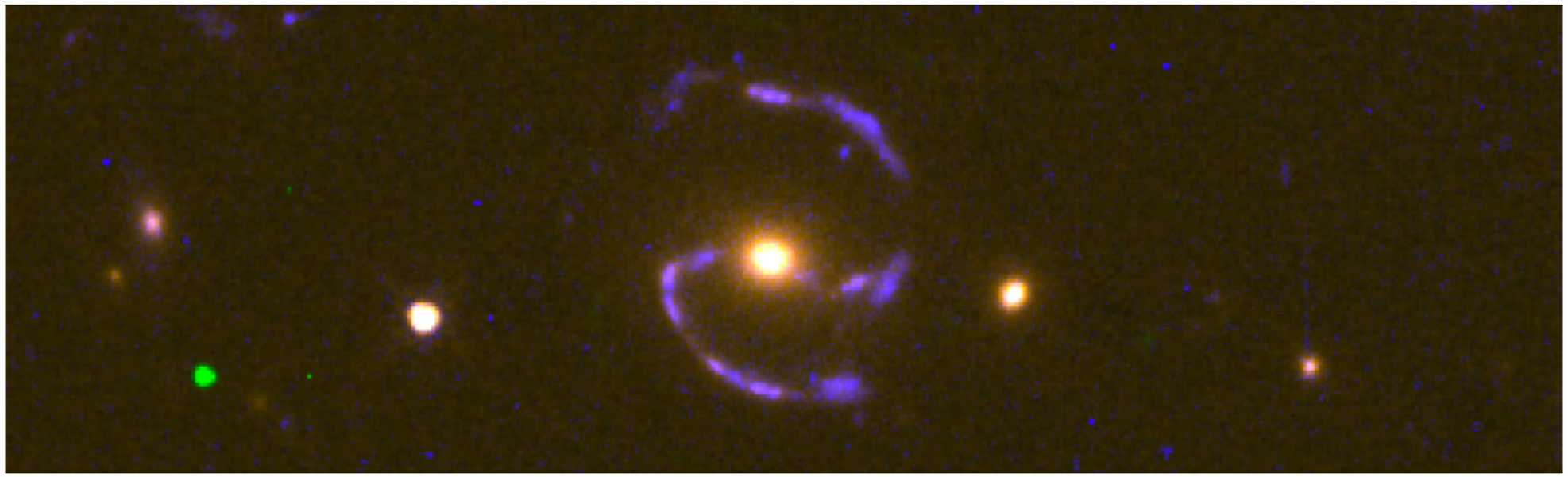
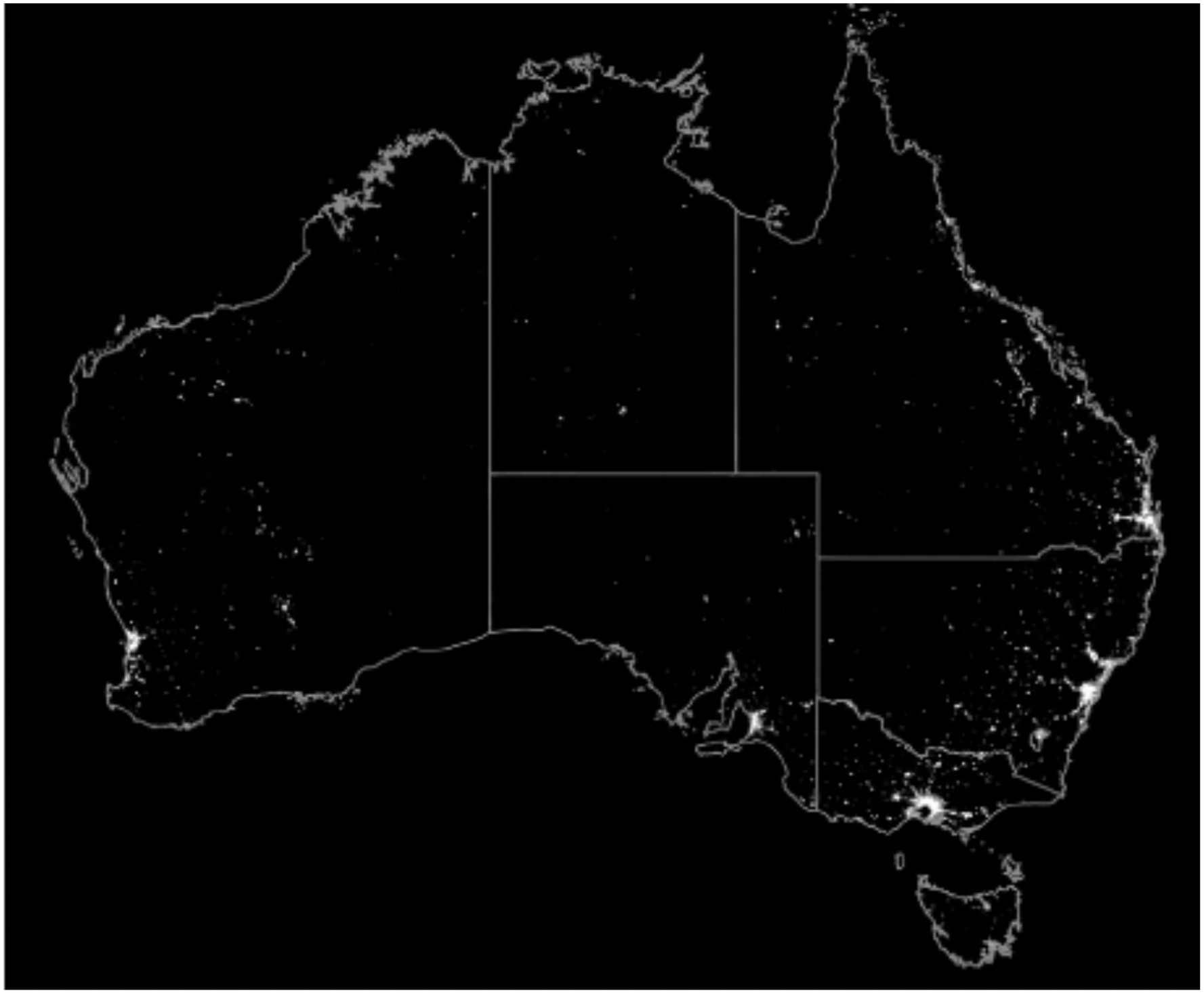
The AGEL Survey
Strong Gravitational Lenses in DES and DECaLS Fields



Kim-Vy Tran
University of
New South Wales

www.kimvytran.org

Why Gravitational Lensing



ASTRO 3D Centre of Excellence

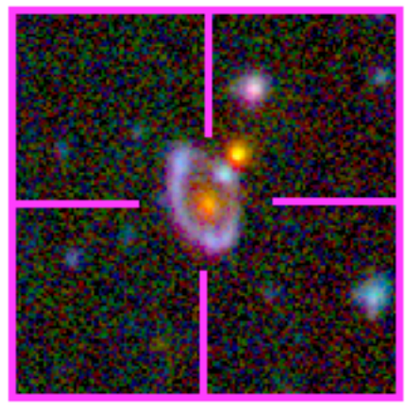
Australian Research Council Centre of Excellence for
All Sky Astrophysics in 3 Dimensions (ASTRO 3D)

Evolution of matter, chemical elements, and energy in the Universe from shortly after the Big Bang to the present day.

astro3d.org.au

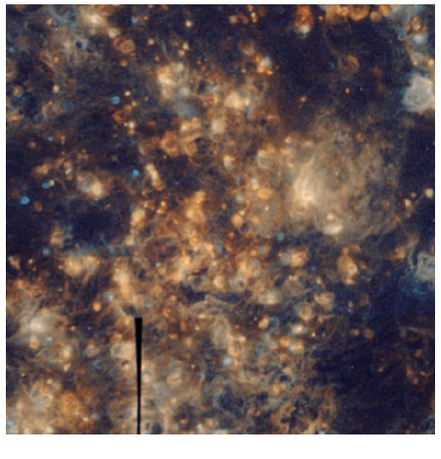
ASTRO 3D Galaxy Evolution

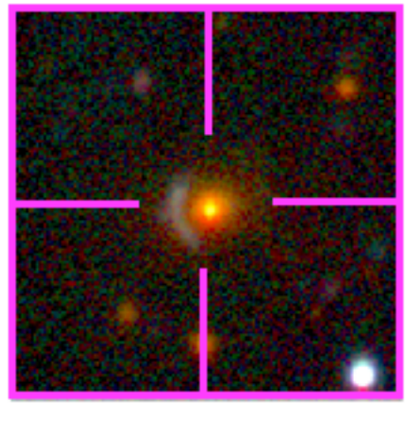
- How chemical elements accumulate in galaxies and their surroundings.
- How visible and dark matter assembles within galaxies
- How ionising radiation is produced and escapes galaxies
- *Connecting sub-parsec to kpc scale physics*



Ongoing Surveys

- DUVET — Fisher et al
- MAGPI — Foster, Mendel, Lagos, Wisnioski et al
- AGEL — Tran, Glazebrook et al
- MOSEL — Gupta, Tran et al
- K3-LARS — Wisnioski et al
- QXR-30 — Ryan-Weber et al





ASTRO 3D Galaxy Evolution

ASTRO 3D Galaxy Evolution with Lenses (AGEL)

- ISM & outflows of background sources
- UV emission line diagnostics of sources
- CGM of foreground lensing galaxies
- Dark matter profiles of lensing galaxies

- Observations
- Keck & VLT spectroscopic follow-up totals 200+ hours
- Hubble Space Telescope 150 orbits
- Wealth of data already in hand (spectroscopy, imaging)

64108

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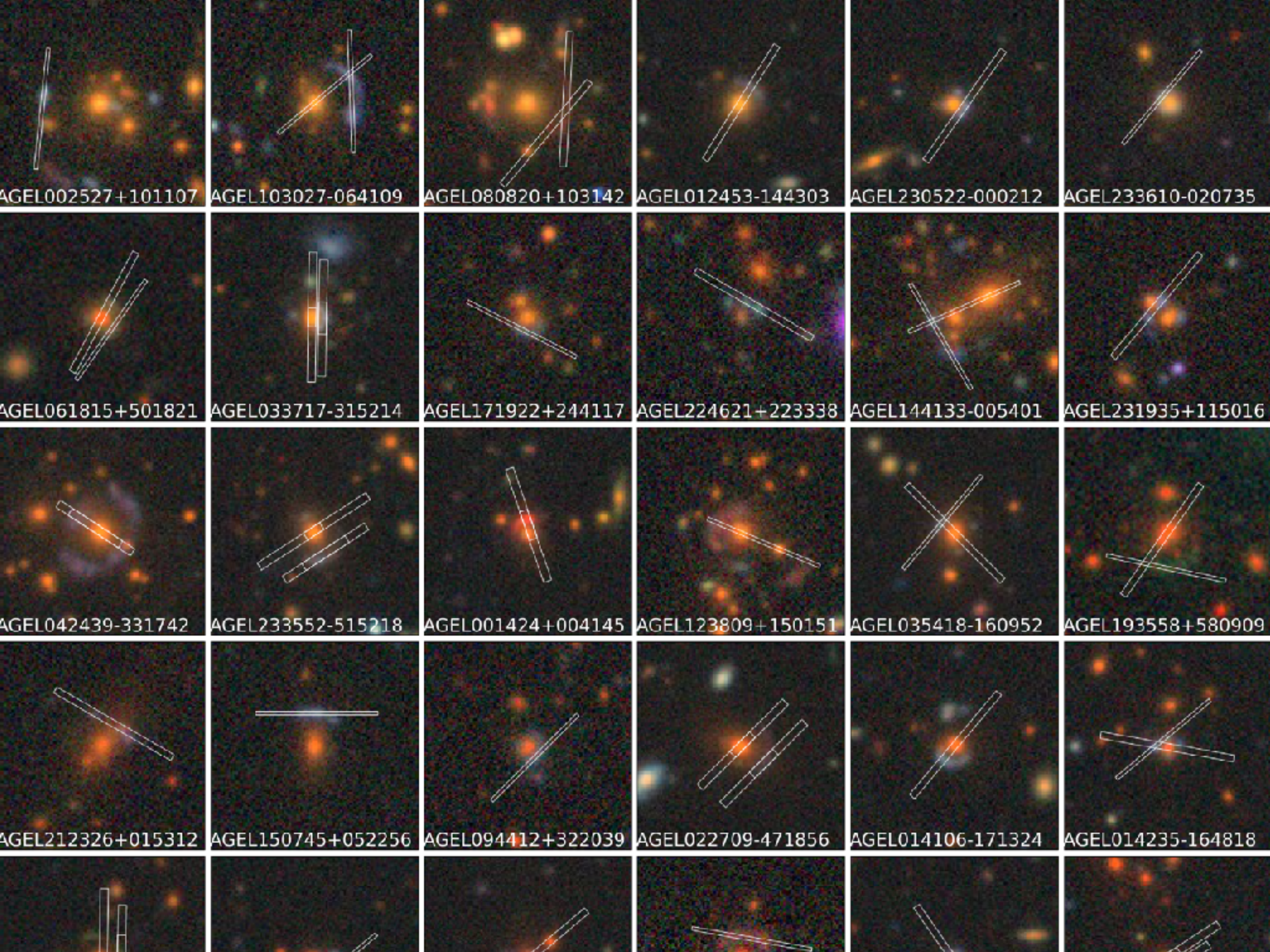
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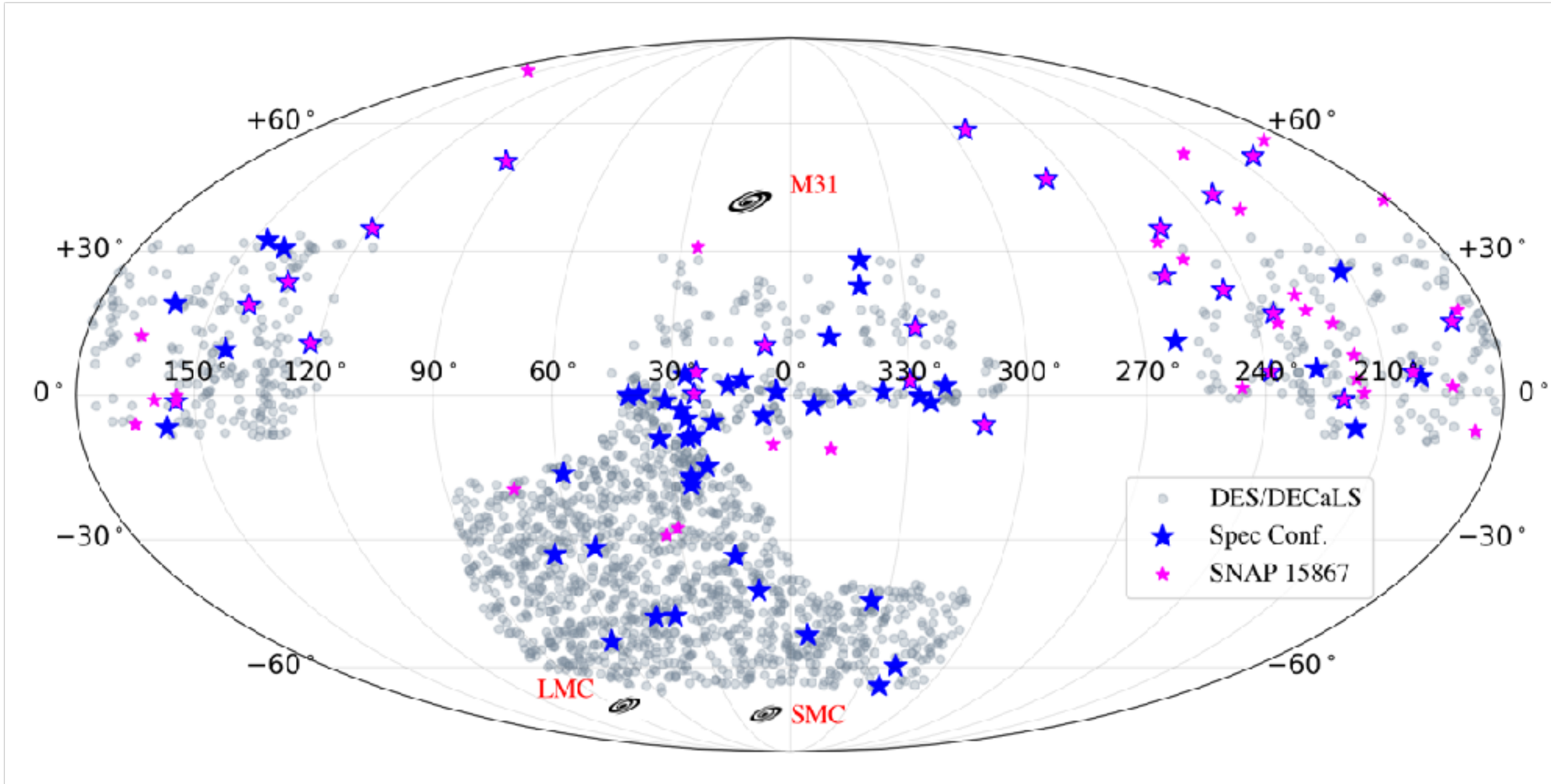
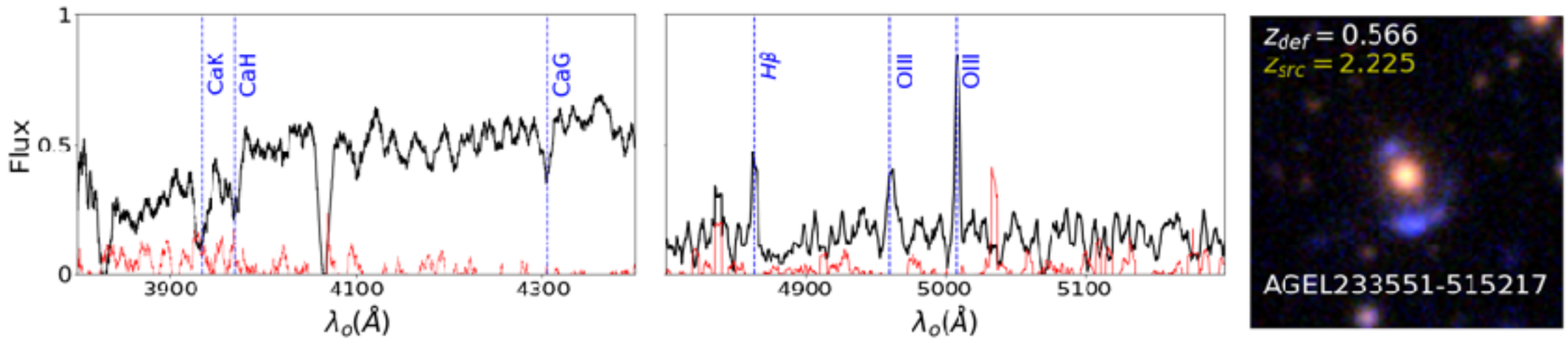
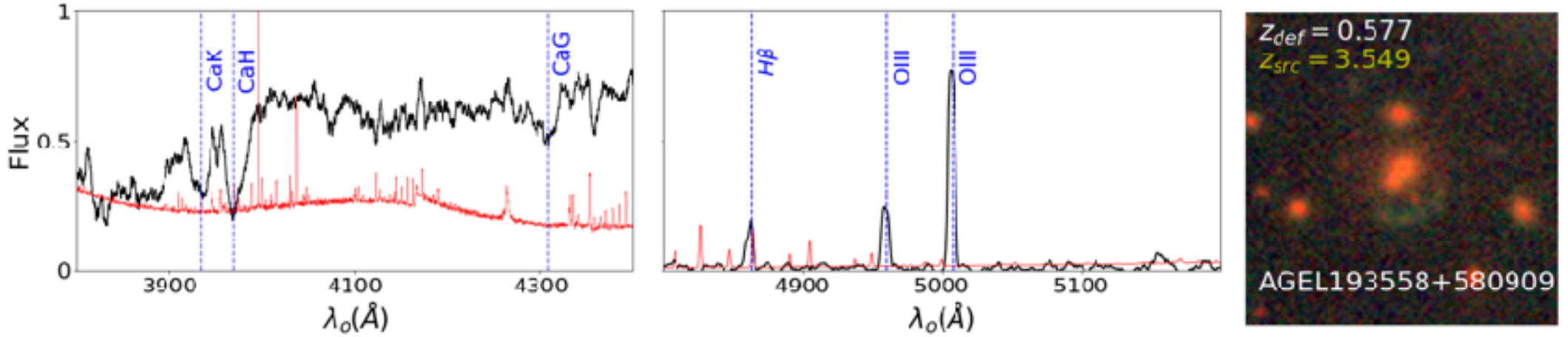
AGEL Survey

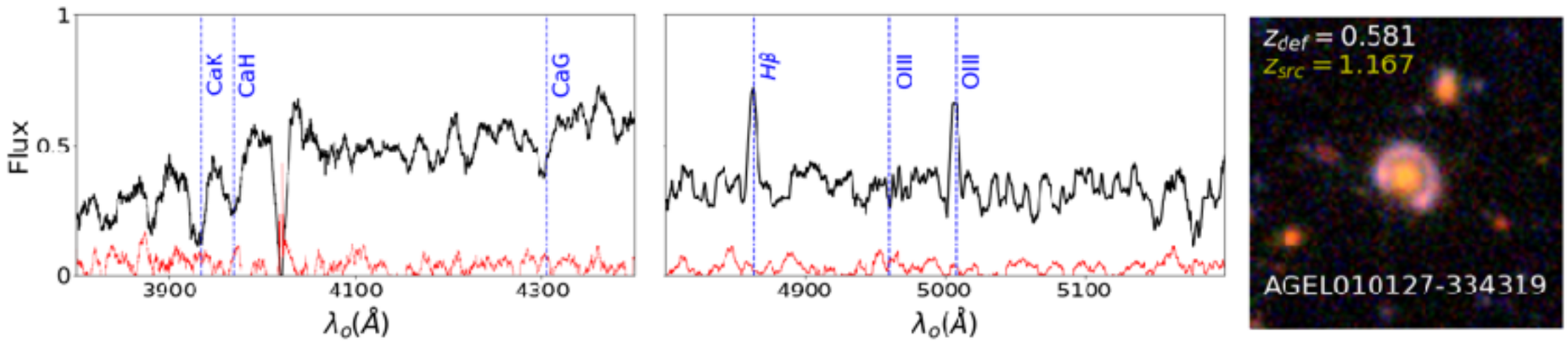


Tran+2022

AGEL Survey

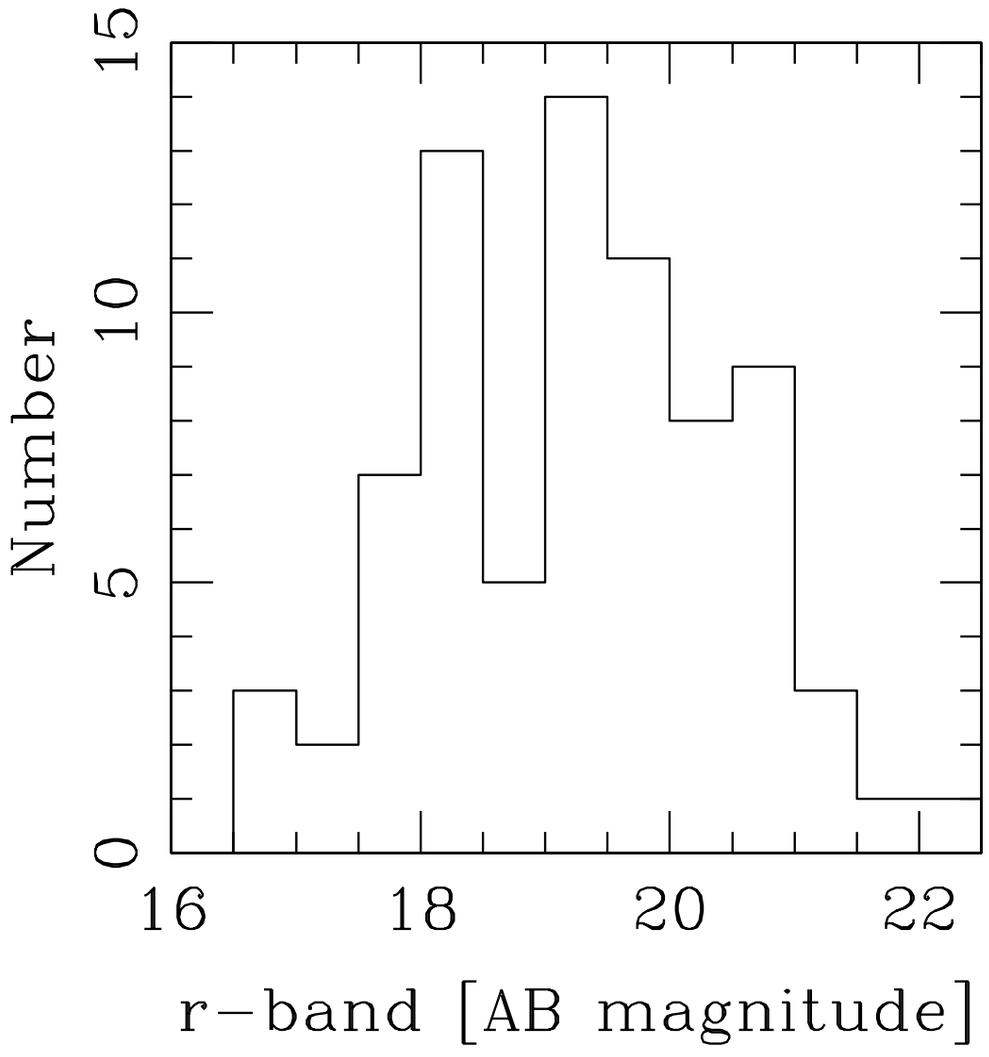


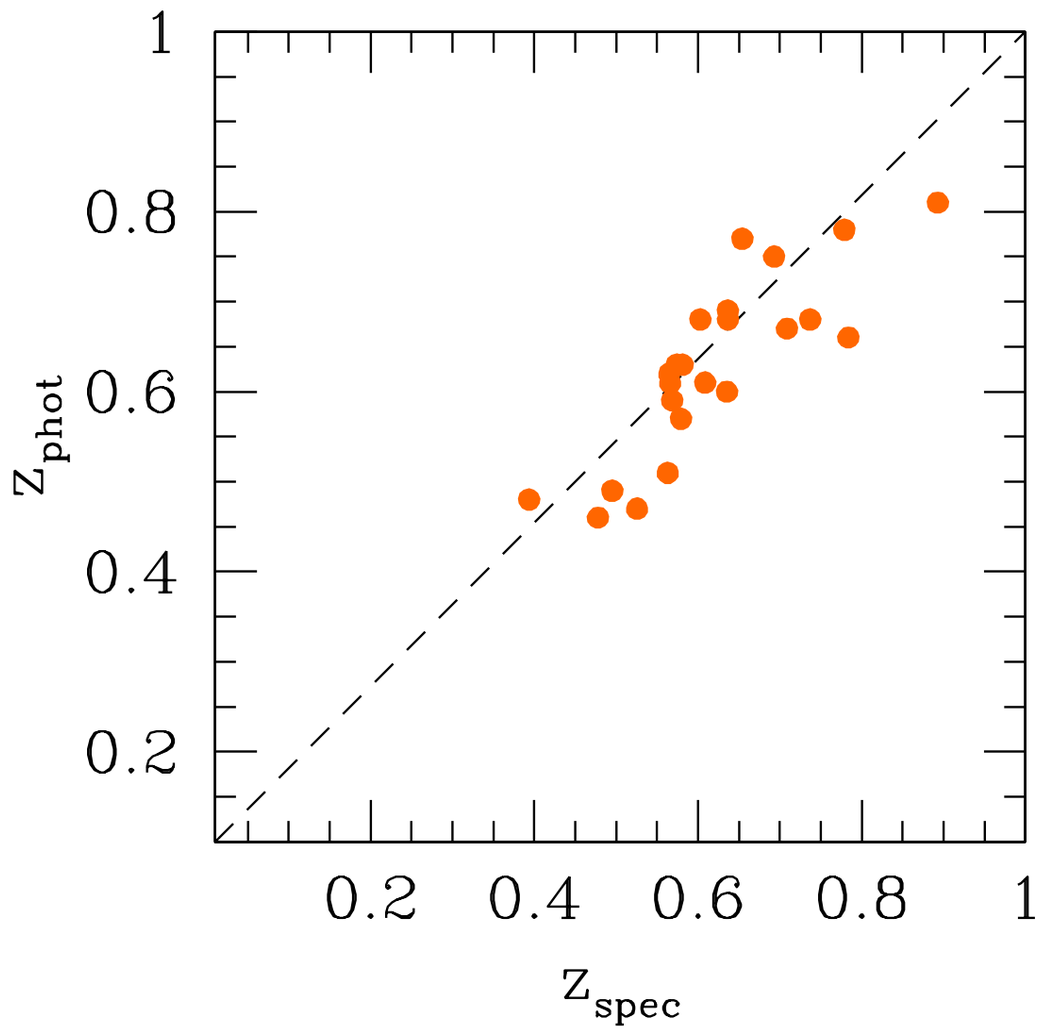




Tran+2022

AGEL Survey





Tran+2022

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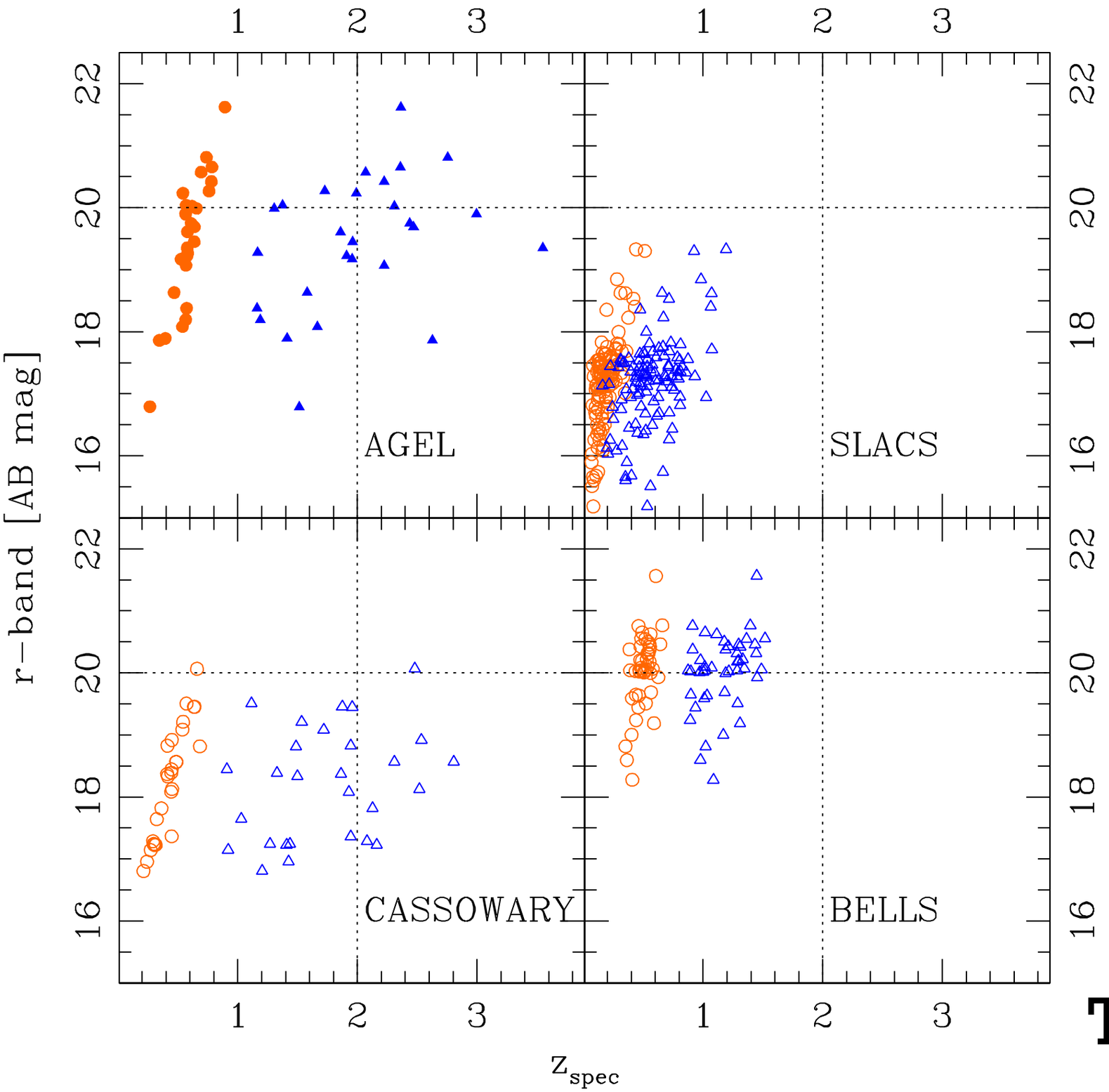

Tran+2022

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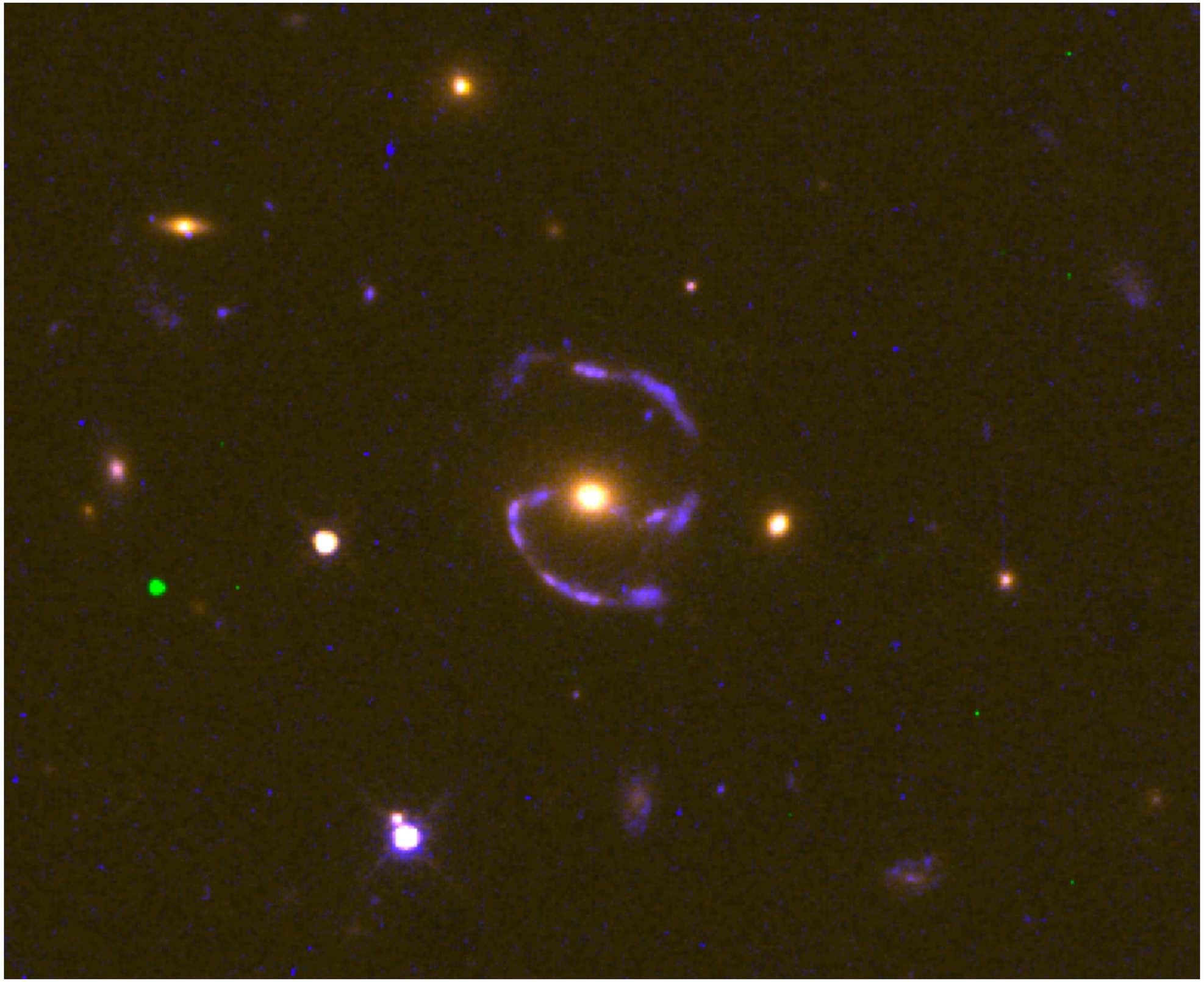
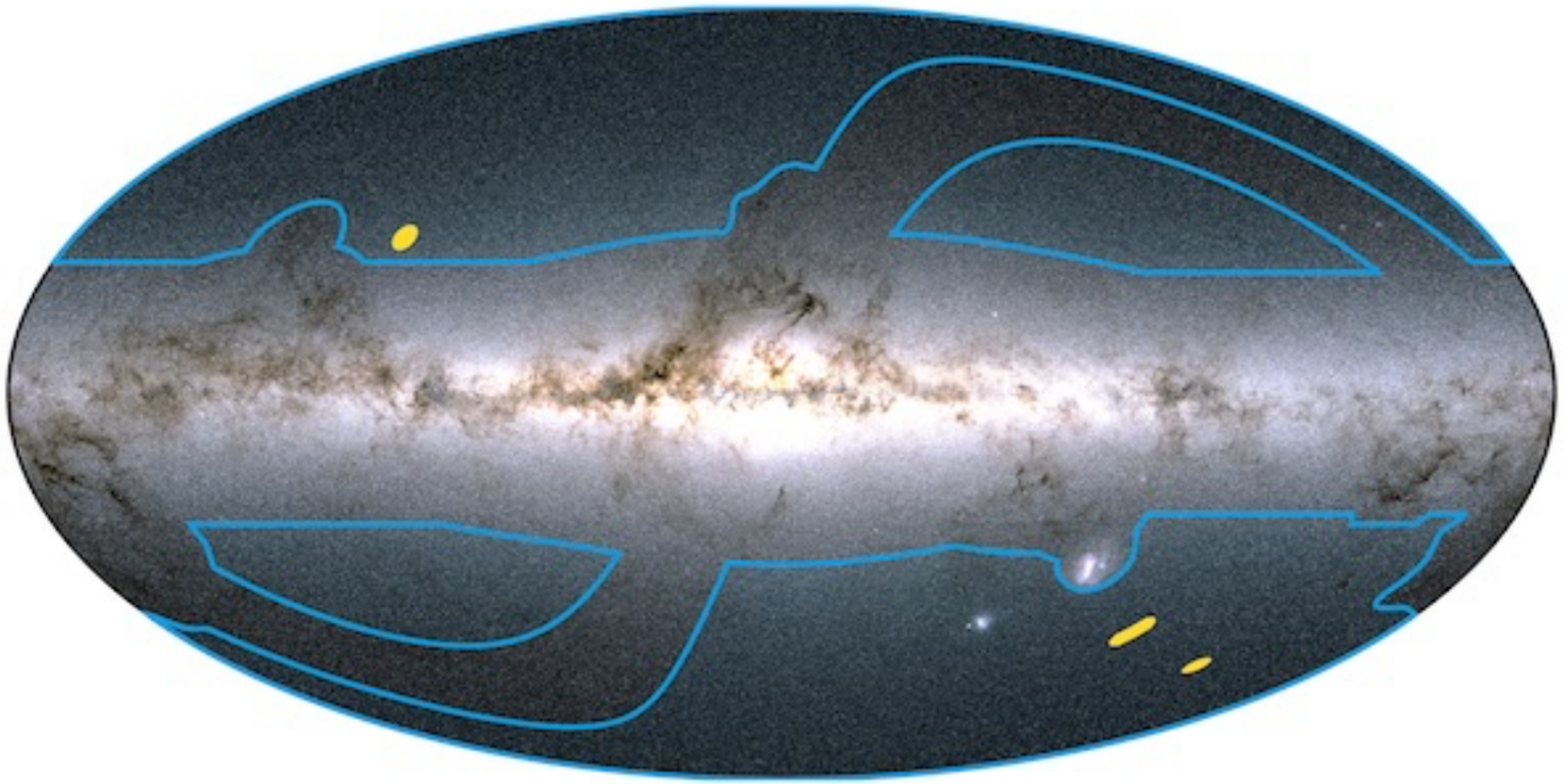


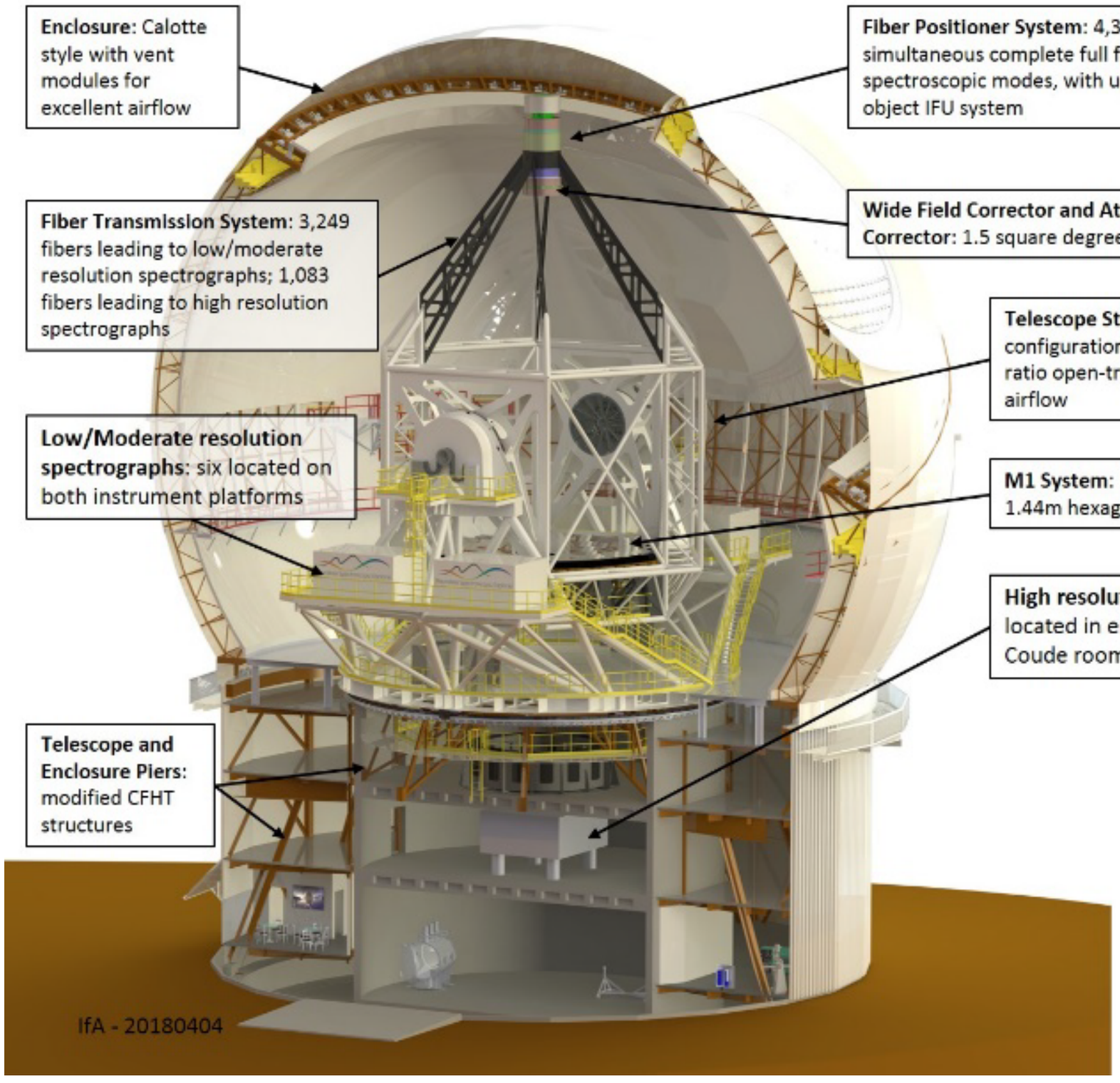
Multi-Object Spectroscopy

Preparing for EUCLID:

1) High multi-plexing factor (hundreds/thousands)
2) Wavelength coverage
3) Spatial resolution
4) Multi-wavelength community datasets



Maunakea Spectroscopic Explorer



Szeto+2020

SPIE Proceedings

Facilities

Mayall/DESI

WHT/WEAVE

VISTA/4MOST

VLT/MOONS

Subaru/PFS

Subaru/FMOS

MSE

Sky Transimission

0 0.2 0.4 0.6 0.8 1

u g r i z Y J H

Redshift

0 1 2 3 4

Lya

UV Absorption

OII

G-band

Hb

OIII

Mg

Na

Ha

Optical redshift desert

Cosmic Noon

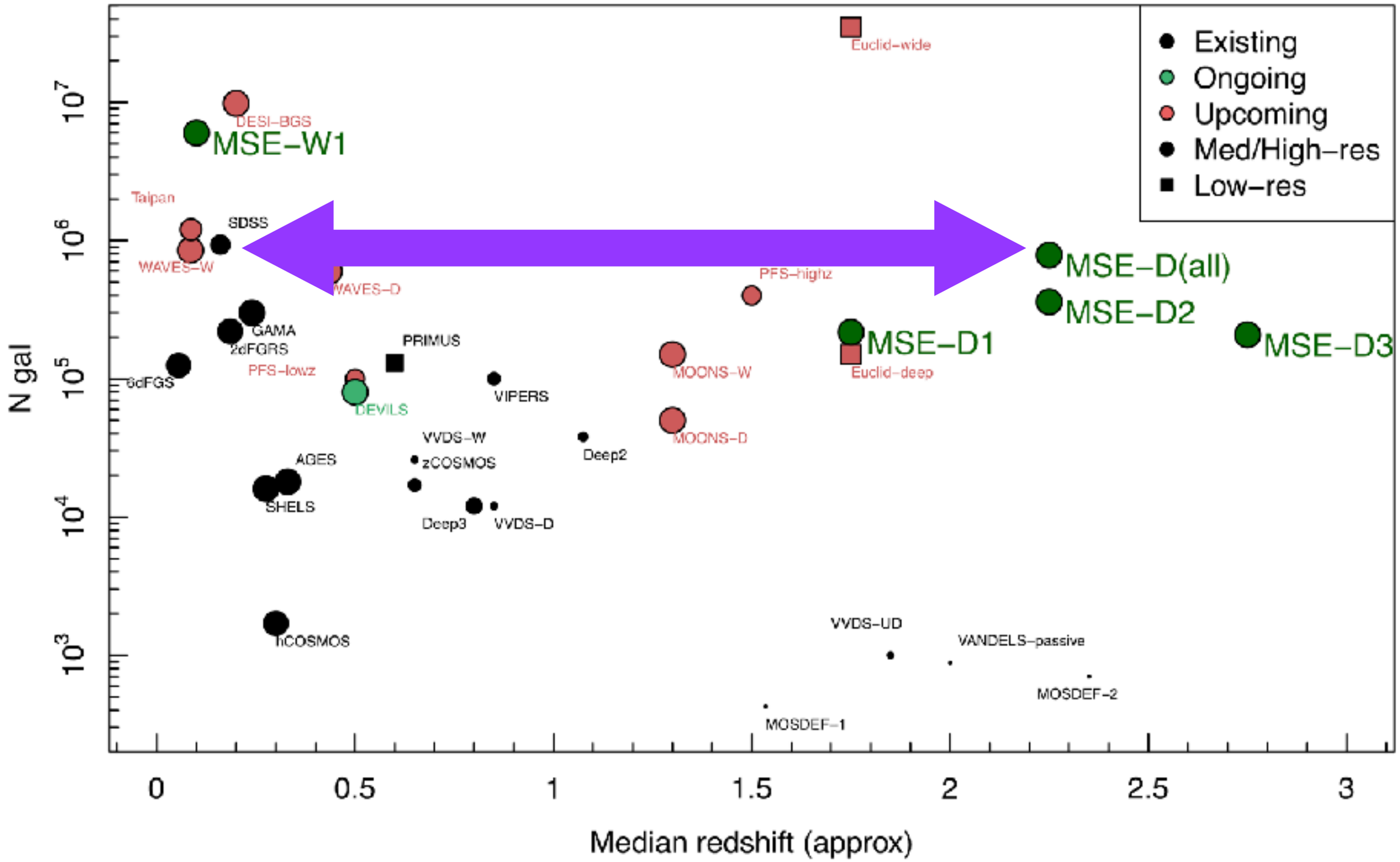
0 500 1000 1500

Wavelength / nm

Travel Time / Gyrs

0 3 5 7 8 9 10 11 12

Maunakea Spectroscopic Explorer



Thanks for listening!