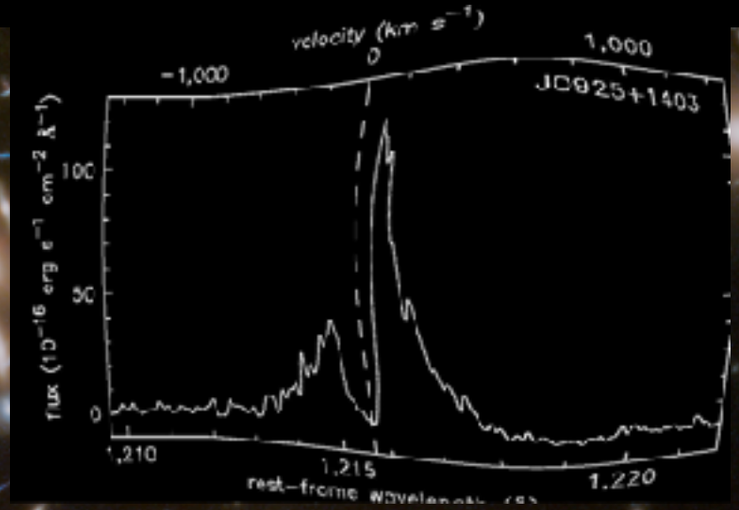
CENTRE DE RECHERCHE ASTROPHYSIQUE DE LYON

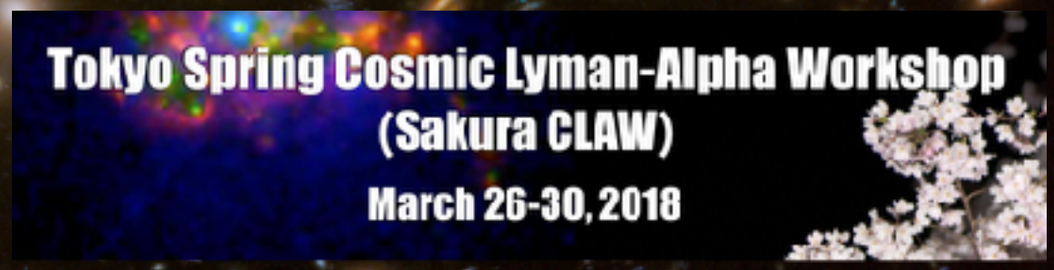


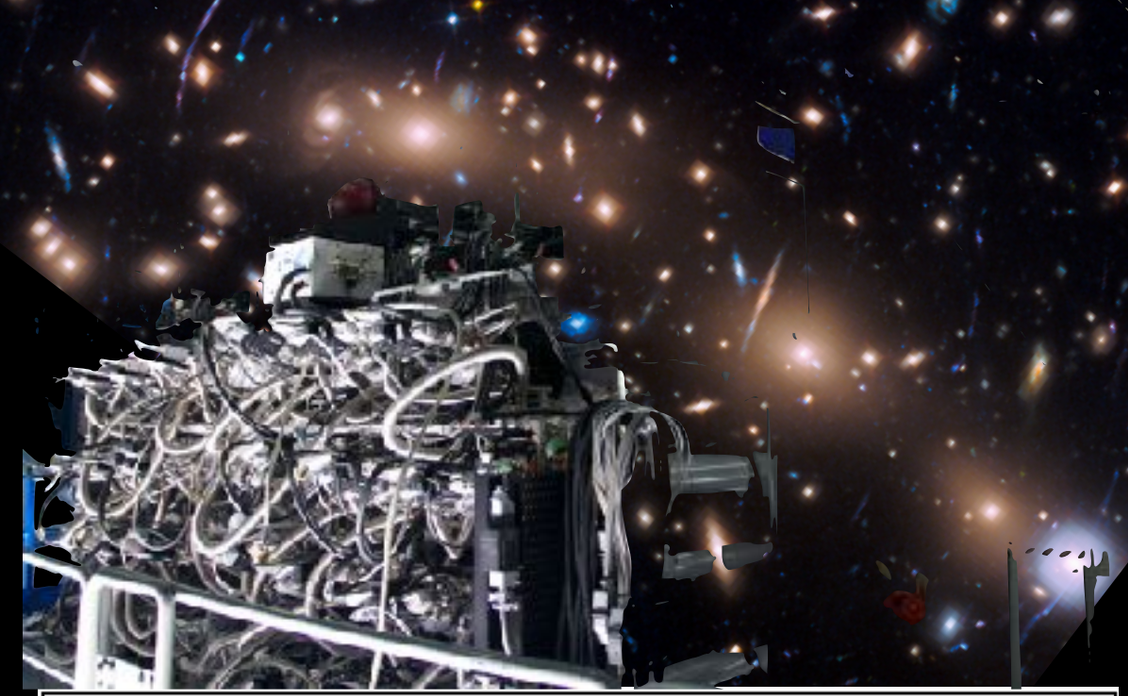
CALENDS

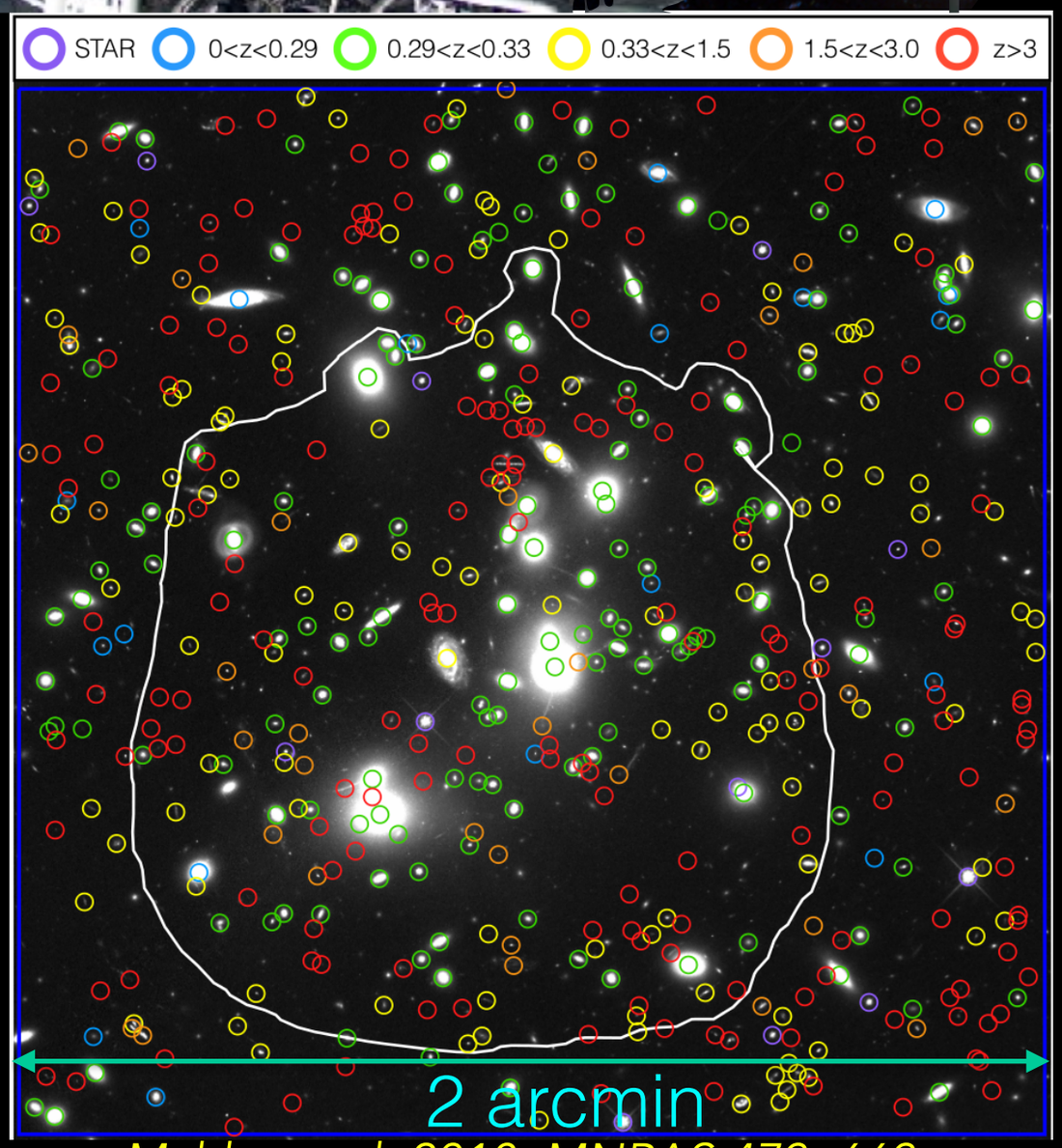
JOHAN RICHARD (CRAL)

Gravitationally lensed Lyman-alpha emitters studied with ミューズ

Vera Patrício (DARK), Renske Smit (Cambridge), Guillaume Mahler (U.Michigan), Adélaïde Claeyssens (CRAL), Johany Martinez (CRAL), David Lagattuta (CRAL), Roser Pello (IRAP), Geoffroy de la Vieuville (IRAP) and the MUSE consortium







Mahler et al. 2018, MNRAS 473, 663

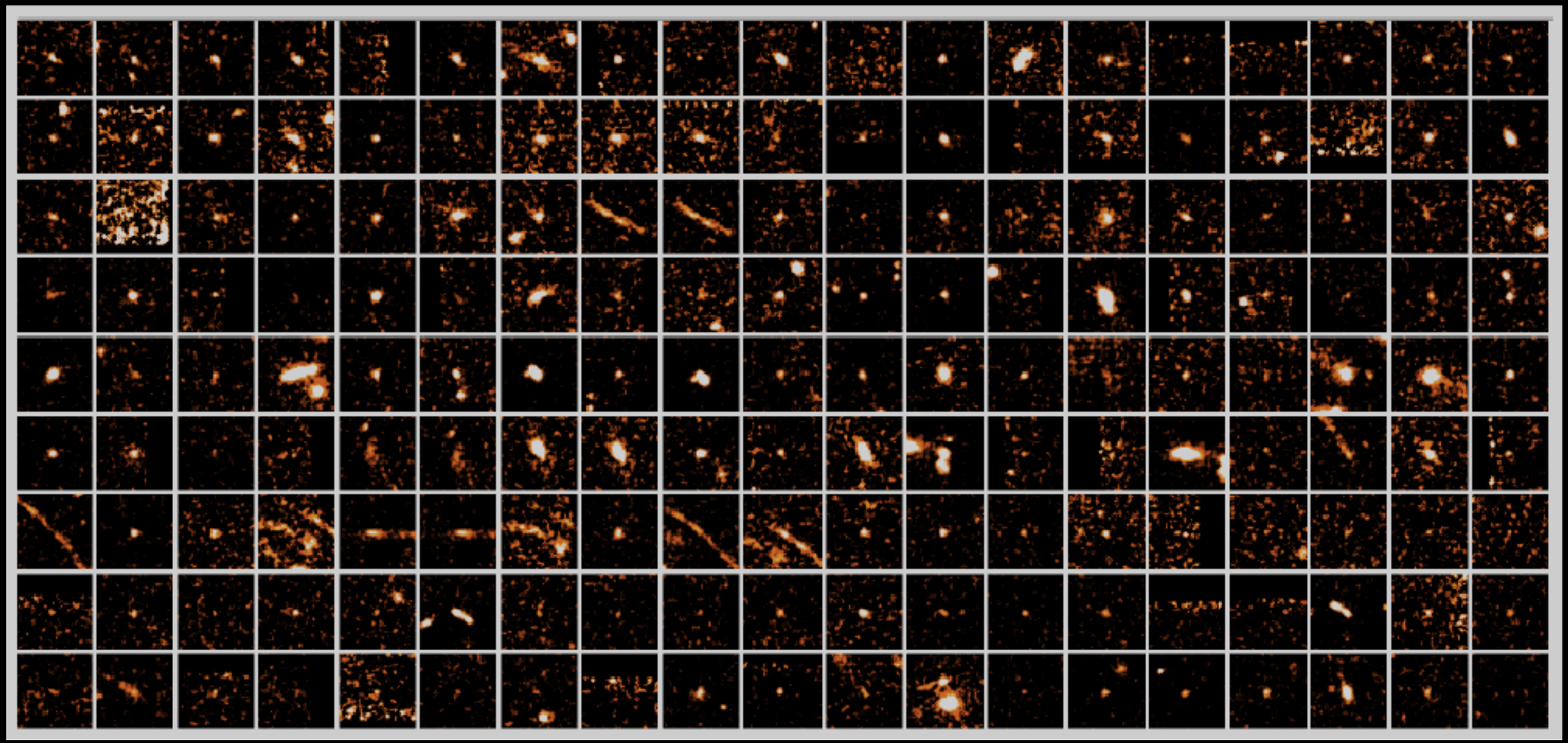
MUSE on lensing clusters

- Use the power of magnification from gravitational lensing.
- MUSE mosaics to cover the high amplification regions
- ~ 30 clusters observed during GTO and non-GTO programs

Science goals

- Spectroscopic redshift for multiple images: mass models and magnification estimates
- Low-luminosity / Mass galaxies (in particular LAEs).
- Extended arcs - resolved properties

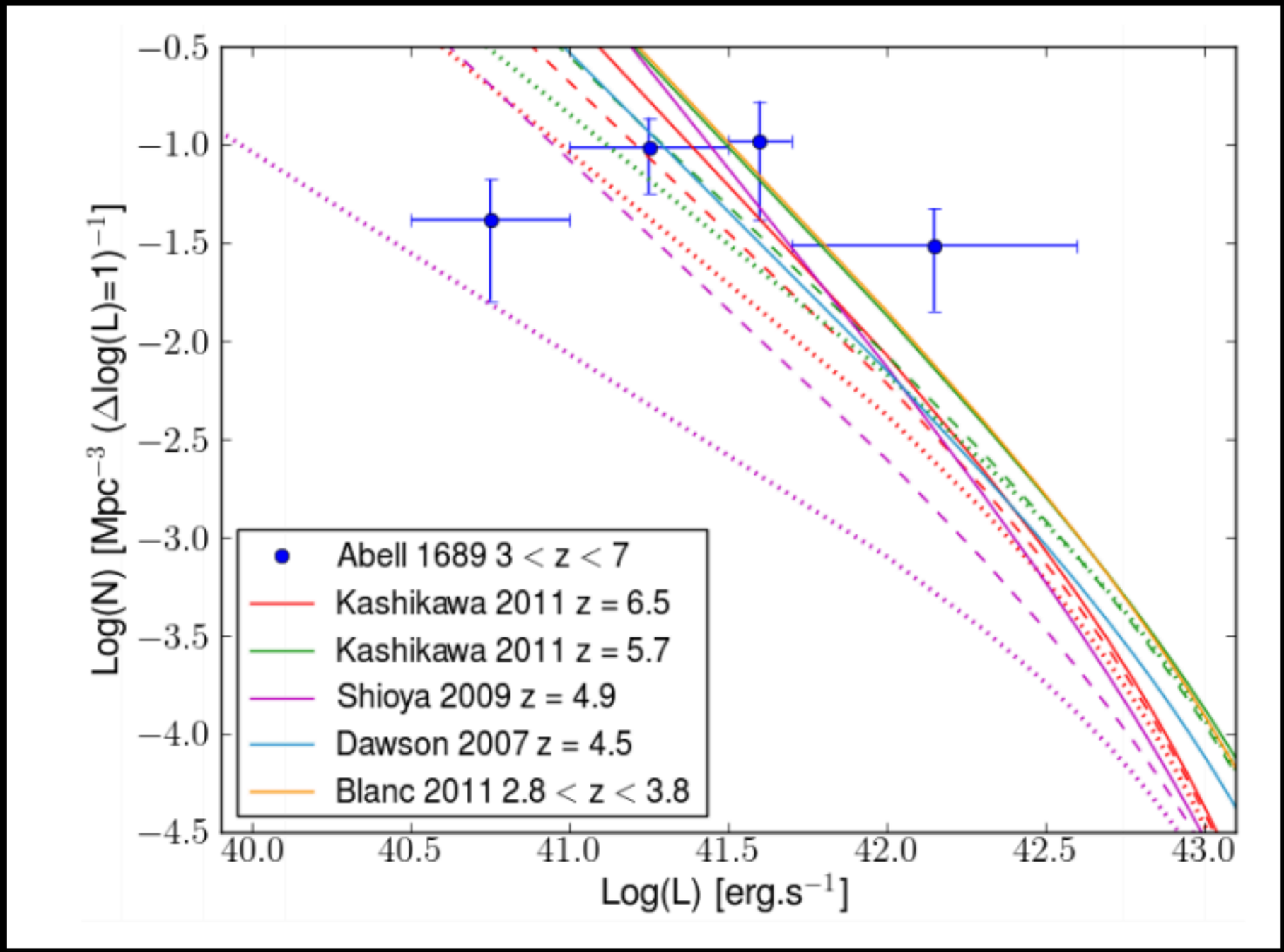
MUSE observations of the Frontier Fields



Mahler et al. 2018, MNRAS 473, 663

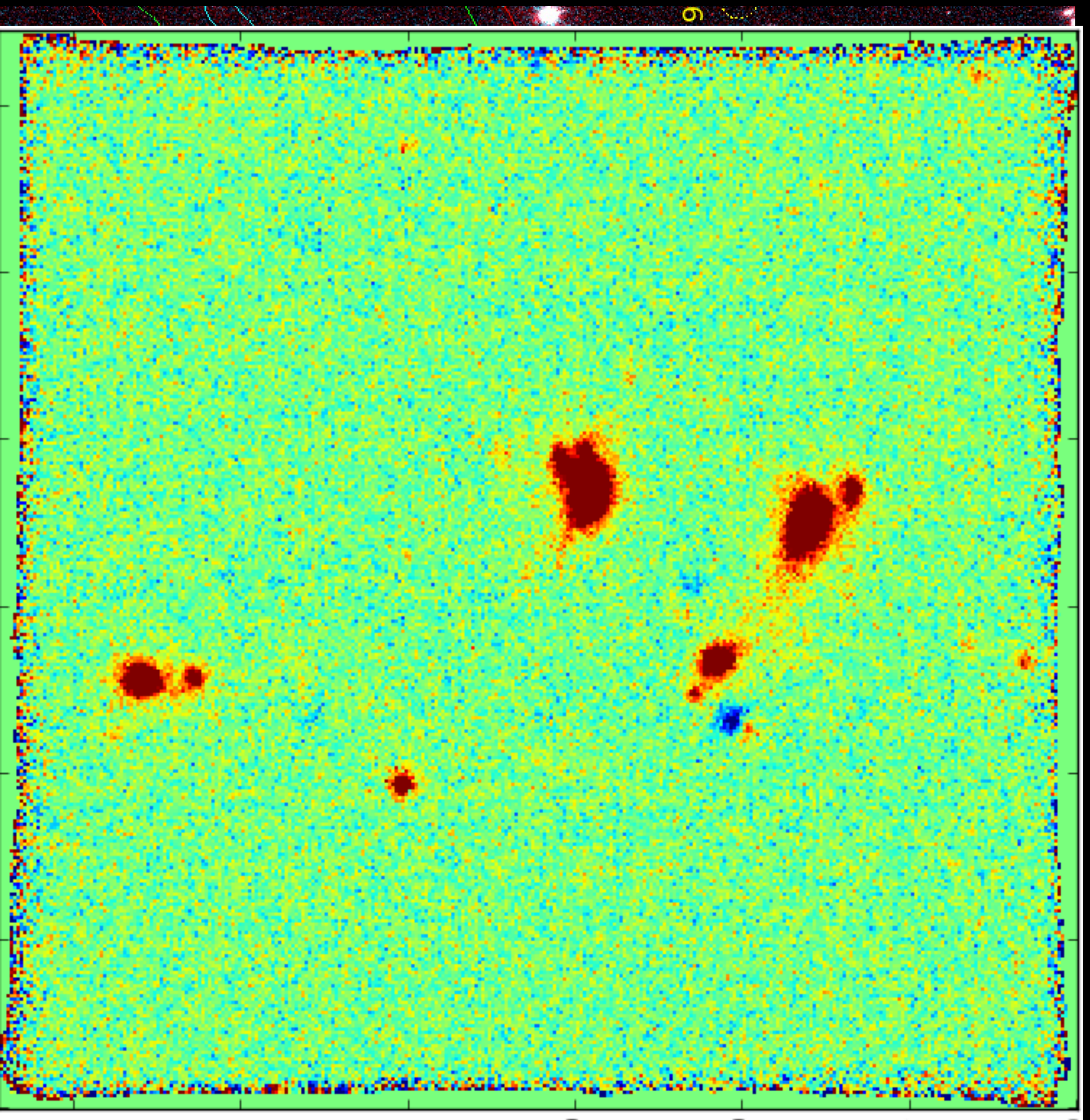
- 171 lensed LAEs in a 2x2 MUSE mosaic of 4-6hrs per pointing

MUSE observations of the Frontier Fields

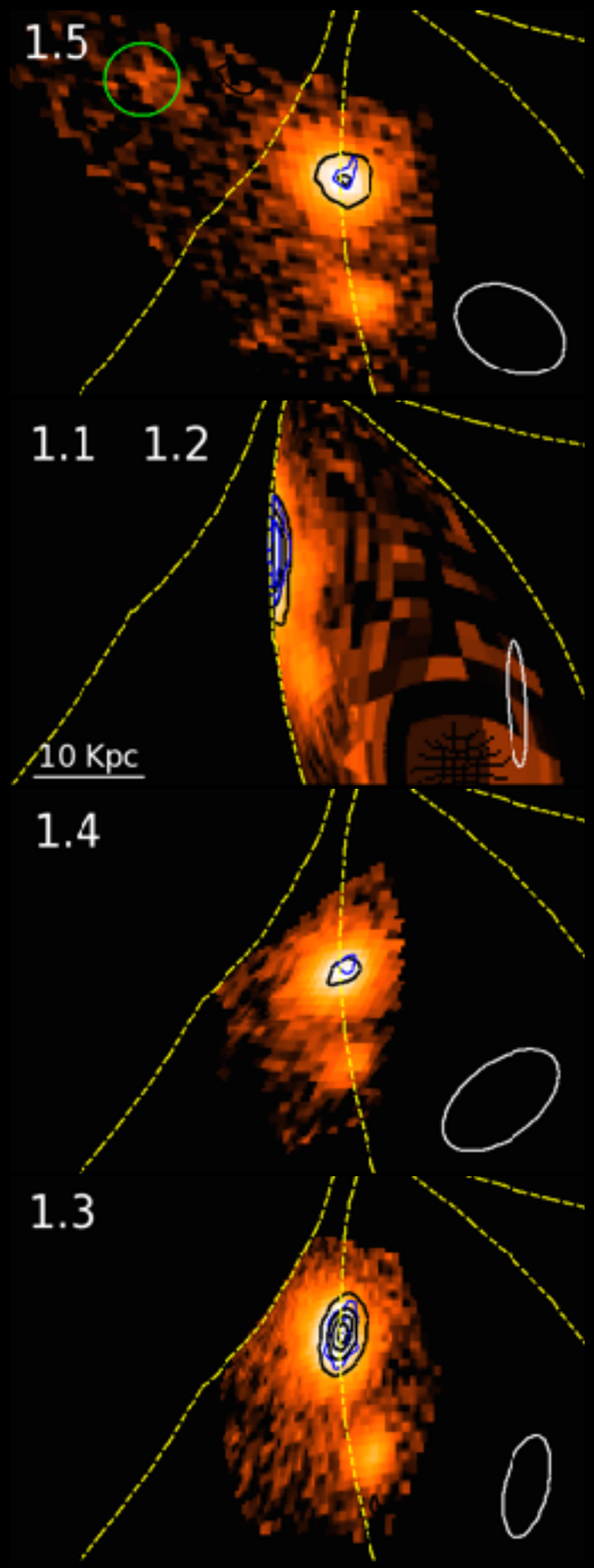


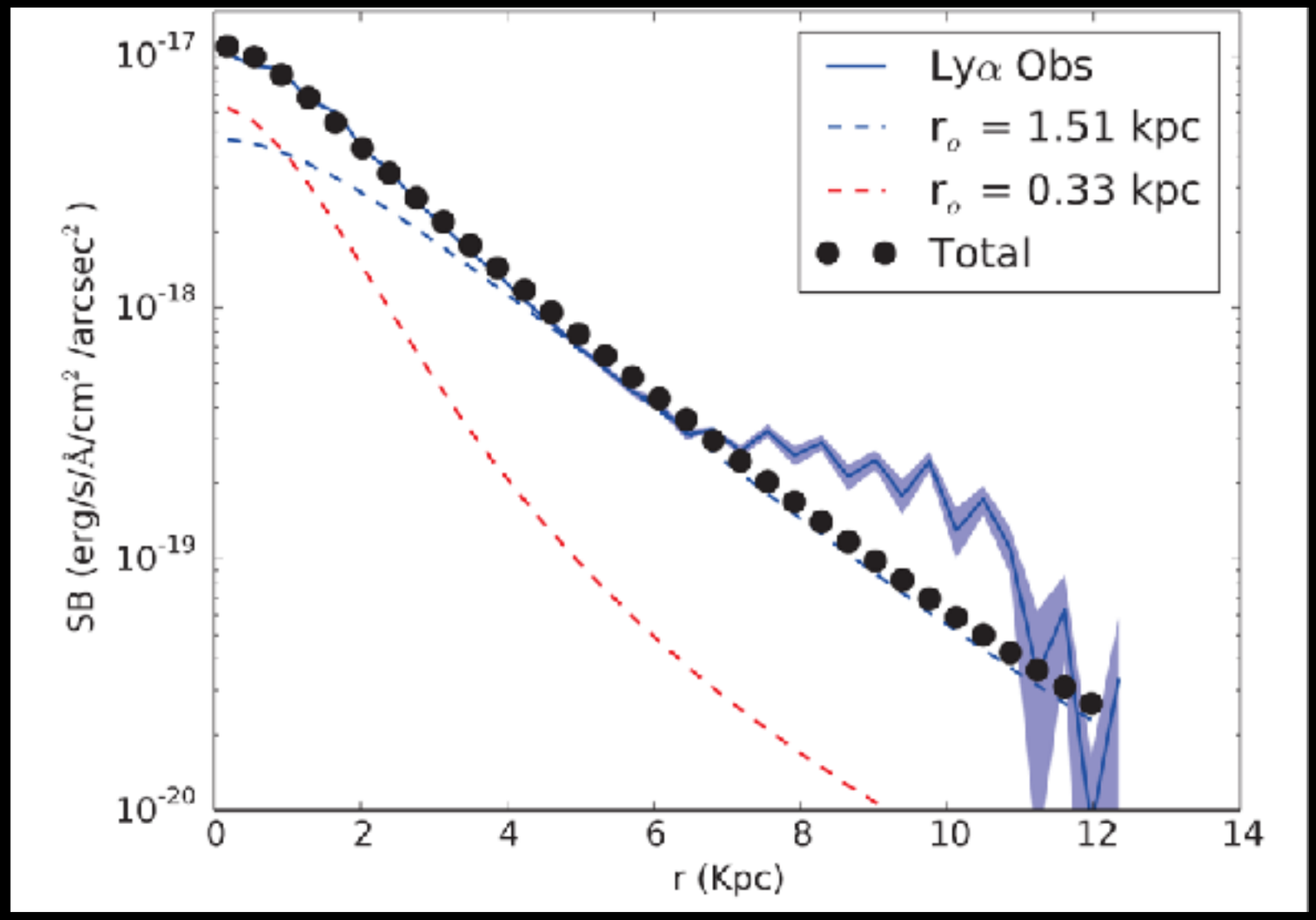
Bina et al. 2016, A&A 594, 14

de la Vieuville et al. 2018, in prep.



SMACS2031

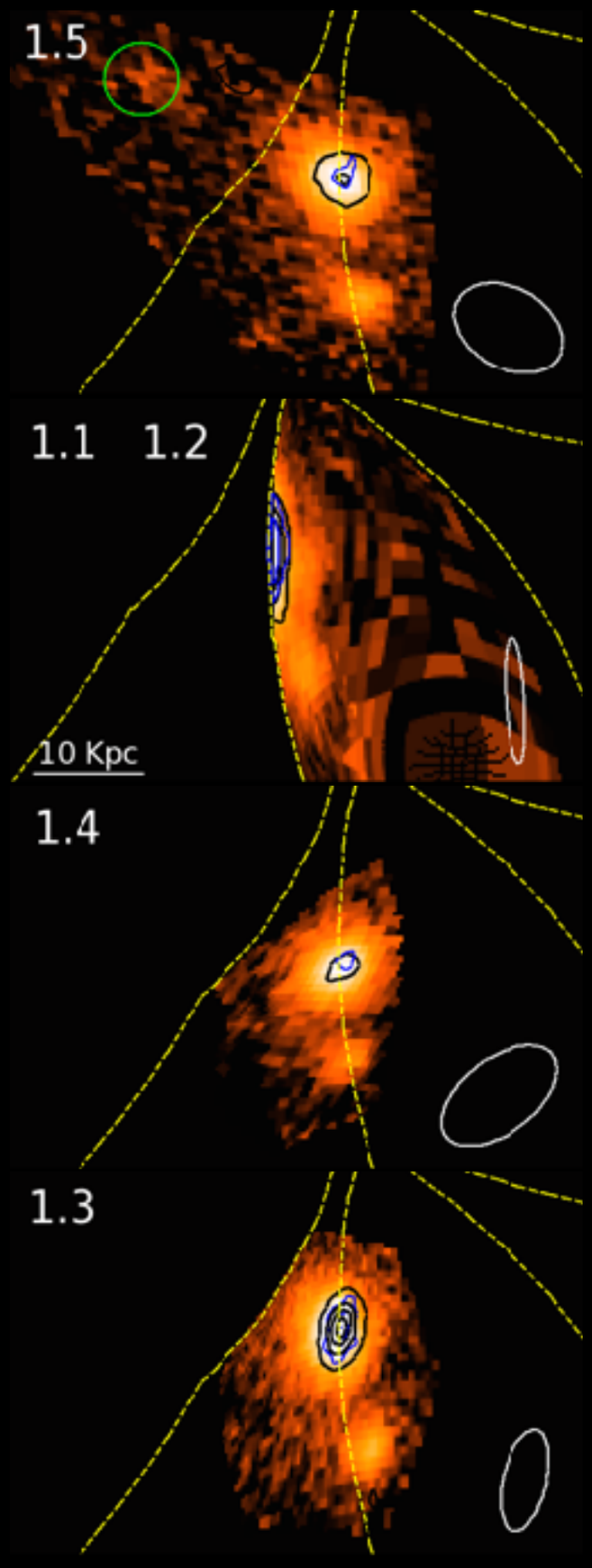


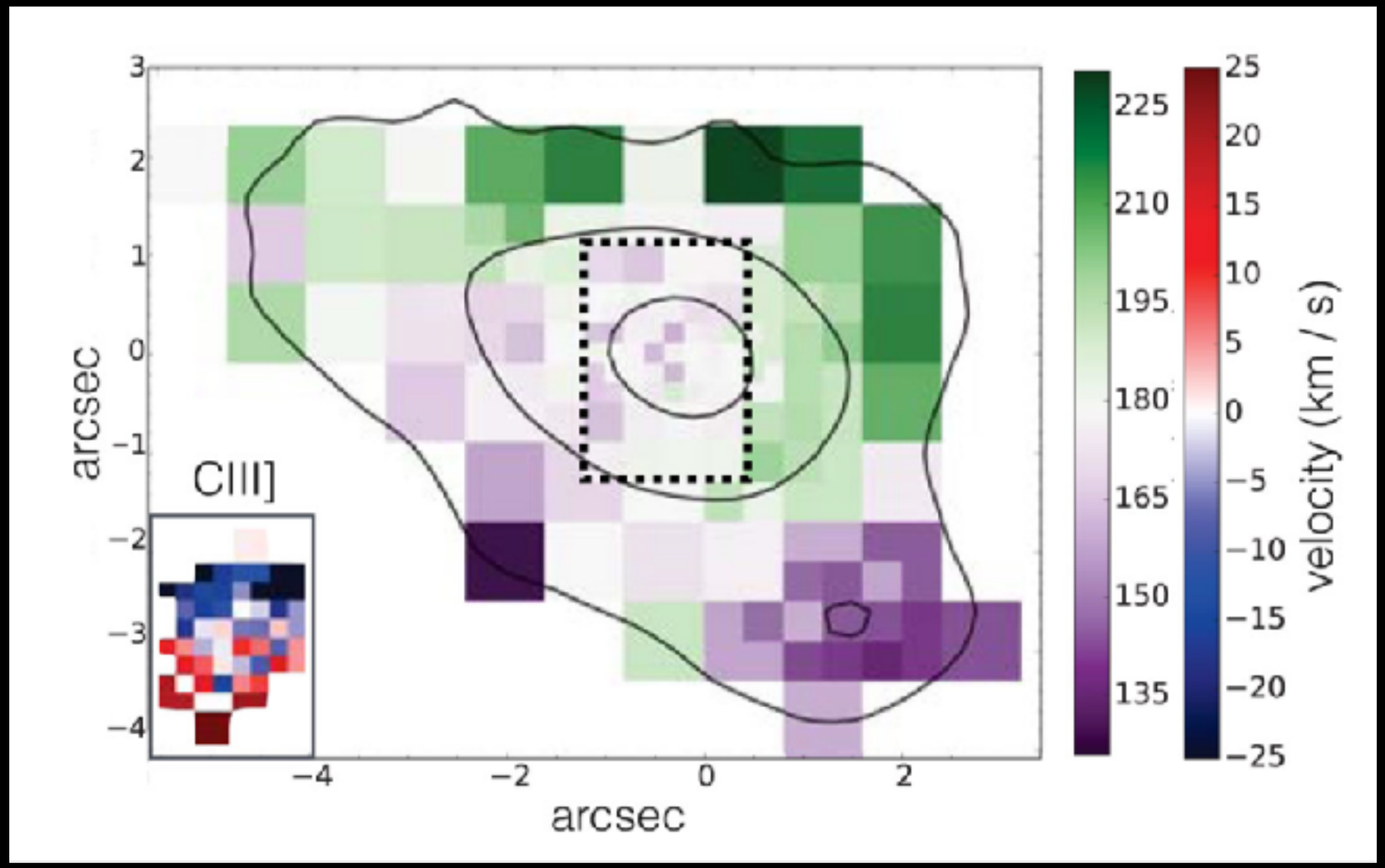


Patrício et al. 2016, MNRAS 456, 4191

- Multiple structure, extended Lyman-α halo around a compact SF galaxy
- Line profile almost identical across the halo, small shift in peak wavelength
- CIII] kinematics!

SMACS2031





Patrício et al. 2016, MNRAS 456, 4191

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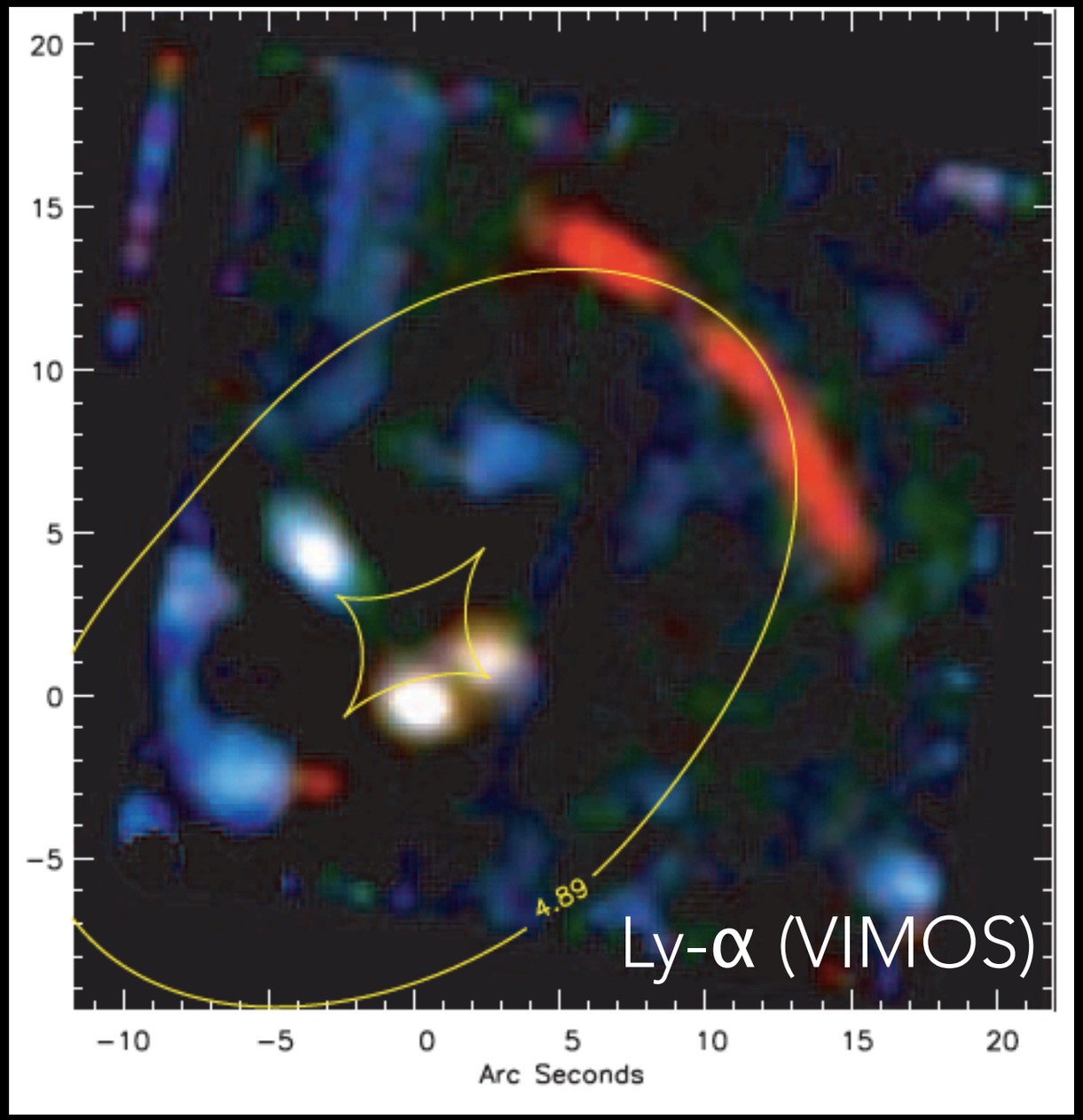
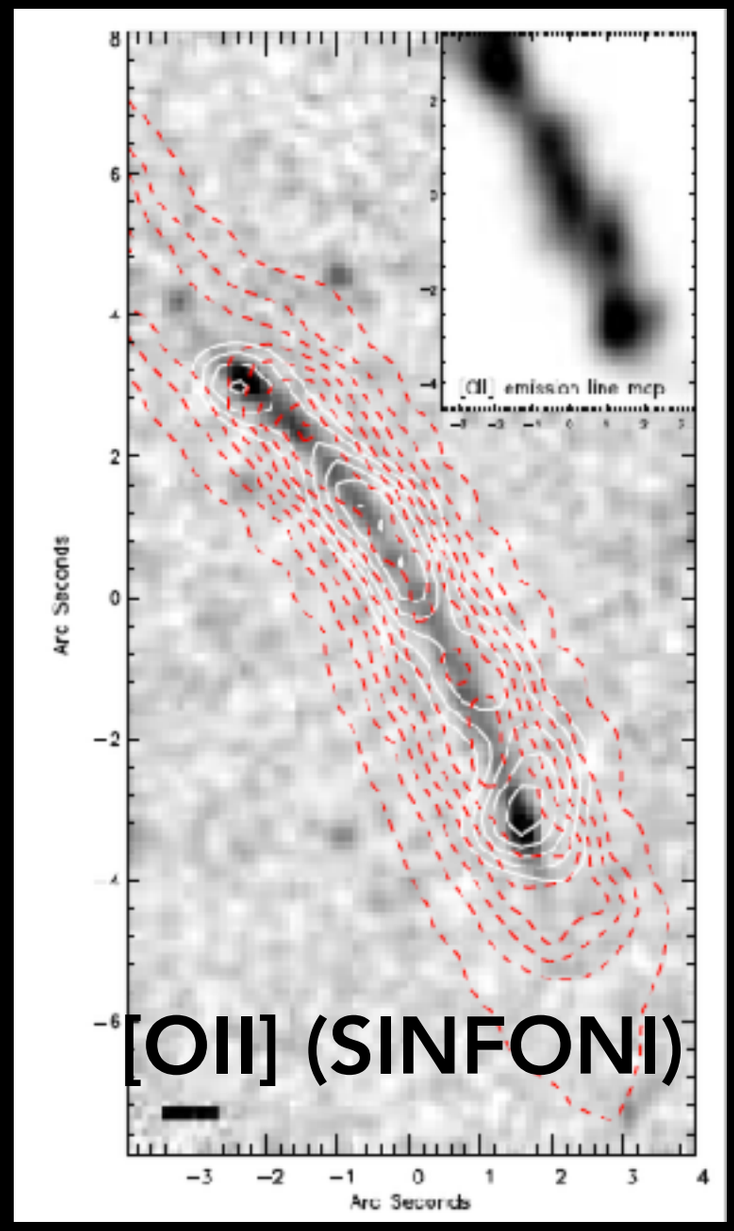
Z>4 STUDIES

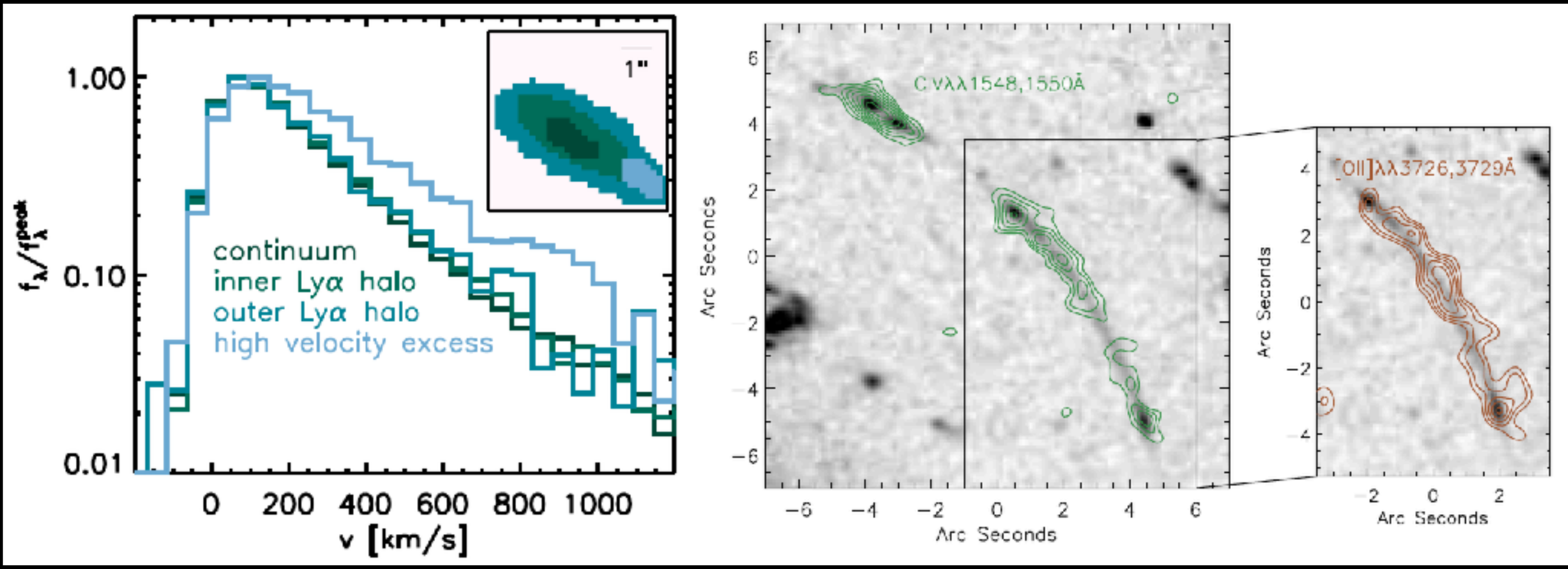




RCS0224 arc (z=4.89) *Swinbank et al. 2007, MNRAS 376, 479*

- Compatible with starburst galaxy surrounded by a bipolar outflow, escaping at v ~ 500 km/s

RCS0224 with MUSE

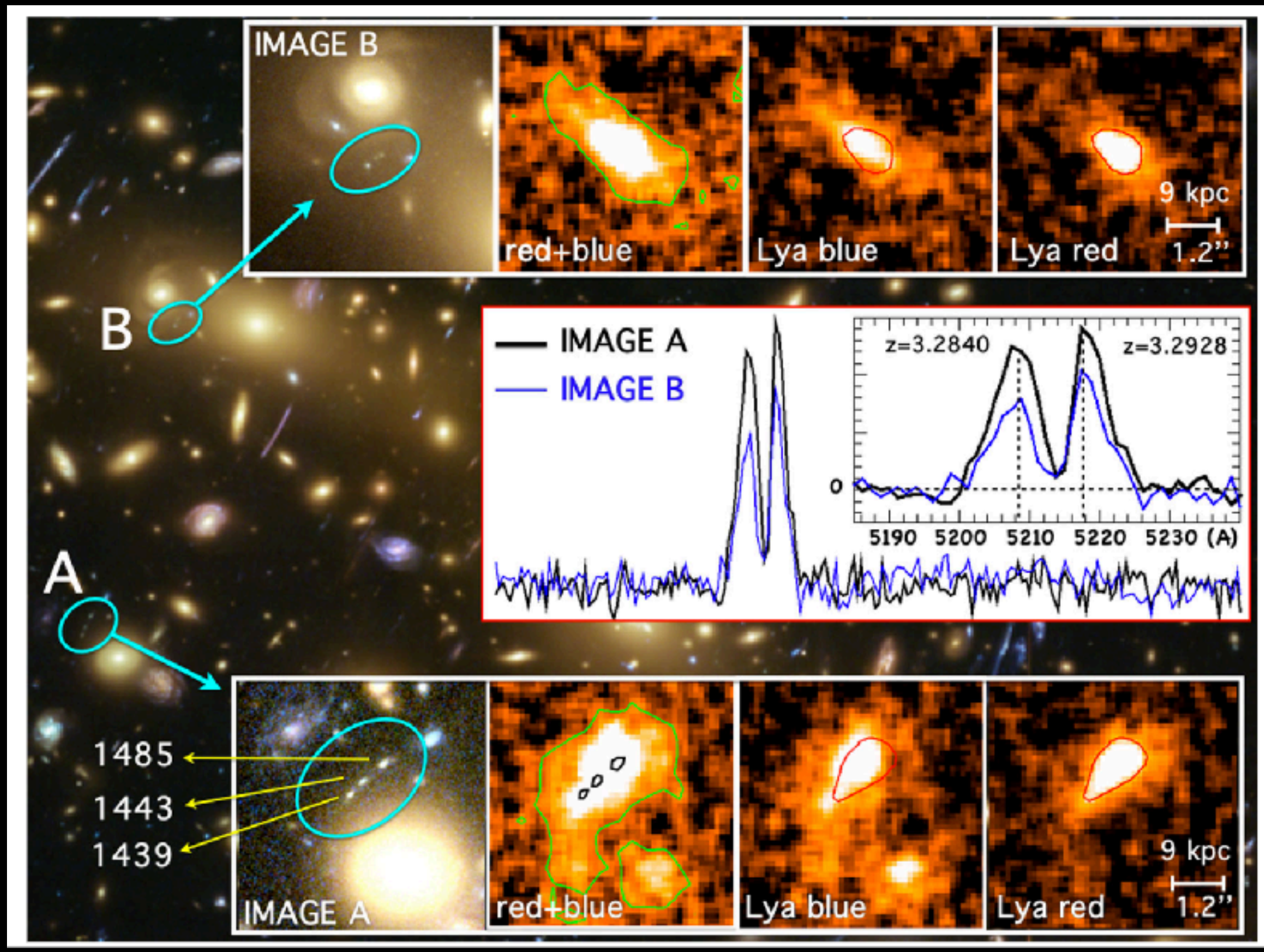


Smit et al. 2017, MNRAS 467, 3306

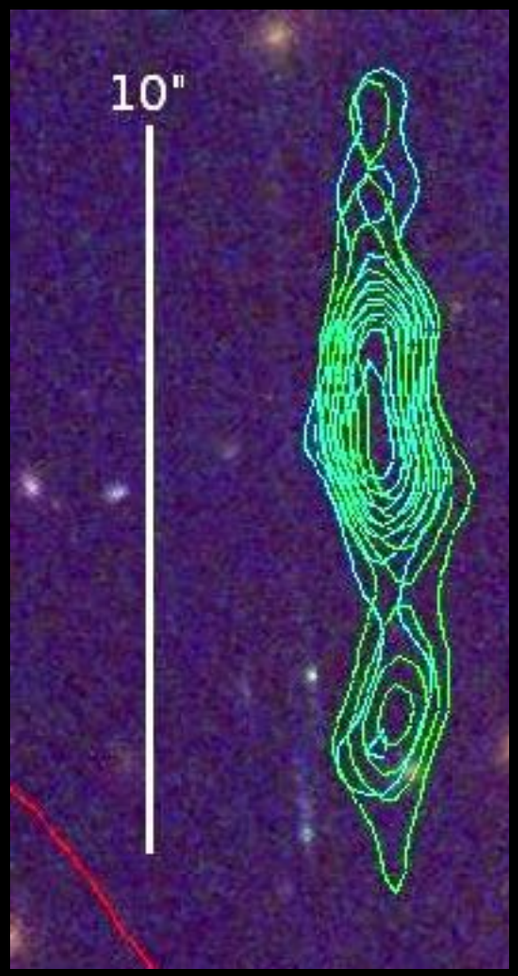
- One of the highest redshifts (z=4.9) extended arcs
- Compatible with starburst galaxy surrounded by a bipolar outflow, escaping at v ~ 500 km/s
- Lyman-alpha profile relatively similar across the nebula except in one direction (high velocity excess)
- Extended CIV emission at z=4.9 across the continuum-bright arc

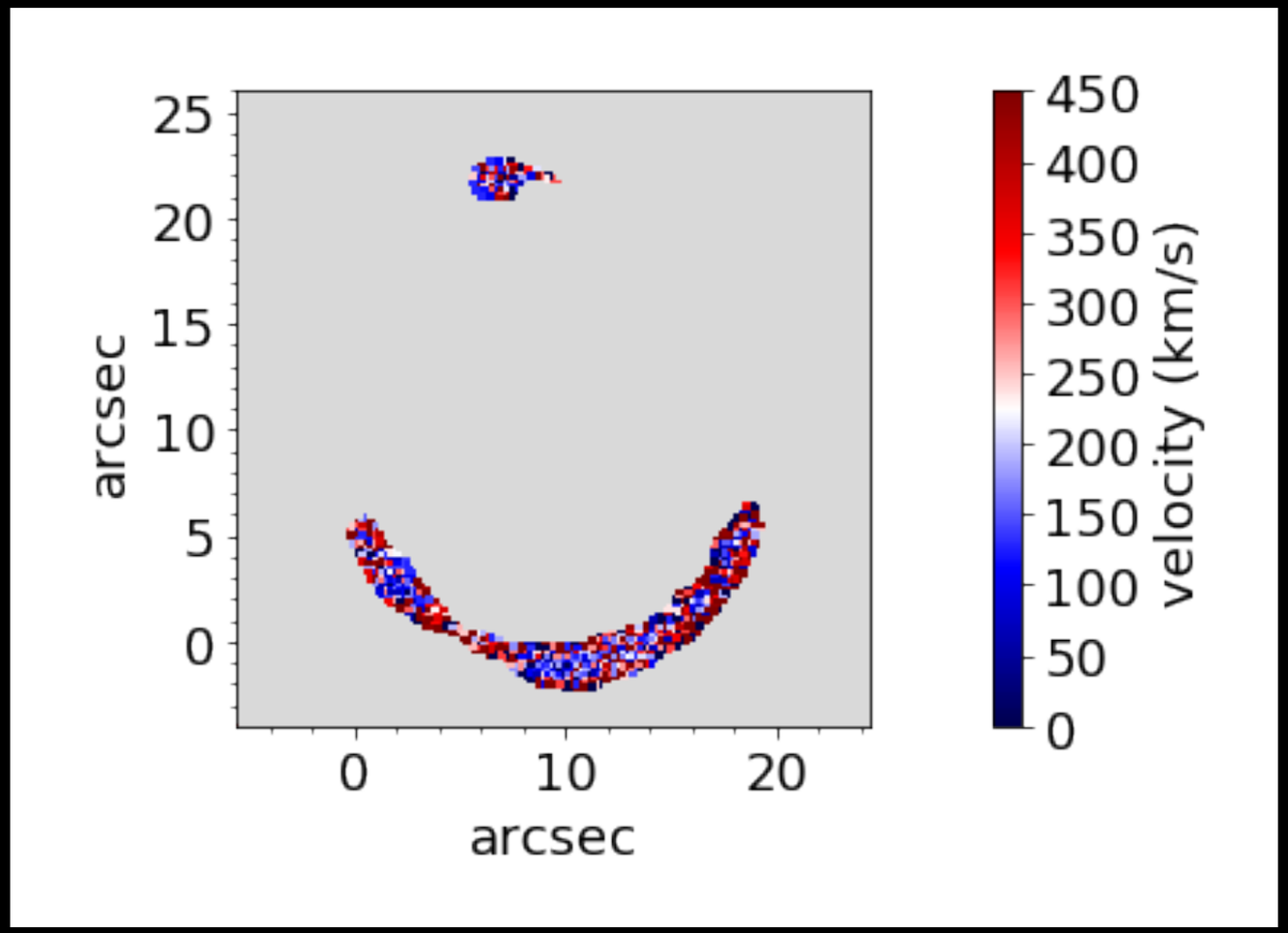
EXTENDED LY-A EMISSION

Vanzella et al. 2017, MNRAS, 465, 3803

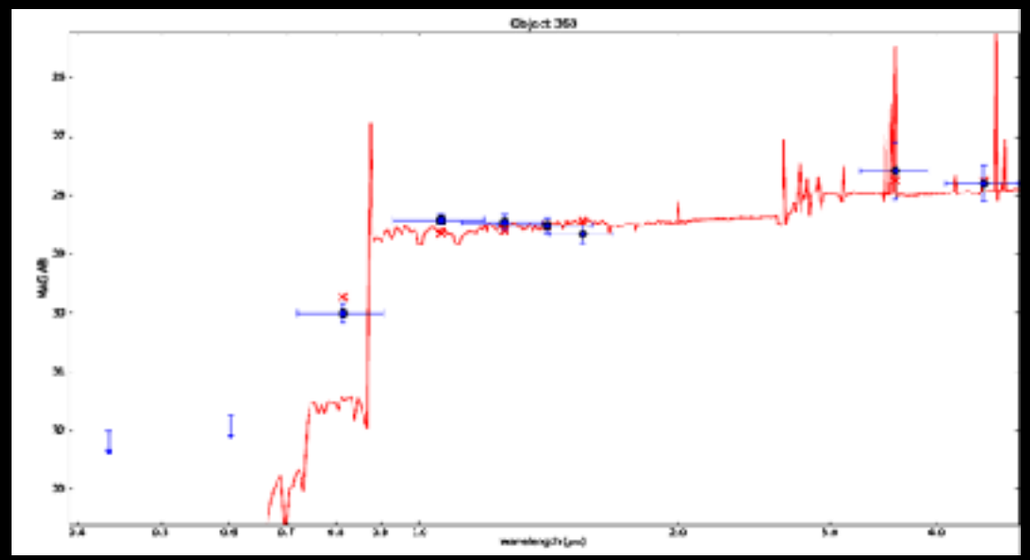


EXTENDED LY-A EMISSION





- Several extended Lyman-alpha nebulae per cluster core: probe scales < 1 kpc
- Overdensities of LAEs: diffuse emission between sources at the same redshift.
- Spec-z improves SED fitting to derive physical properties (*Martinez et al. in prep.*)



SUMMARY

- MUSE + lensing clusters is the best combination to probe down to the faintest luminosities of LAEs

- Observations of cluster cores identify many extended Lyman-alpha nebulae with a better intrinsic resolution than in blank fields. Adaptive Optics will help!

- Many follow-ups are possible with JWST, in particular with NIRSpec (MSA or IFU): kinematics of rest-optical lines, other diagnostics

THANK YOU