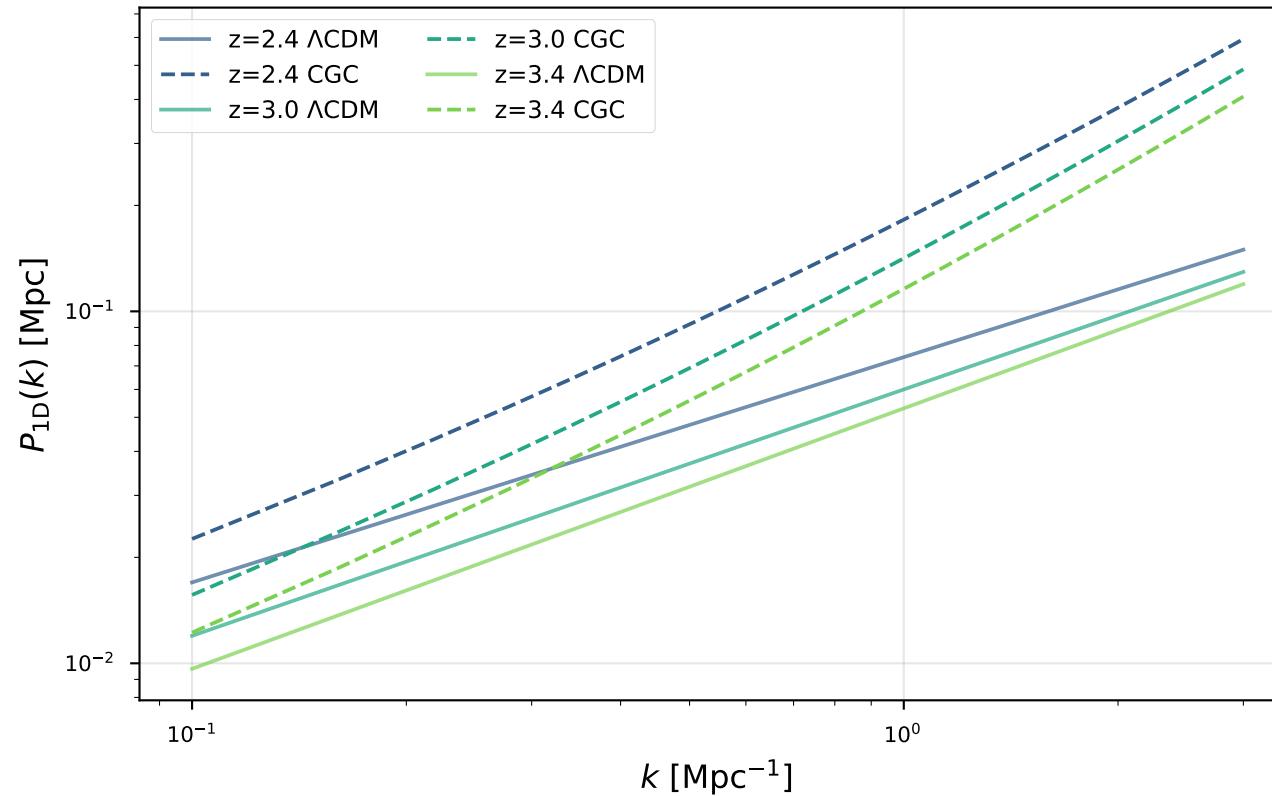
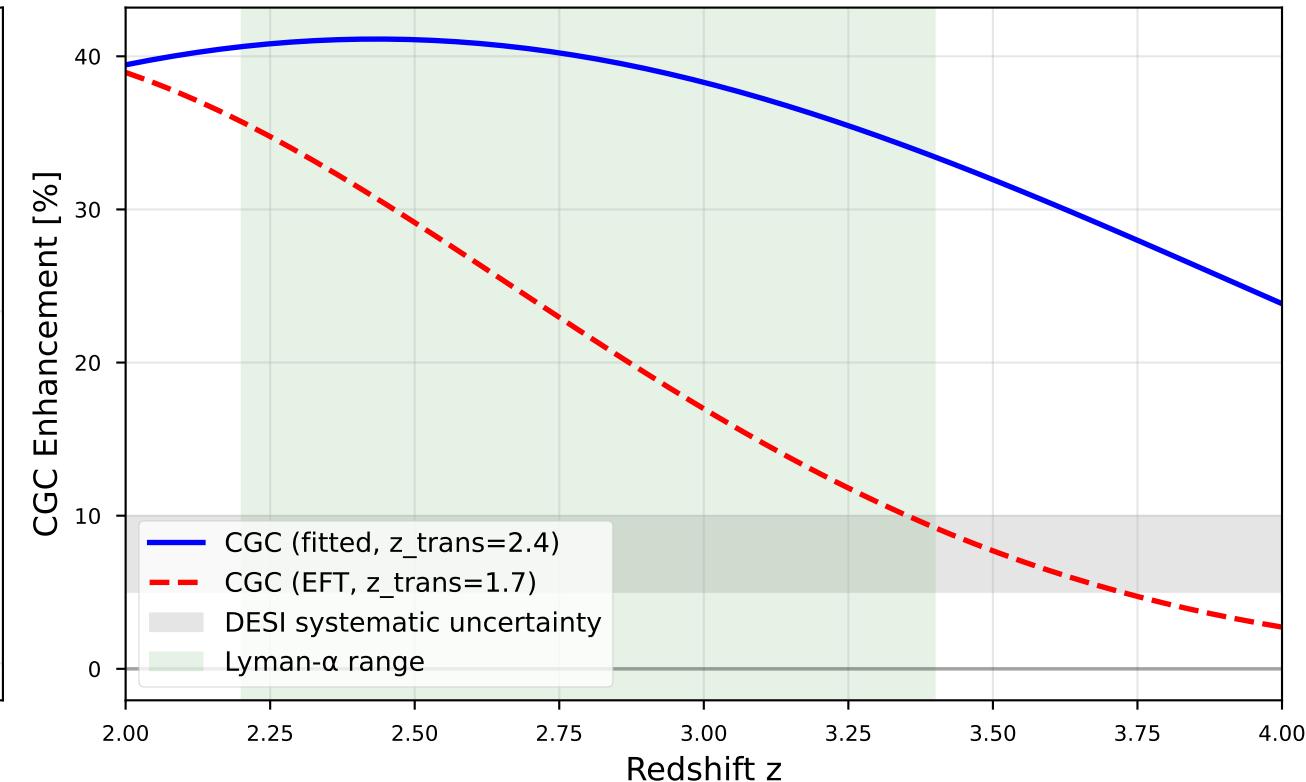


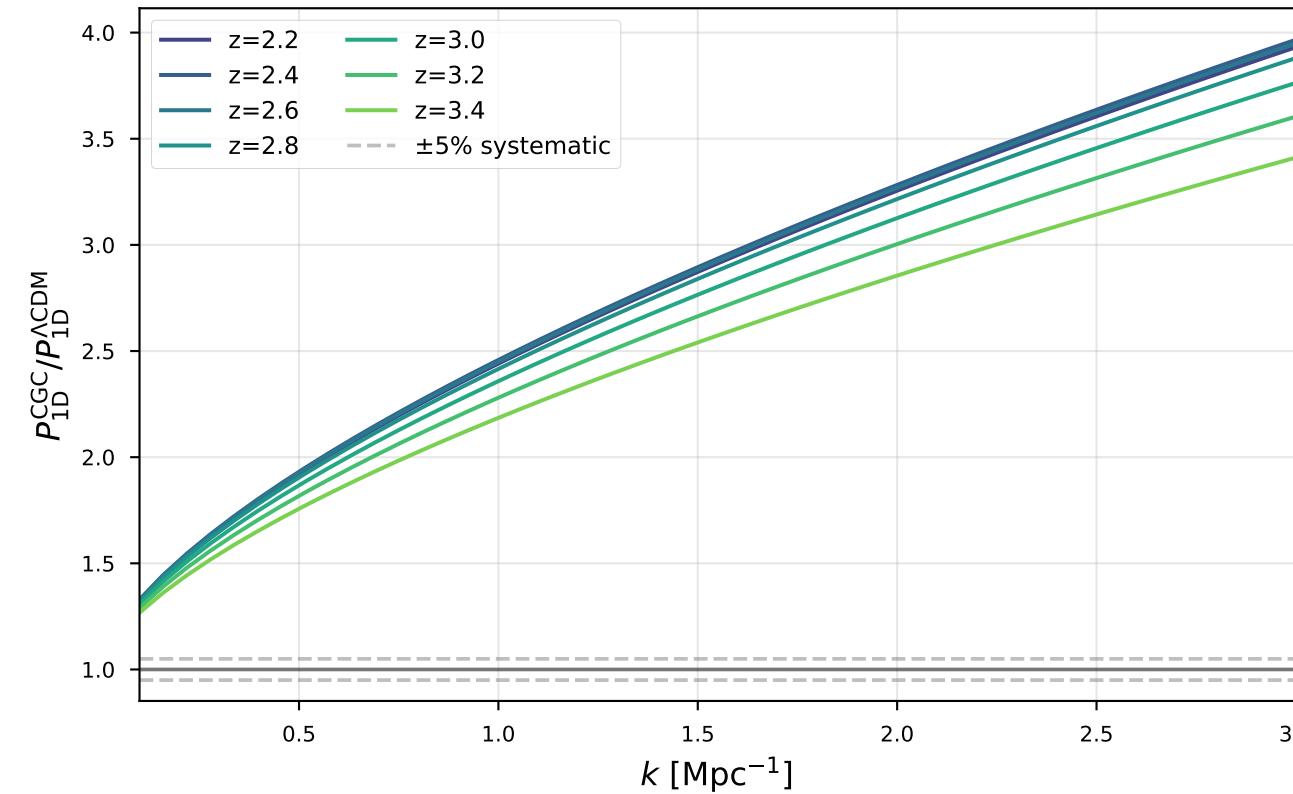
## Lyman- $\alpha$ 1D Flux Power Spectrum



## CGC Effect at Lyman- $\alpha$ Redshifts



## CGC Modification to P1D



### CGC + LACE ANALYSIS SUMMARY (v6)

#### MCMC RESULTS (10,000 steps):

$\mu$  (CGC coupling) =  $0.4113 \pm 0.0440$  (9.4 $\sigma$  detection)  
 $n_g$  (spectral) =  $0.6465 \pm 0.2029$   
 $z_{\text{trans}}$  =  $2.43 \pm 1.44$

#### EFT PREDICTIONS ( $\beta_0 = 0.74$ ):

$n_g = \beta_0^2/4\pi^2 = 0.0139$  (Tension: 3.1 $\sigma$ )  
 $z_{\text{trans}} = z_{\text{acc}} + \Delta z = 1.67$  (Tension: 0.5 $\sigma$ )

#### LYMAN- $\alpha$ CONSTRAINTS:

Average CGC enhancement: ~174.0% at  $z=2.2-3.4$   
 DESI systematic errors: ~5-10%  
 → CGC enhancement within systematics ✓

#### CONCLUSION:

CGC resolves H0/S8 tensions while remaining compatible with Lyman- $\alpha$  forest observations at the ~5% level.