

# Dark Energy Survey Year 3 Large-Scale Structure + Weak Lensing Results

**Cyrille Doux** *on behalf of the DES Collaboration*

UNIVERSITY of PENNSYLVANIA

*Department of Physics and Astronomy  
Warren Center for Data and Network Sciences*

RUBIN-LSST FRANCE MEETING

MAY 27<sup>TH</sup> 2021



THE DARK ENERGY SURVEY



**Penn**  
UNIVERSITY of PENNSYLVANIA

# Humans of DES Y3

## ▶ Dark Energy Survey Year 3 Key Project

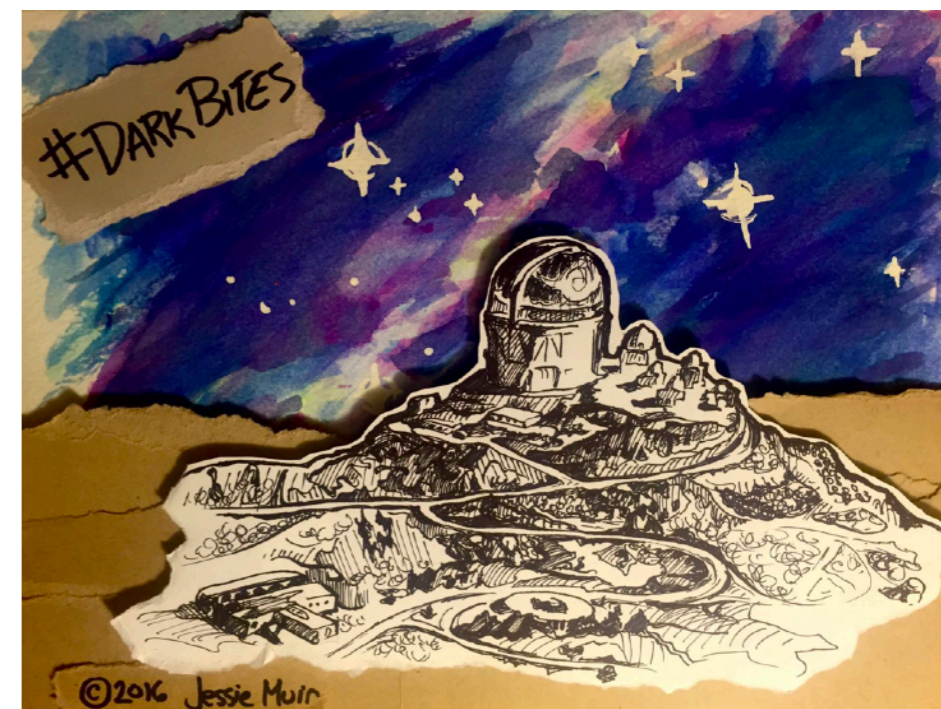
▶ [@TheDESsurvey](https://twitter.com/TheDESsurvey) : ~400 scientists from 25 institutions in 7 countries (USA, UK, Spain, Brazil, Switzerland, Germany, Australia)

▶ DES Y3 shear+clustering KP : >100 people over 3 years from DES (+SPT)

## ▶ DES Y3 papers

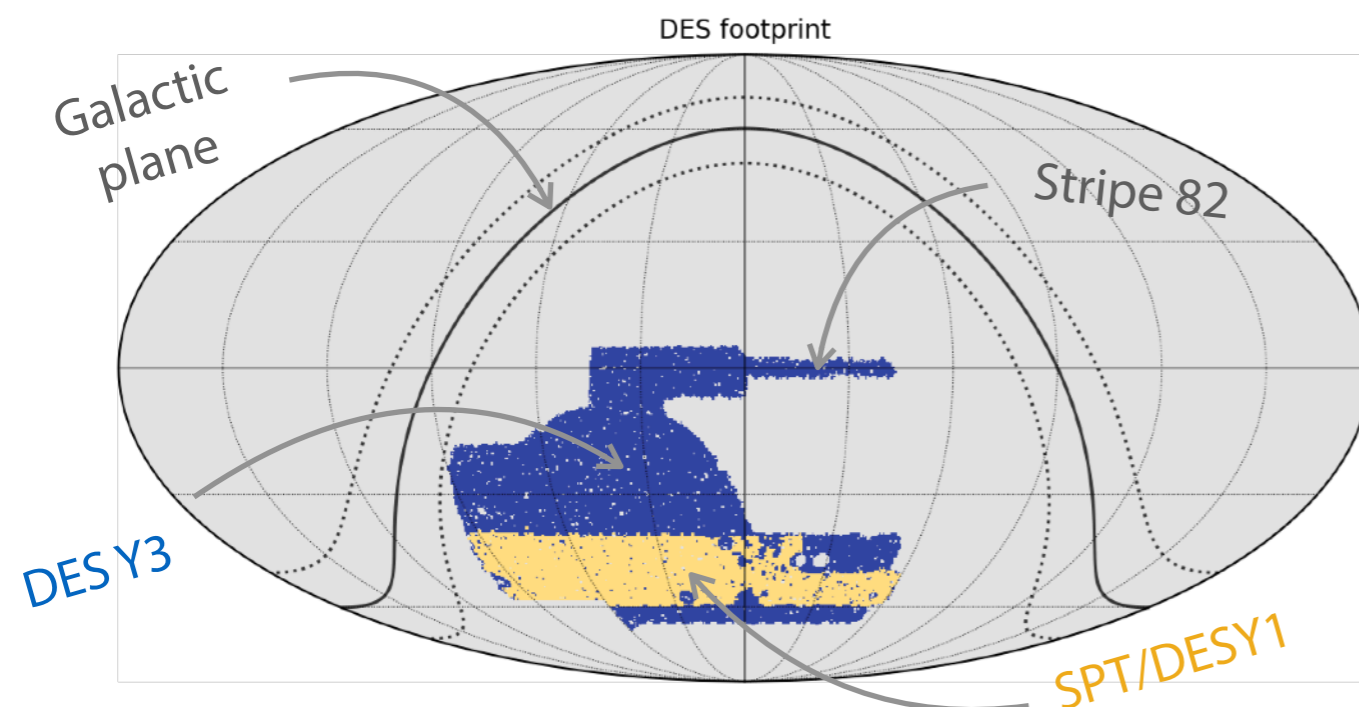
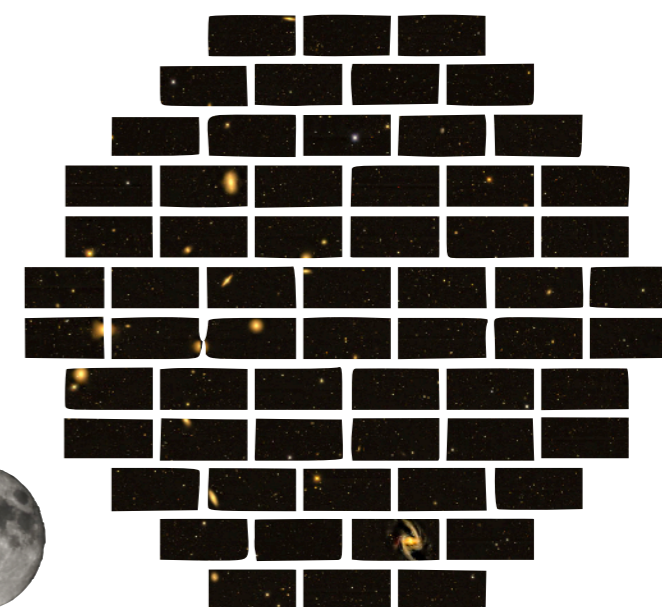
▶ First batch of papers released in Nov-Dec (15/29 papers), check out [#darkbites!](https://twitter.com/darkbites)

▶ See <https://www.darkenergysurvey.org/des-year-3-cosmology-results-papers/>



# The Dark Energy Survey

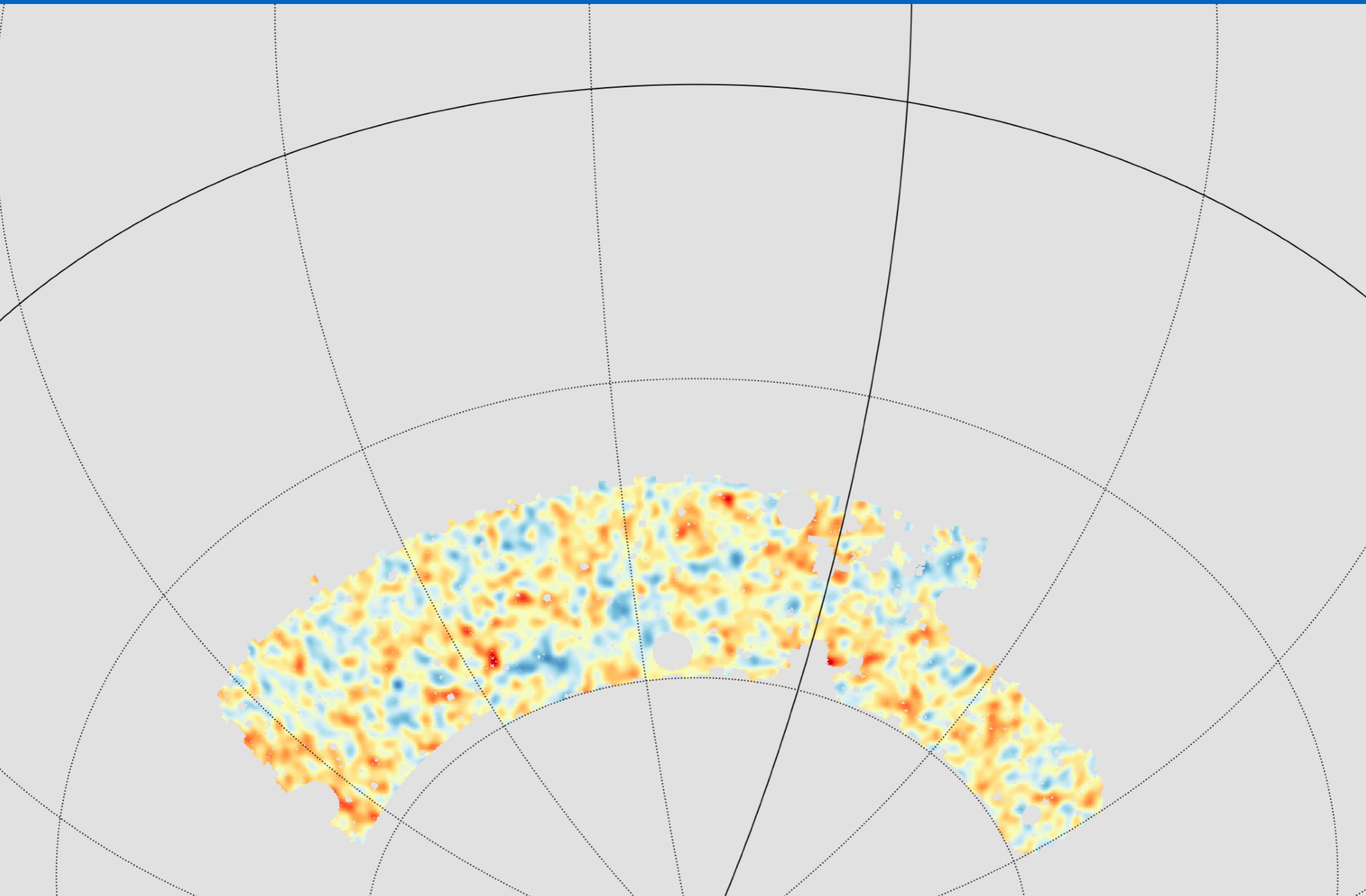
- ▶ **Blanco 4-meter telescope at Cerro Tololo (CTIO) in Chile**
- ▶ **Dark Energy Camera (DECam)**
  - ▶ 3.0 deg<sup>2</sup> field-of-view, 70 CCD chips, 570 Mpix, *griz(Y)* filters
  - ▶ Seeing  $\sim 0.9'$  in *r*-band, magnitude  $i_{AB} < 23.0$ ,  $r < 23.5$
- ▶ **Survey(s)**
  - ▶ 5000 deg<sup>2</sup> footprint + deep fields, observed 2013-2019
  - ▶ Overlaps with COSMOS, eBOSS and SPT
  - ▶ DR2 (6 years) of 543M galaxies + 145M stars to  $i \sim 23.8$



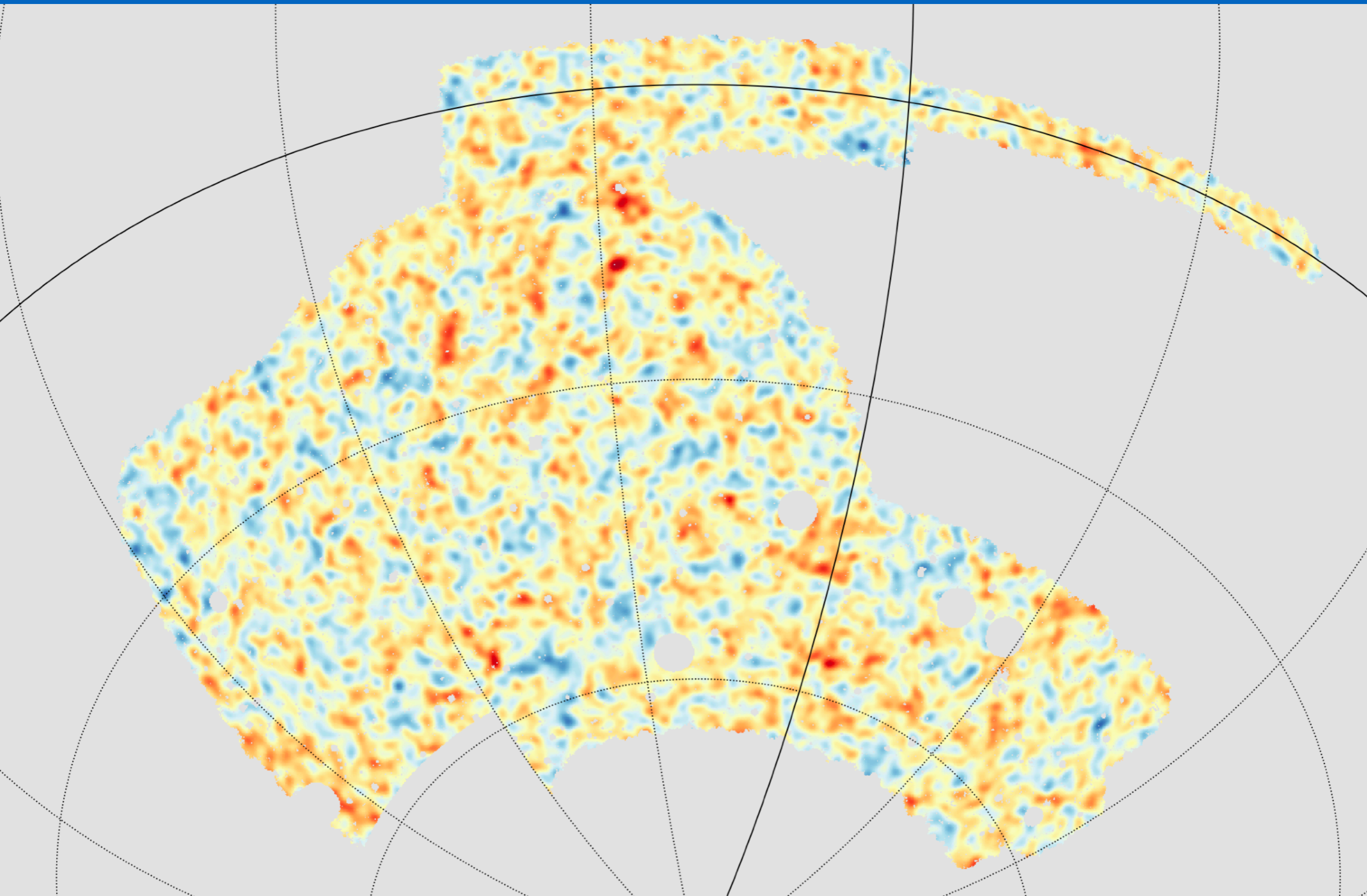
	DES	HSC	KiDS +VIKING
FoV [deg <sup>2</sup> ]	3.0	1.8	1.0
Area [deg <sup>2</sup> ]	5000	1400	1350
Filters	griz(Y)	grizY	ugriz +ZYJHKS
Seeing [arcsec]	0.9	0.6	0.7
Source density [gal/arcmin <sup>2</sup> ]	$\sim 7$	$\sim 22$	$\sim 9$
Depth	$r \sim 23.5$	$i \sim 24.5$	$r \sim 23.5$

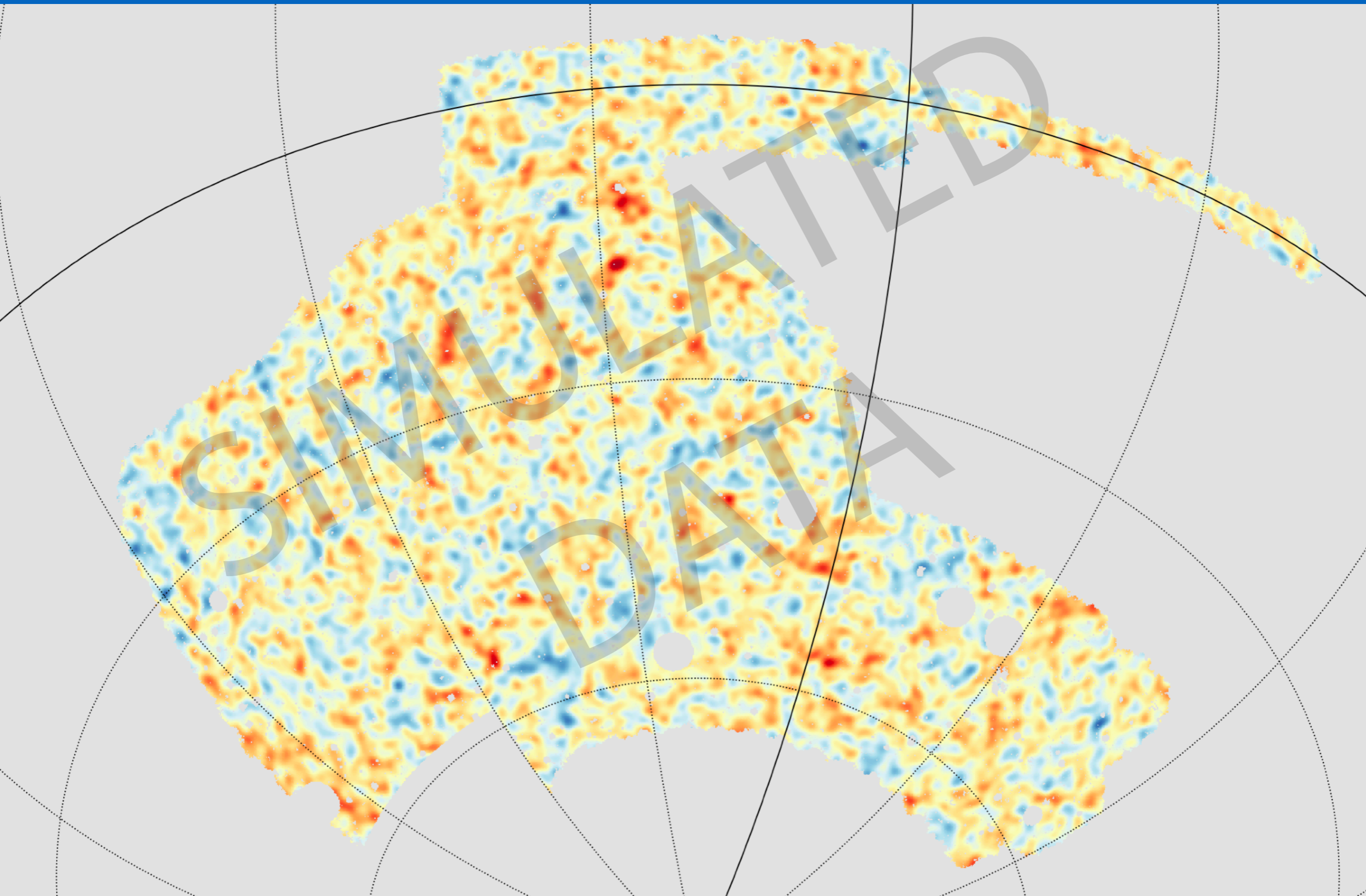
Hildebrandt

# DES Y1 to Y3



# DES Y1 to Y3







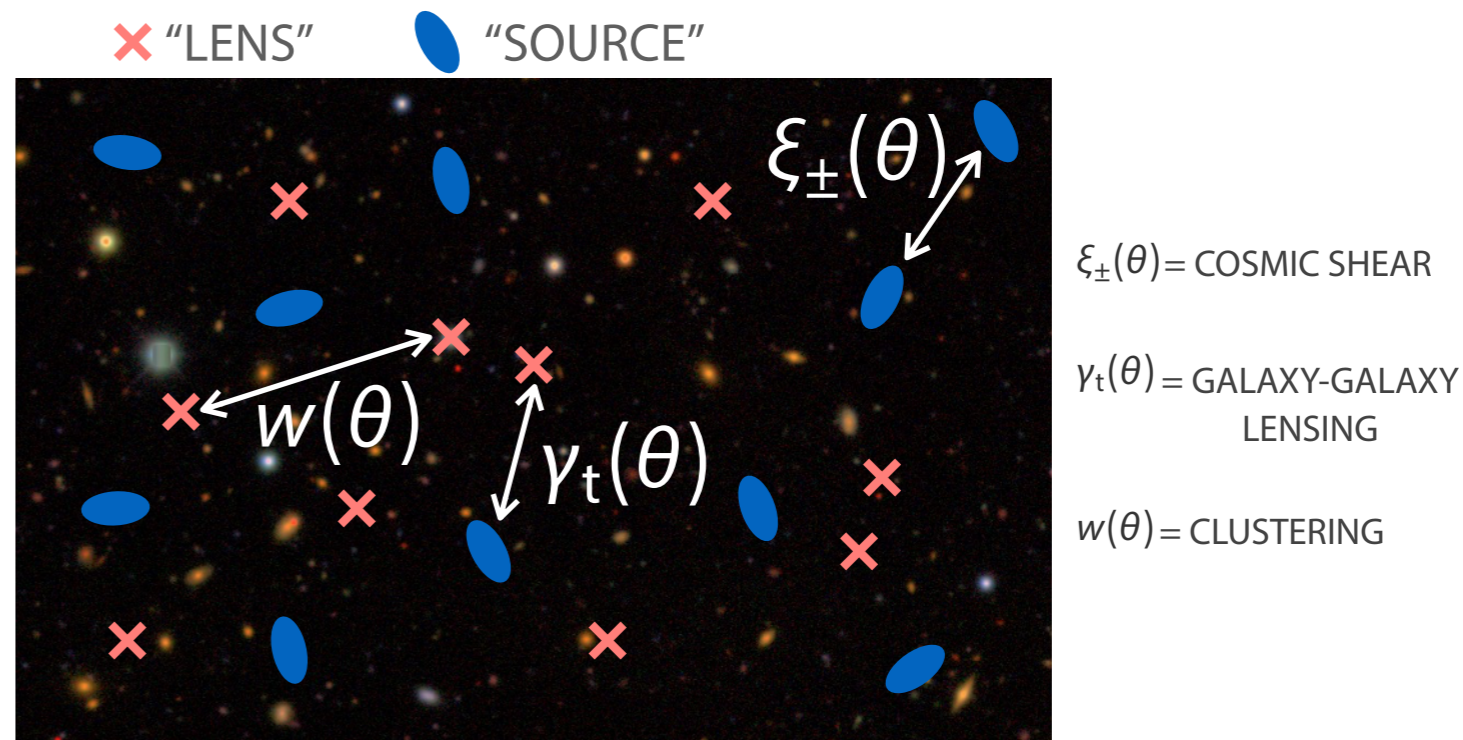
# DES Y3 3x2pt cosmology

## ▶ What's DES Y3 3x2pt ?

- ▶ Combining **large-scale structure** information from galaxy lensing and clustering

## ▶ 3 galaxy samples :

- Sources  : 100M+ galaxies
- Lenses  : MAGLIM and REDMAGIC



## ▶ Goals

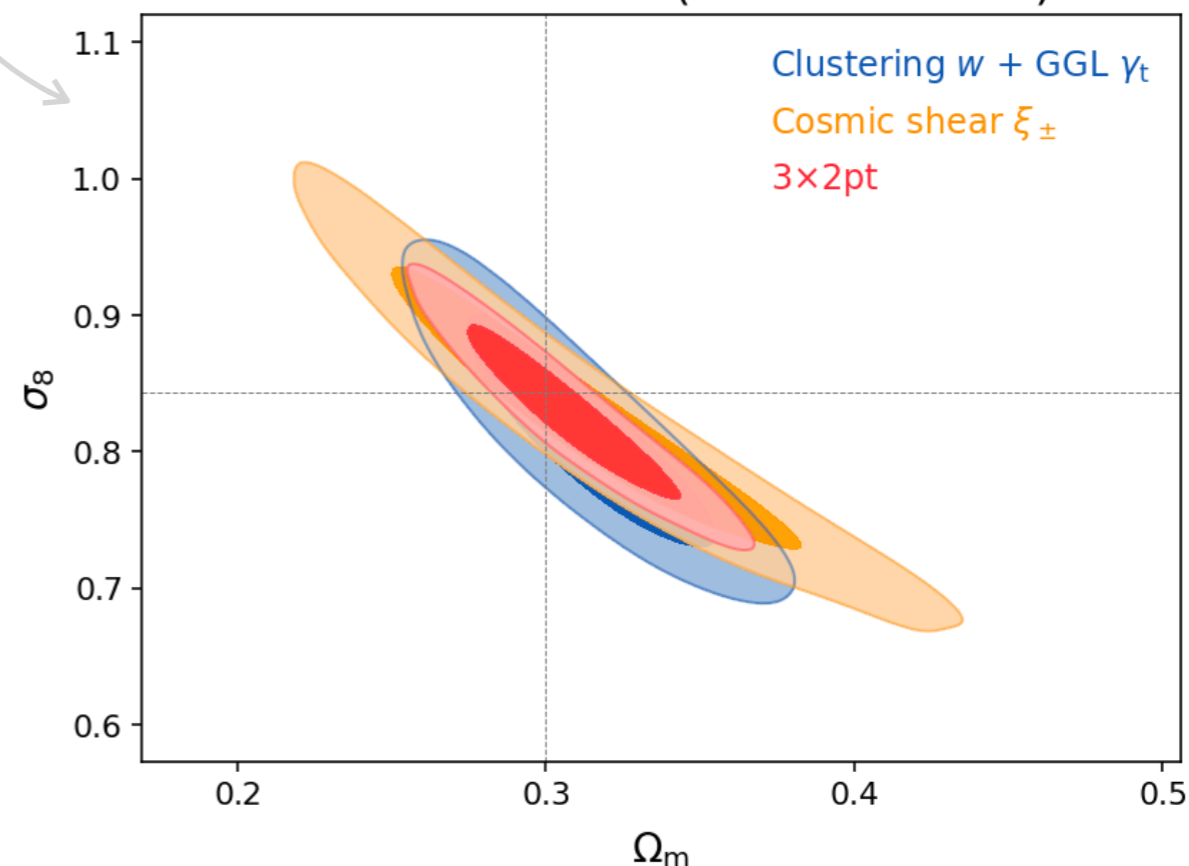
- ▶ **Testing the concordance  $\Lambda$ CDM model** by measuring the amount ( $\Omega_m$ ) and clumpiness ( $\sigma_8$ ) of matter at low redshift vs inference from CMB observations

## ▶ DES Y3 results

- ▶ Many **methodological improvements** from images to cosmological parameters (see also presentation at Action Dark Energy, Feb 9<sup>th</sup> 2021)

- ▶  $\sigma_8 = \dots$

DES Y3 forecasts (simulated data)



Join the webinar for the presentation of  
DES Y3 cosmology results from lensing and clustering  
at 17h30 today!

- ▶ Click [here](#) to join the zoom webinar.
- ▶ Submit questions through [this form](#)
- ▶ Find publications on the [DES website](#) (30 papers)