

DES



LSST



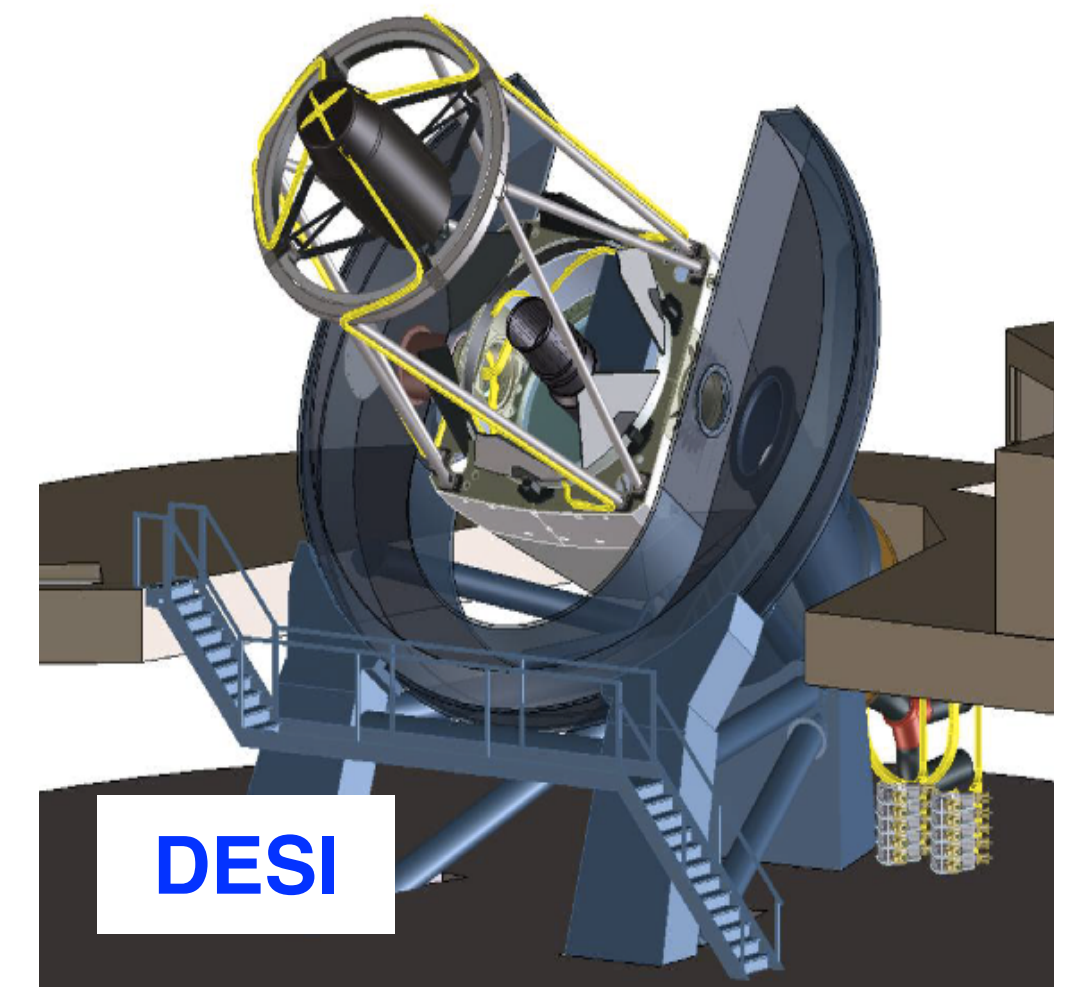
PAUS



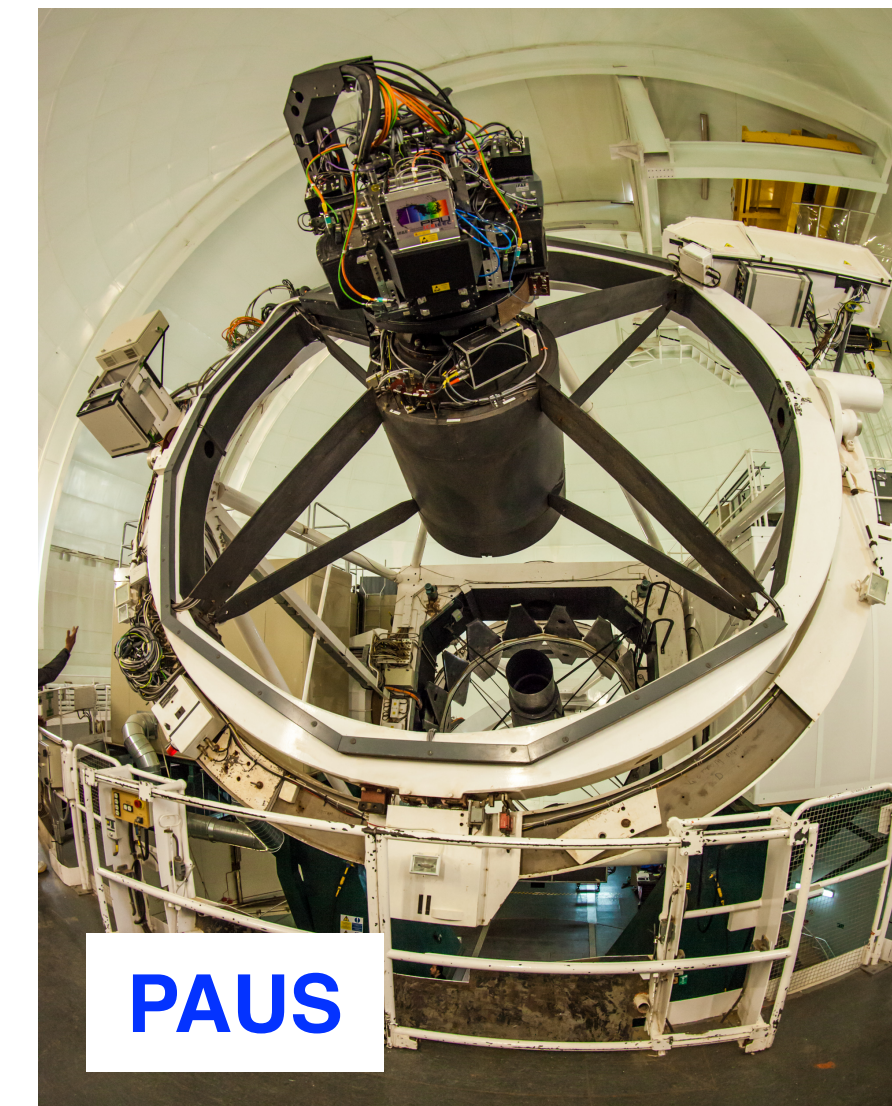
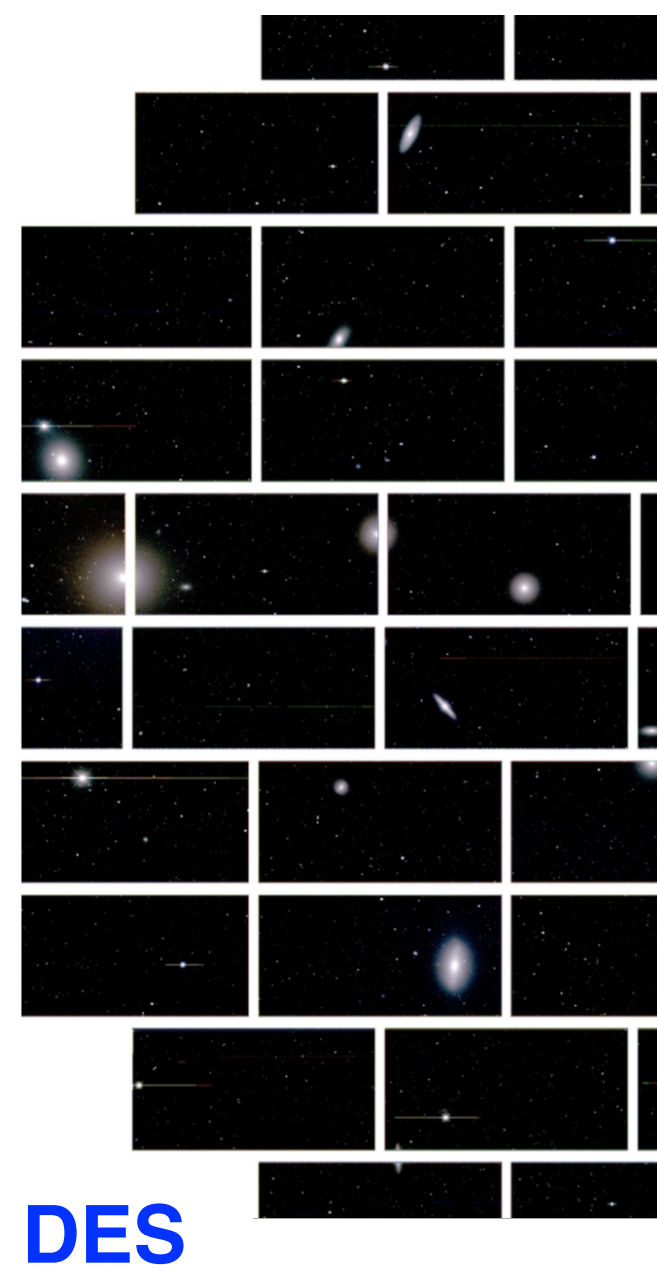
Euclid

# Observational Cosmology

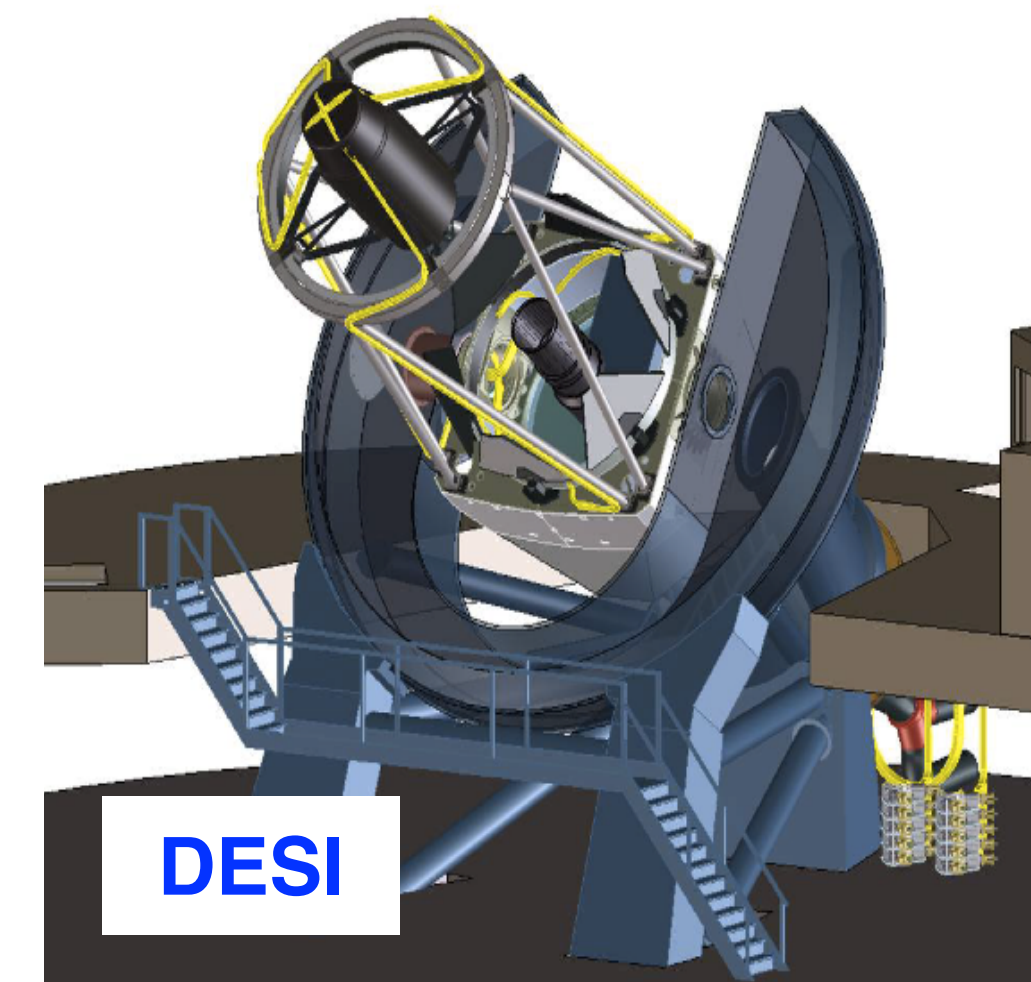
Andreu Font-Ribera



DESI



- Data analysis
- Hardware

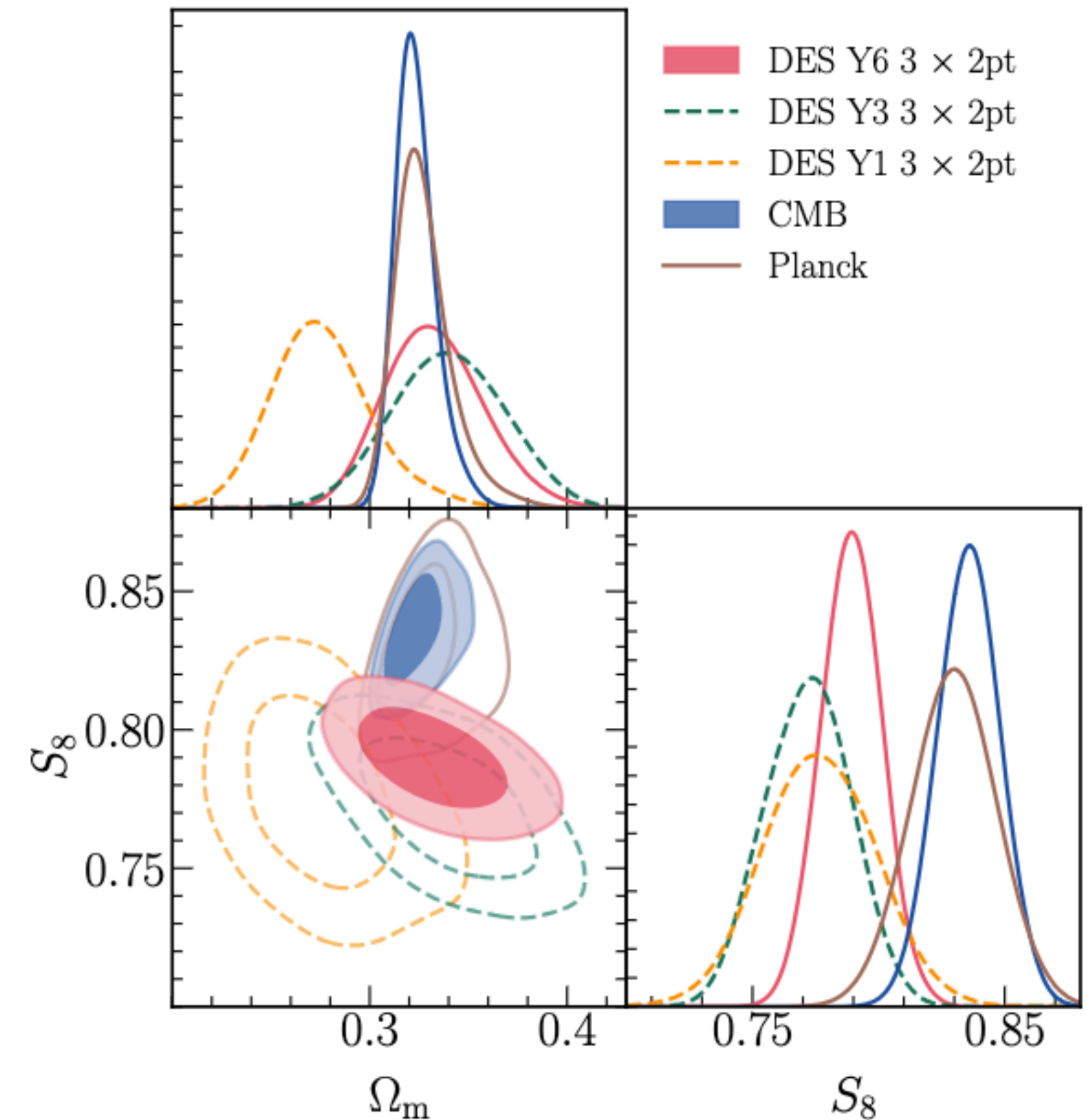


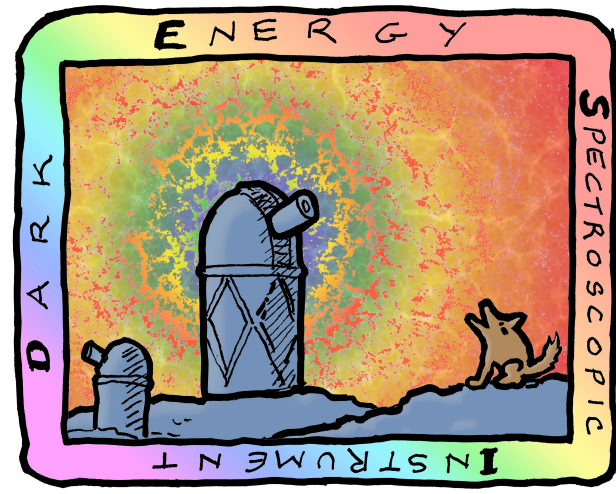


DARK ENERGY  
SURVEY

# DES Year 6 data analysis

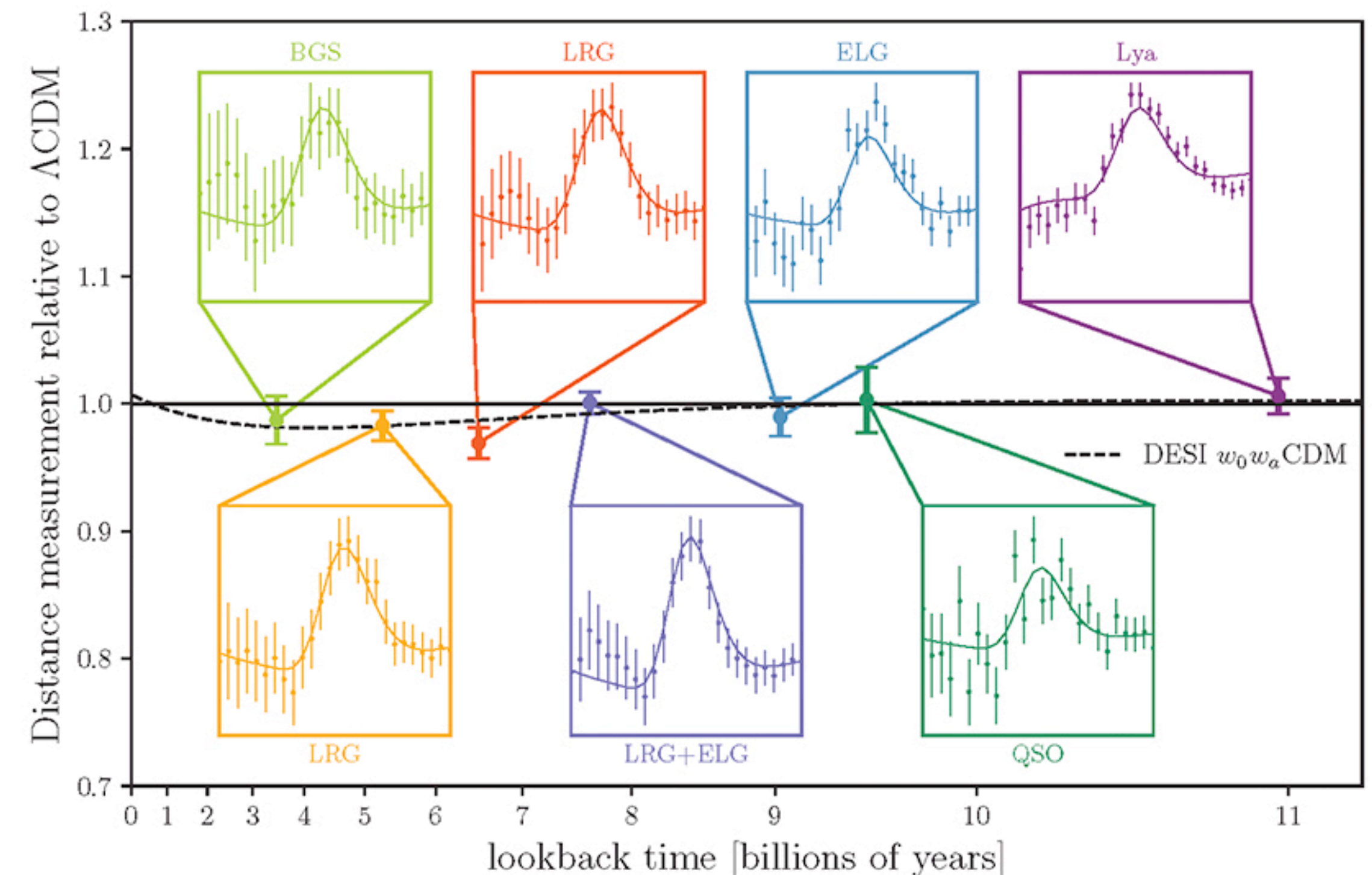
- DES is the largest photometric galaxy survey to date
  - More than 140 million galaxies used for weak lensing
  - DES-Y6 is the state of the art in studies of growth of structure
- IFAE has been a key player in DES since the beginning
  - Important hardware contributions (read-out electronics)
  - Leadership roles in management and science WGs for 10 years
- Leadership in the DES-Y6 BAO (Santi Ávila)
- Leadership in the final DES-Y6 3x2pt analysis:
  - Cosmology from cosmic shear (Simon Samuroff)
  - Clustering redshifts (William d'Assignies)
  - Lensing magnification (Elisa Legnani)





# DESI BAO data analysis

- Dark Energy Spectroscopic Instrument (DESI) is the largest spectroscopic galaxy survey to date
  - More than 14 millions spectroscopic redshifts used for Baryon Acoustic Oscillations (BAO)
  - DESI DR2 BAO is the state-of-the-art in studies of the expansion of the Universe
- IFAE is a key player in DESI
  - Important hardware contributions (Guiding, Focusing Alignment cameras)
  - Leadership roles in management and science WGs for 5 years
- Leadership in Lyman alpha forest studies (Andreu Font-Ribera)
- Currently leading DESI DR3 BAO preparations (Andreu Font-Ribera)

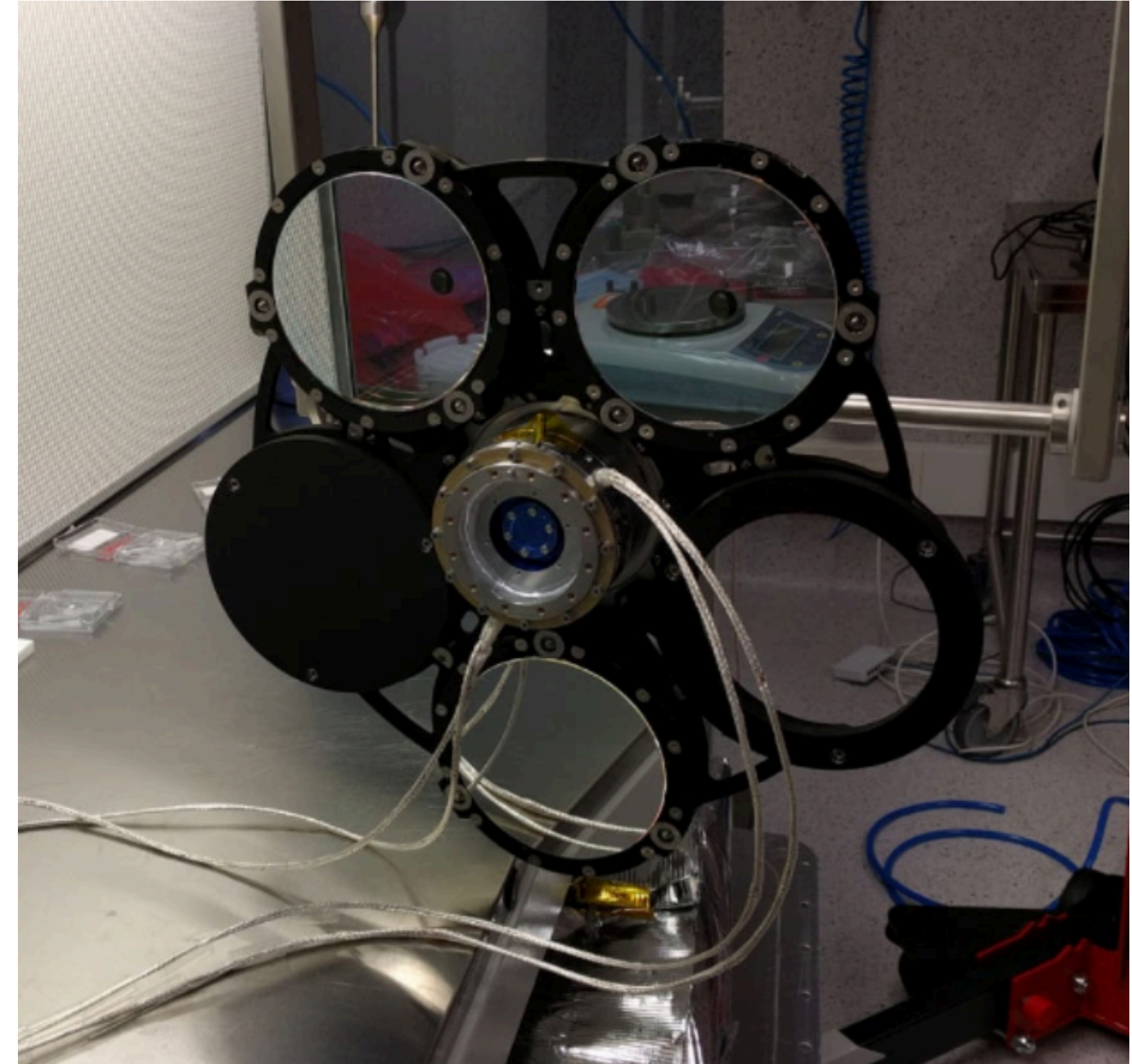


# Euclid data analysis

---

---

- Euclid was launched in 2023, includes:
  - Large photometric survey (weak lensing)
  - Large spectroscopic survey (BAO)
- IFAE is a key player in Euclid
  - Important hardware contributions (Filter wheel)
  - Leadership roles in management and science
- Leadership in Photometric redshifts (Marc Manera)
- Chair of the Speakers Bureau (Cristóbal Padilla)
- Currently working on first cosmological results



# LSST / DESC data analysis

---

---

- Legacy Survey of Space and Time (LSST) at the Vera Rubin Observatory will be
  - 4x more area than DES
  - 3 mag deeper than DES
  - taking data nightly until 2036
- IFAE contributions to LSST
  - contributions in software and data management
  - data rights for 5 faculty at IFAE
- Dark Energy Science Collaboration of LSST
  - Leading the Modeling and Combined Probes WG (Christos Georgiou)
- Currently analyzing data from survey validation



# Characterization of IR detectors

---

---

Besides data analysis, we are also involved in hardware R&D (PI: Cristóbal Padilla).

In particular, in development and characterization of infrared detectors for space missions

## **ATHENA** (European consortium)

- European project to develop IR chips
- Characterization of new detectors for Very-Long Wavelengths Infra Red (VLWIR, at ~15 microns)



## **ARRAKIHS** (ESA satellite)

- Twin telescope to study nearby galaxies
- IFAE is in charge of the EO characterization of the NIR detectors

