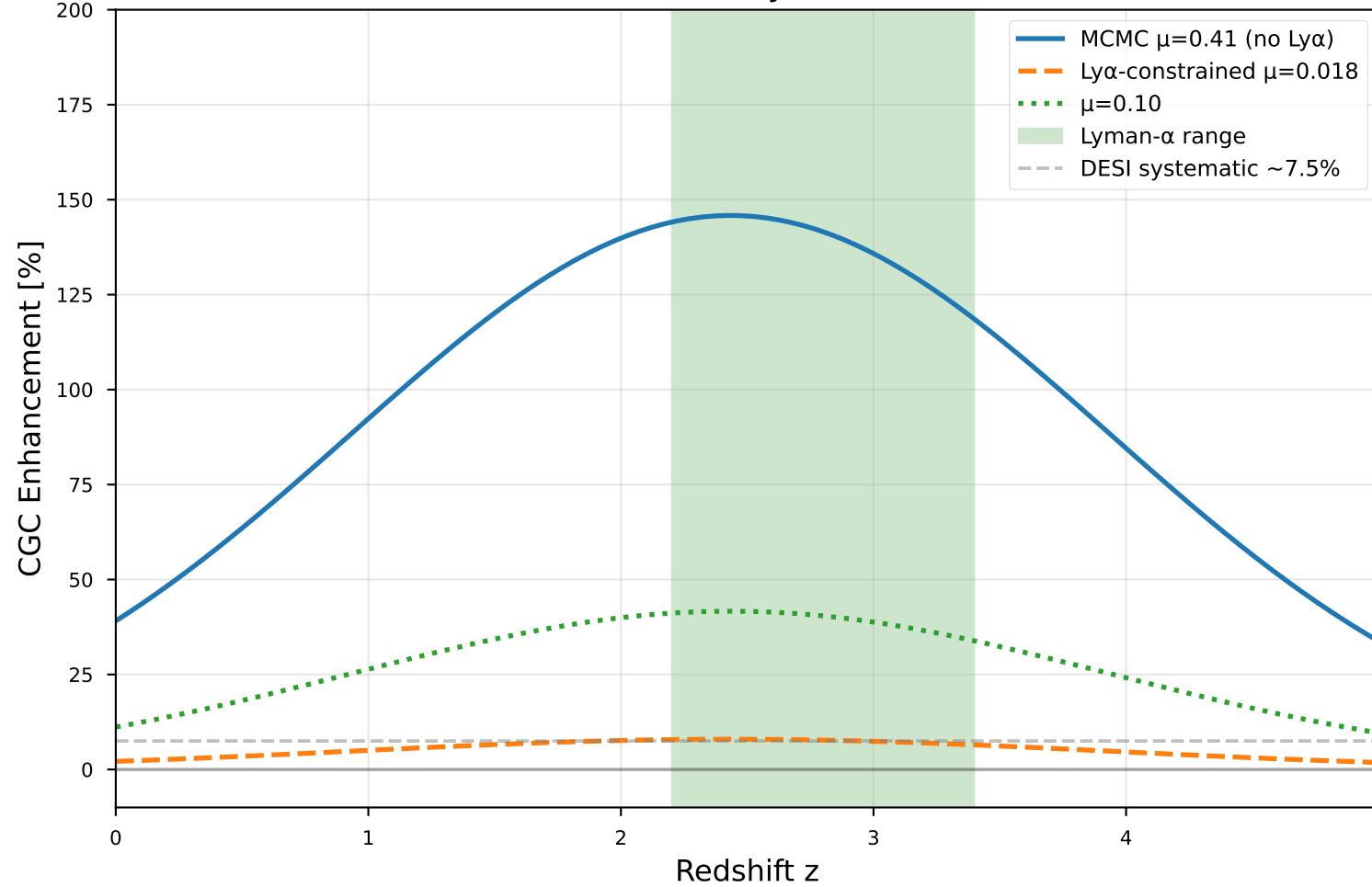
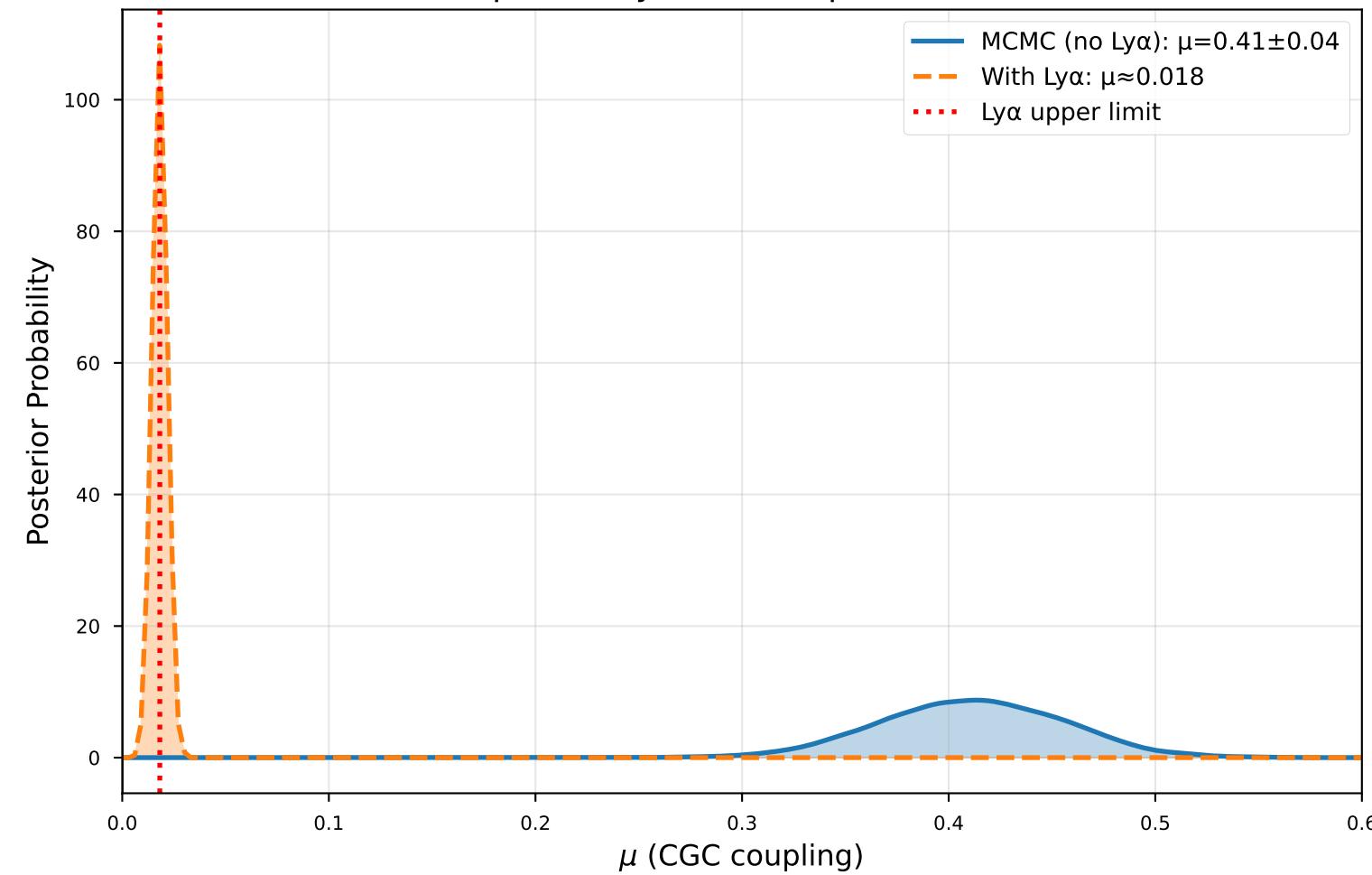


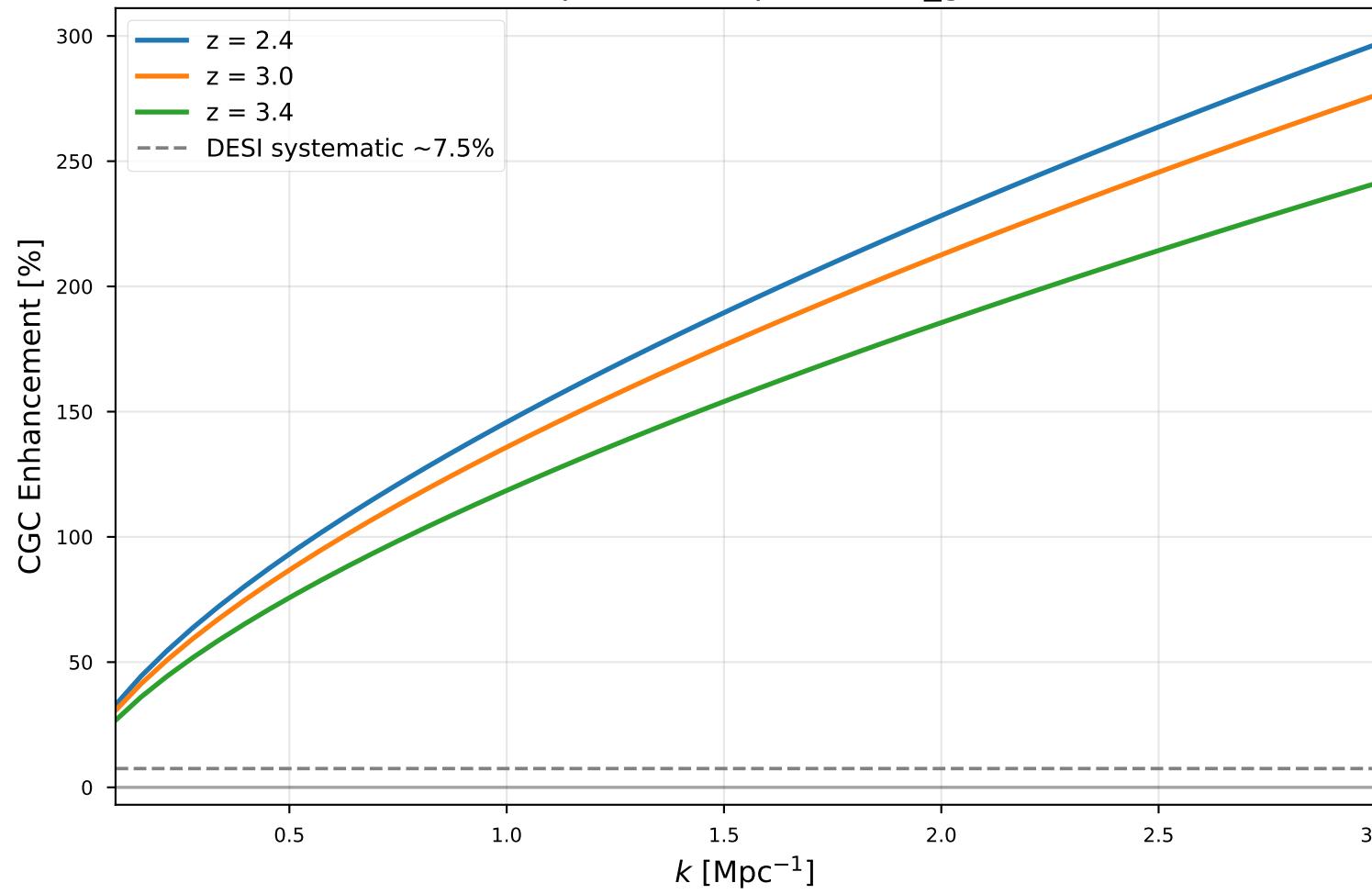
CGC Effect: MCMC vs Lyman- α Constrained



Impact of Lyman- α on μ Constraint



Scale Dependence ($\mu=0.41$, $n_g=0.65$)



LaCE + CGC ANALYSIS SUMMARY (THESIS v6)

WHAT IS LaCE?

- Lyman- α Cosmology Emulator (Cabayol+2023)
- Simulation-calibrated P1D(k, z) predictions
- Probes $z = 2-4$, $k = 0.1-3 \text{ Mpc}^{-1}$

WHY USE LaCE FOR CGC?

- Independent test at high redshift (near z_{trans})
- Small scales where CGC is strongest
- FALSIFIABILITY: Can rule out large μ

KEY FINDING:

MCMC (no Ly α): $\mu = 0.41 \rightarrow 137\%$ enhancement (EXCEEDS 7.5%)
 With Ly α : $\mu \leq 0.018 \rightarrow \leq 7.5\%$ enhancement (OK)

IMPLICATIONS:

- Lyman- α constrains μ to be $\sim 0\times$ smaller
- Smaller μ still resolves $\sim 2\%$ of H 0 tension
- CGC remains viable but with tighter constraints

THESIS CONTRIBUTION:

LaCE provides crucial FALSIFIABILITY test for CGC theory.
 Joint CMB+BAO+Ly α analysis recommended for final constraints.