

SUPERNOVA HOST GALAXIES IN THE DARK ENERGY SURVEY



PHIL WISEMAN



Dark Energy Survey @theDESurvey · Sep 20

▼

This is a cluster of galaxies called Abell 3151. Over the course of the 5 years of DES, we detected over 20 supernovae in this field of view.

Spoiler: not all of them were in the cluster - many happened much more distant! #DEST4TD #DESimages @poshandcrabby



3

7

35

2

THE TEAM



Miika Pursiainen



Mike Childress



Mark Sullivan



Claudia Gutierrez



Matt Grayling



Charlotte Angus



Lisa Kelsey



Tomás Müller



Mat Smith



Chris Frohmaier



Lizi Swann



Maria Vincenzi



Bob Nichol



Ben Thomas



Phil Wiseman

THE TEAM



Miika Pursiainen



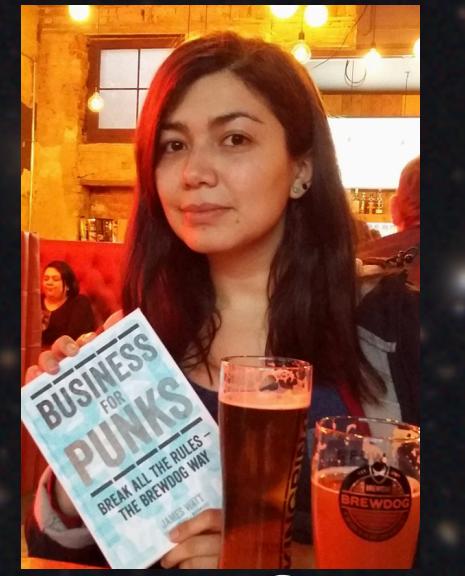
Mike Childress



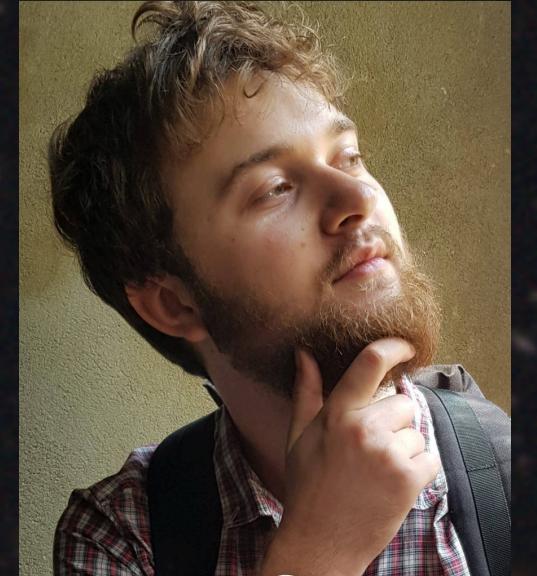
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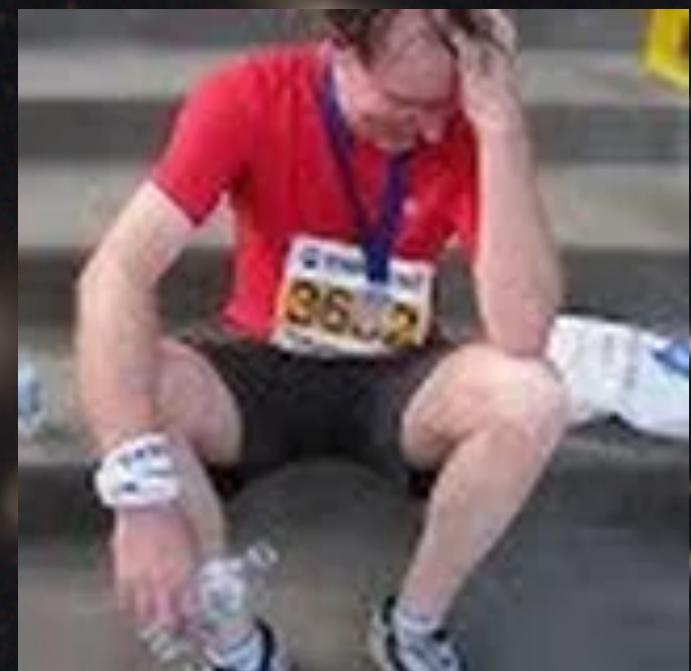
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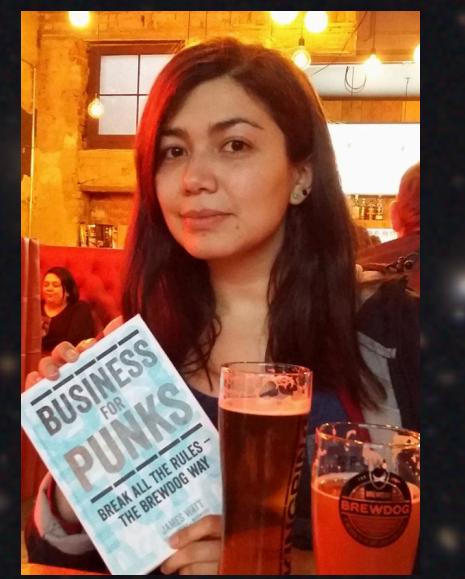
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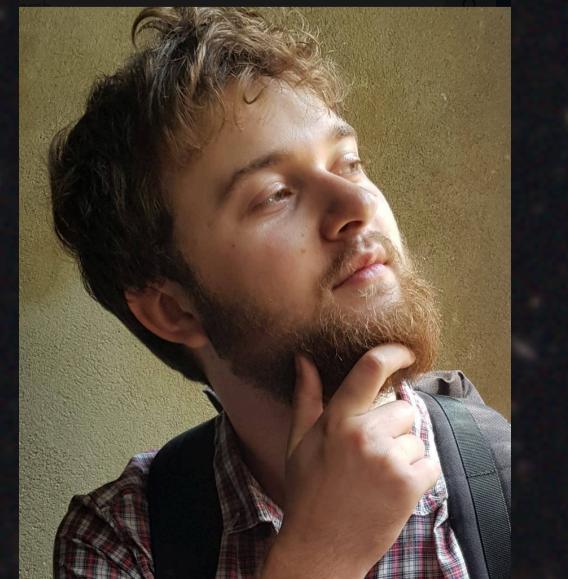
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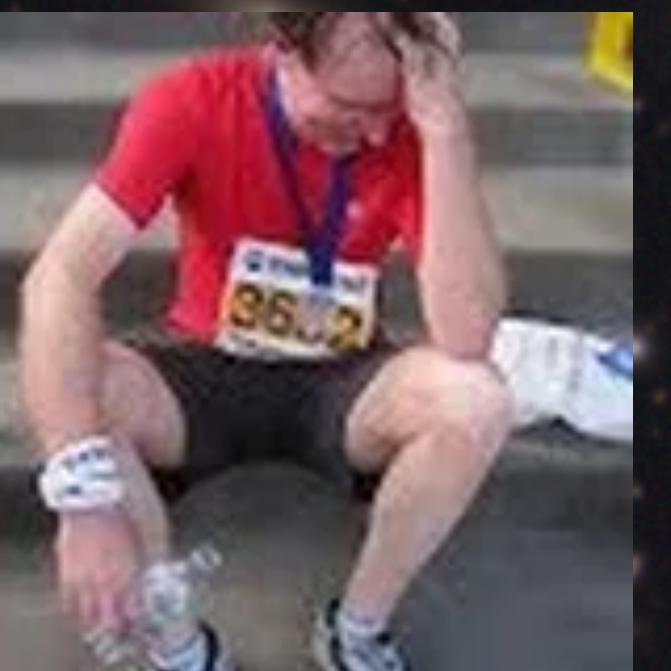
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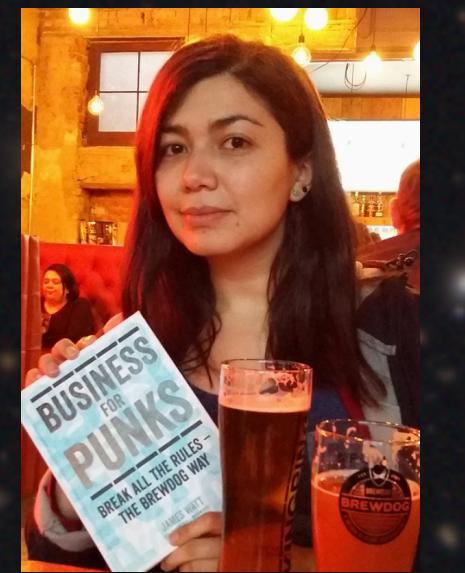
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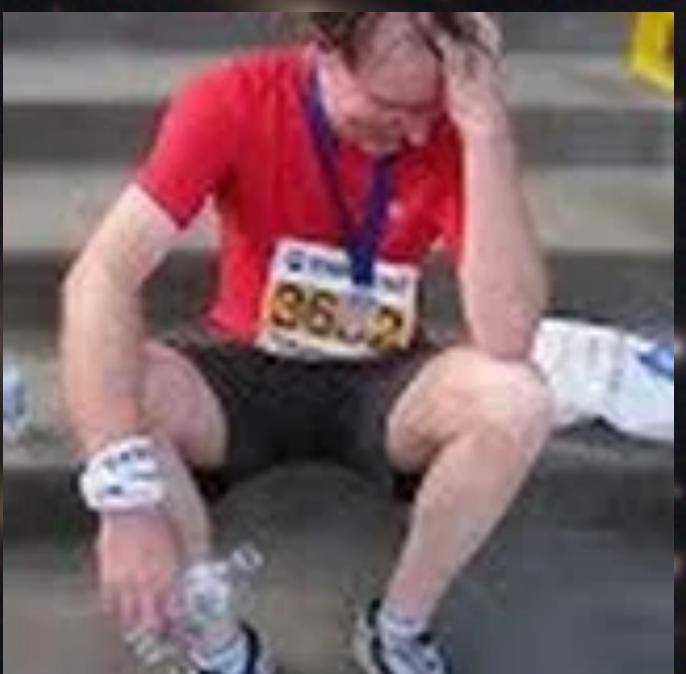
Chris Frohmaier



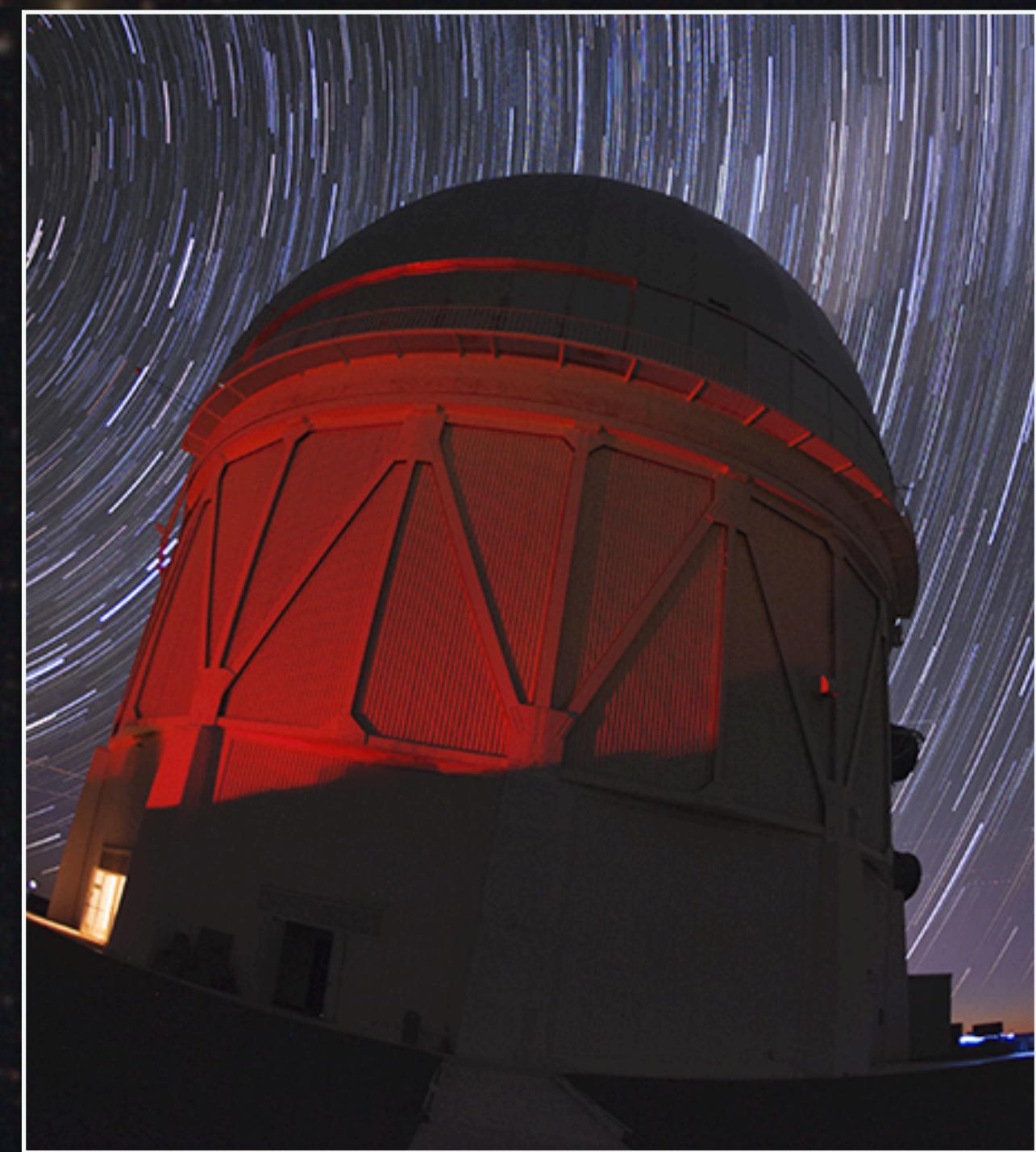
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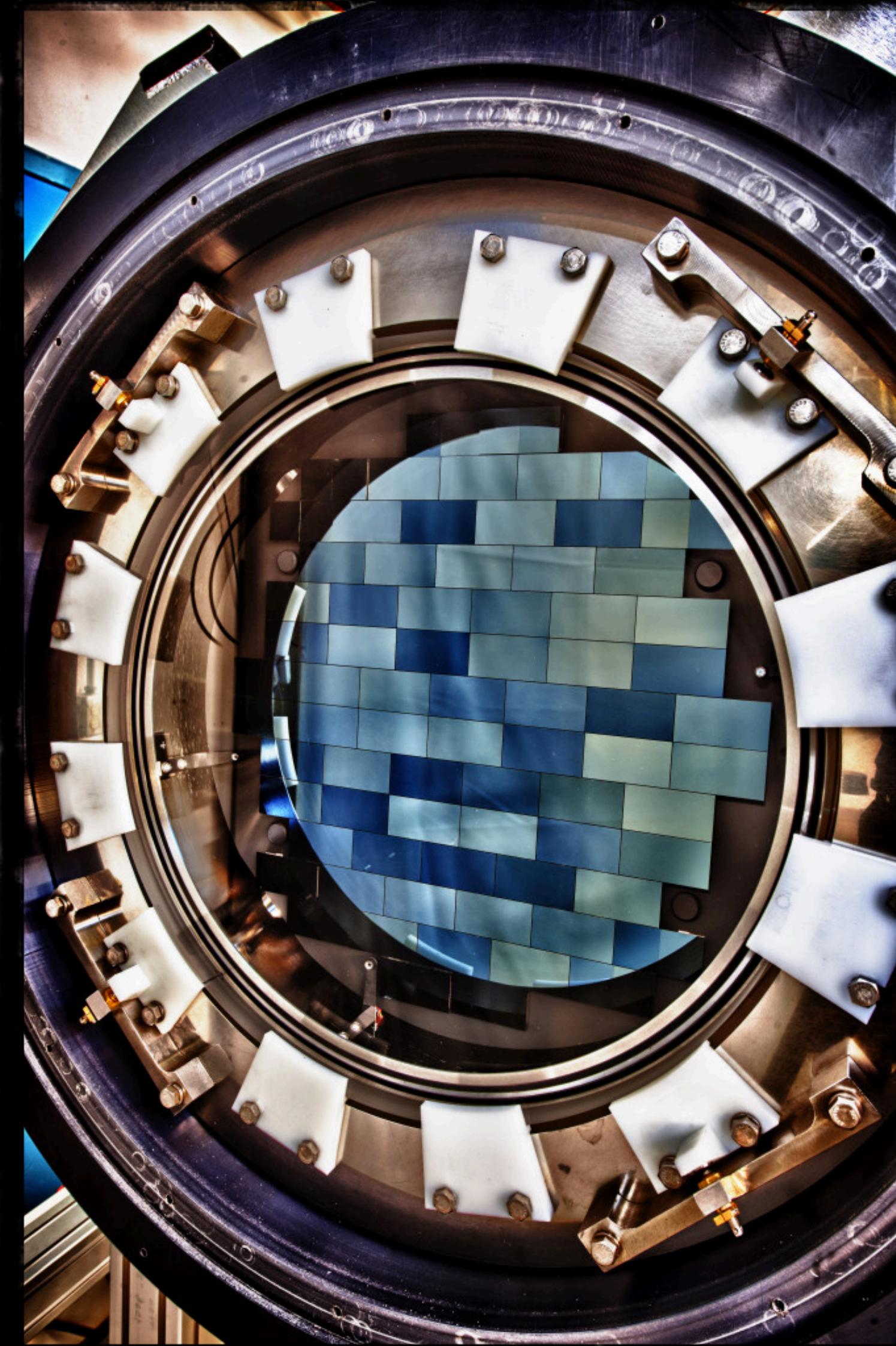
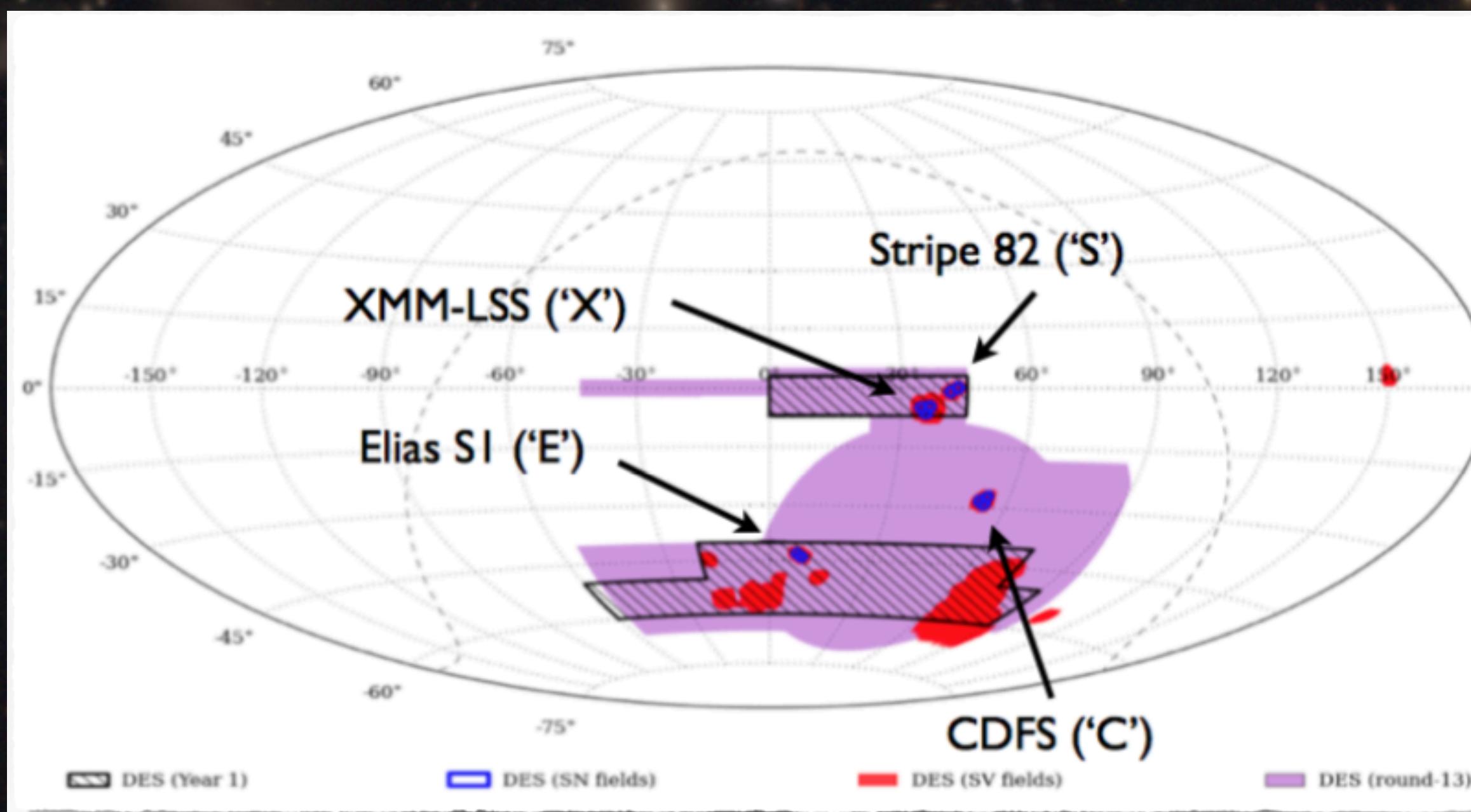
Bob Nichol



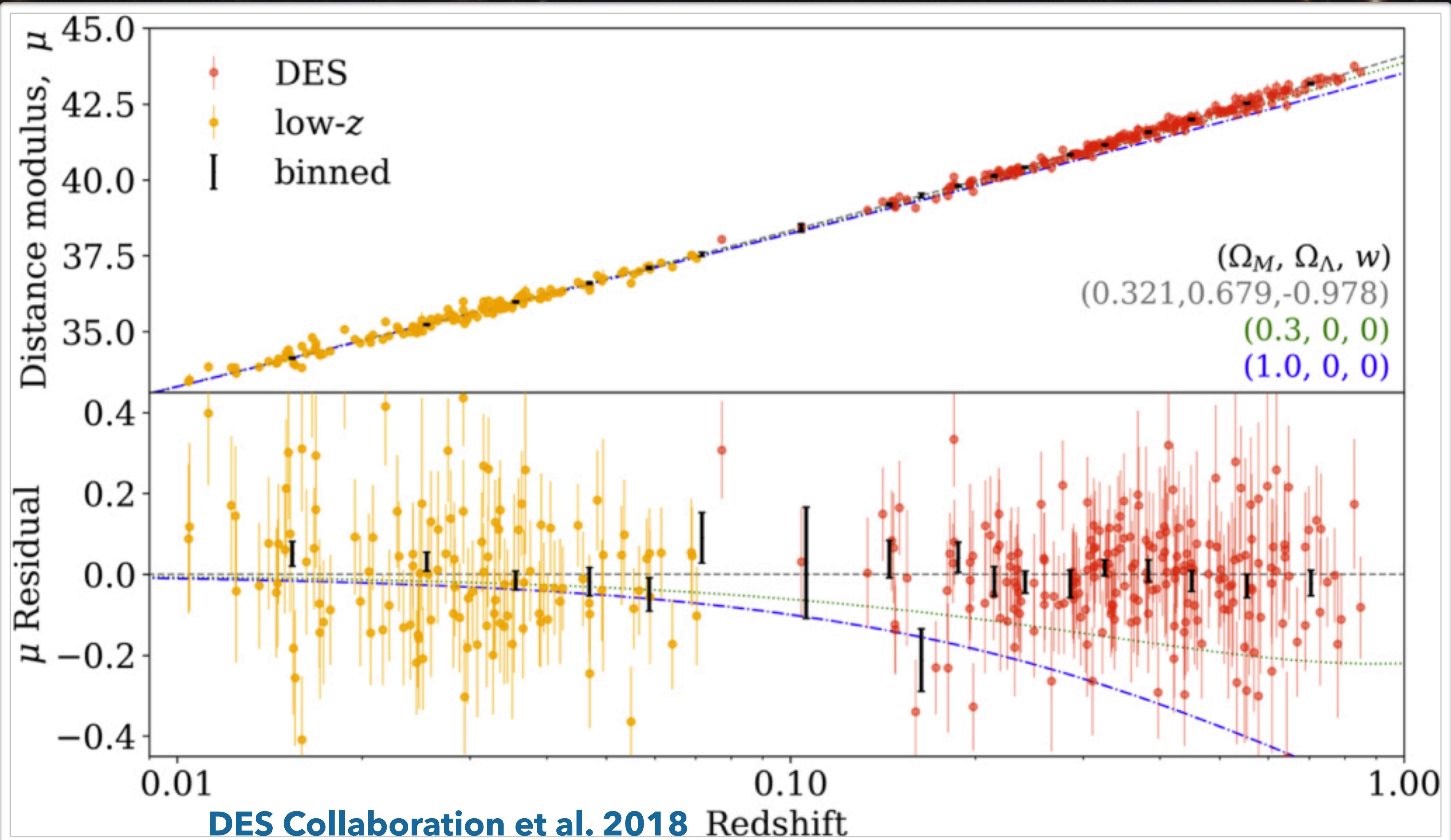
THE DARK ENERGY SURVEY

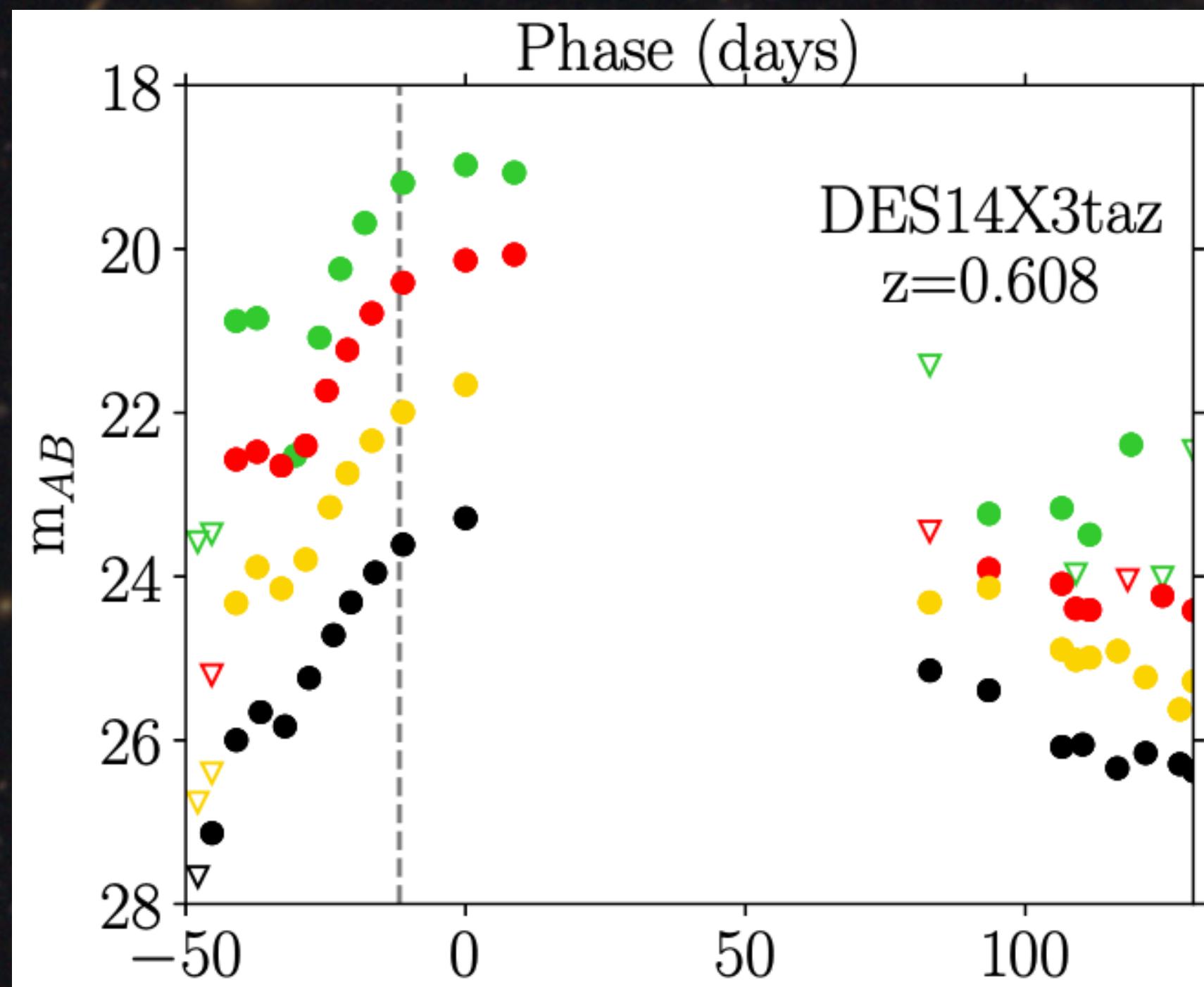
4m Blanco Telescope @ CTIO

DES Footprint

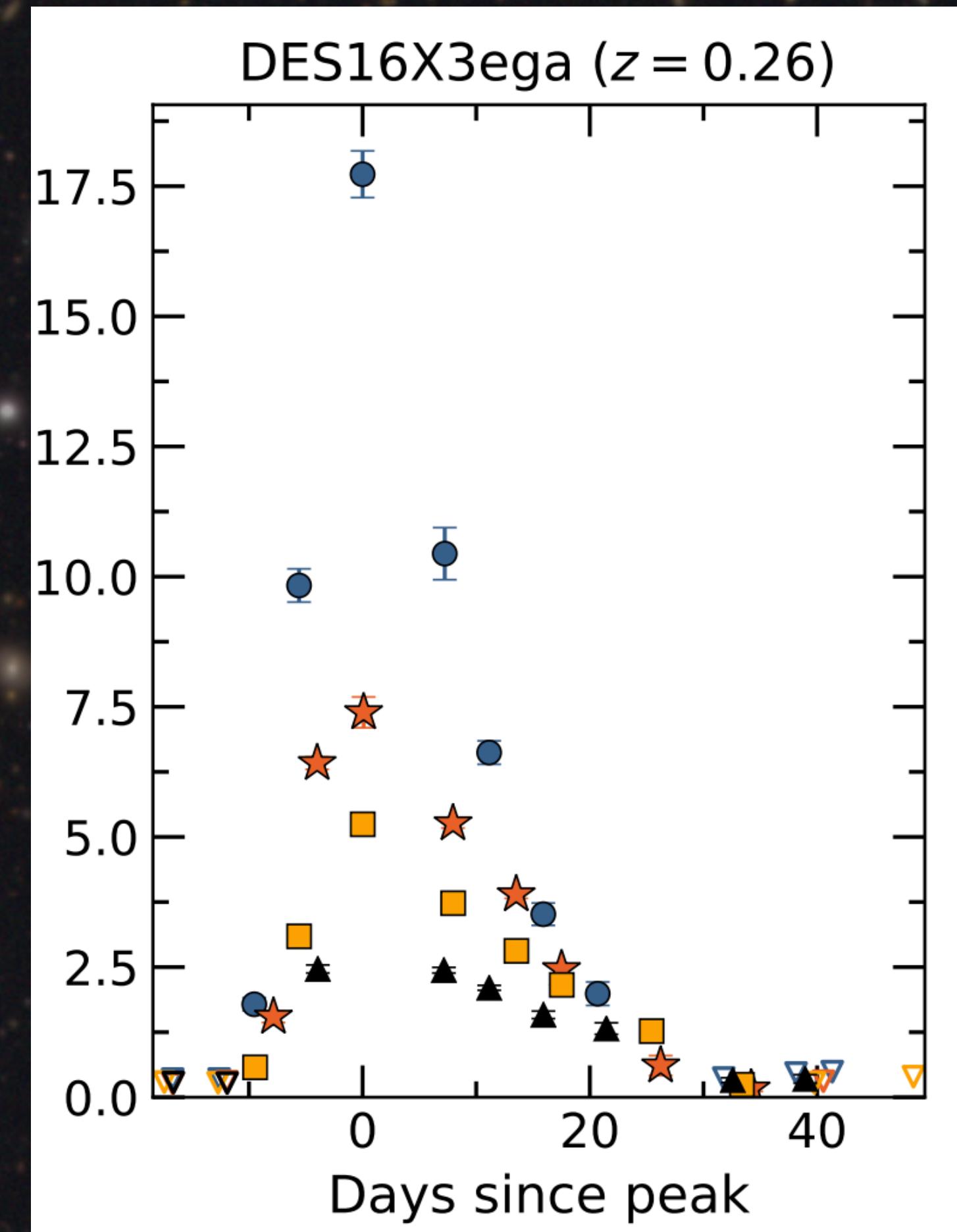


DECam

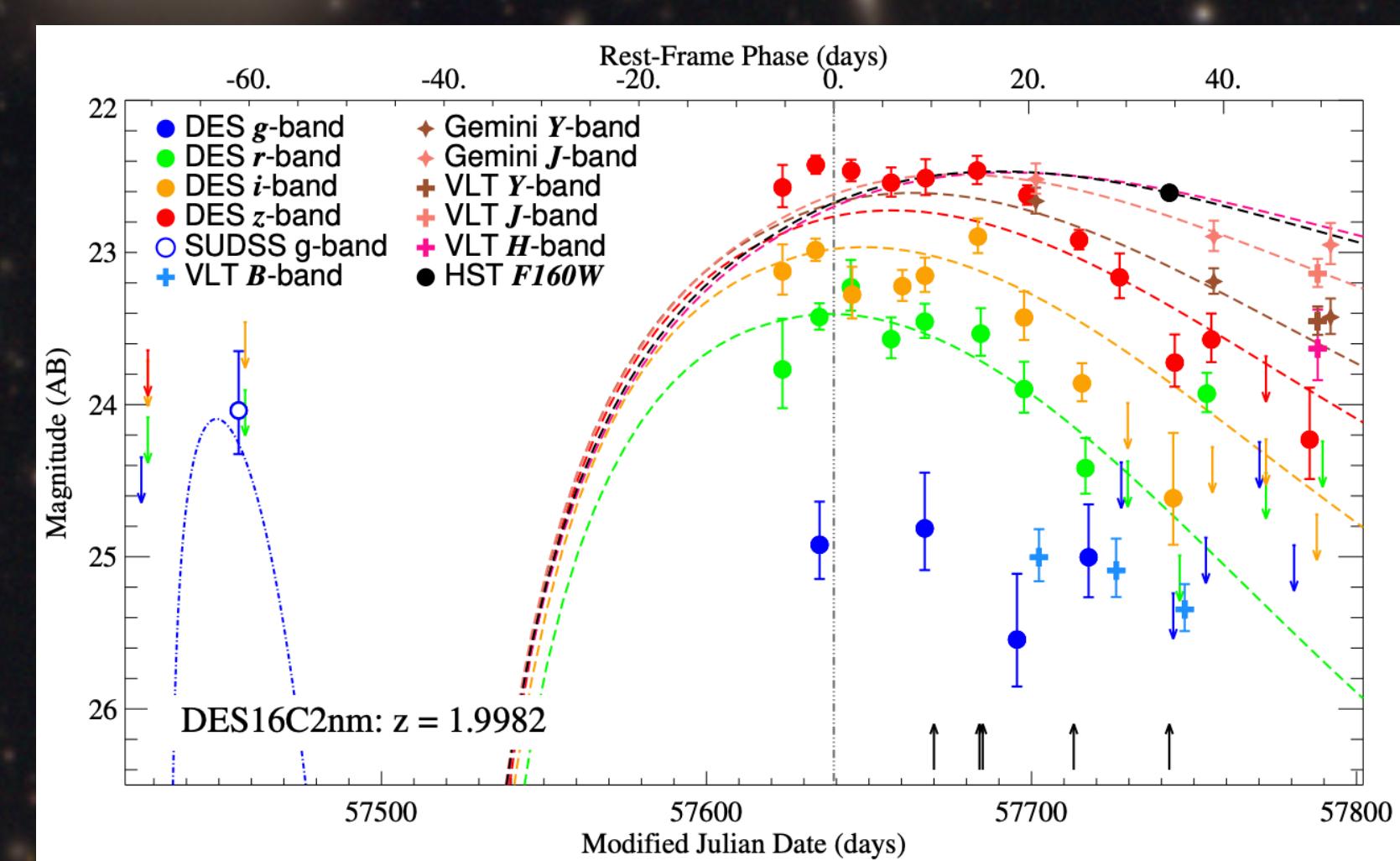




C. R. Angus et al. 2018

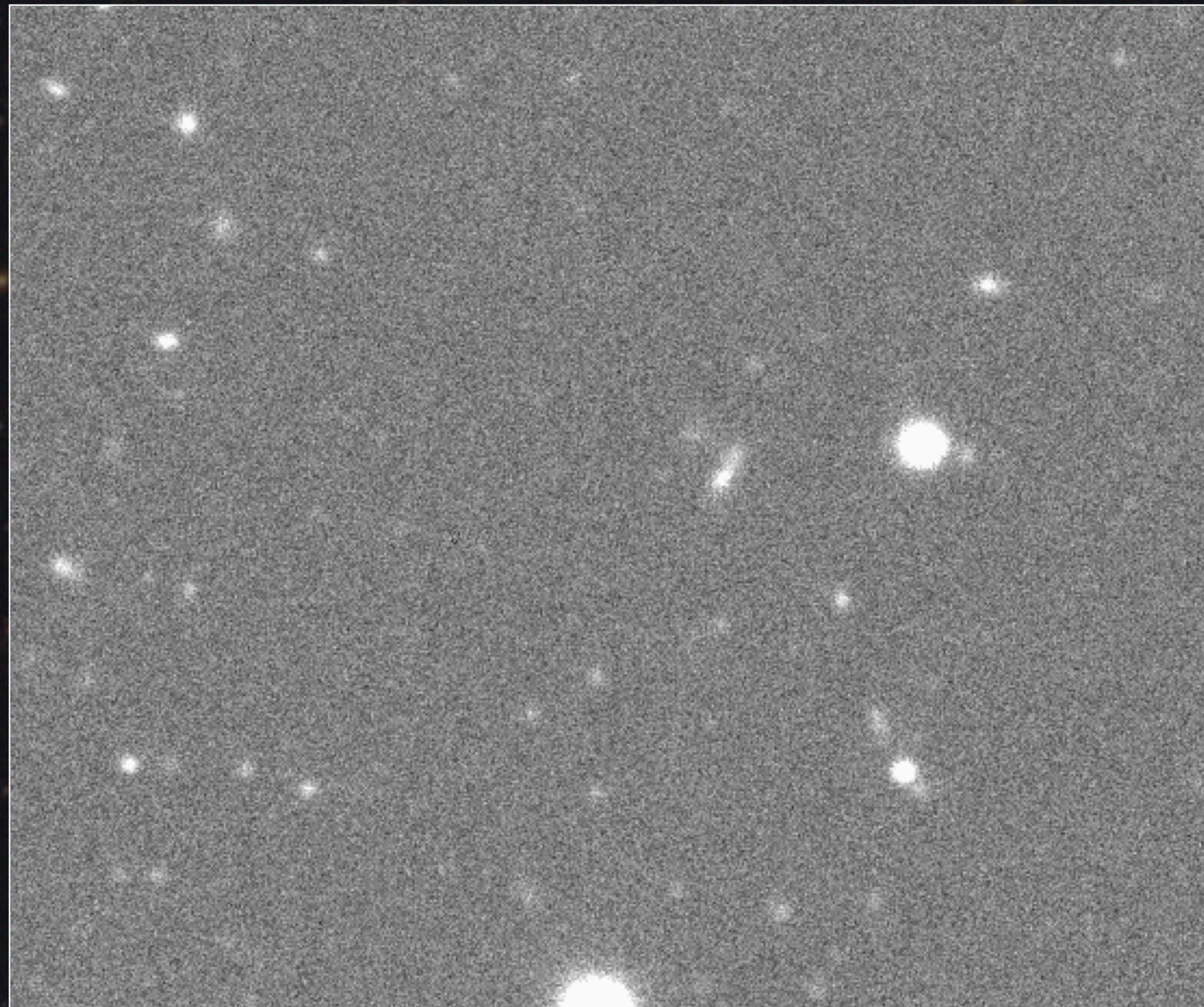


M. Pursiainen et al. 2018



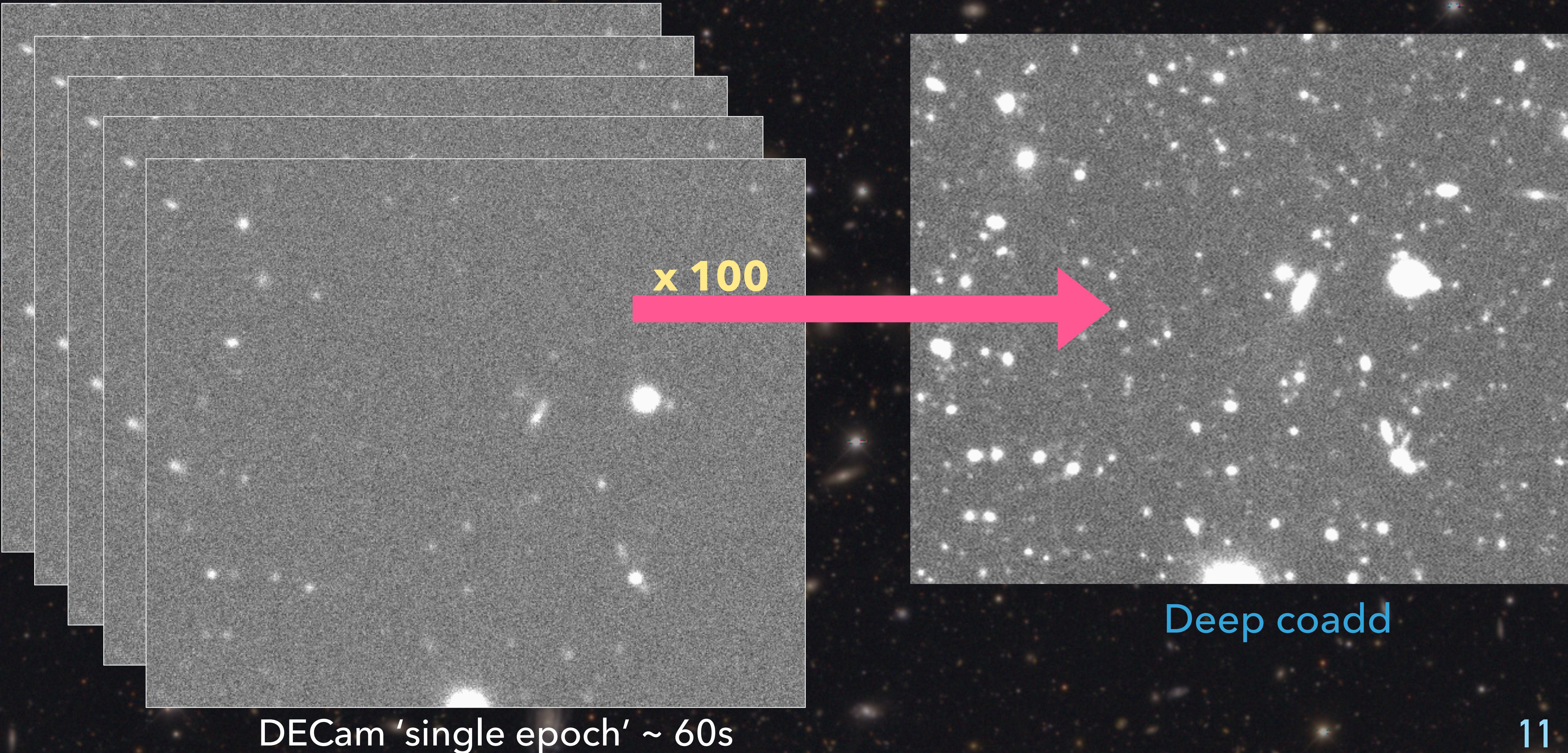
M. Smith et al. 2018

Deep Stacked Photometry

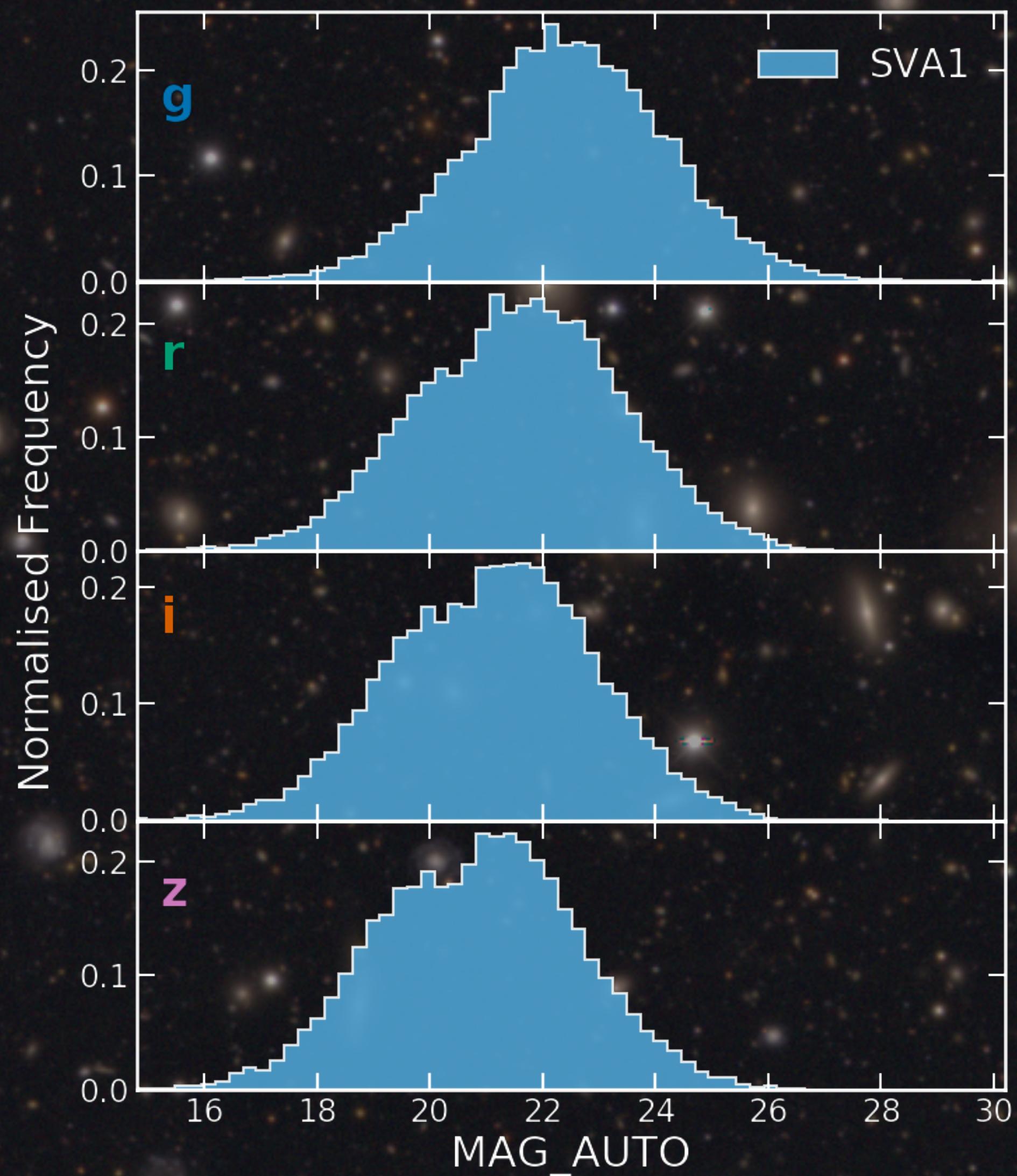


DECam 'single epoch' ~ 60s

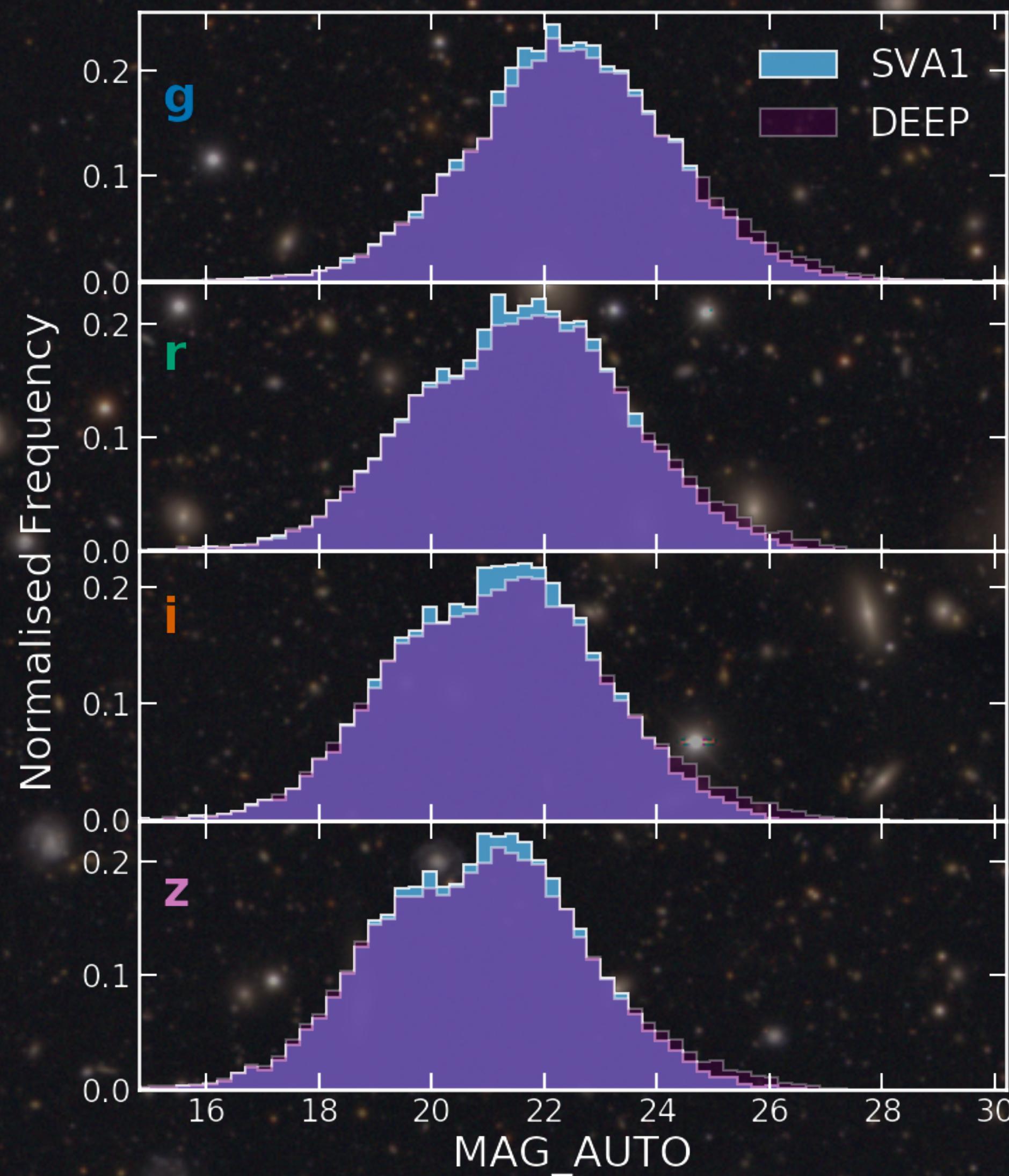
Deep Stacked Photometry



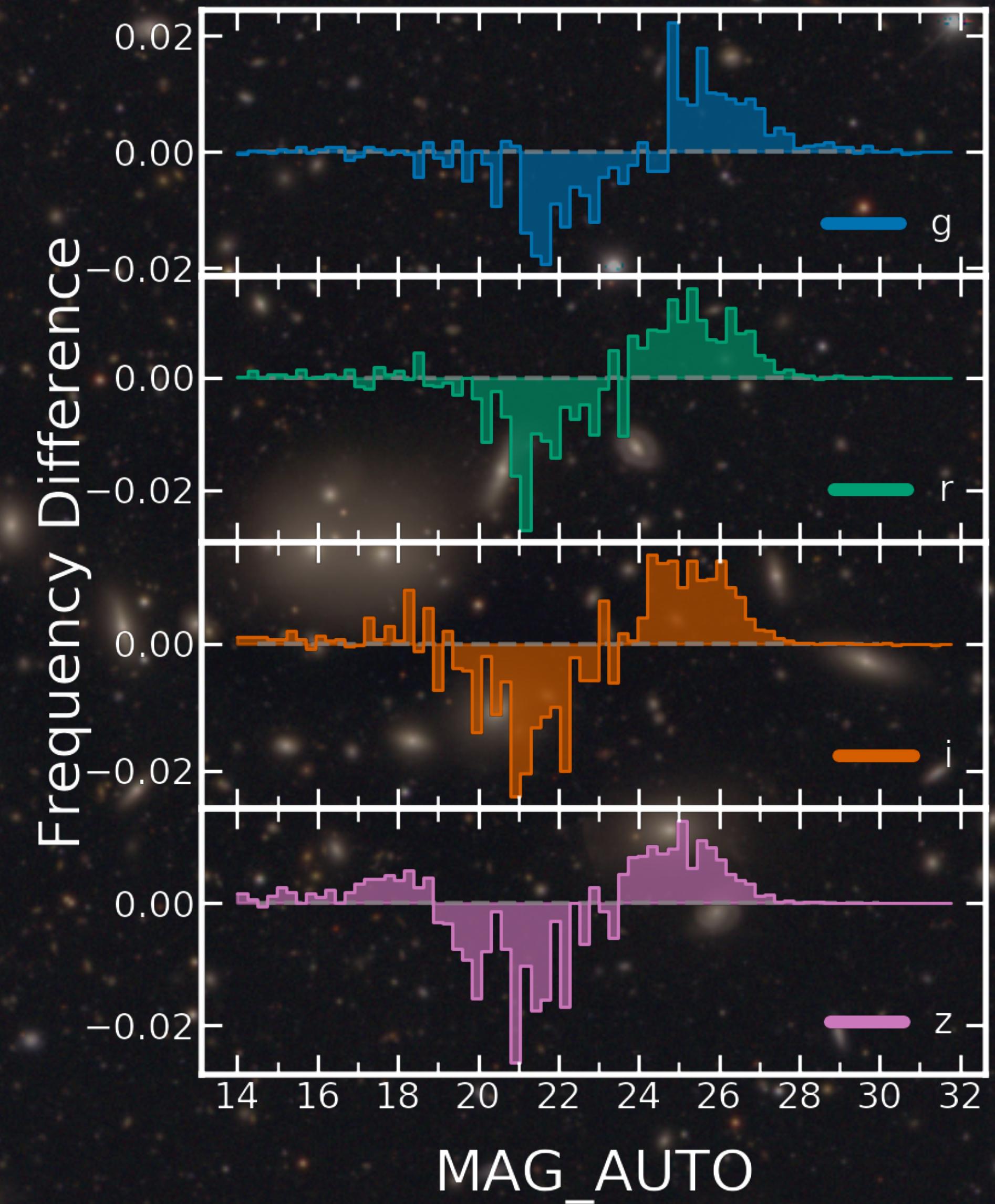
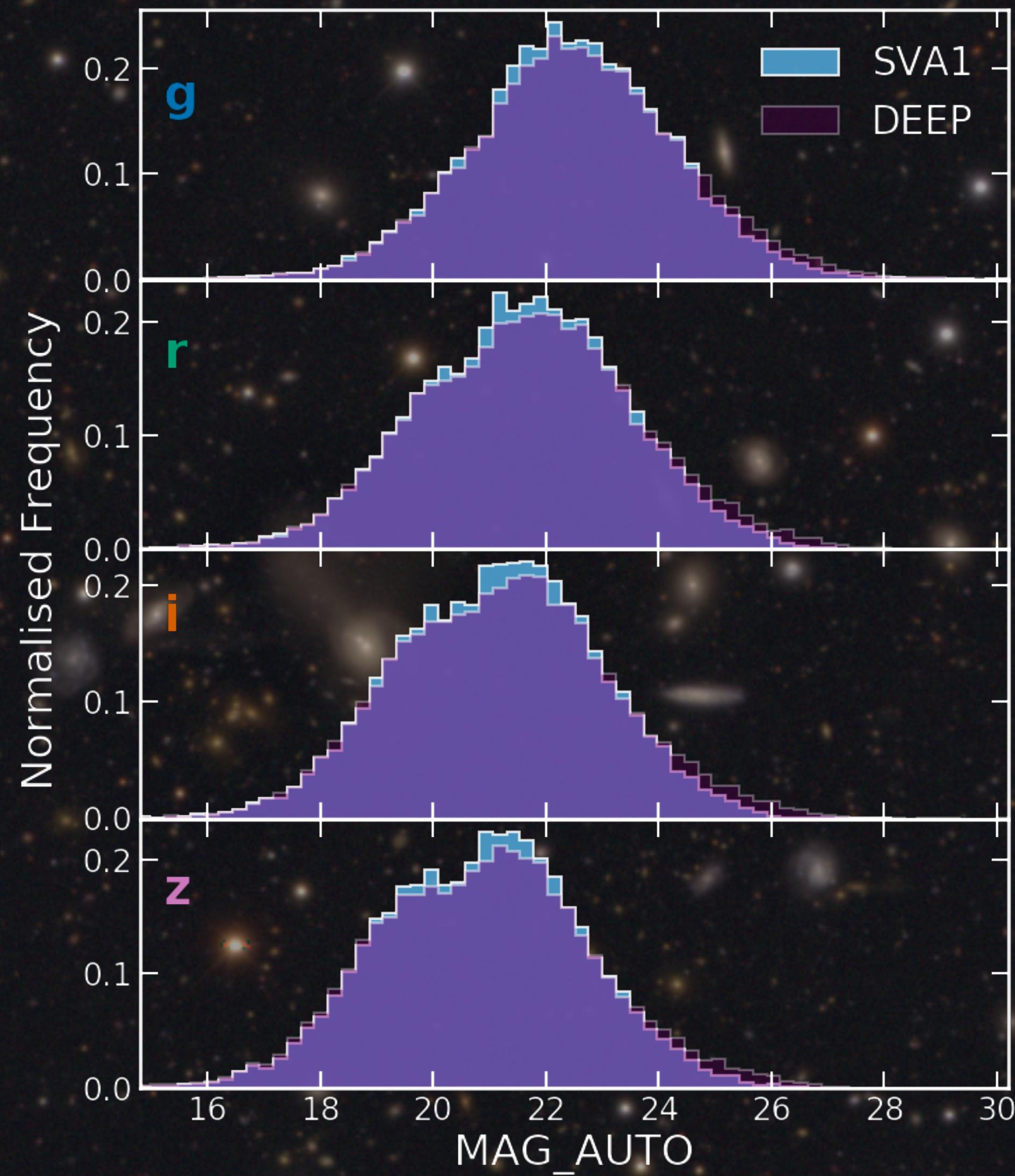
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Deep Stacked Photometry



Deep Stacked Photometry

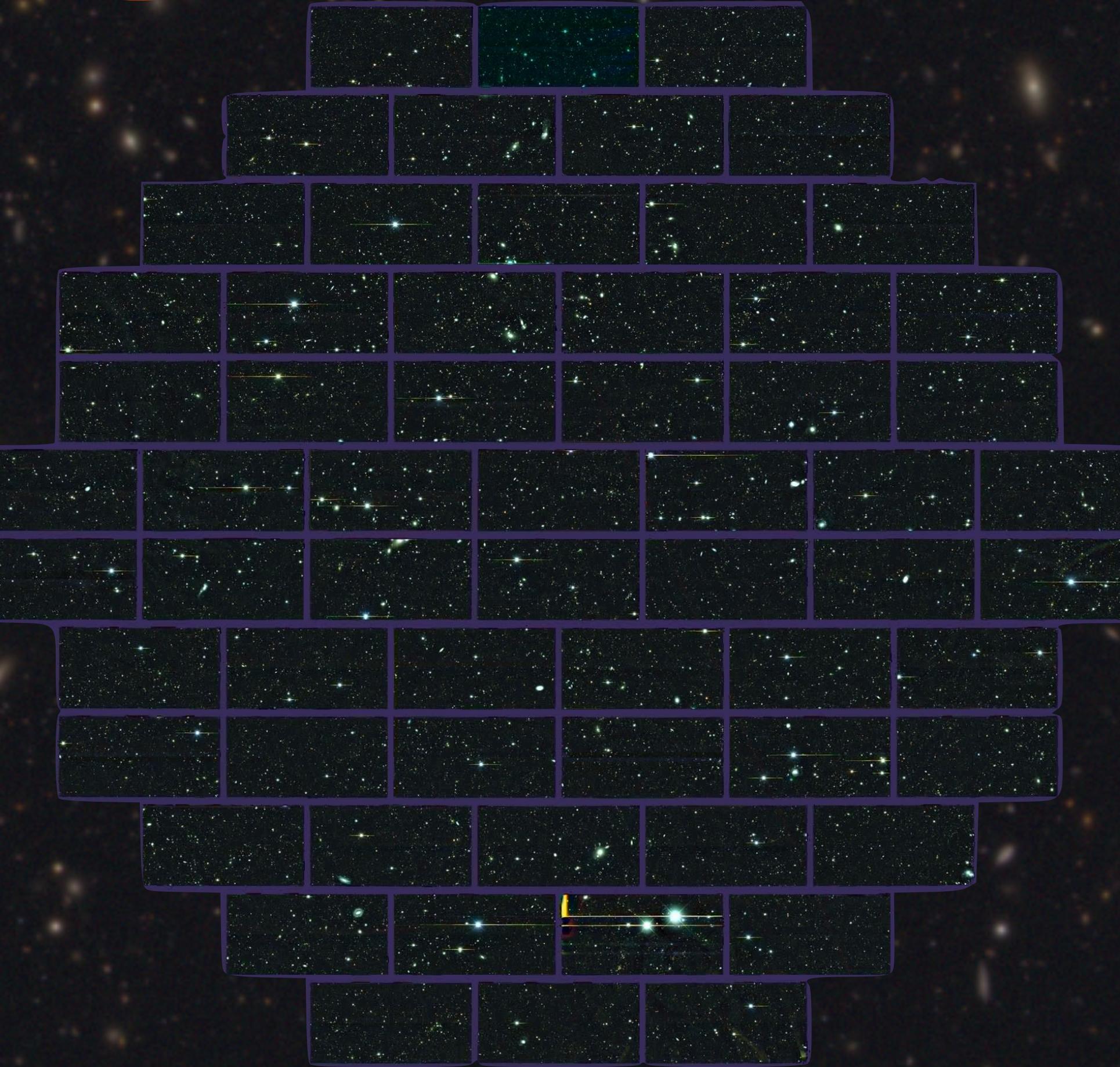


Deep Stacked Photometry

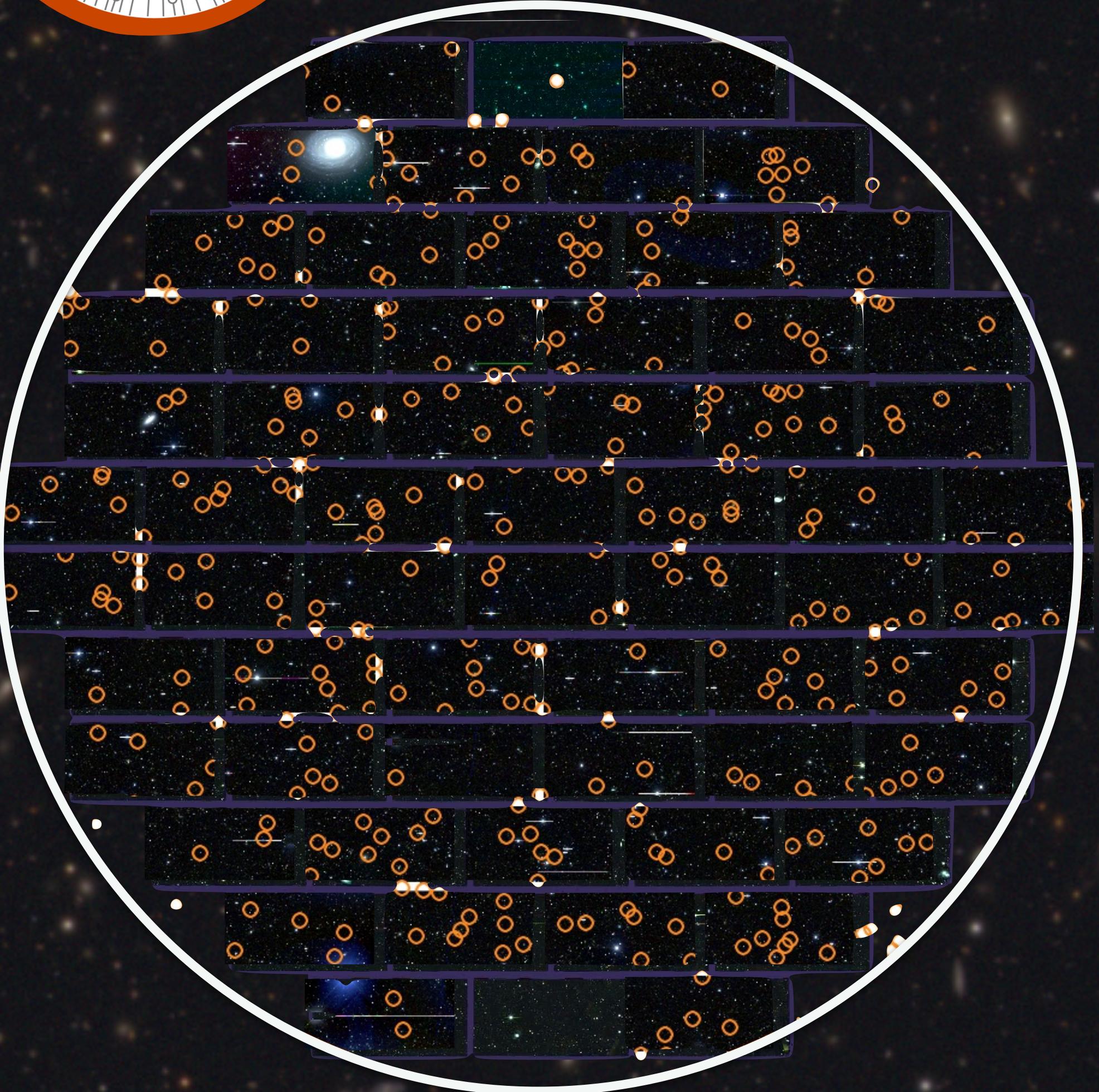
Allows us to calculate:

- Stellar masses (See talk by Mat Smith)
 - “prompt” and “tardy” la fractions
 - Rates
- (Star formation rates)
- Host misidentification
- Survey selection function
- Host luminosity/mass functions (la, CC, SLSN, RETs)
- Truly “remote” transients (Talk by Chris Frohmaier)

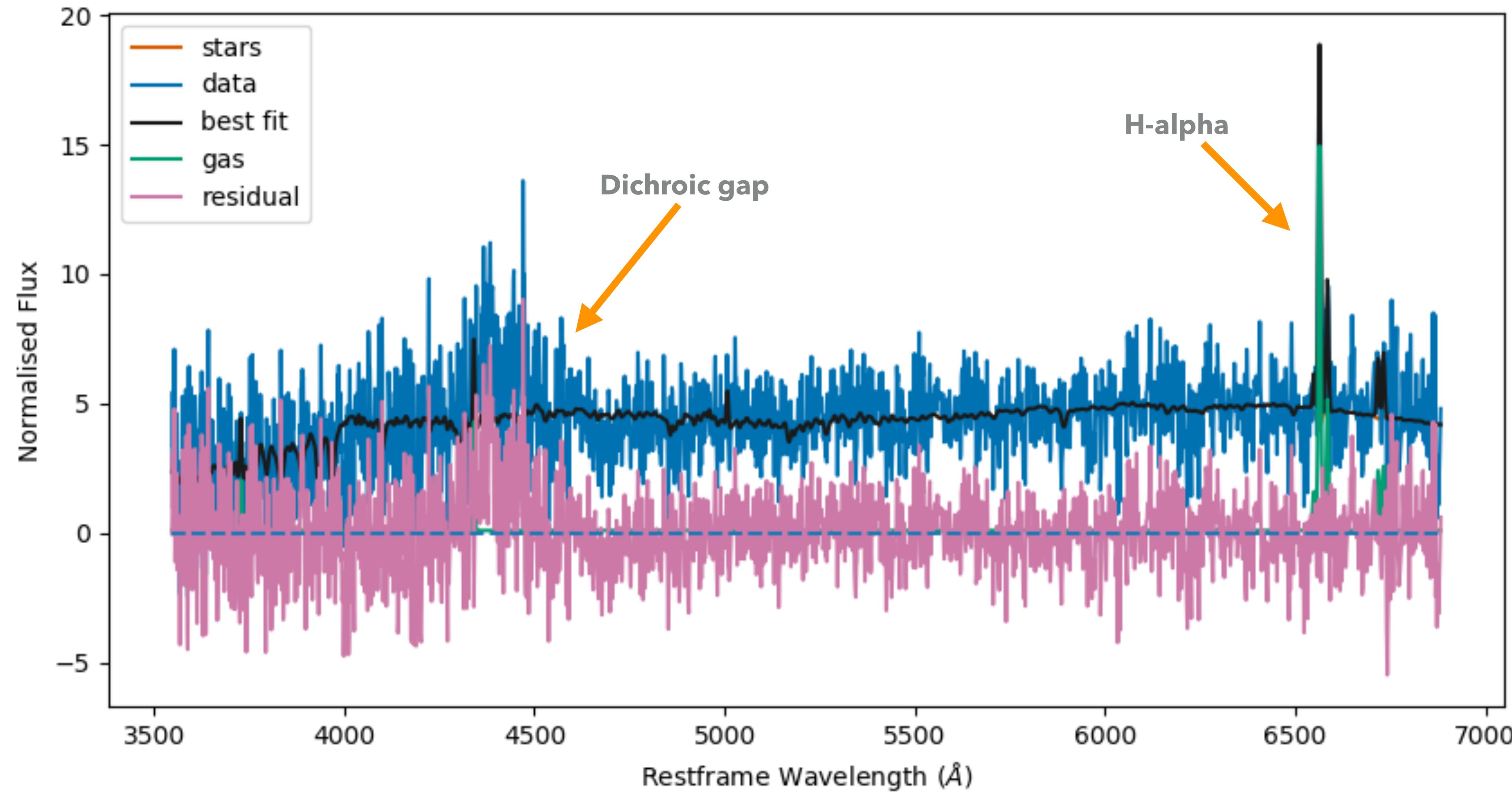
Fibre Spectroscopy



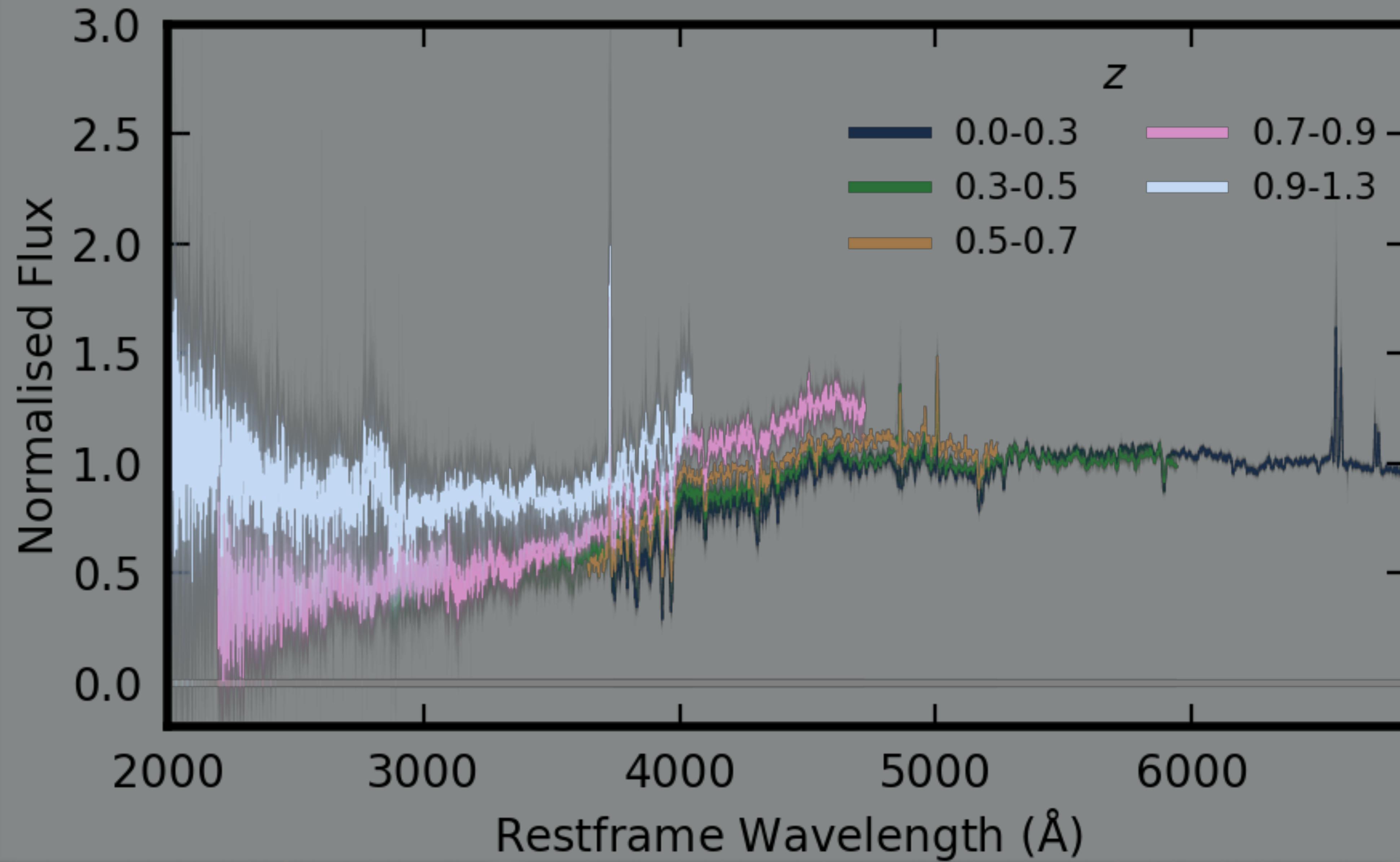
Fibre Spectroscopy



Fibre Spectroscopy



Fibre Spectroscopy **If in doubt... stack it up!**

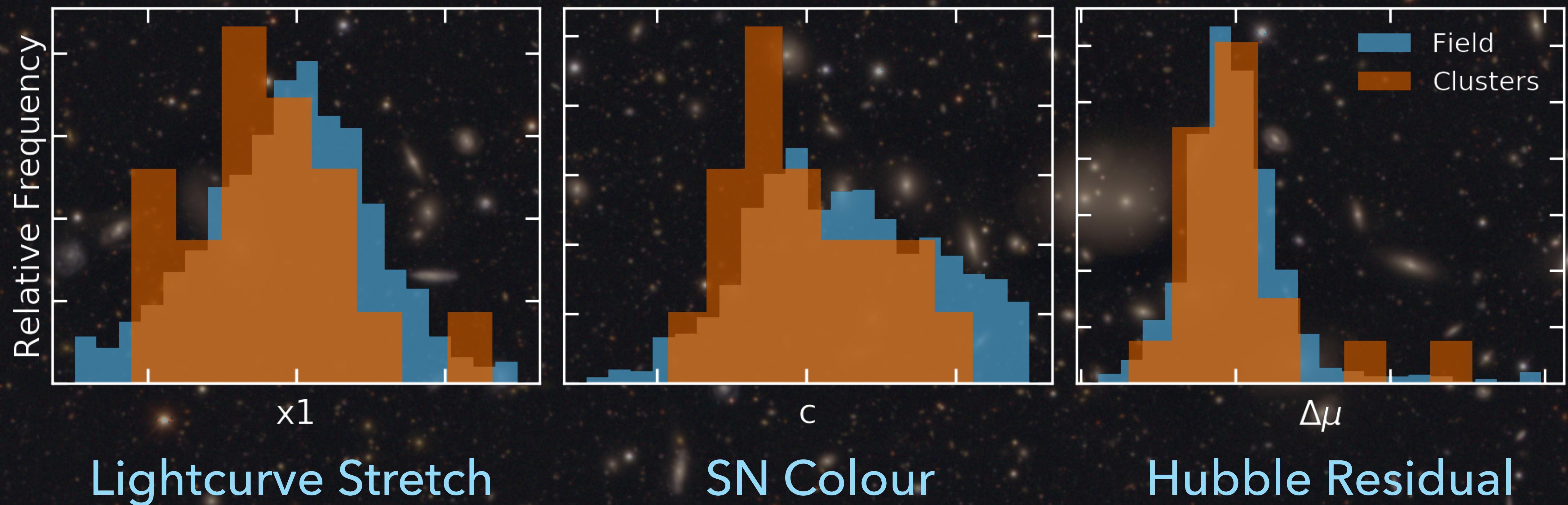


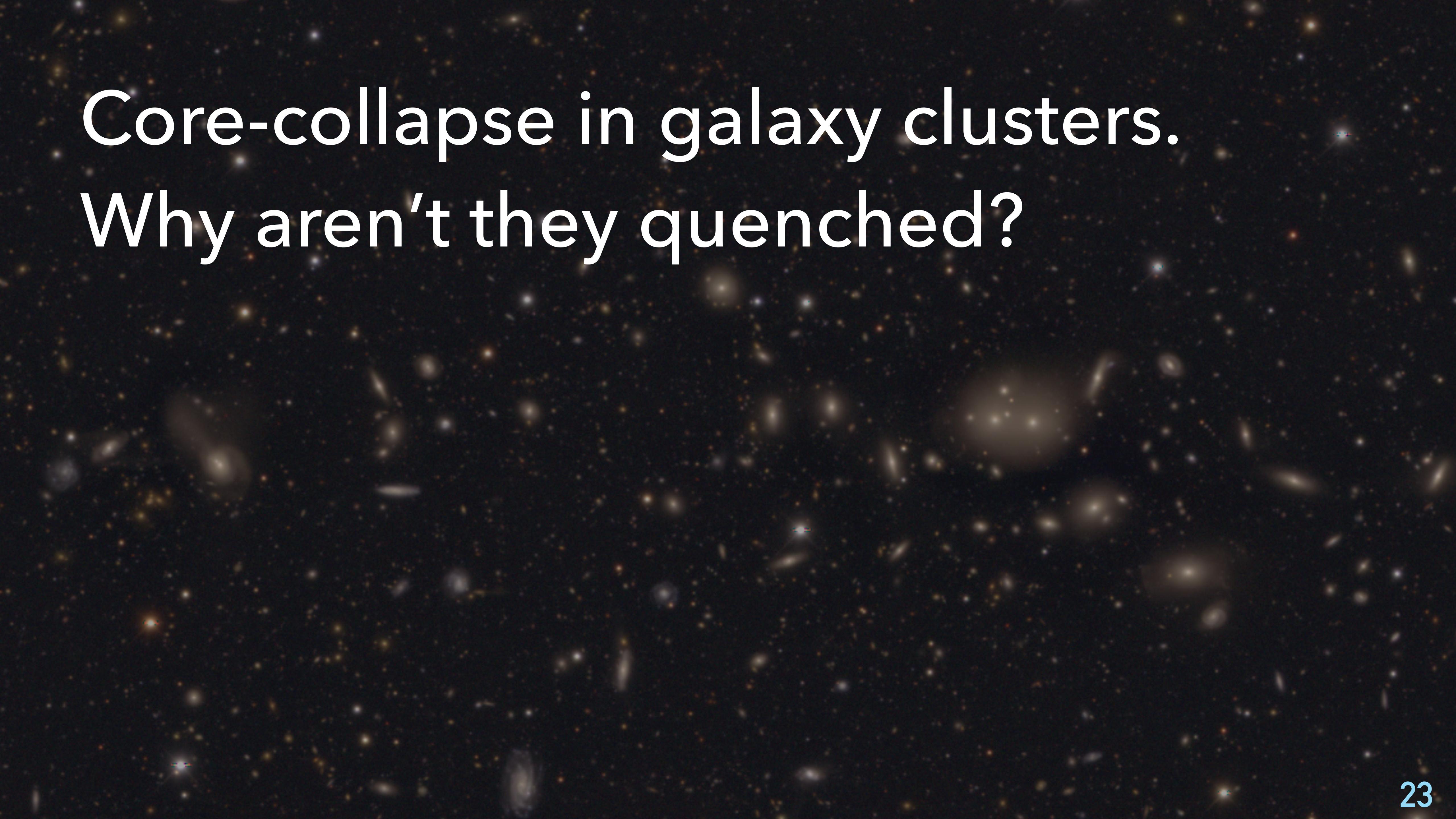
Fibre Spectroscopy

Results coming soon in Swann et al. and Wiseman et al.

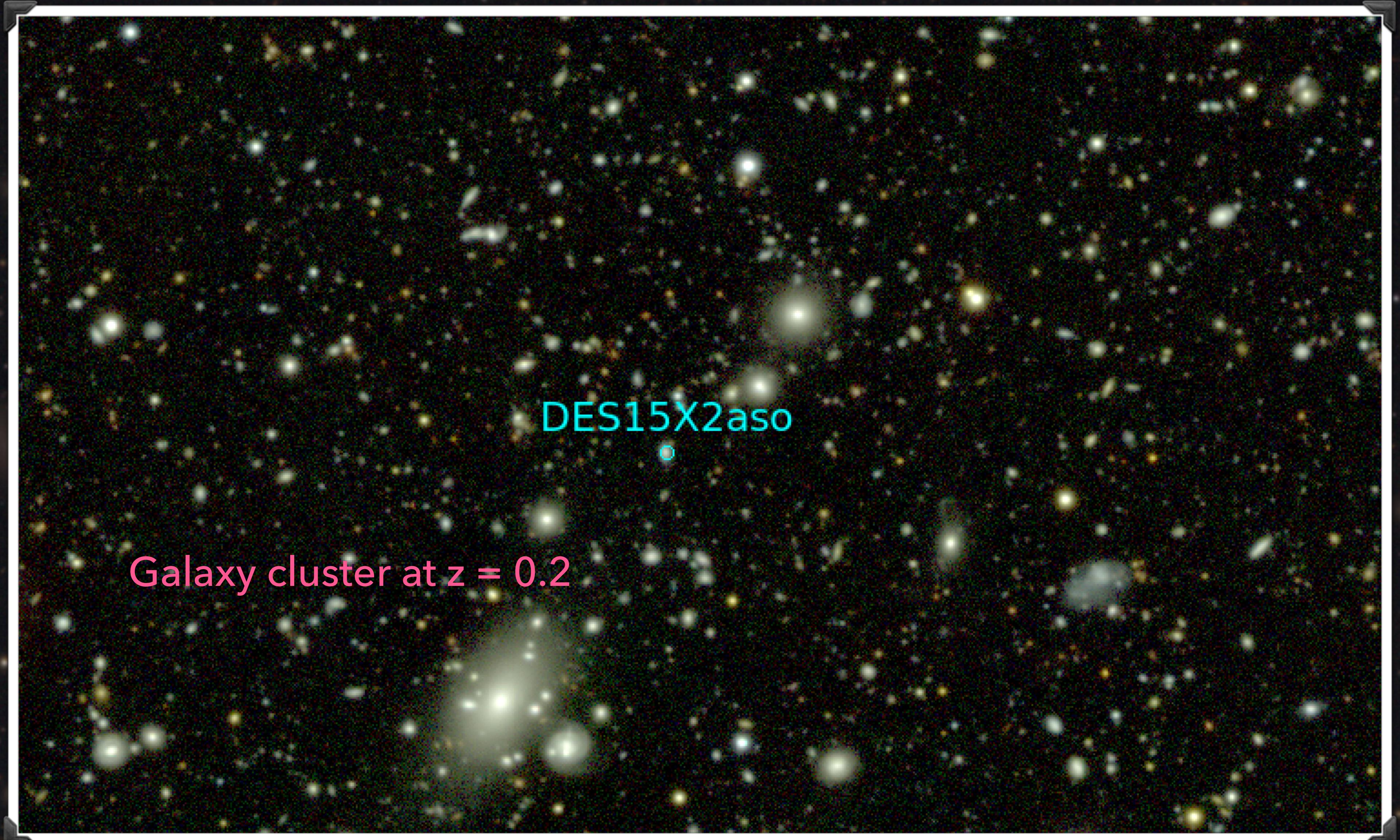
Supernovae hosted in Galaxy Clusters

SNe Ia in galaxy clusters - better standard candles?





Core-collapse in galaxy clusters.
Why aren't they quenched?



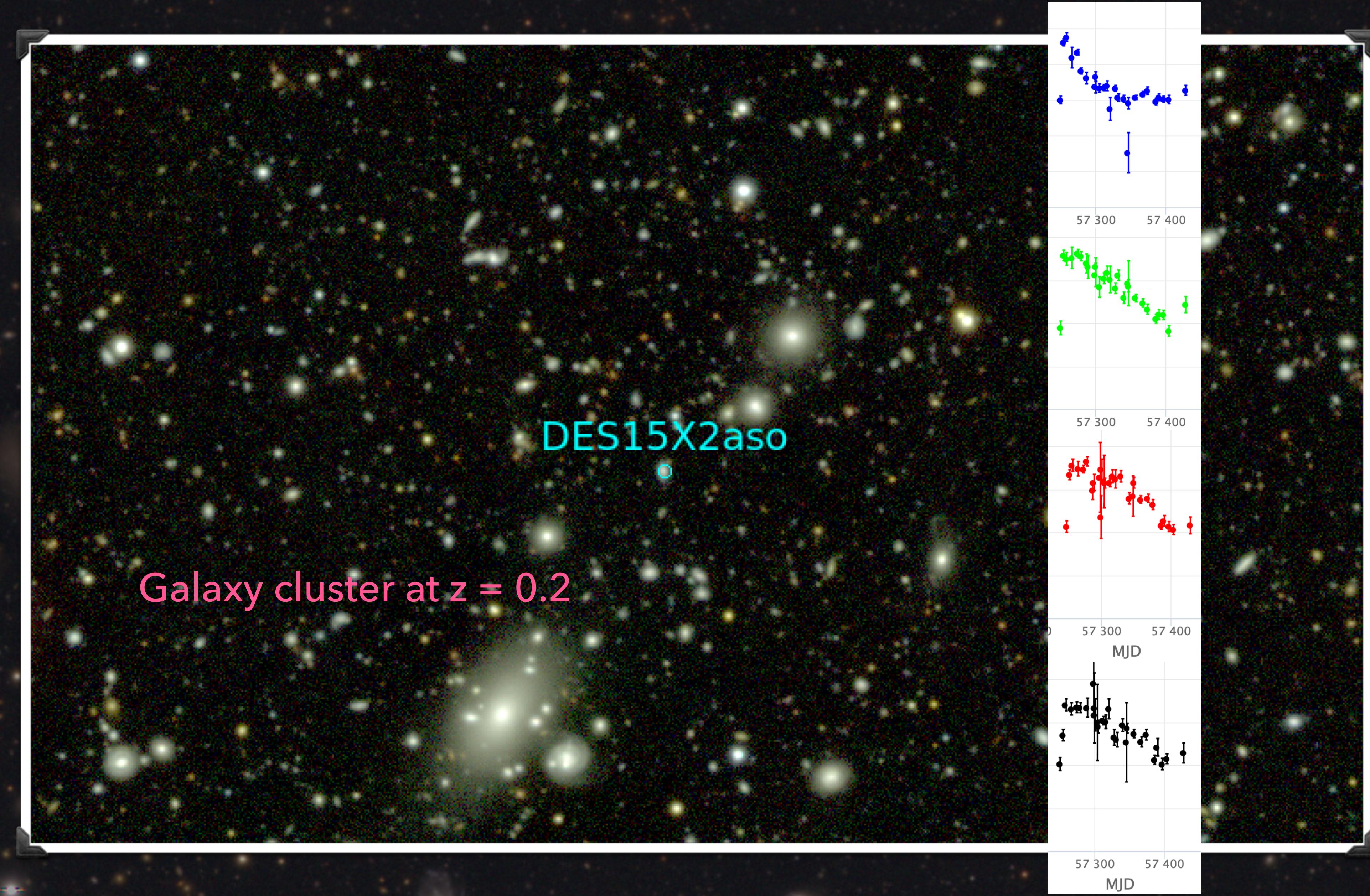
Galaxy cluster at $z = 0.2$

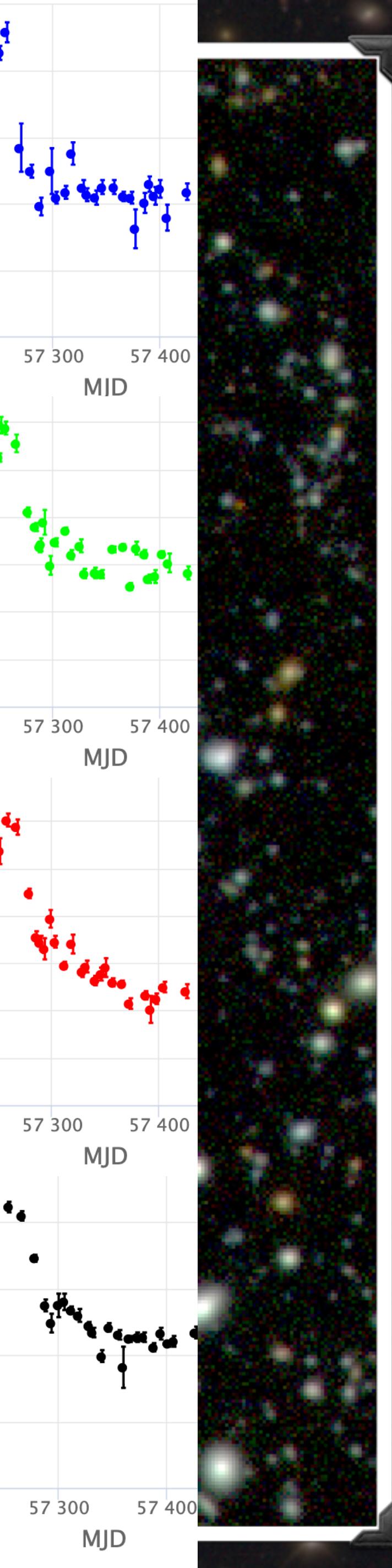
DES15X2aso



Galaxy cluster at $z = 0.2$

DES15X2aso





Take-to-the-pub Points



- DES deep field coadds reach mag 27
- We get the “true” host galaxy more often than shallower host photometry
- ★ Facilities SN host studies to high redshift
- OzDES fibre spectroscopy can be stacked to measure aggregate host properties - endless possibilities
- There are numerous DES SNe hosted in galaxy clusters
- ★ SNe Ia are lower stretch, bluer - consistent with passive hosts
- ★ At least 5 good CCSN candidates - can place limits on depletion/ stripping timescale