

eBOSSxDES project 530

« Probing gravity with combination of RSD and galaxy-galaxy lensing of ELG, LRG and DES weak-lensing »

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Combining CMASS & GGL

de la Torre et al. (2017), Jullo et al. (2019)

28,039 CMASS galaxies on 338 deg² (83 deg⁻²)

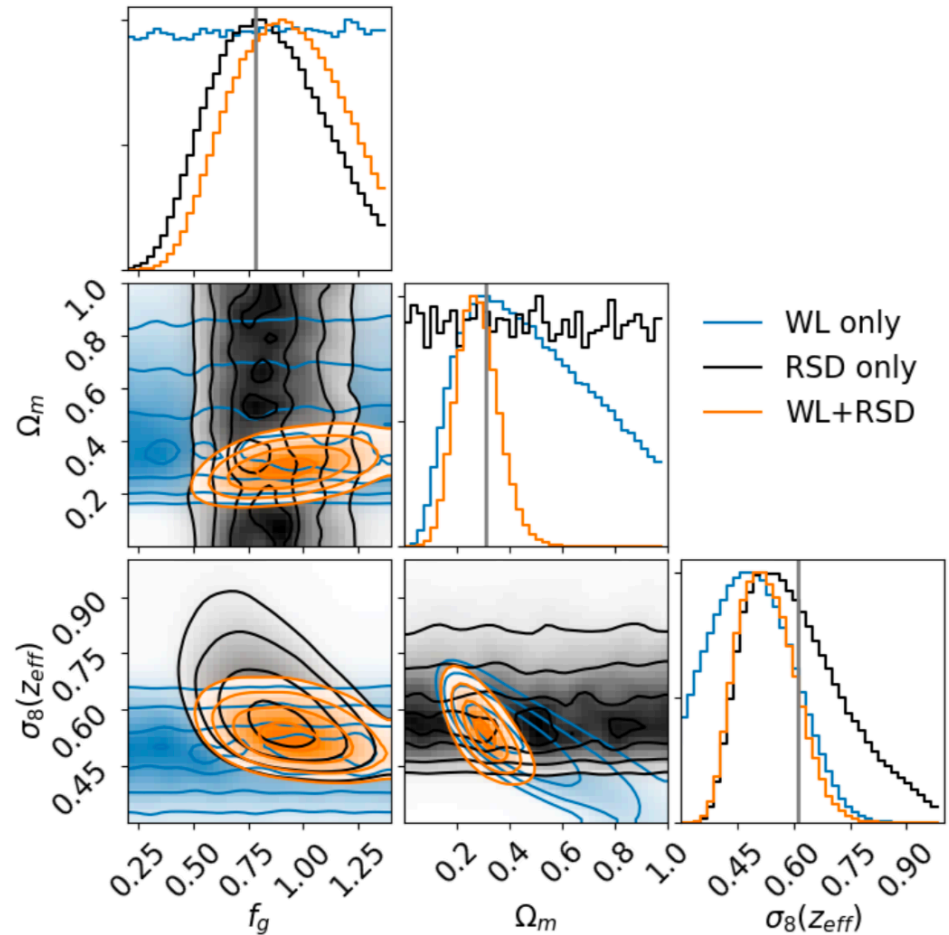
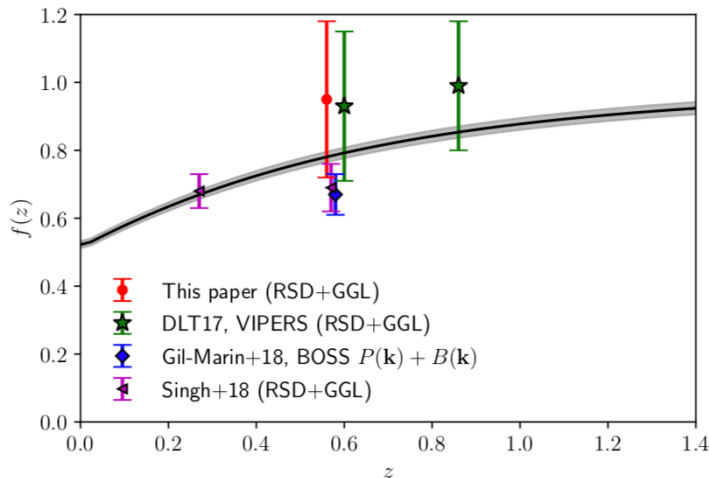
Weak-Lensing from CFHT-Stripe 82

- $i < 22.5$, $z_{\text{med}}=0.58$
- 5.4 gal.arcmin⁻²

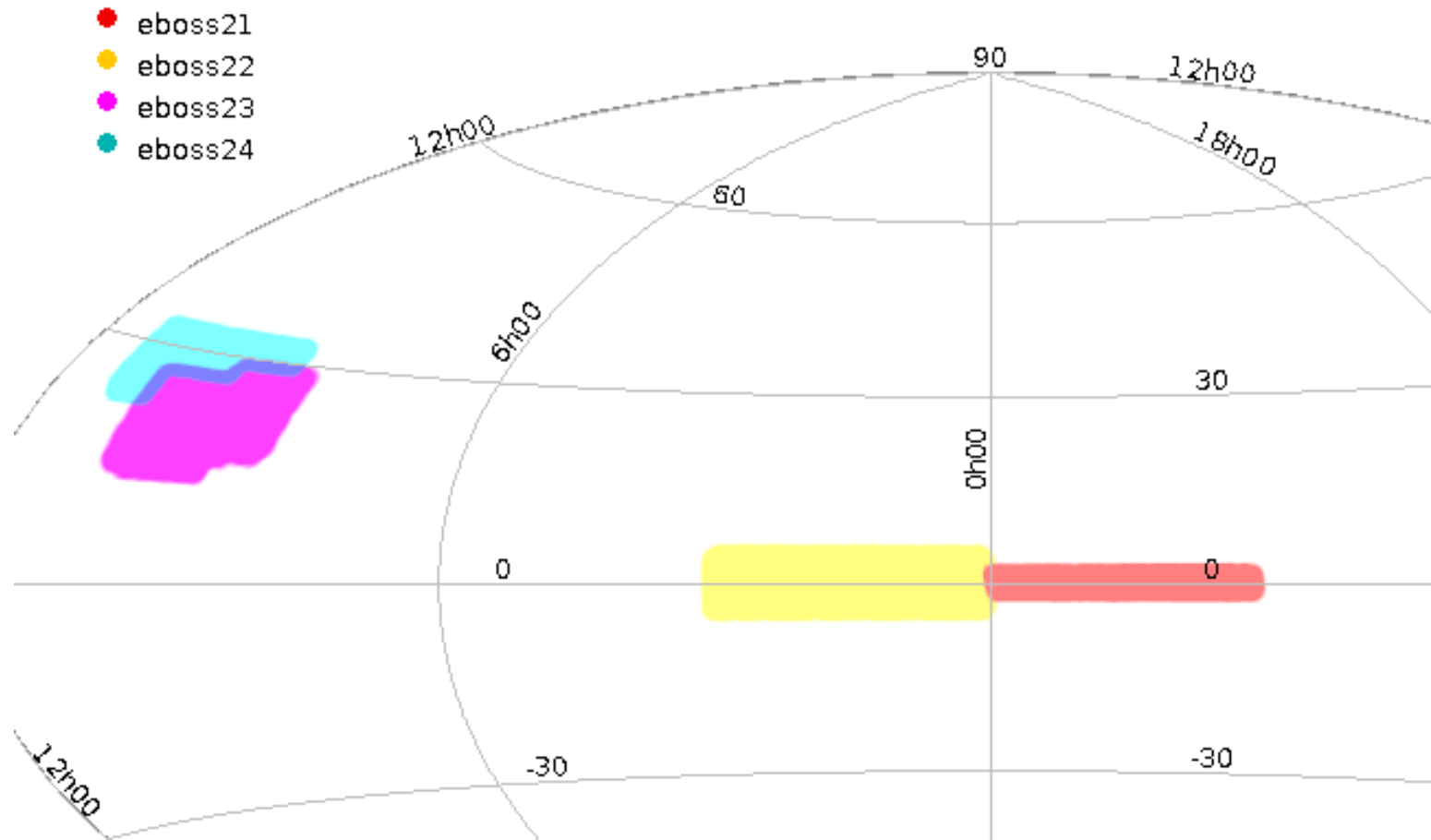
and CFHTLenS

- $i < 25.5$, $z_{\text{med}} = 0.70$
- 7.7 gal.arcmin⁻²

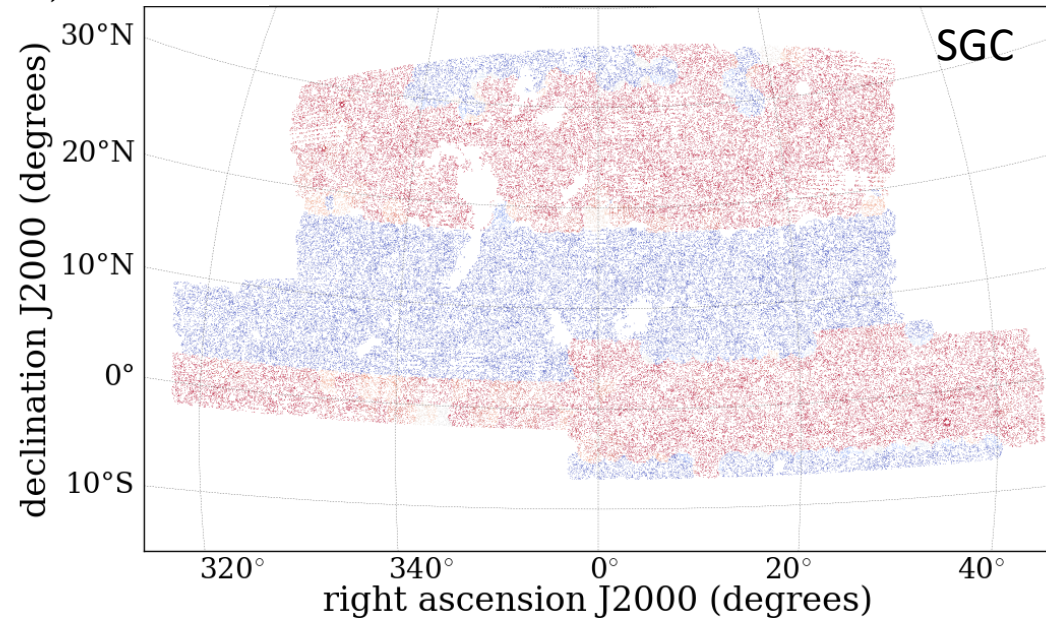
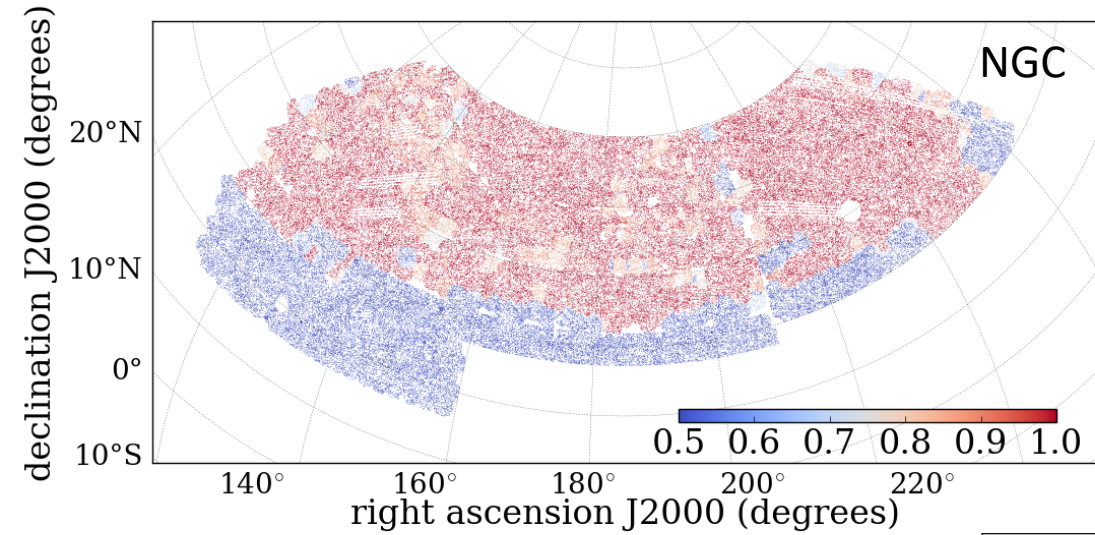
Our model can reproduce small scales (<5% bias on Ω_M with $R_0=1$ Mpc/h, $s_{\text{min}}=18$ Mpc/h)



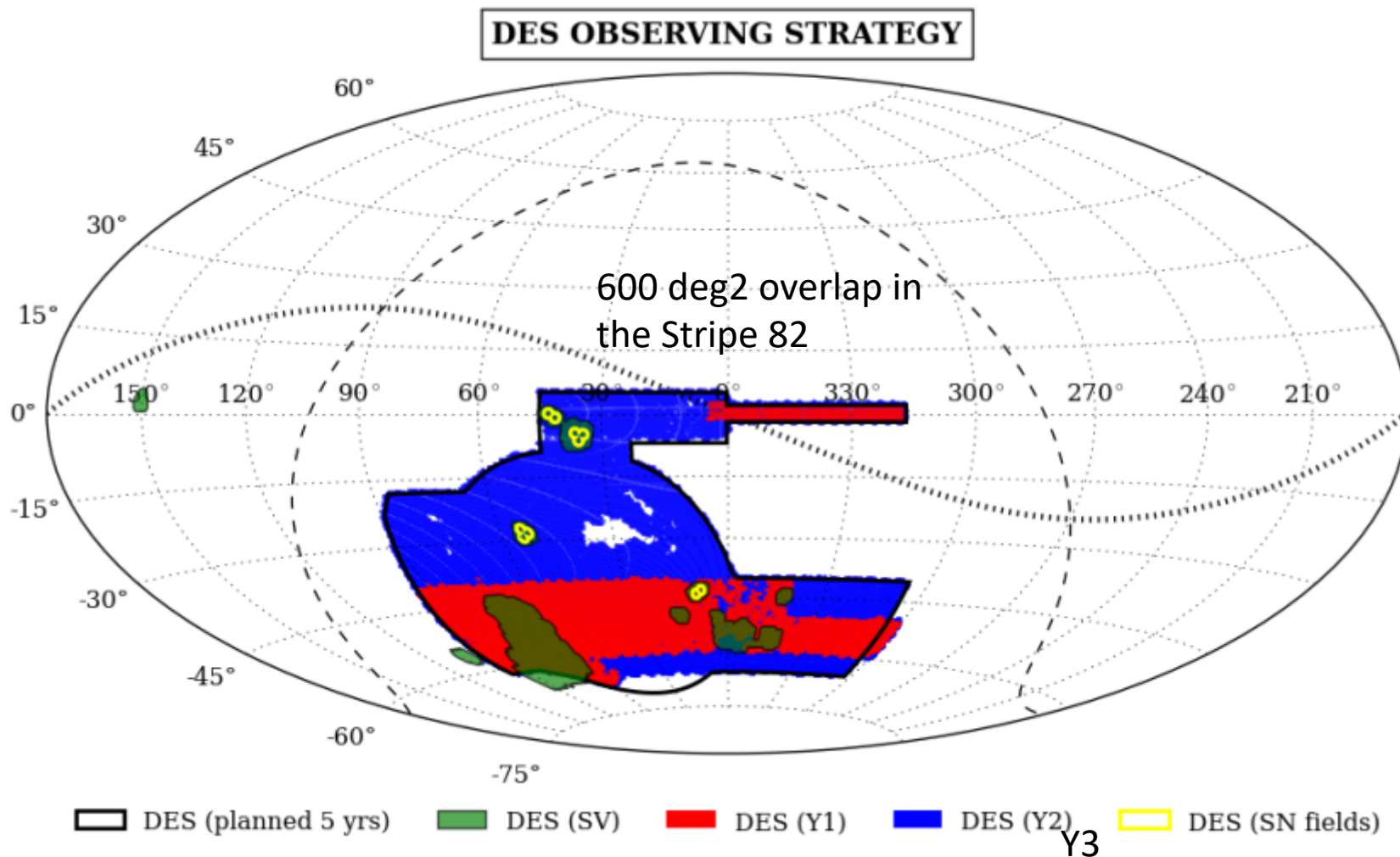
eBOSS catalogue ELG



eBOSS catalogue LRG v4



DES footprint

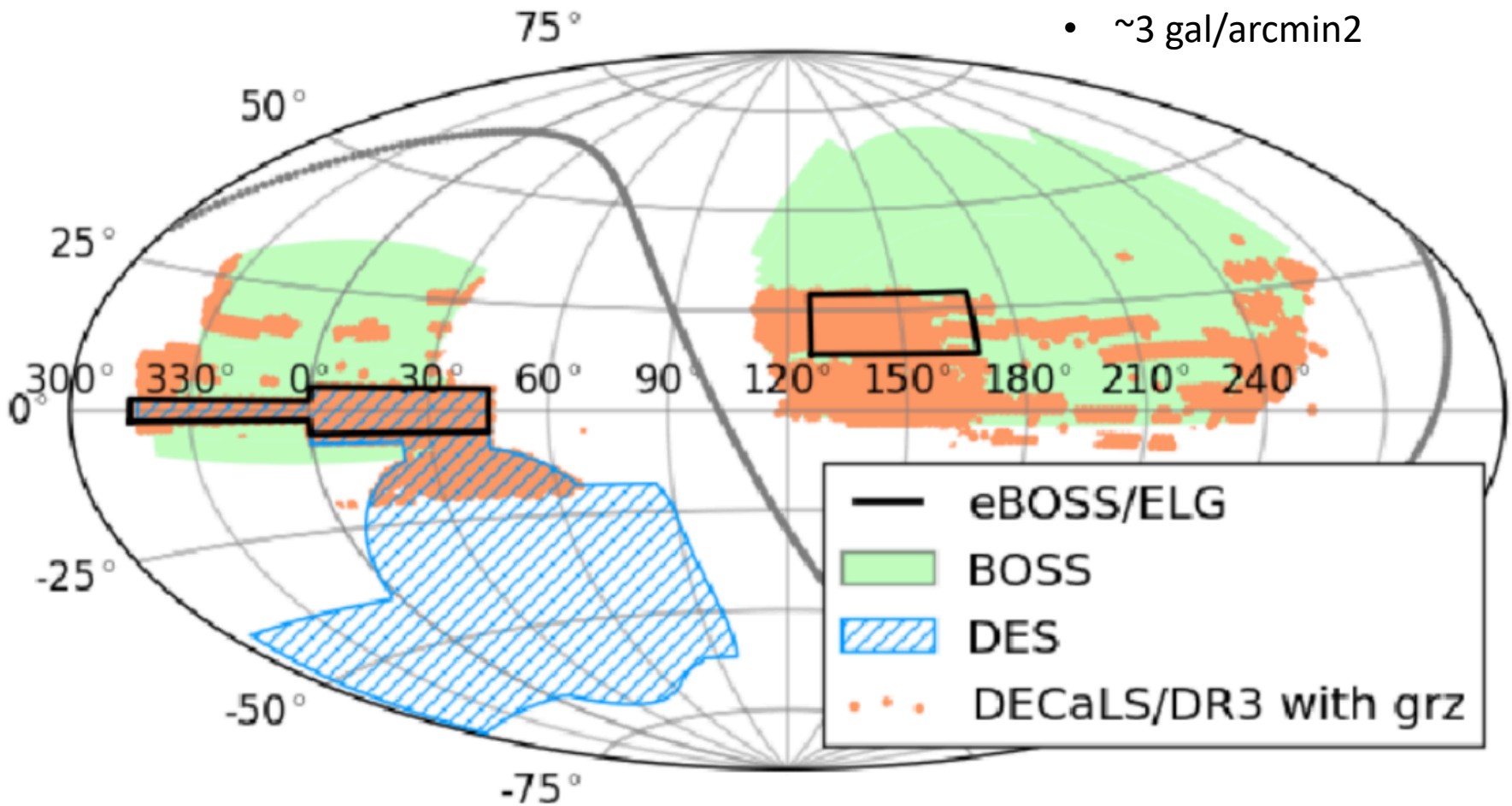


DECaLS WL?

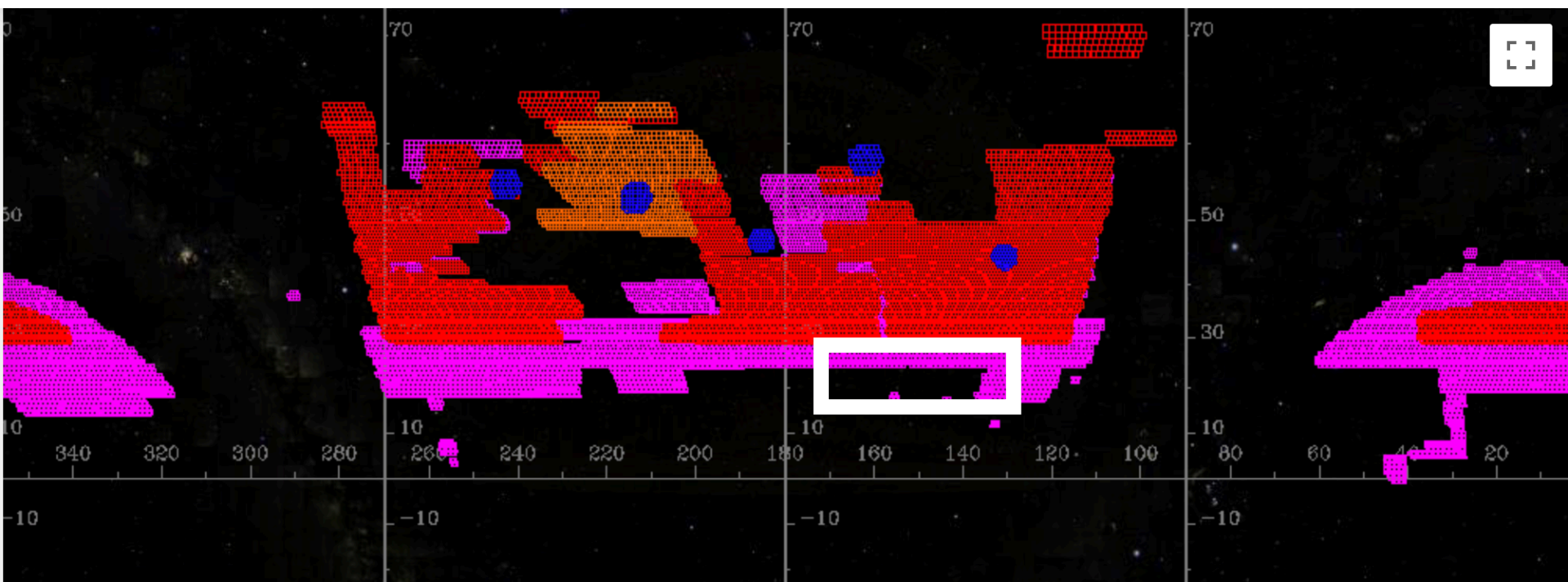
=> Release DR8 end of May 2019

DECaLS/DR3 properties

- $z_{\text{med}} = 0.5$
- $\sim 3 \text{ gal/arcmin}^2$



UNIONS Status in May 2019



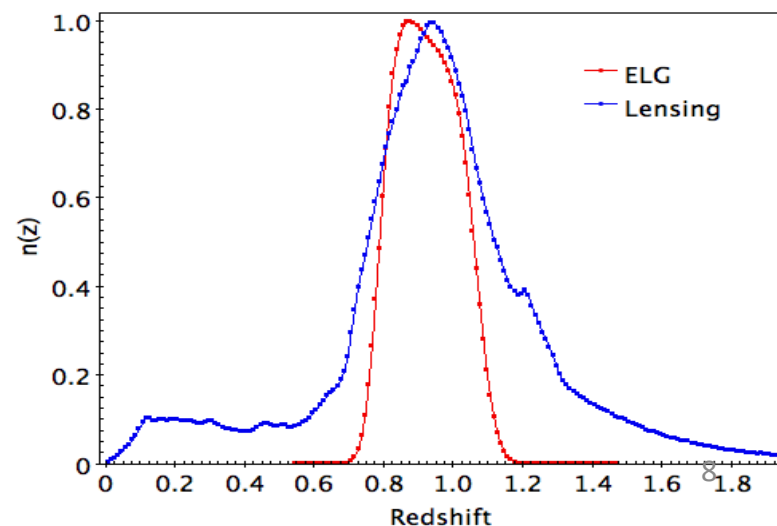
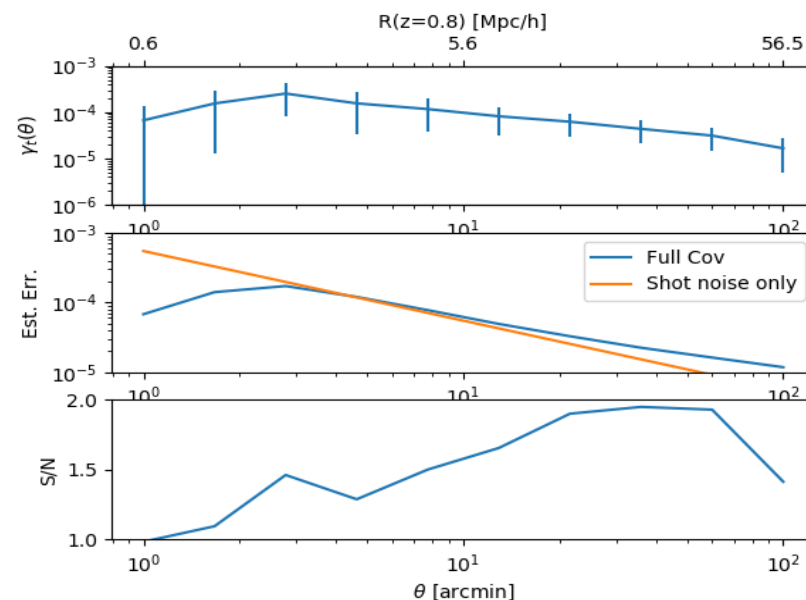
UNIONS DR1 sky coverage (Pan-STARRS griz = blue, CFIS-u = magenta, CFIS-r = red, CFISr&CFIS-r-LSB=orange)

- Weak-lensing catalogue calculation in progress
- Estimate of the $n(z)$ in progress

eBOSS-ELG DES Forecast

COSMOSIS¹ to perform measurements forecast, with the following setting:

- 600 deg² of overlapping area
- 180 ELG.deg⁻², galaxy bias = 1.65
- 0.24 bkg gals.arcmin⁻² for lensing
- $n(z)$ for DES with photo-z cut (Bin 3, metacalibration, DES2017)
- Intrinsic alignment
- Linear model for $C_{gm}(l)$ and $Cov[C_{gm}](l, l')$
 - => We can improve this with simulations
- Planck cosmological parameters

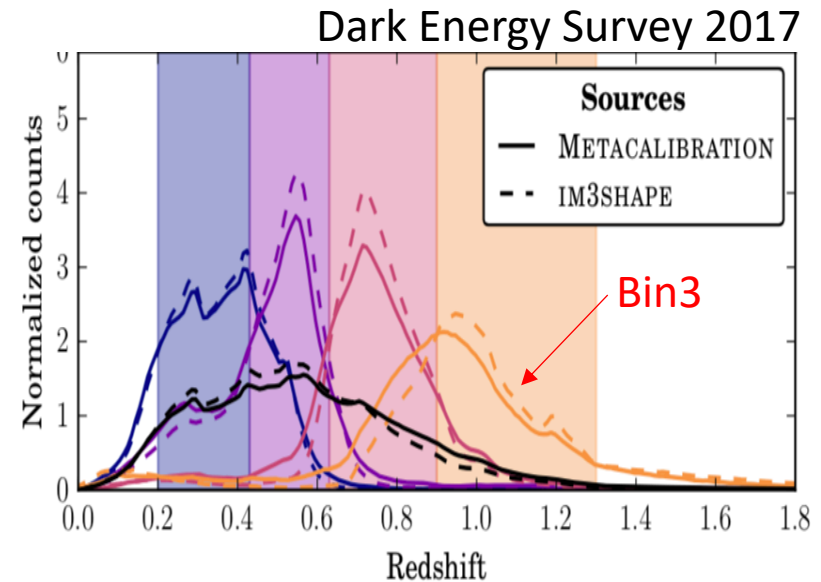
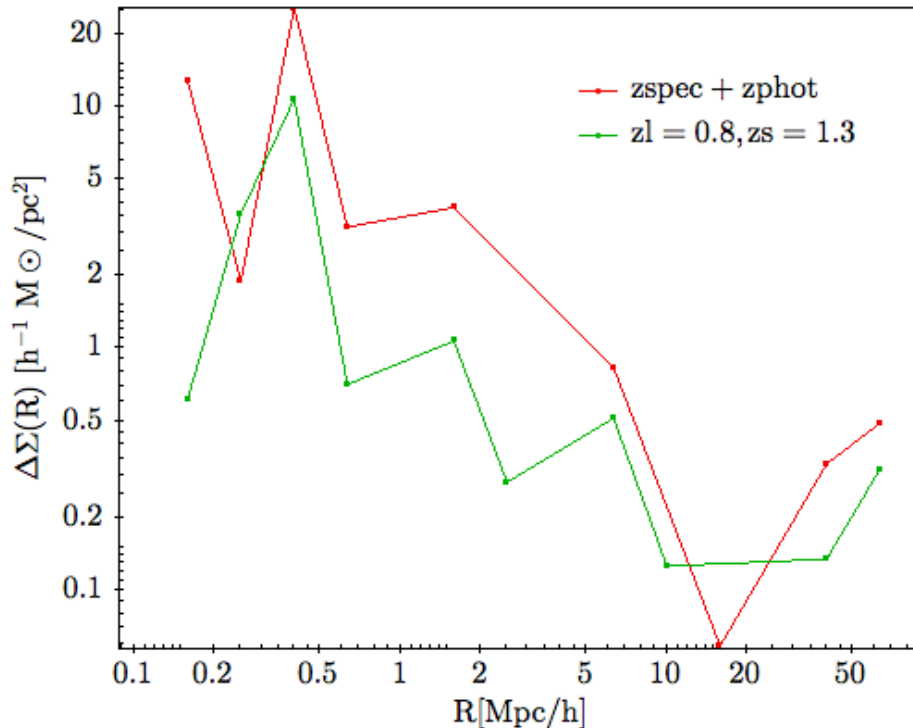


¹ <https://bitbucket.org/joezuntz/cosmosis>

DESxELG measurements

First measurement to assess the S/N:

- Overlapping area 153 deg² on eboss21 region
- 29836 ELG and 131997 background sources (DES, Bin3, im3shape)
=> 195 ELG.deg⁻² and 0.24 bkg gal.arcmin⁻²



Improvement solutions

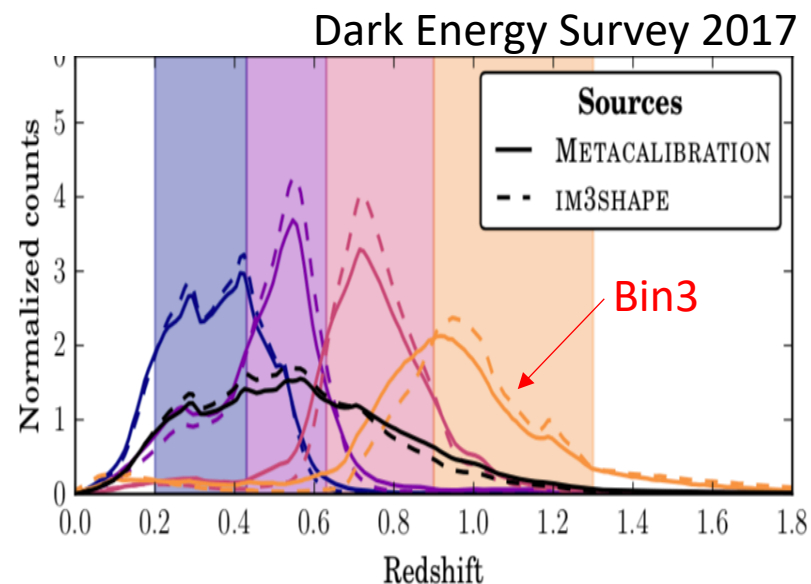
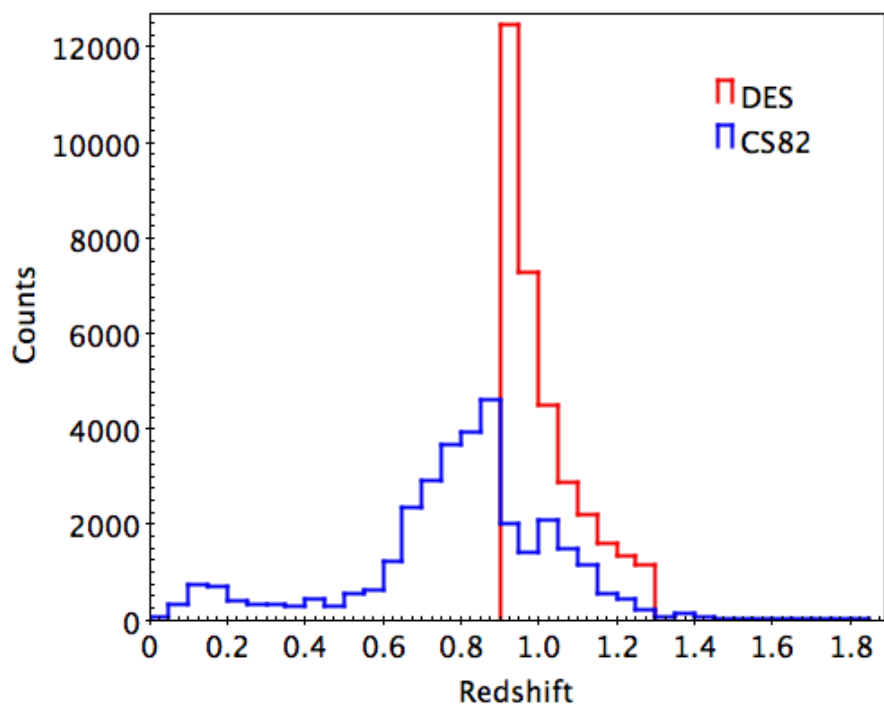
- Add more lensing data on wider area
 - eboss22 region, combine with CFHT-Stripe 82 (+85 deg²)
 - NGC region, combine with DECaLS DR3/DR8
- => Bad zphot, need to find color-color selection to get $z > 0.6$ sources
 - Request access to DES Y3 Fat-Stripe82 data
- Correlate lensing with LRG and CMASS samples

Next steps

- Add CS82, DECaLS lensing information
- Cross-correlated lensing with LRG and CMASS
- Estimate covariance matrices
 - Analytic prescription with COSMOSIS
 - Compare with Outerrim Hearing2015 mock catalogues
 - Use halo model to add lensing signal without ray-tracing through N-body particles (Giocoli et al. 2017)
- Add DES Y3 weak-lensing data
- Prepare Shear catalogue for DR8
- Estimate z_{phot} for DR8?

Comparison DES vs CS82

Comparison between *DES-im3shape* and *CFHT-CS82* catalogues (Jullo et al. 2019)



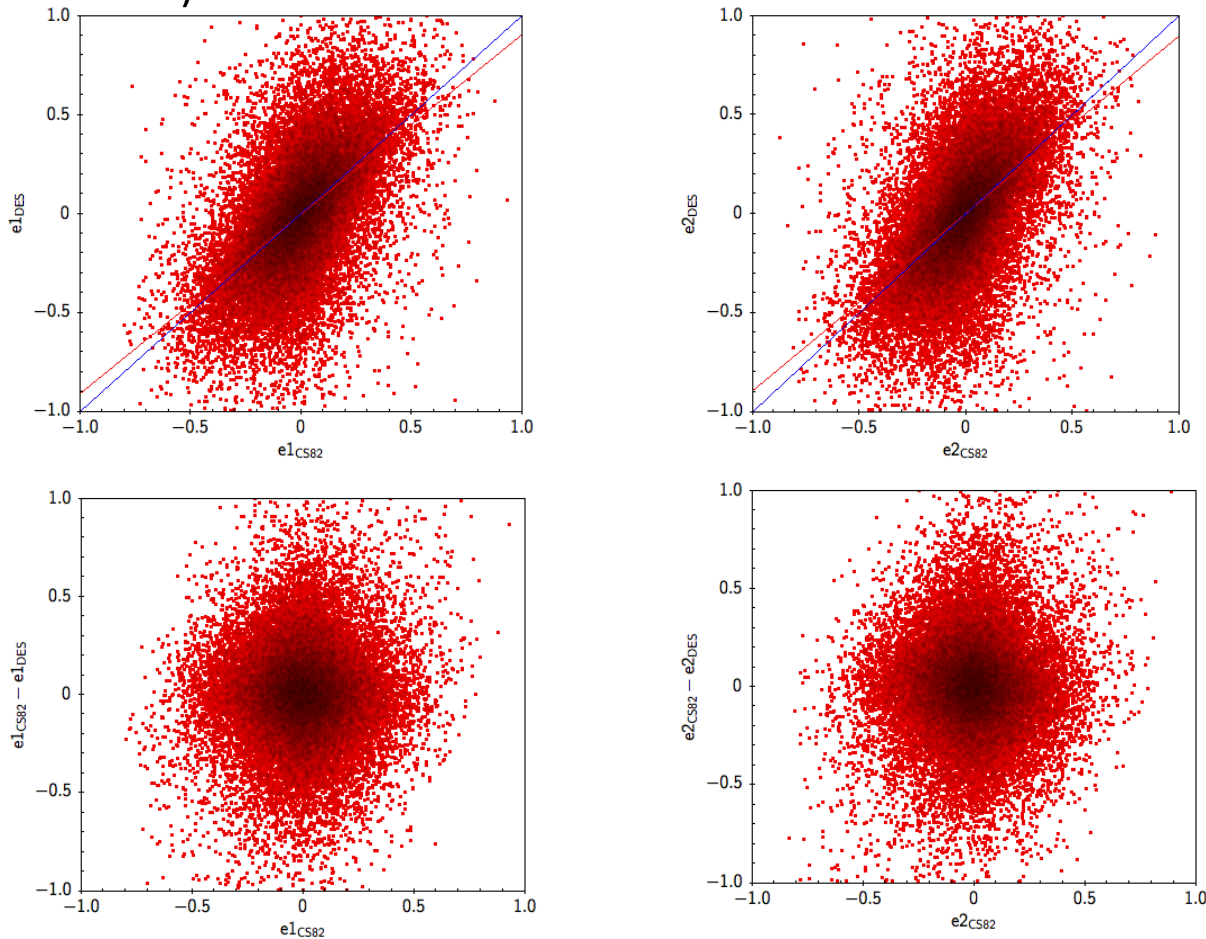
DES Bin3

Selection in photometric redshift $0.9 < z < 1.3$

=> The CS82 $n(z)$ reproduces the DES $n(z)$ at $z < 0.90$

Comparison DES vs CS82

Comparison between *DES-im3shape* and *CFHT-CS82* catalogues (Leauthaud et al. 2016, Jullo et al. 2019)



=> Large scatter between measurements but no systematic bias

Comparison DES vs DECaLS/DR3

Comparison between *DES-im3shape* and *DECaLS/DR3* catalogues (Shan et al. 2017, Phriksee et al. submitted)

