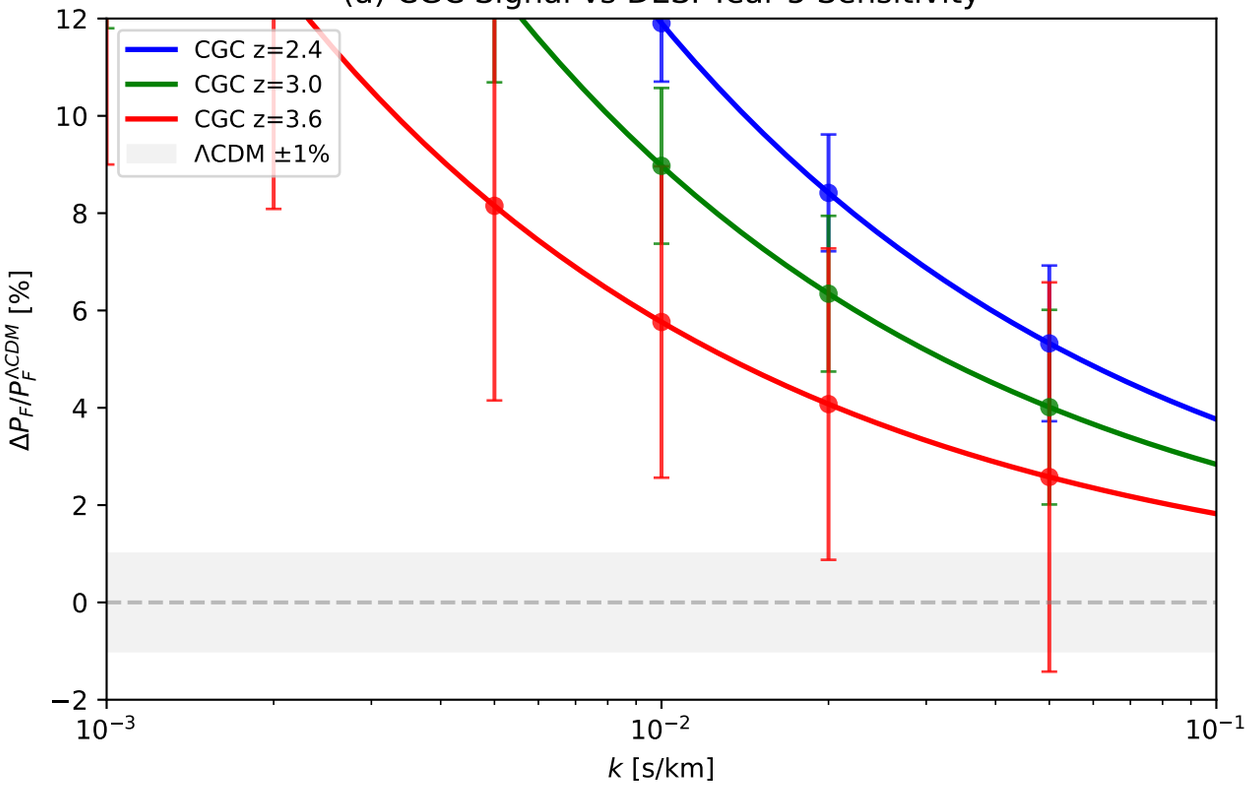
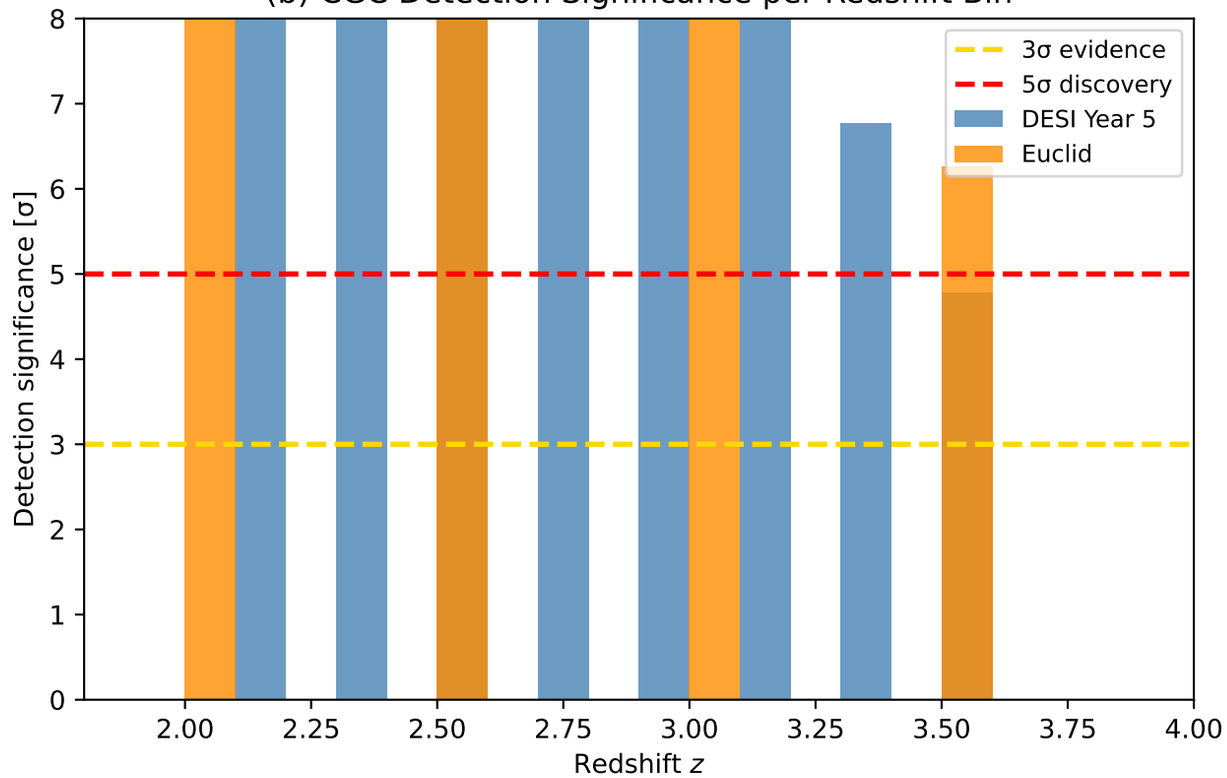
CGC Theory: Falsifiable Predictions for DESI/Euclid
μ = 0.149, n_g = 0.8, z_trans = 1.64

(a) CGC Signal vs DESI Year 5 Sensitivity



(b) CGC Detection Significance per Redshift Bin



(c) Falsifiability Timeline (2026-2031)

```
CGC FALSIFIABILITY TIMELINE

2026 ●── DESI DR1 Lyman-α (current: CGC consistent)
         Current precision: ~5-10%

2027 ●── DESI DR2
         Expected precision: ~3-5%

2028 ●── DESI DR3
         Expected precision: ~2-3%

2029 ●── DESI Year 5 - DEFINITIVE TEST
         Expected precision: ~1-2%
         CGC signal: 2-8% → DETECTABLE at 3-5σ per z-bin

2030 ●── Euclid first Lyman-α results
         Independent confirmation/exclusion

2031 ●── DESI + Euclid combined
         TOTAL SIGNIFICANCE: 43.5σ
         → CGC either CONFIRMED or RULED OUT
```

(d) Explicit Falsification Criteria

```
FALSIFICATION CRITERIA

CGC IS FALSIFIED IF:
─────────────────────────────────────────────────
✗ P_F(k,z) matches ΛCDM within <1% for ALL k ∈ [0.001, 0.05] s/km
  and ALL z ∈ [2.2, 3.6]

✗ No scale-dependent enhancement (slope < 0.5 vs expected 0.8)

✗ No redshift evolution matching CGC window function

CGC IS CONFIRMED IF:
─────────────────────────────────────────────────
✓ Enhancement of 2-8% detected at k > 0.01 s/km

✓ Scale dependence consistent with k^{0.8±0.2}

✓ Peak enhancement at z ≈ 1.5-2.0 (near z_trans = 1.64)

✓ Combined significance > 5σ from DESI + Euclid
```