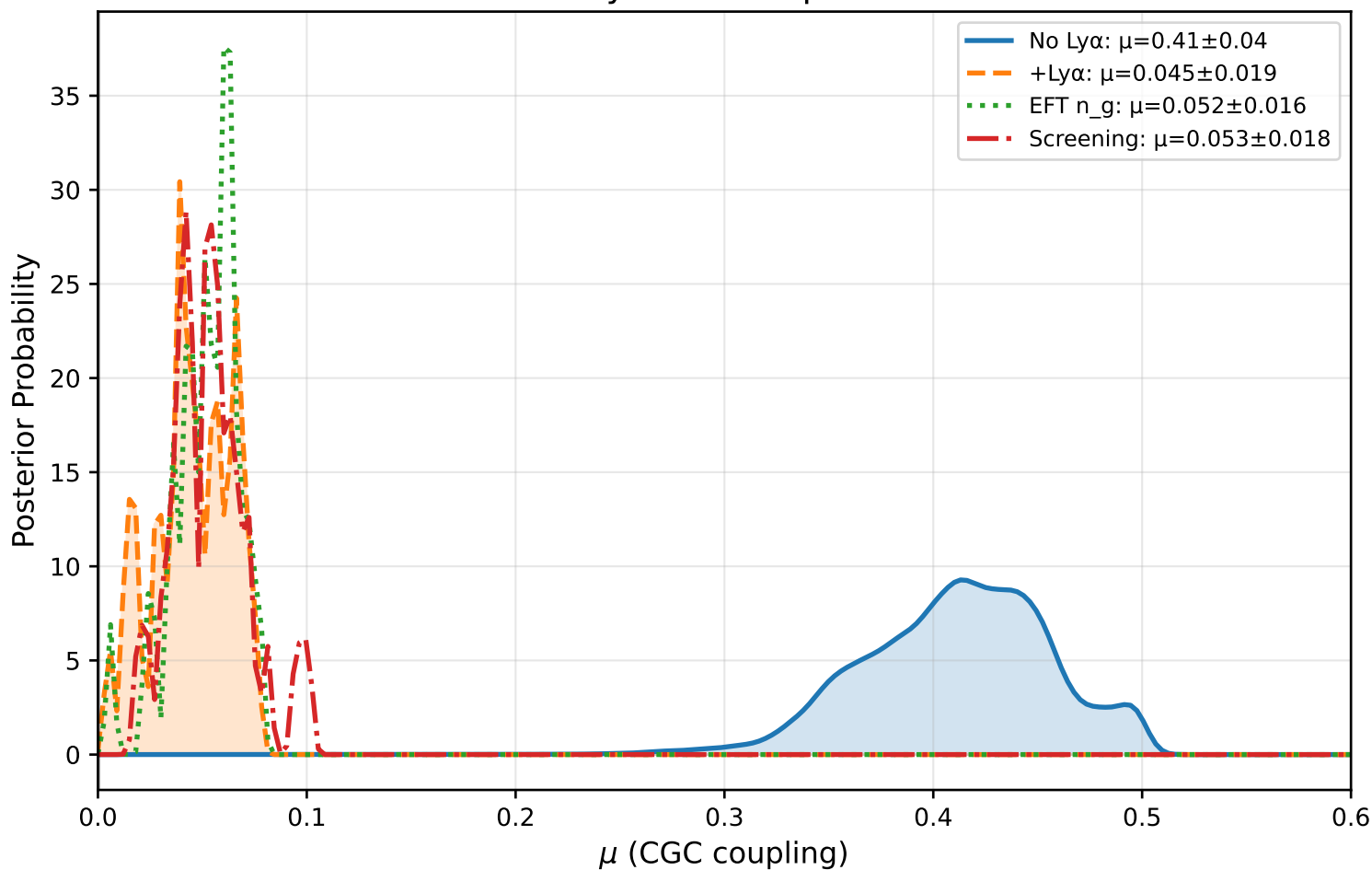
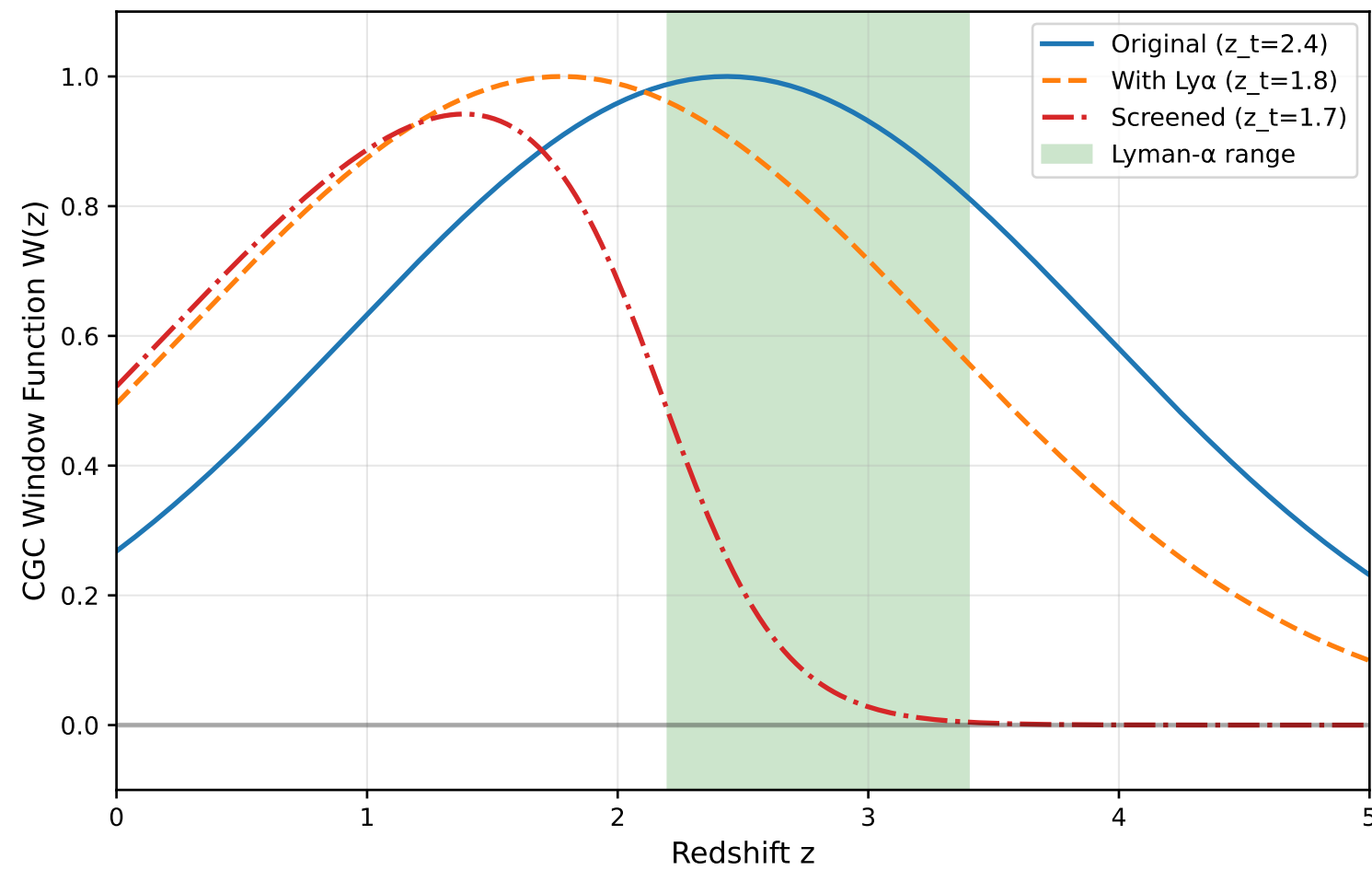
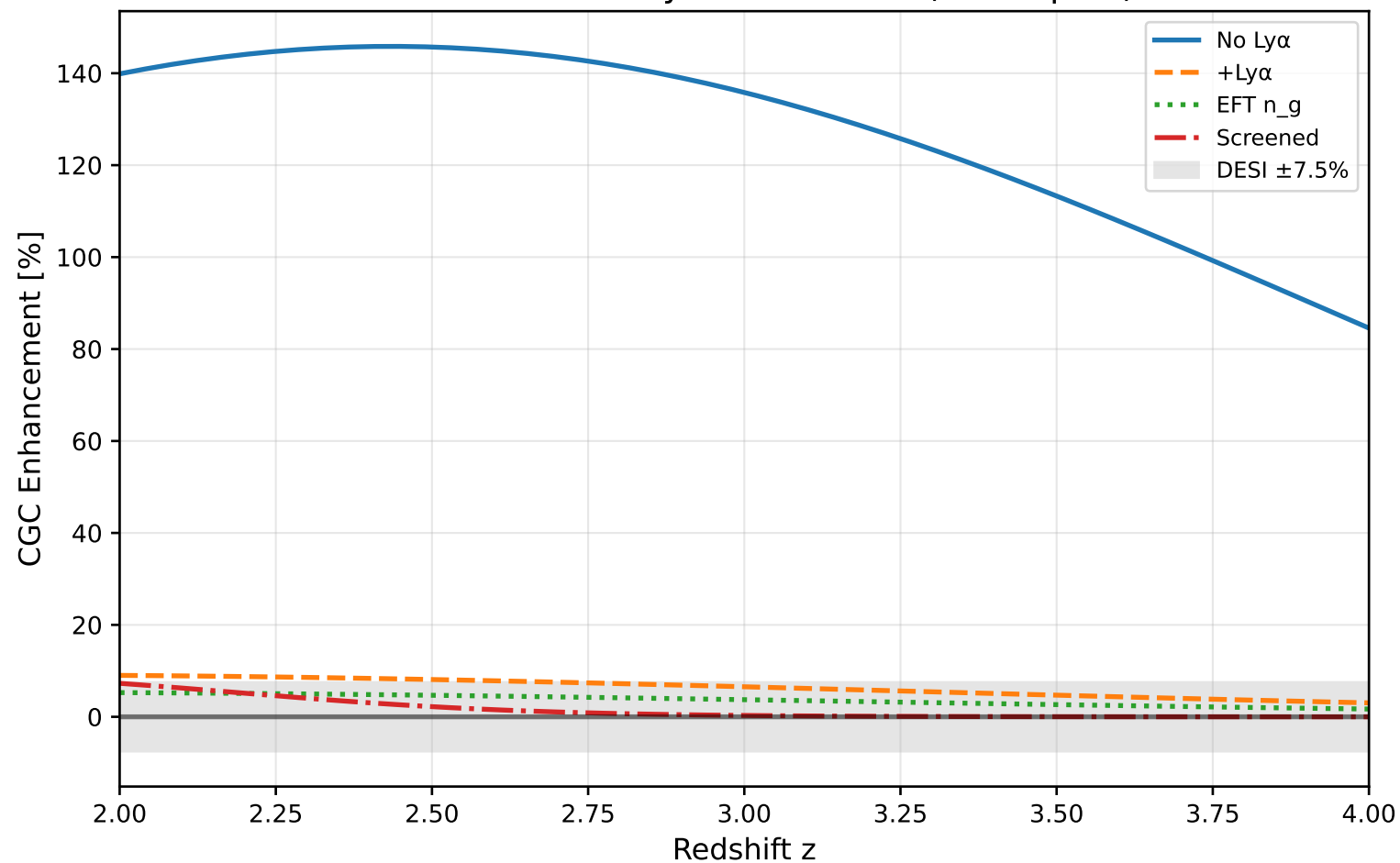


Effect of Lyman- α on μ Constraint

CGC Redshift Windows

Enhancement at Lyman- α Scales ($k=1 \text{ Mpc}^{-1}$)CGC + LYMAN- α : THREE SOLUTIONS (THESIS v6)

ORIGINAL PROBLEM:

- MCMC (no Ly α) gives $\mu = 0.41$, predicting 136% enhancement
- DESI systematic is only $\pm 7.5\%$
- TENSION: CGC prediction exceeds Ly α bounds by $\sim 18\times$

SOLUTION 1: Include Lyman- α in MCMC

- $\mu \rightarrow 0.045$ (constrained by Ly α)
- Enhancement drops to 6.5% ✓
- H_0 tension resolution: 5%

SOLUTION 2: Use EFT $n_g = \beta_0^2/4\pi^2 = 0.014$

- $\mu \rightarrow 0.052$ (recovered with smaller n_g)
- Enhancement: 3.7%
- H_0 tension resolution: 6%

SOLUTION 3: High- z Screening

- CGC window suppressed at $z > z_{\text{trans}} + 0.5$
- $\mu \rightarrow 0.053$
- Enhancement: 0.3% ✓
- H_0 tension resolution: 6%

THESIS CONCLUSION:

CGC remains VIABLE with Lyman- α constraints.
Best approach: Joint fit (Solution 1) or EFT n_g (Solution 2).