MUSE integral-field spectroscopy towards the Frontier Fields Cluster Abell S1063

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In collaboration with:

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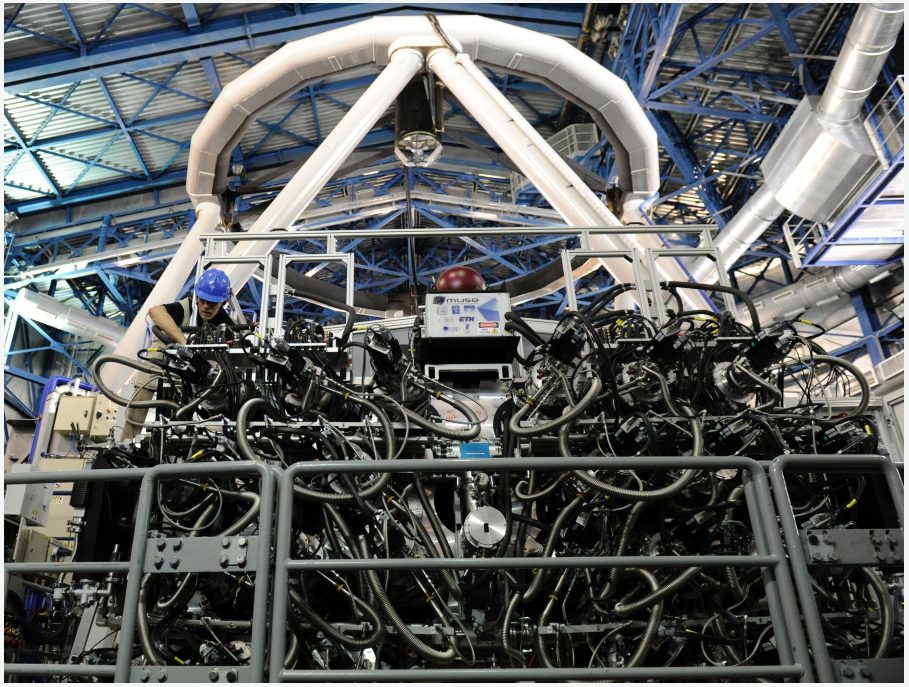
university of groningen

Accepted by A&A,arXiv (1409.3507)

AS1063 by MUSE

MUSE

- Multi Unit Spectroscopic Explorer (MUSE)
- Recently installed at VLT
- 24 Integral Field Units (IFUs)
- 4800-9300 Å (1.25 Å/px)
- 1'x1' FOV (0.2"/px)



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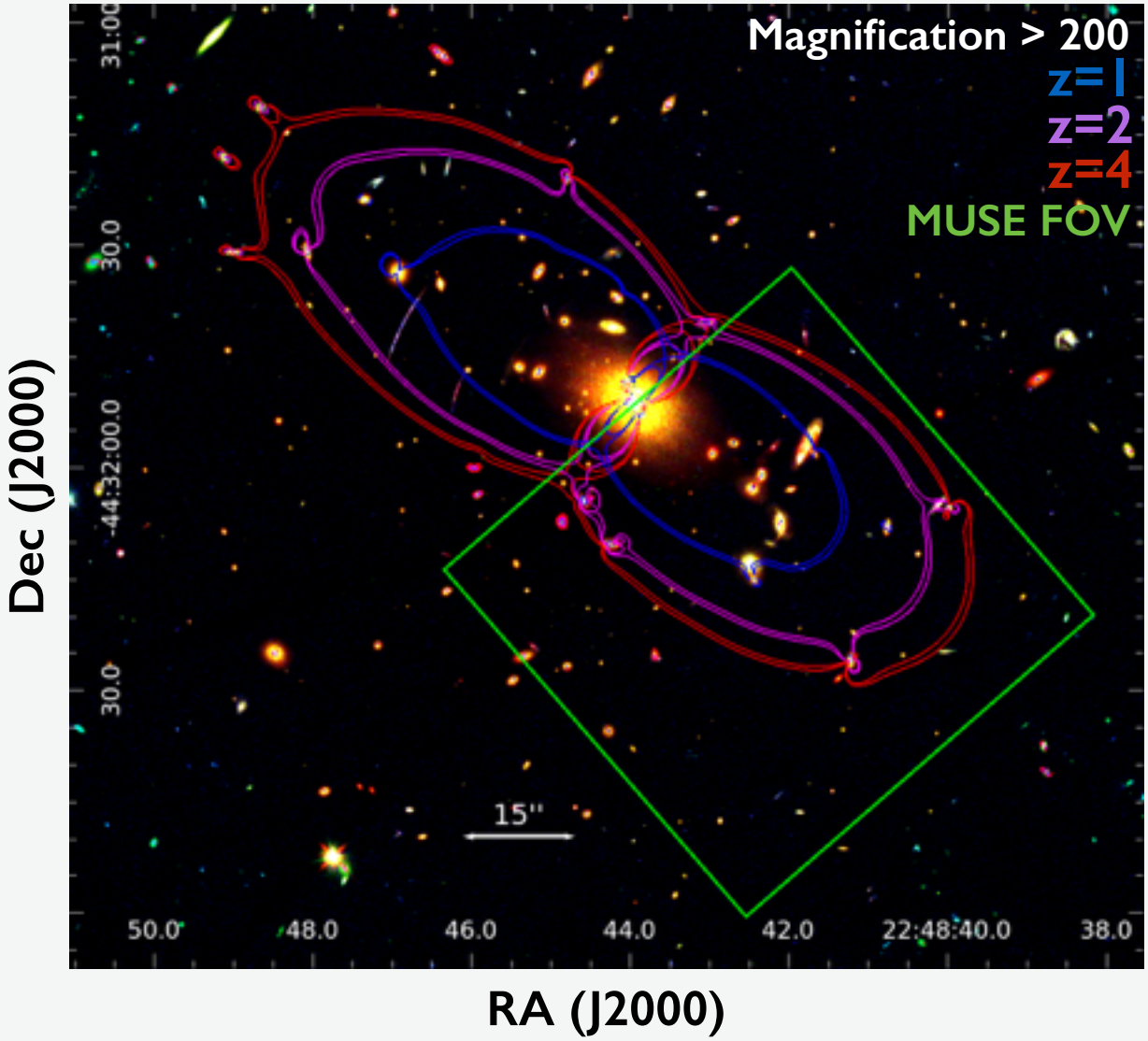
Abell S1063

- Merging cluster
- z=0.348
- $\sigma \approx 1500$ km/s



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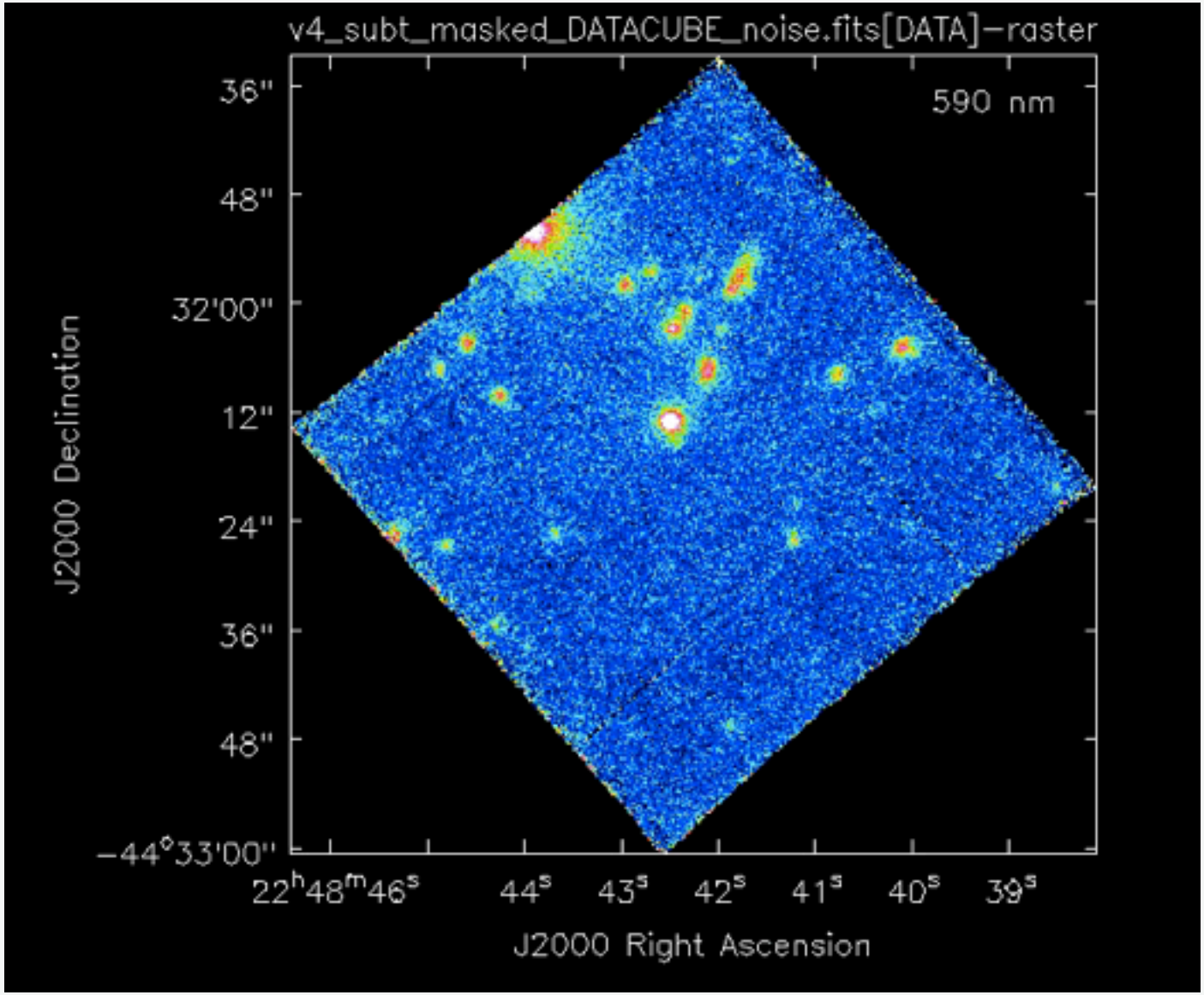
Observations

- Science Verification
- June 25th & 29th
- PIs: K. Caputi & C. Grillo / B. Clement
- 3.1 hours total exposure time
- Standard pipeline reduction
- 3D datacube

MUSE data



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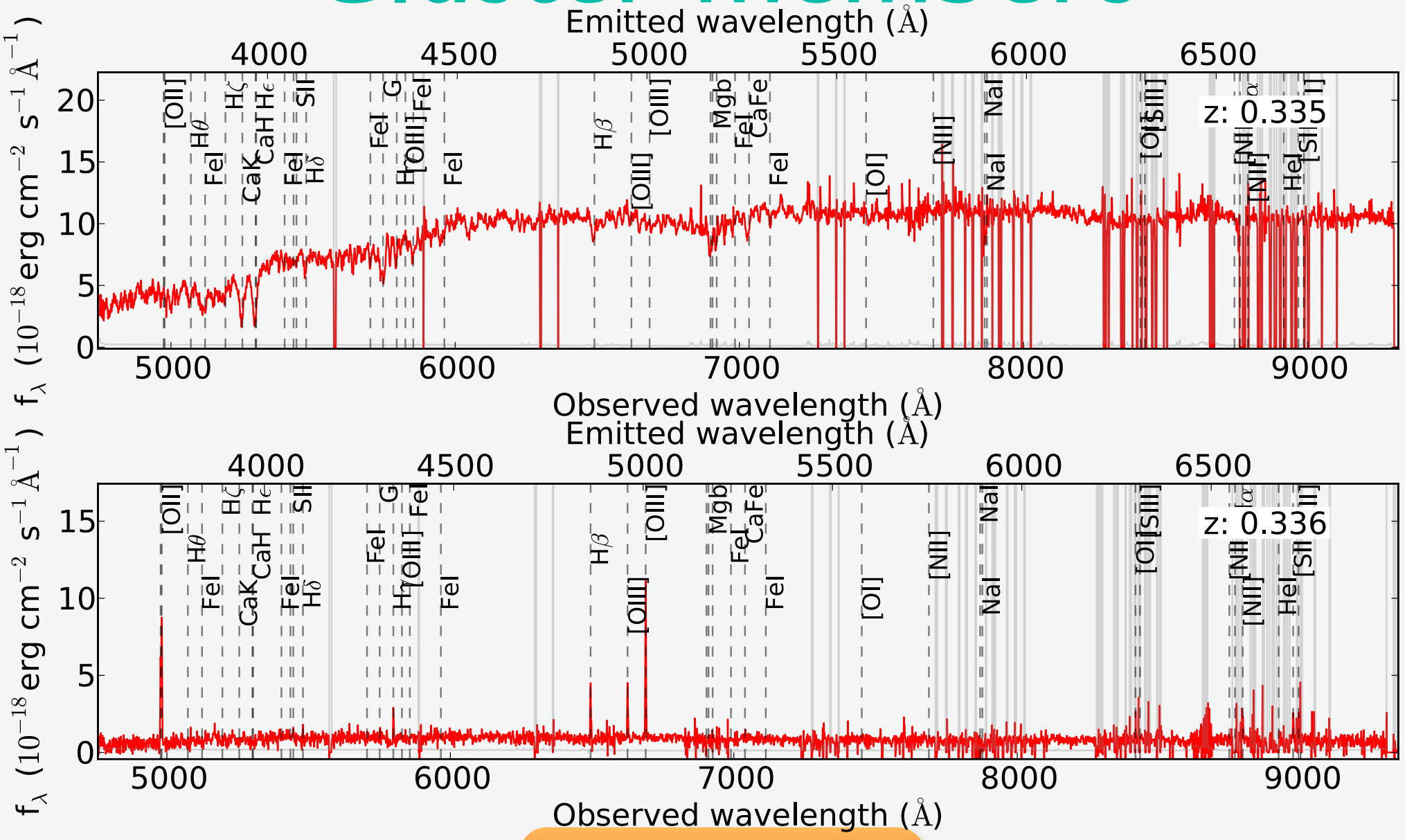
Cluster members



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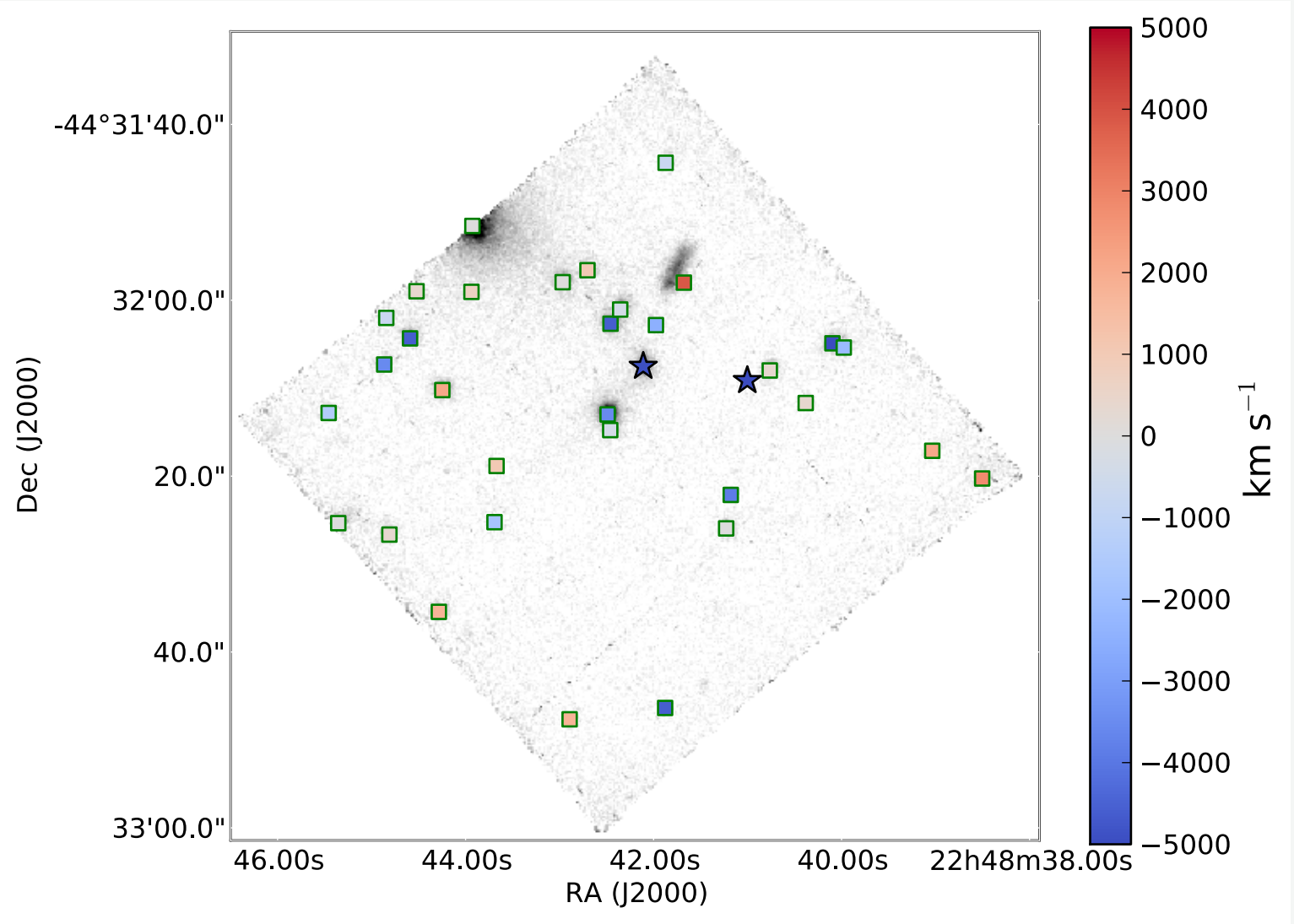
Cluster members



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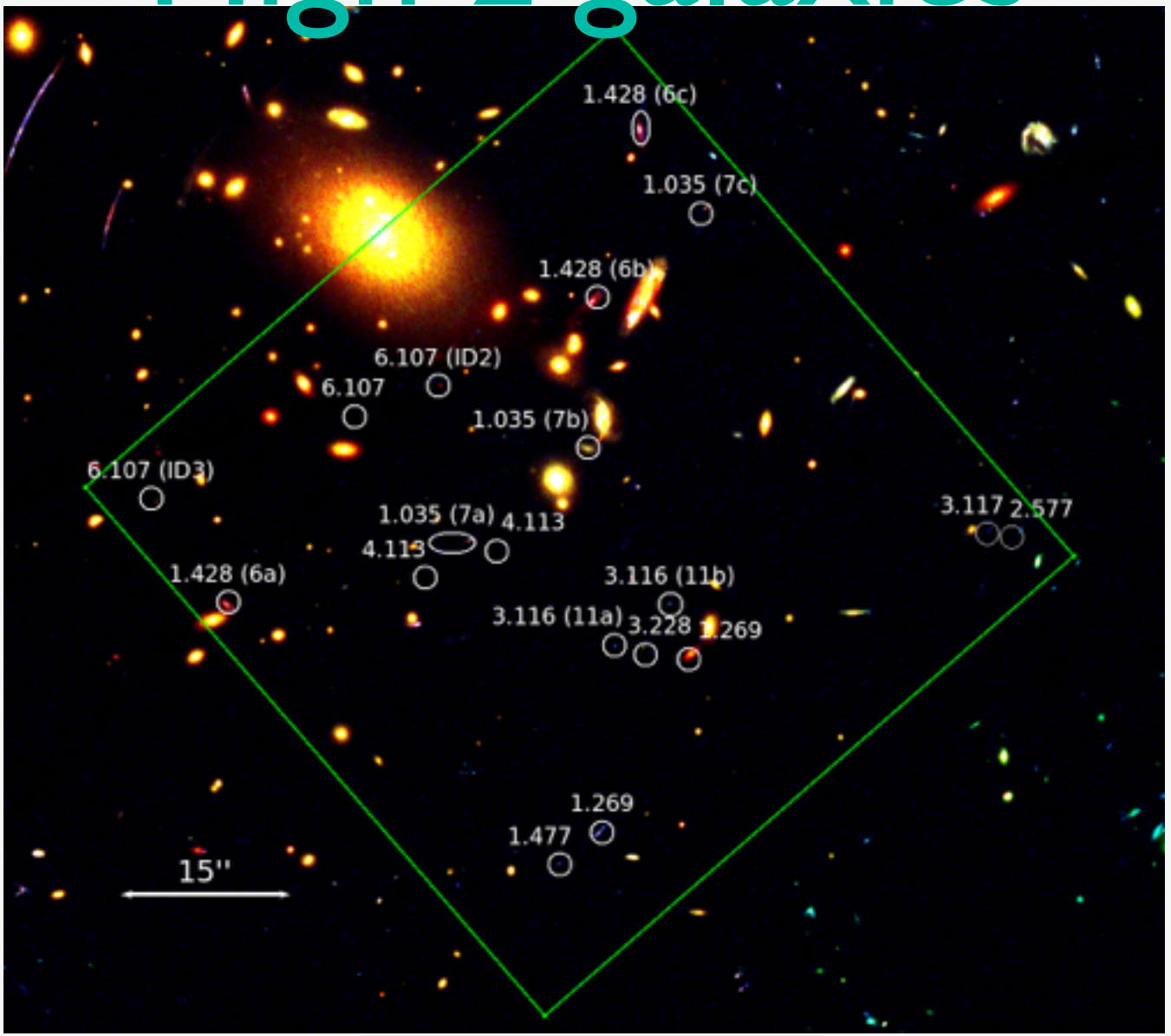
High-z galaxies



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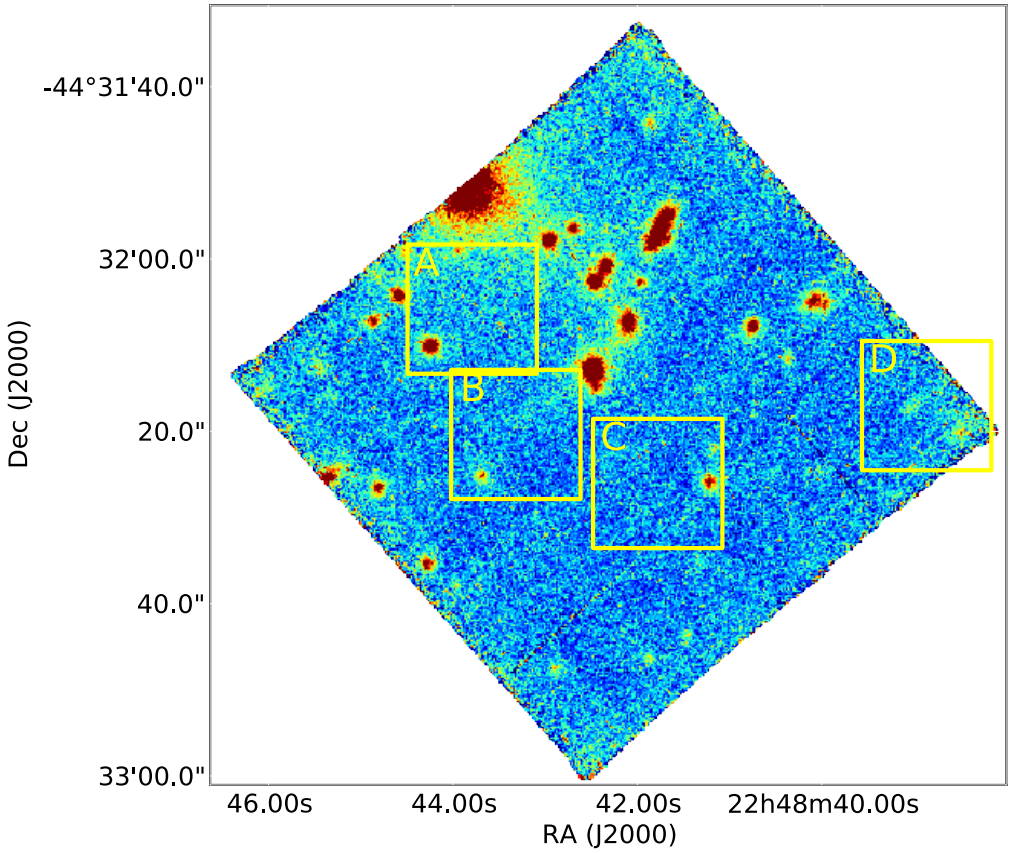
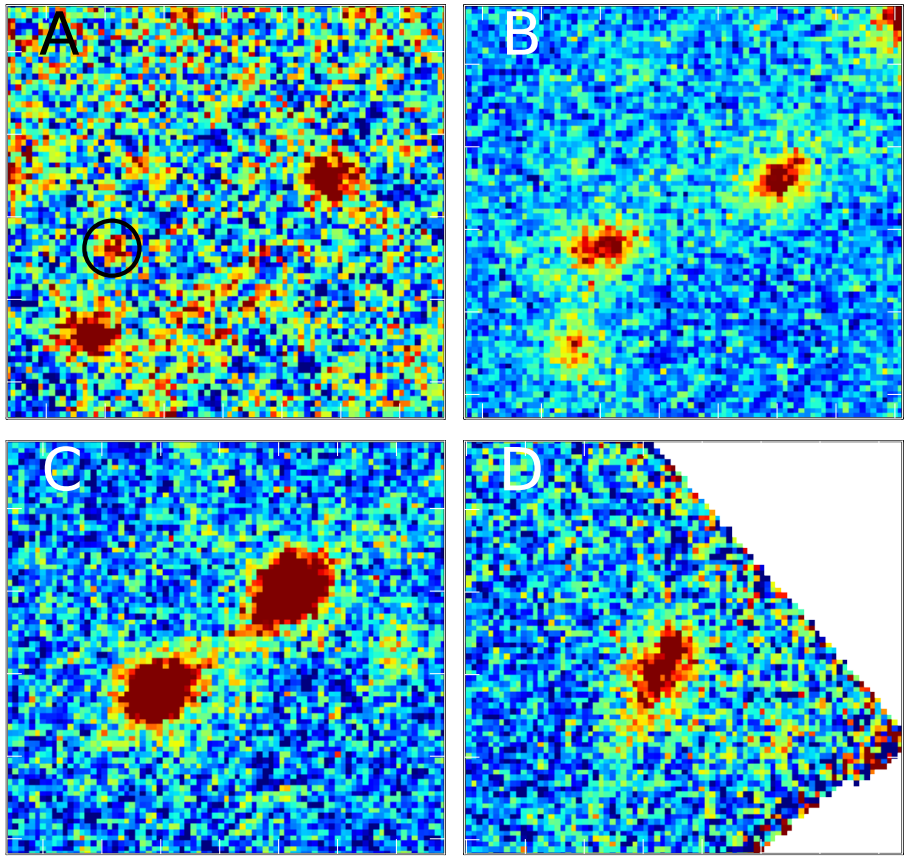
Lyman-α Emitters





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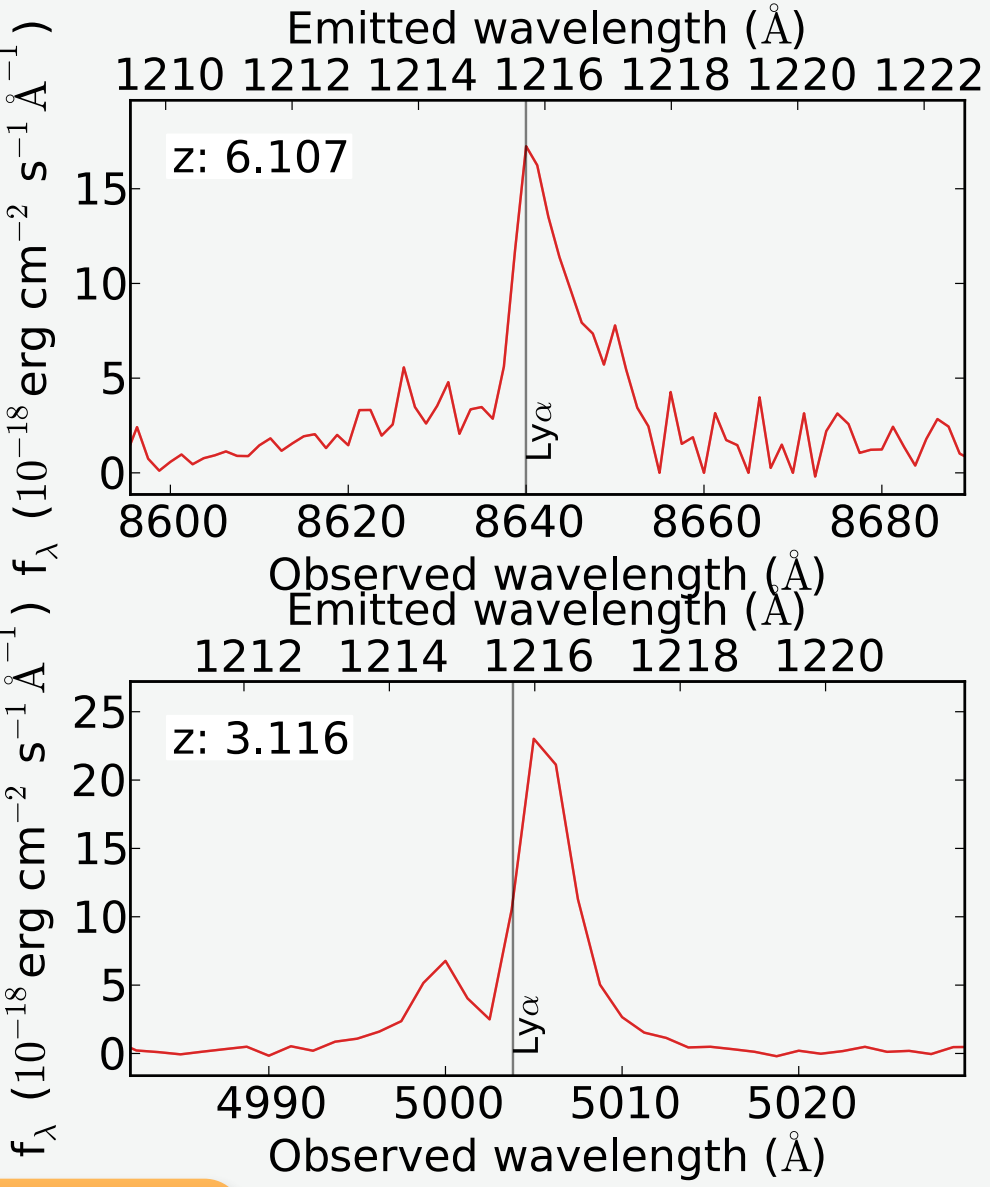
Lyα- profiles

- 5 LAEs
- z=3.116; 3.117 (**new**!); 3.228 (**new**!); 4.113 (**new**!); 6.107
- Narrow, FWHM=2.5Å
- Asymmetrical
- Double peaked with small separation



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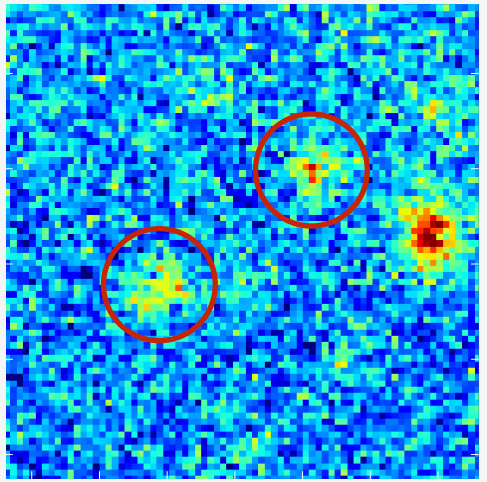
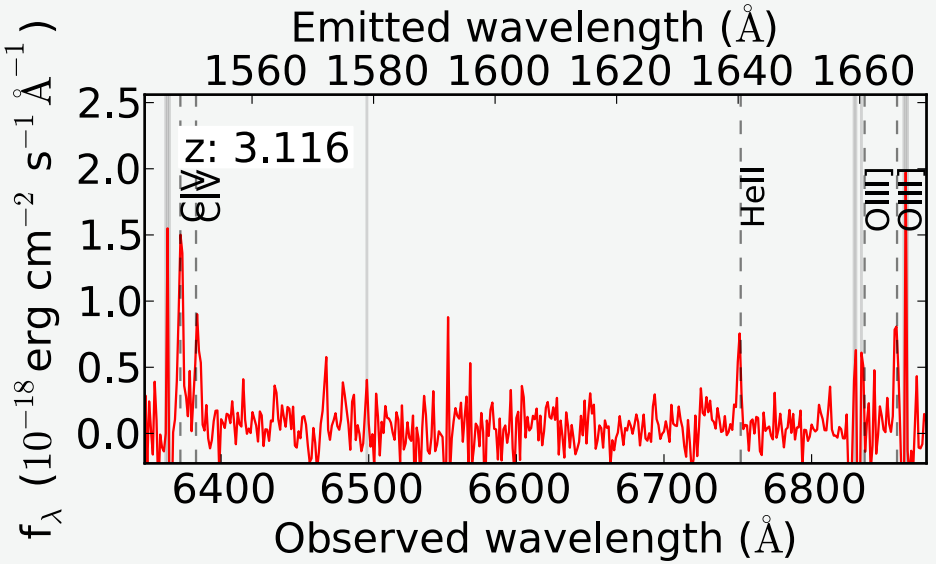
Presence of AGN

- Multiply lensed LAE at z=3.116
- UV emission lines
- C IV, He II, O III], and C III]





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New z=4 LAE

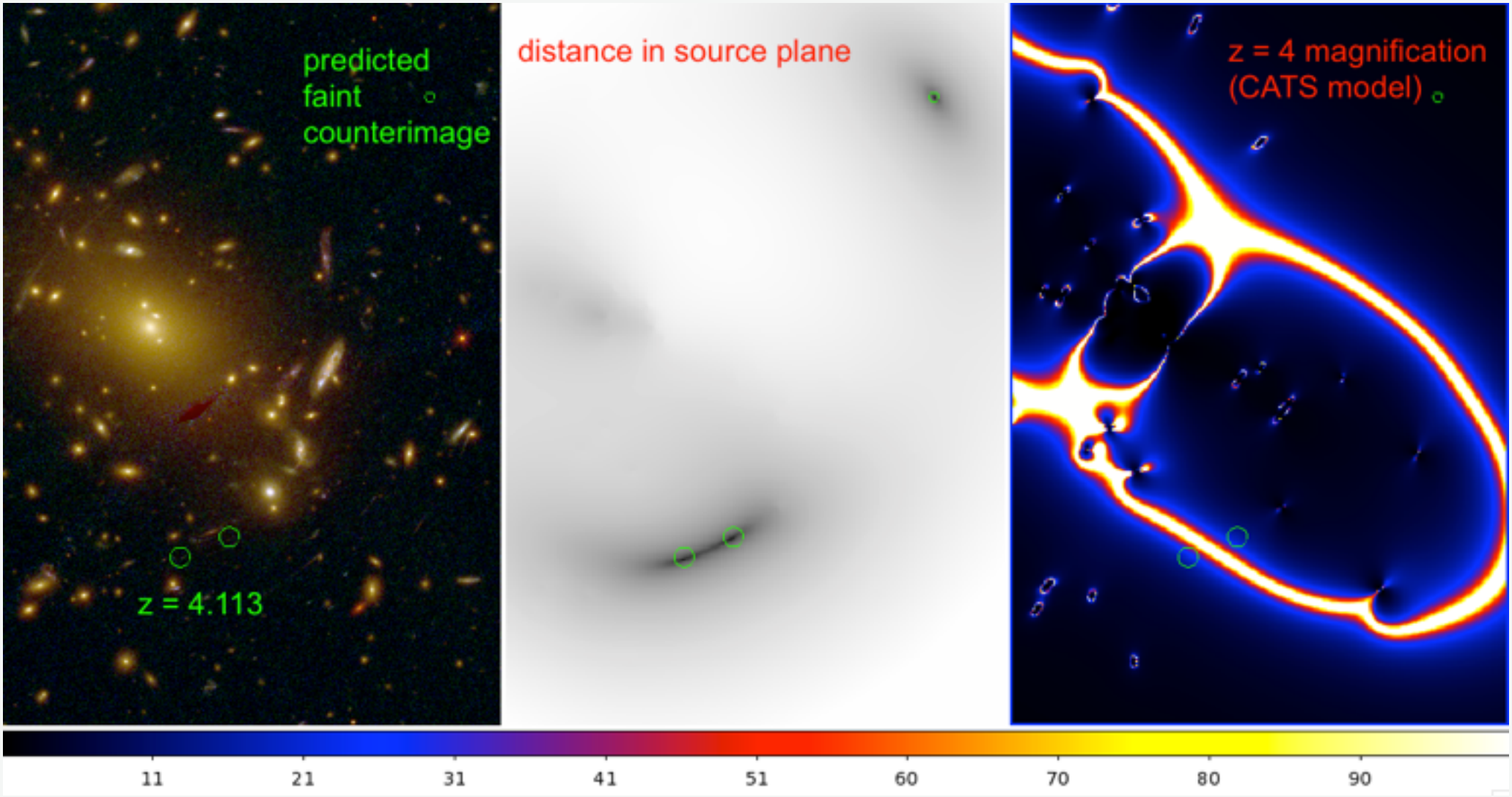

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Figure provided by Dan Coe

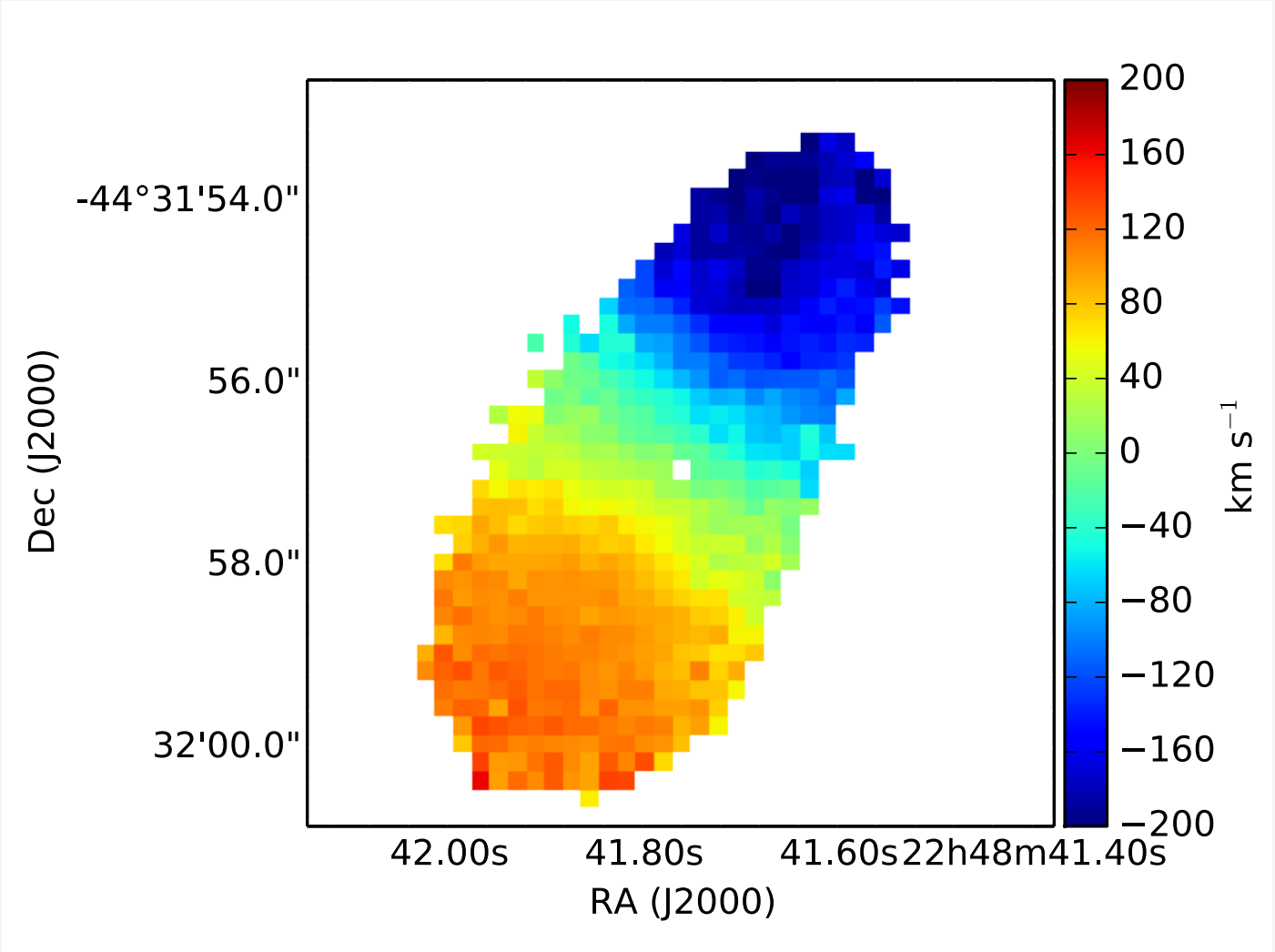
Conclusions

- MUSE is ideal for observing clusters
- 53 redshifts determined with 3.1 h exposure
  - 34 cluster members, 29 new
  - 17 galaxies at higher z, 10 new
- Possible AGN found
- New z=4 LAE found, consistent with models
- Wide range of science

Emission lines

Line	λ	low-z	high-z
Hα	6562.8	-	0.42
[O III]	5006.8	-	0.86
Hβ	4861.3	-	0.91
[O II]	3726.3729	0.29	1.50
C III]	1907, 1909	1.52	3.88
C IV	1548, 1551	2.10	5.00
Lyα	1215.7	2.94	6.65

Velocity maps



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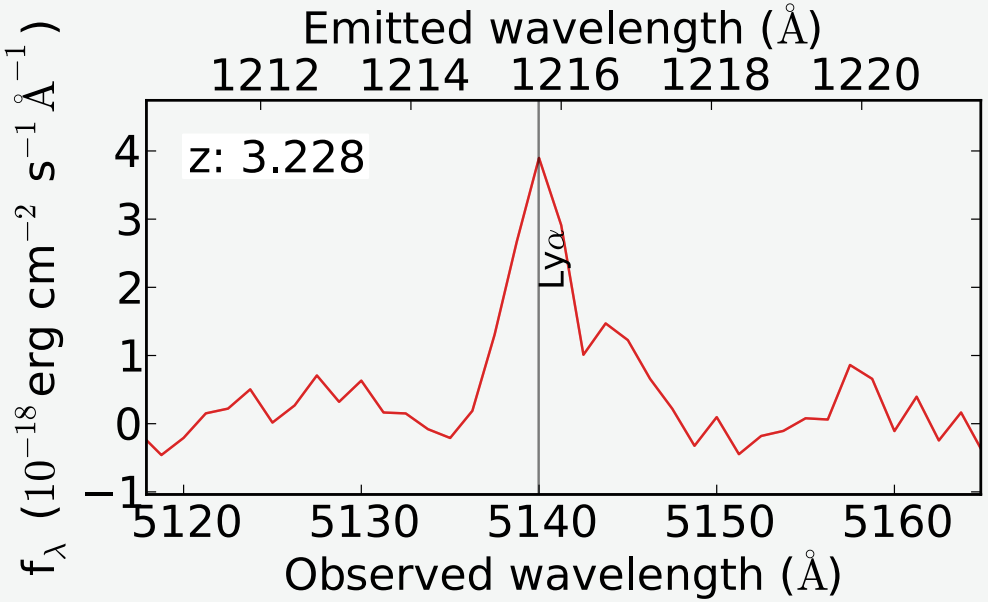
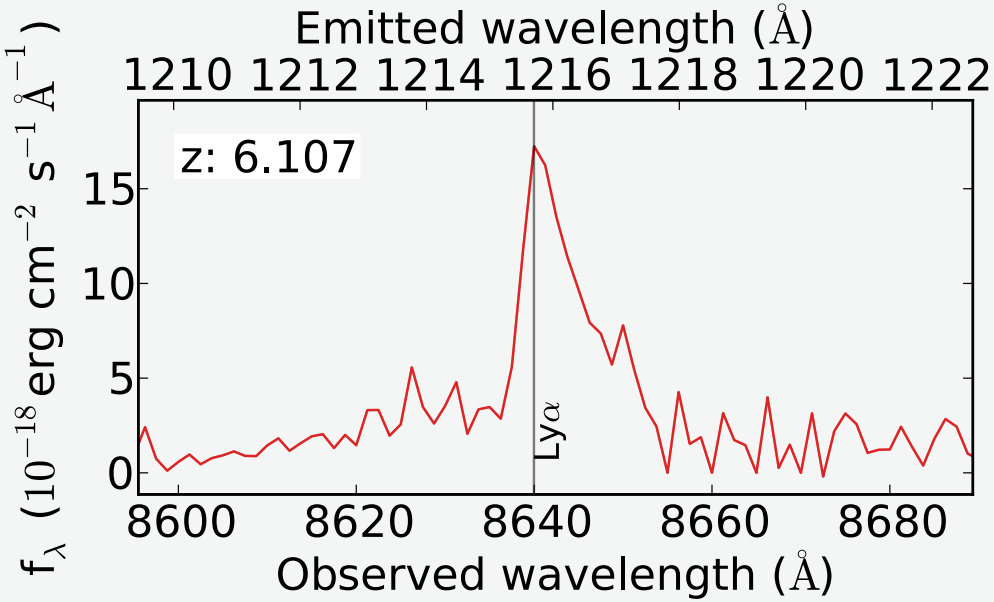
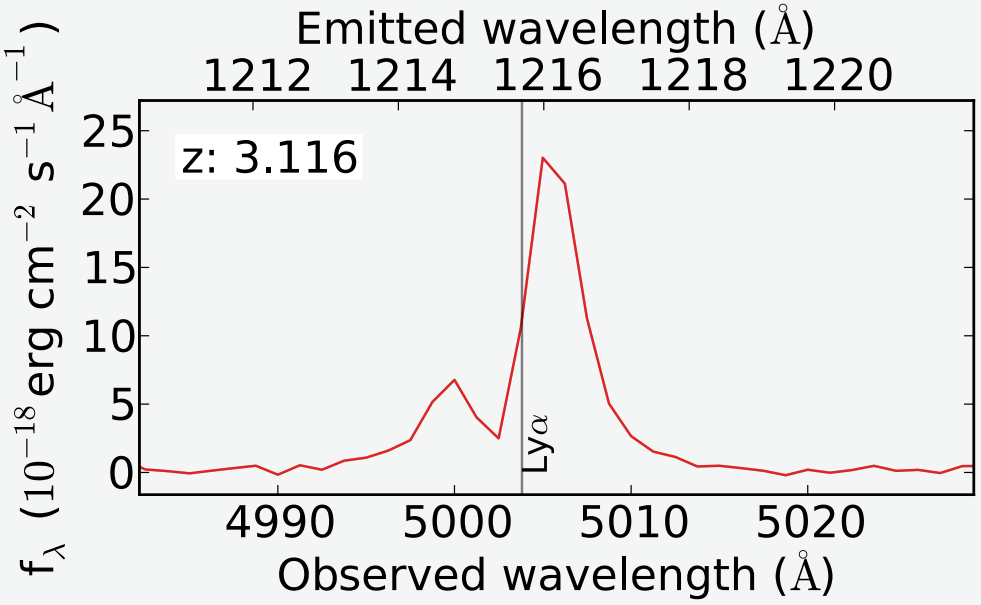
Line ratio's

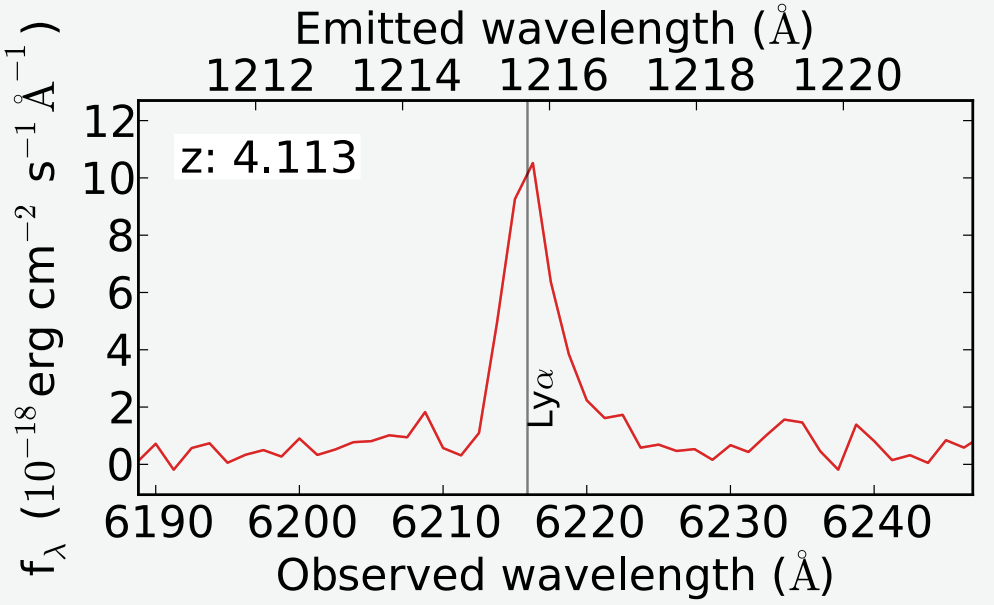
	Measured	AGN[1]	Hot O-stars[1]
C IV	17.3	1	1
He II/C IV	0.20	0.10-1.51	0.03
O III]/C IV	0.25	0.59-0.71	0.24
C III]/C IV	0.29	0.49-0.57	0.29

[1]Binette et al. 2003, A&A, 405, 975


Emitted wavelength (Å)
1212 1214 1216 1218 1220
z: 3.228
Lyα
f_λ (10^{-18} erg cm^{-2} s^{-1} Å^{-1})
5120 5130 5140 5150 5160
Observed wavelength (Å)


Emitted wavelength (Å)
1210 1212 1214 1216 1218 1220 1222
z: 6.107
Lyα
f_λ (10^{-18} erg cm^{-2} s^{-1} Å^{-1})
8600 8620 8640 8660 8680
Observed wavelength (Å)


Emitted wavelength (Å)
1212 1214 1216 1218 1220
z: 3.116
Lyα
f_λ (10^{-18} erg cm^{-2} s^{-1} Å^{-1})
4990 5000 5010 5020
Observed wavelength (Å)


Emitted wavelength (Å)
1212 1214 1216 1218 1220
z: 4.113
Lyα
f_λ (10^{-18} erg cm^{-2} s^{-1} Å^{-1})
6190 6200 6210 6220 6230 6240
Observed wavelength (Å)

LABOCA excess

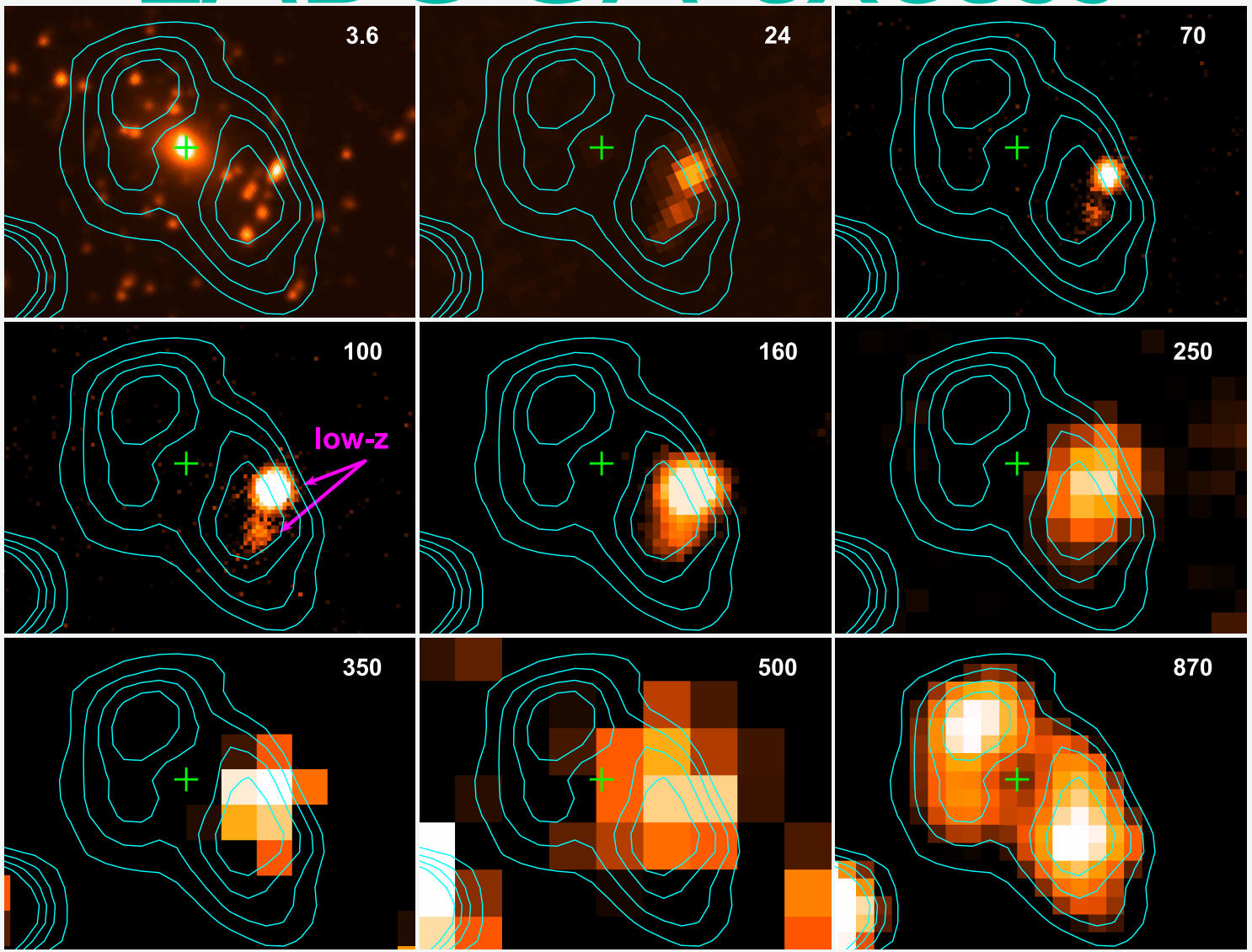


Figure 1 from Boone+ 2013

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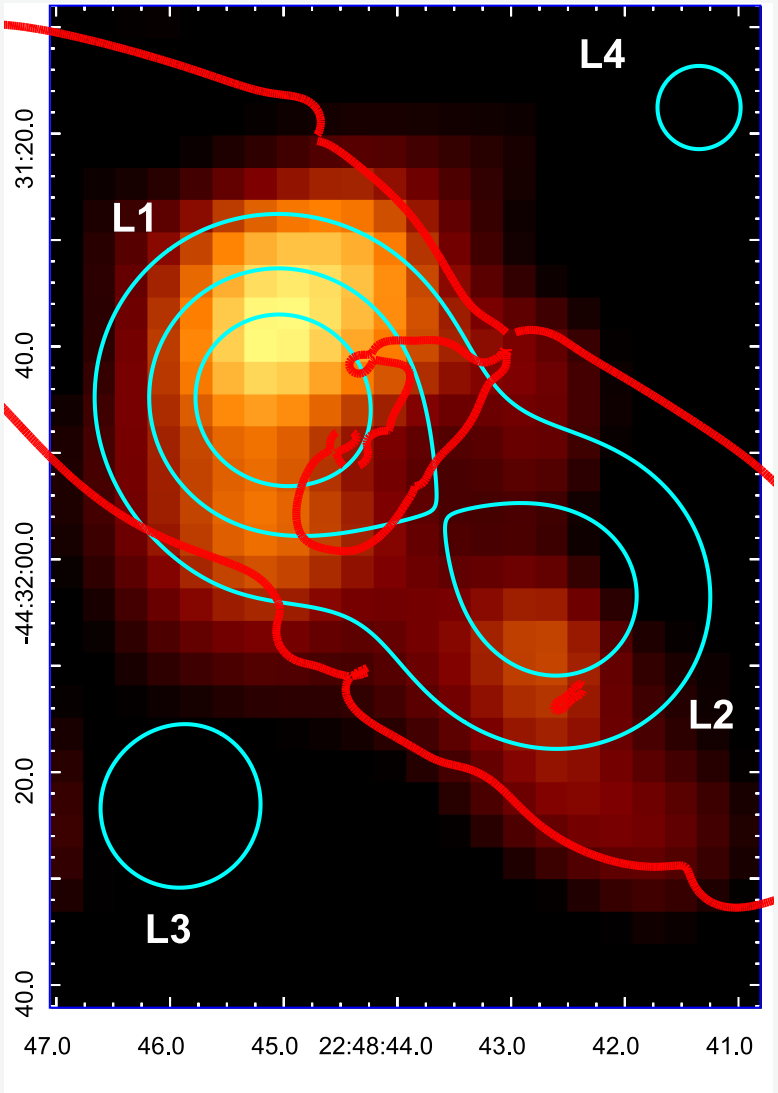
LABOCA excess



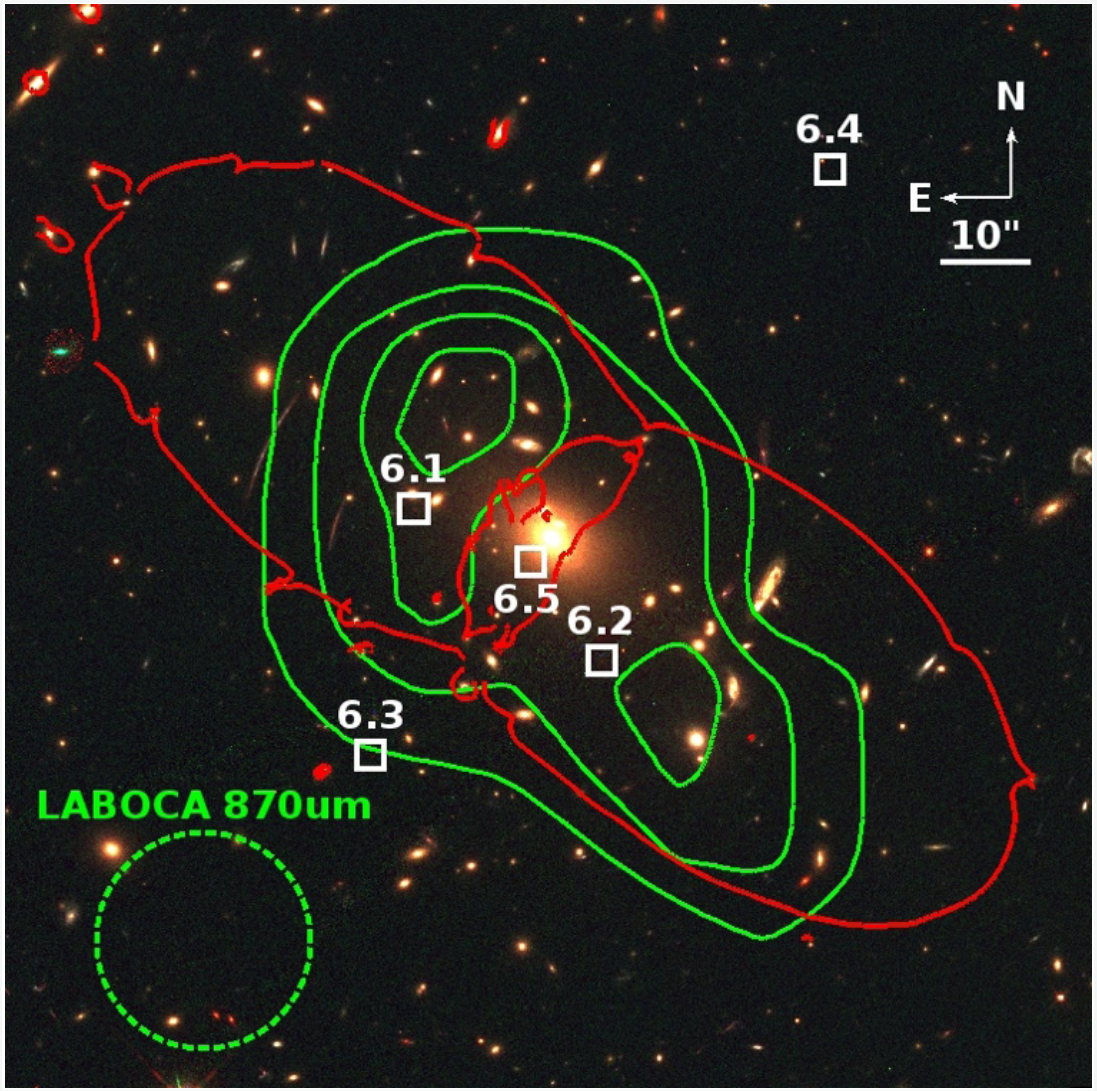


Figure 2 from Boone+ 2013

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LABOCA counterparts?

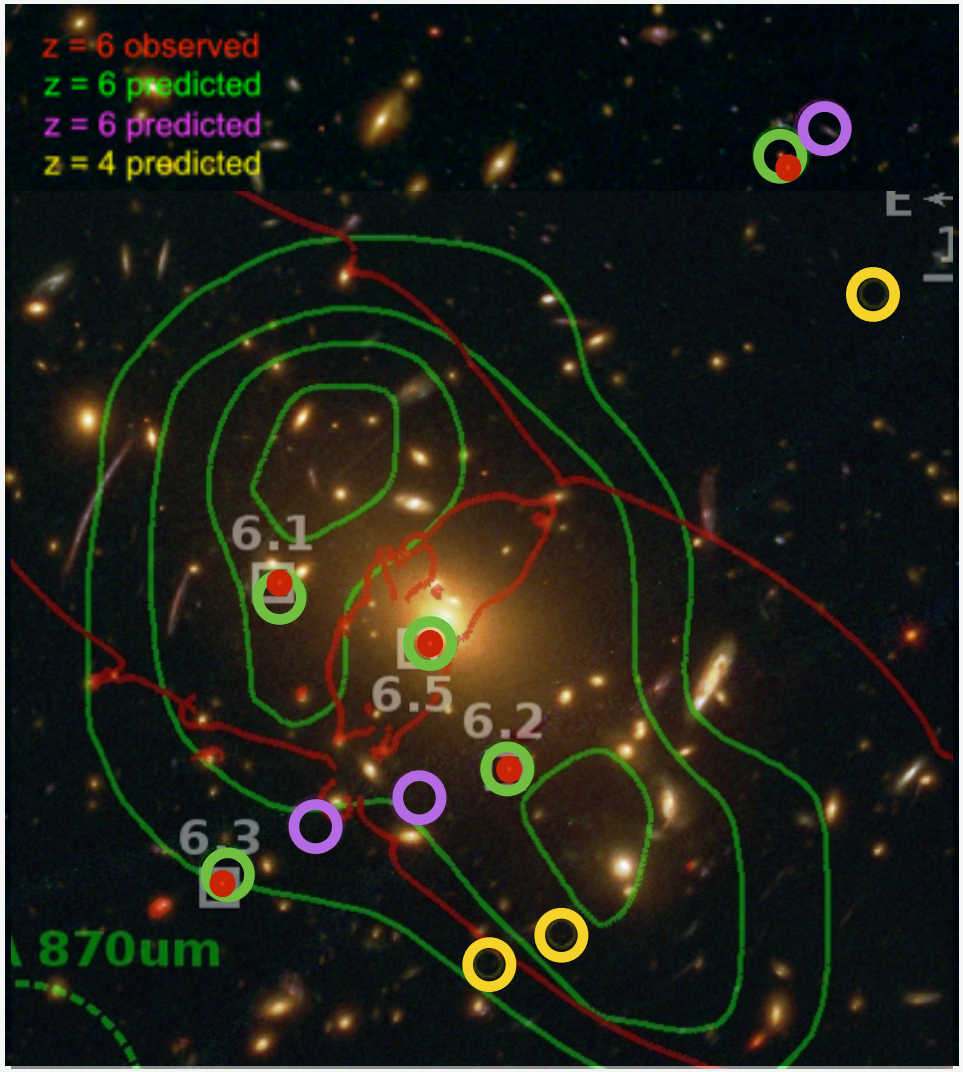

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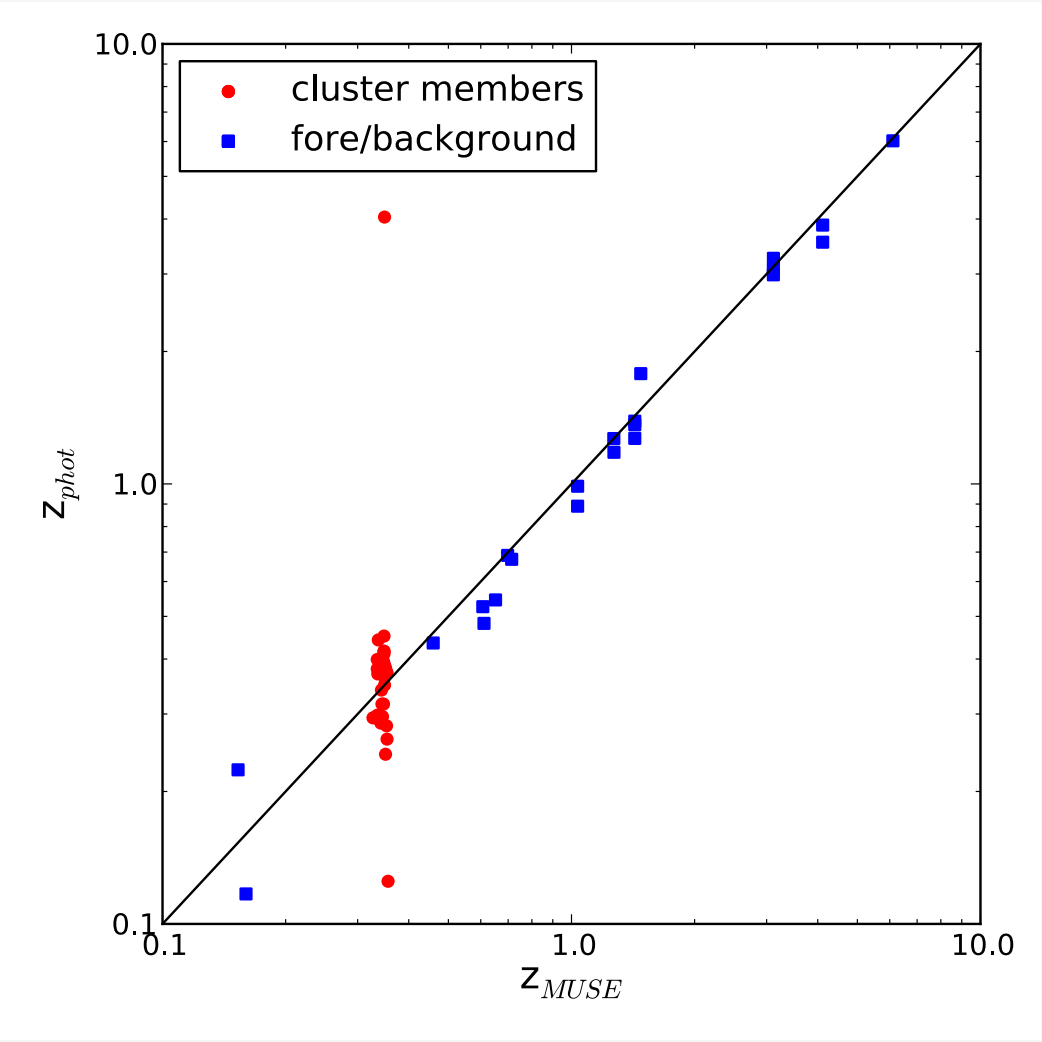
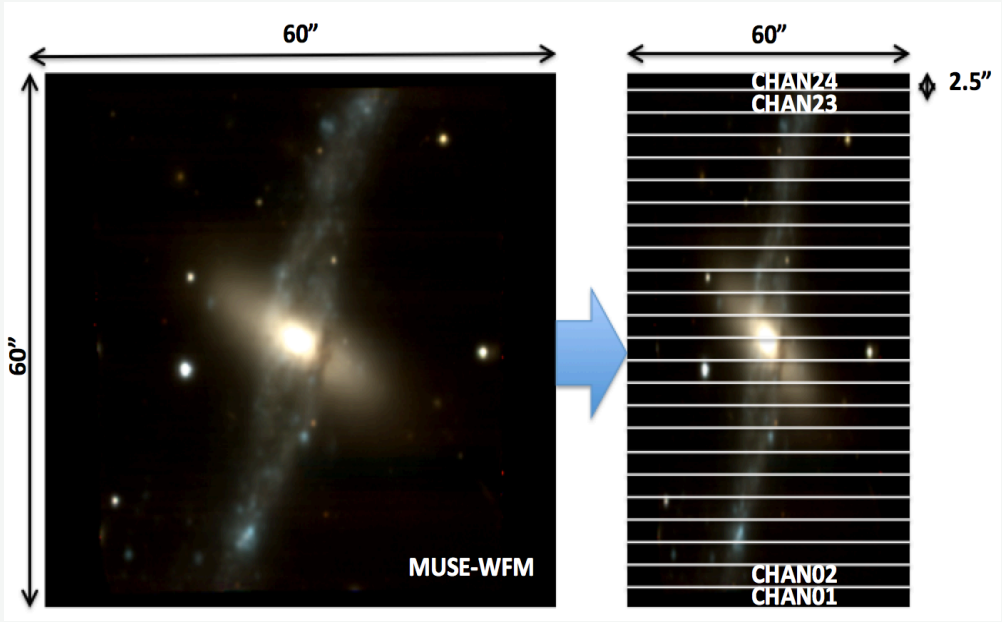
Photo-z estimates

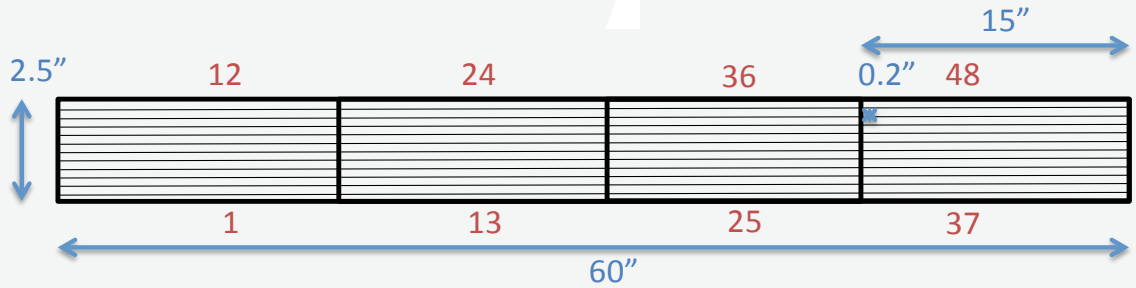


AS1063 by MUSE

MUSE

- Wide Field Mode:
  - 1×1 arcmin^2 FOV
  - 0.2” per spaxel
- Wavelength:
  - 4800 - 9300 Å
  - 1.25 Å per spaxel
- Spatial accuracy ~0.12”





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