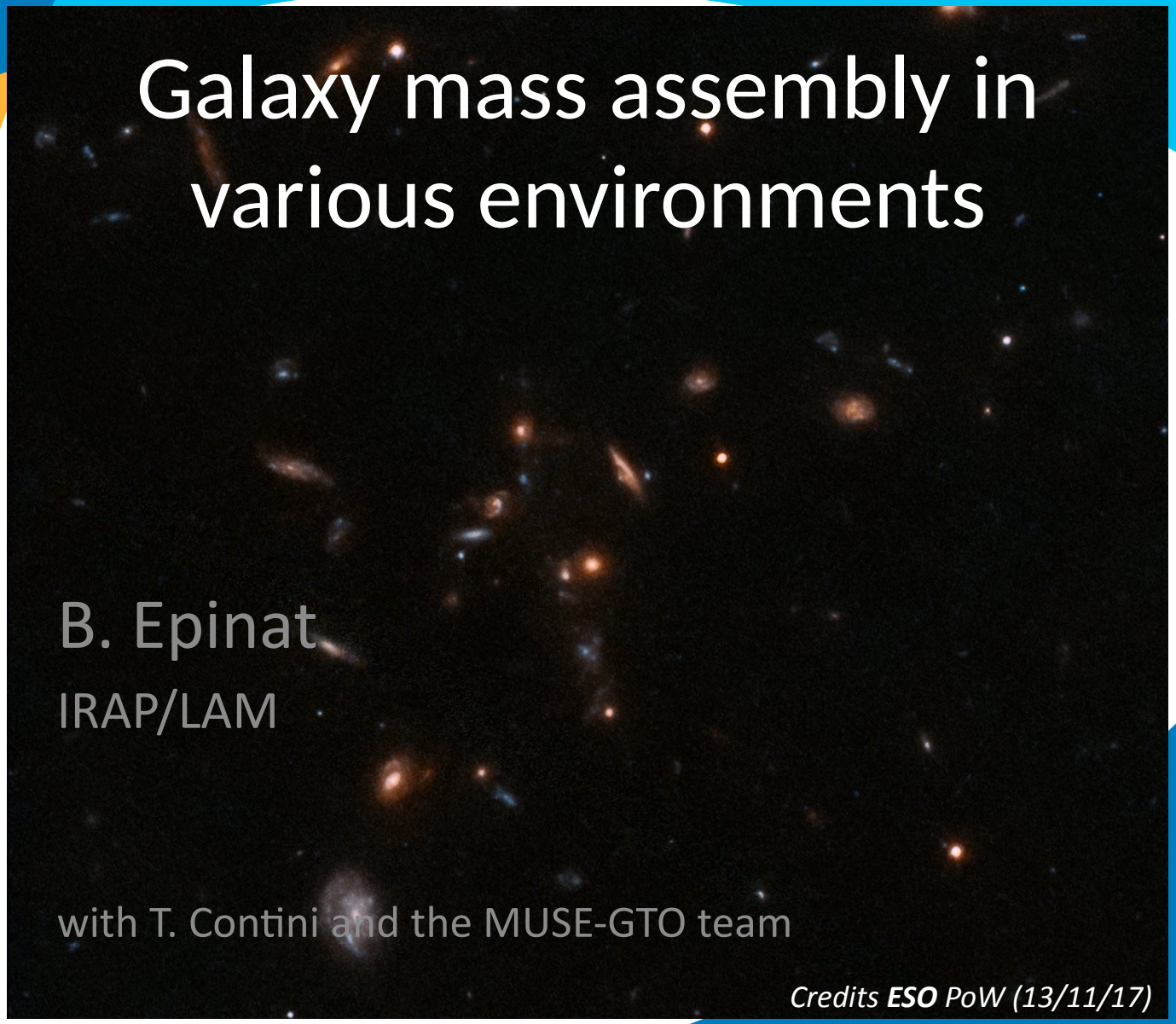
Galaxy mass assembly in various environments



B. Epinat

IRAP/LAM

with T. Contini and the MUSE-GTO team

*Credits **ESO** PoW (13/11/17)*

PNCG
Programme National de Cosmologie et Galaxies

Aix*Marseille université

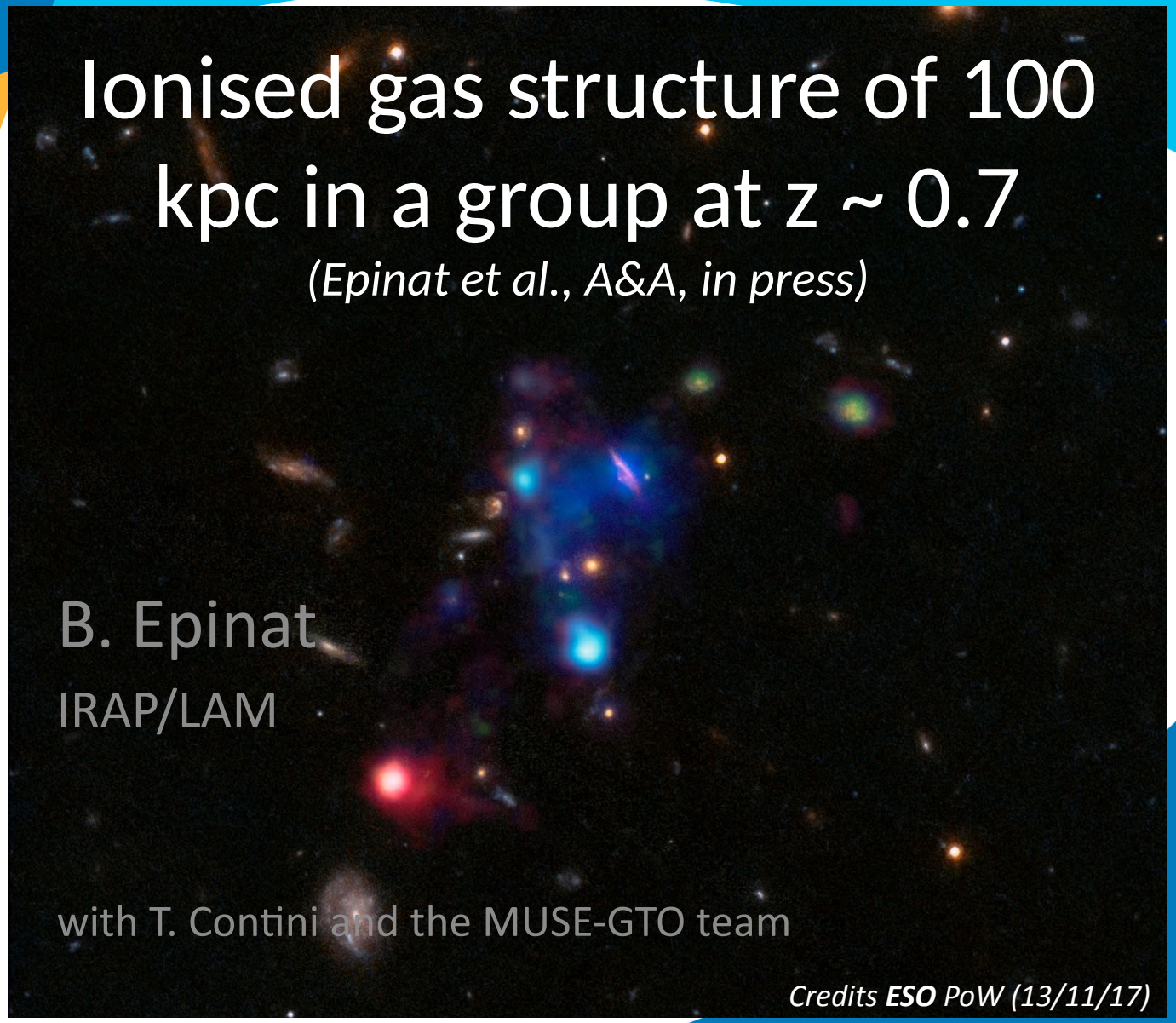
cnrs

LAM
Laboratoire d'Astrophysique de Marseille

irap
astrophysique & planétologie

Ionised gas structure of 100 kpc in a group at z ~ 0.7

(Epinat et al., A&A, in press)



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COSMOS-GR30 membership

Group @ z ~ 0.72

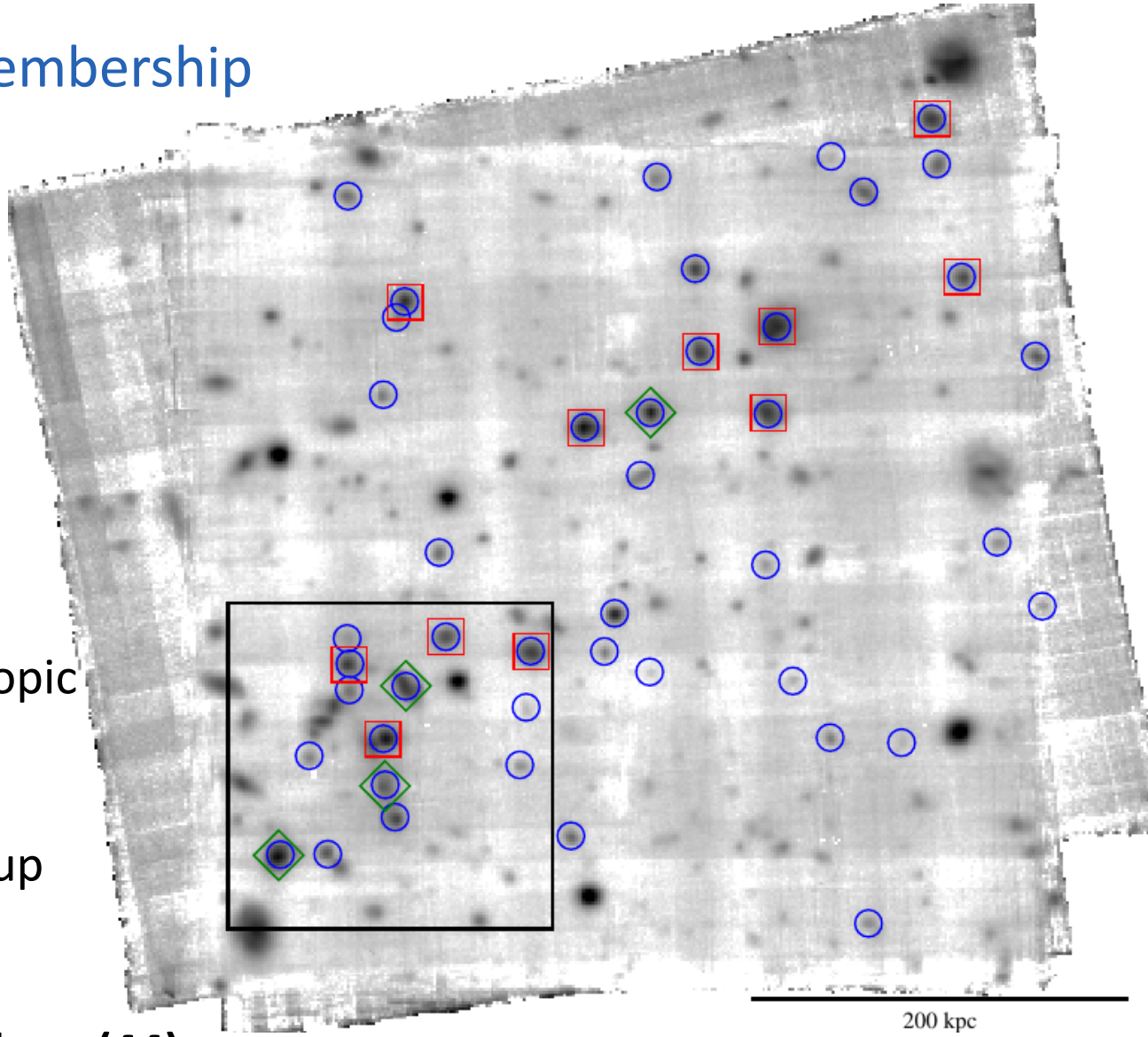
<u>MUSE data:</u>
Observations: 9.75h
Seeing : 0.7’’

MUSE white light image

Red: previous spectroscopic group members (11)

Green: photometric group member candidates (4)

Blue: MUSE group members **(44)**

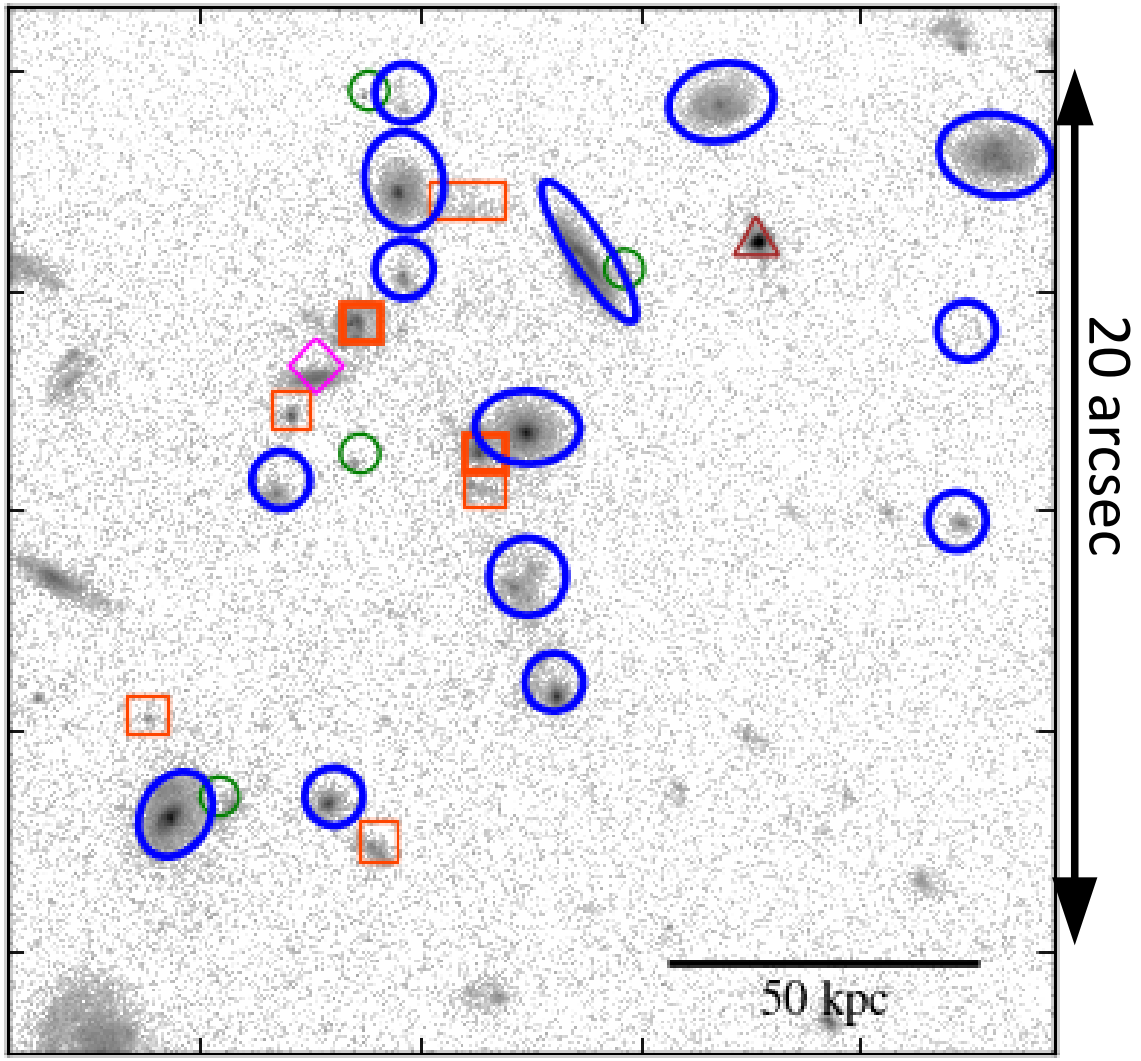


Extended ionised region

Group @ z~0.72

MUSE data:
Observations: 9.75h
Seeing : 0.7''

HST/ACS image F814W



Blue: group members
Magenta & Red: secure foreground and background galaxies
Green: no secure redshift

Extended ionised region

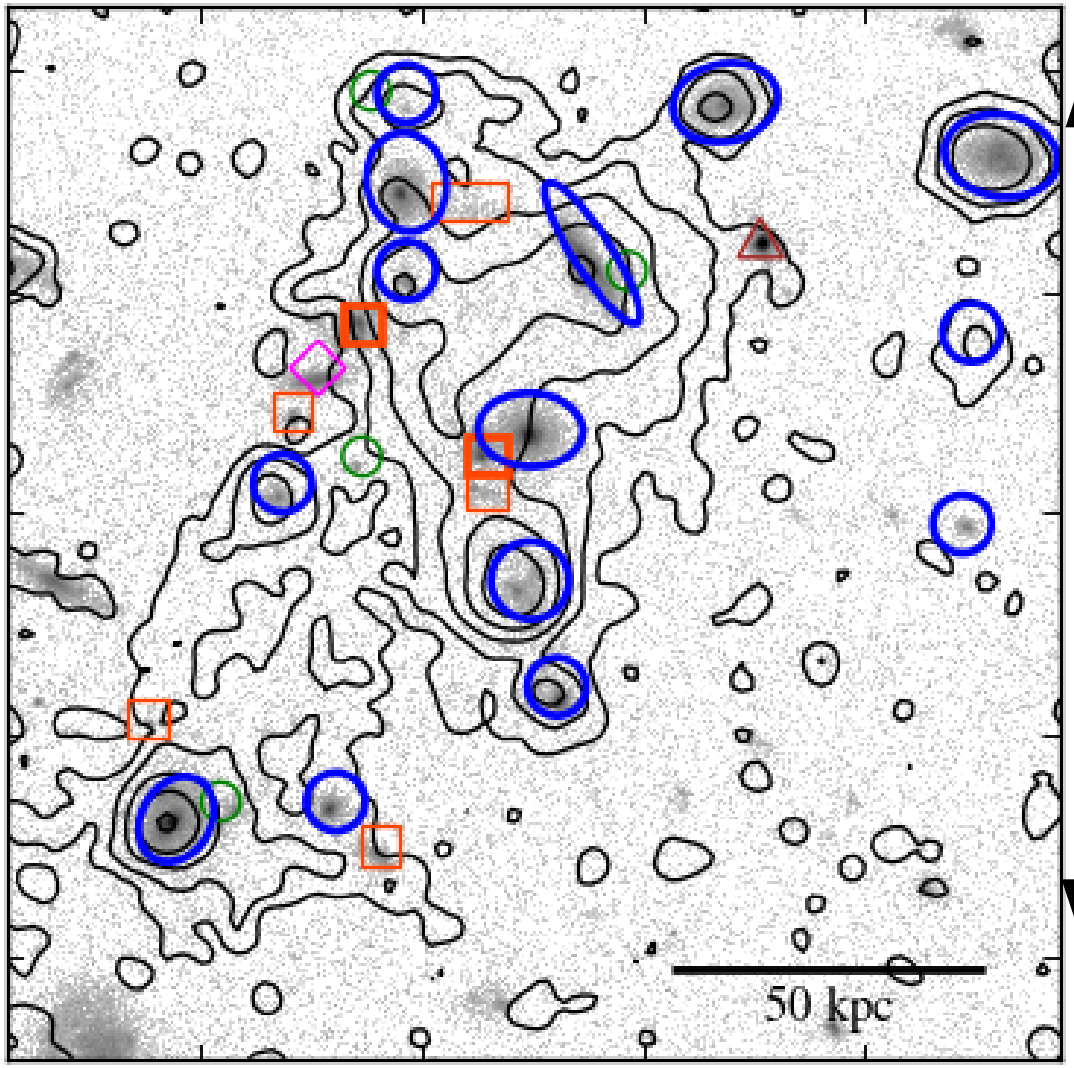
Group @ z~0.72

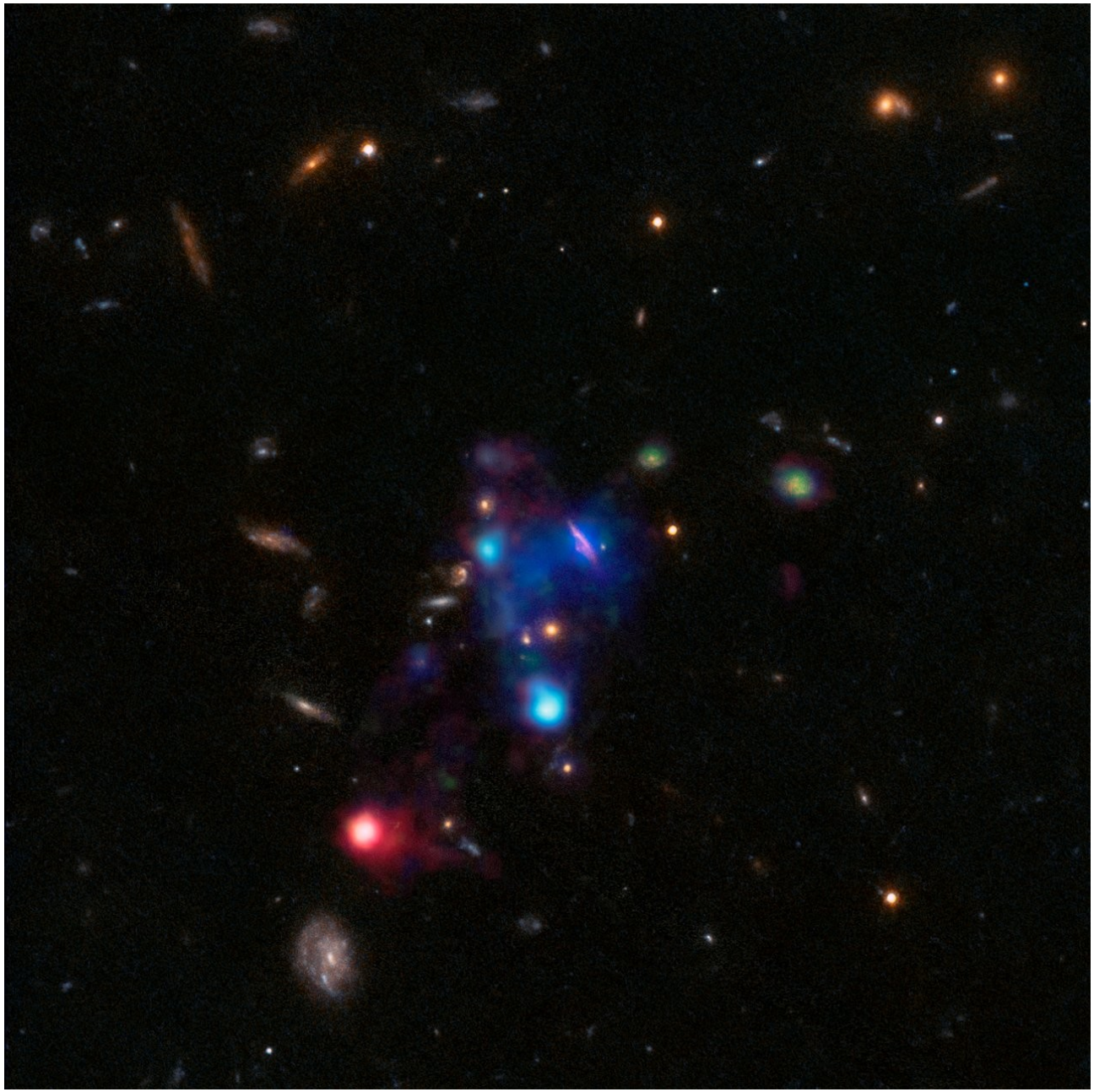
MUSE data:
Observations: 9.75h
Seeing : 0.7''

HST/ACS image F814W
+ MUSE [OII] contours

→ [OII] over ~10000 kpc²

Blue: group members
Magenta & Red: secure foreground and background galaxies
Green: no secure redshiftt





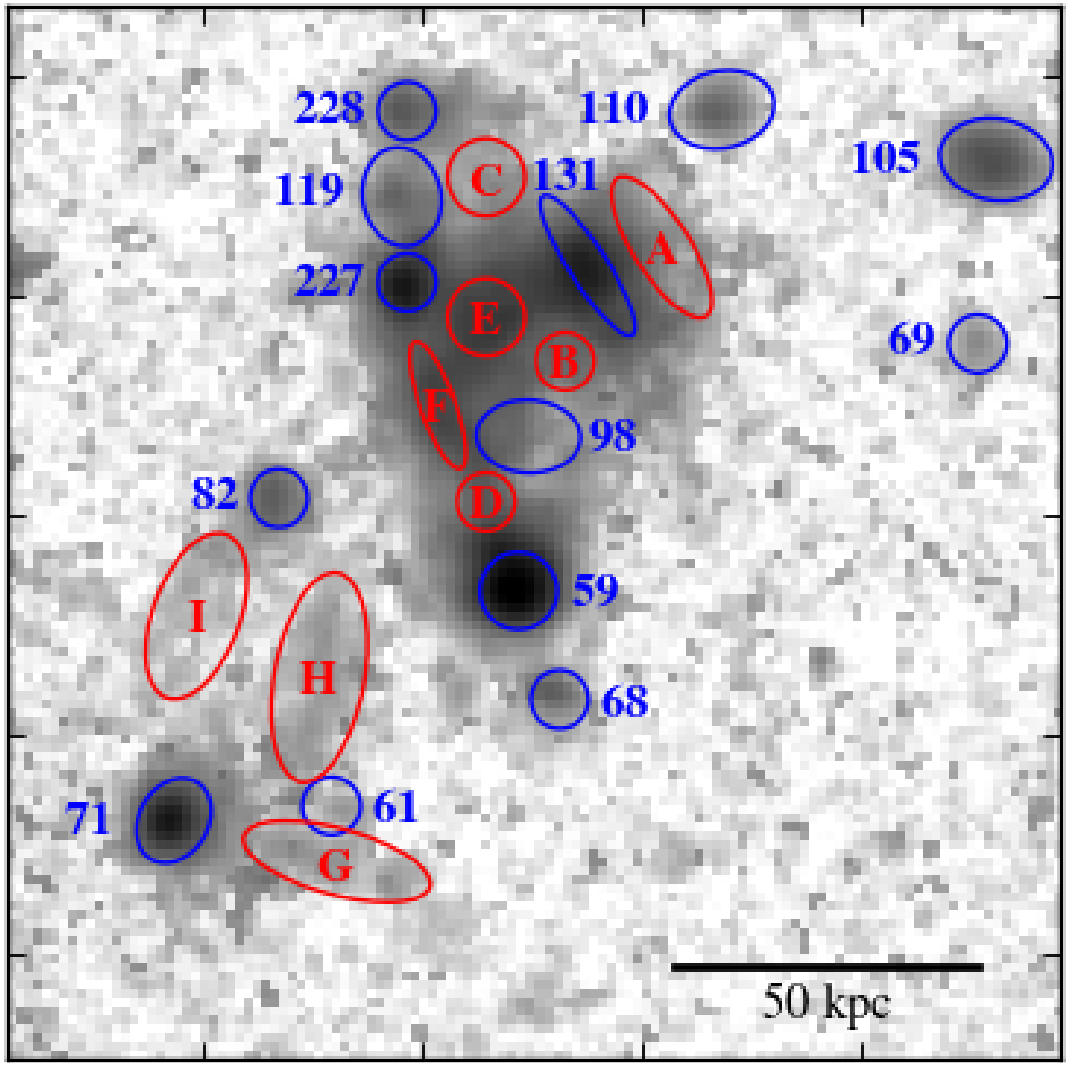
Spectra extraction

Blue: group members
Red: extended regions

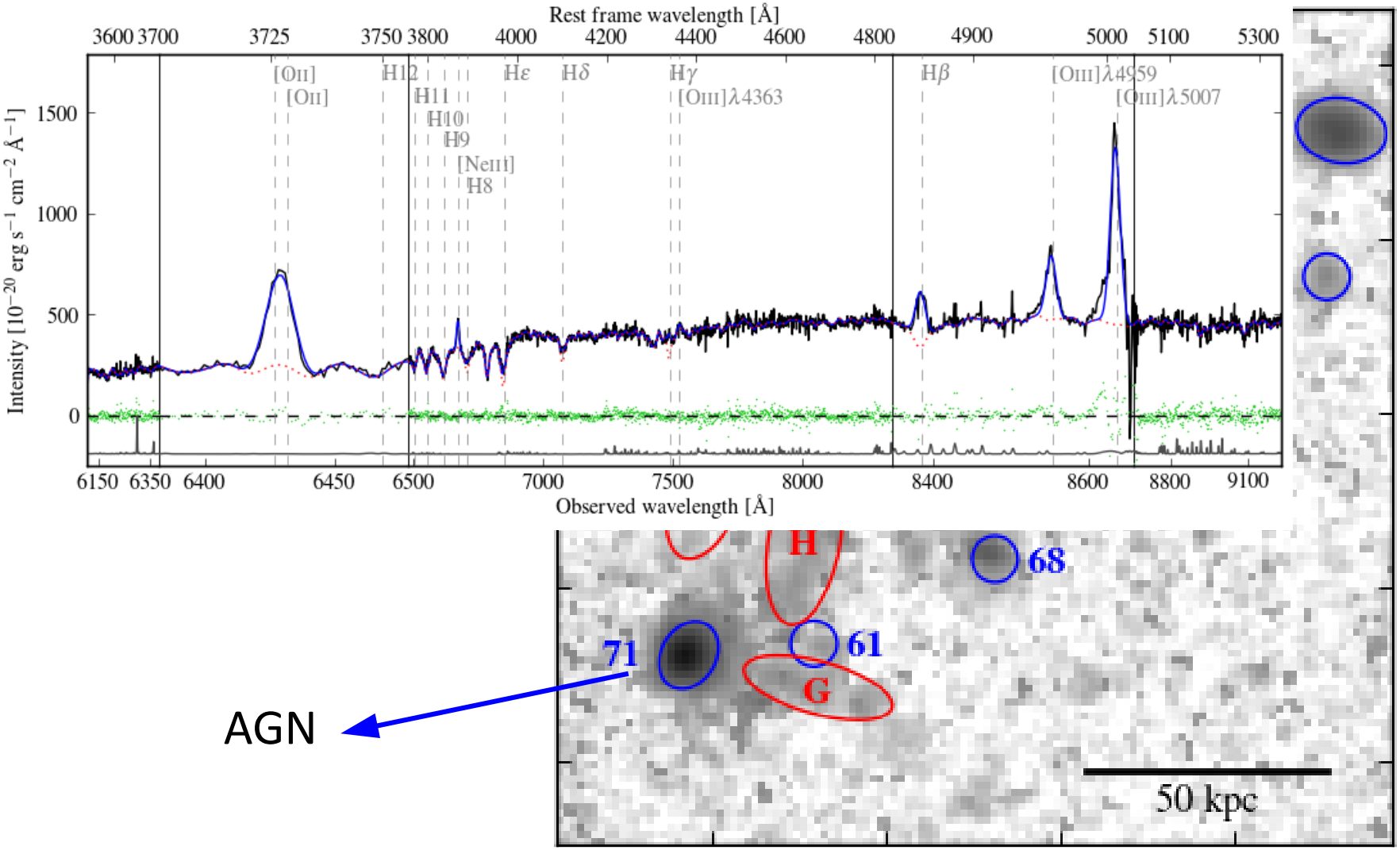
Spectra extraction over each region

Continuum removed (PPXF) to measure emission line fluxes

- Balmer lines
- [OIII] lines
- [OII] doublet



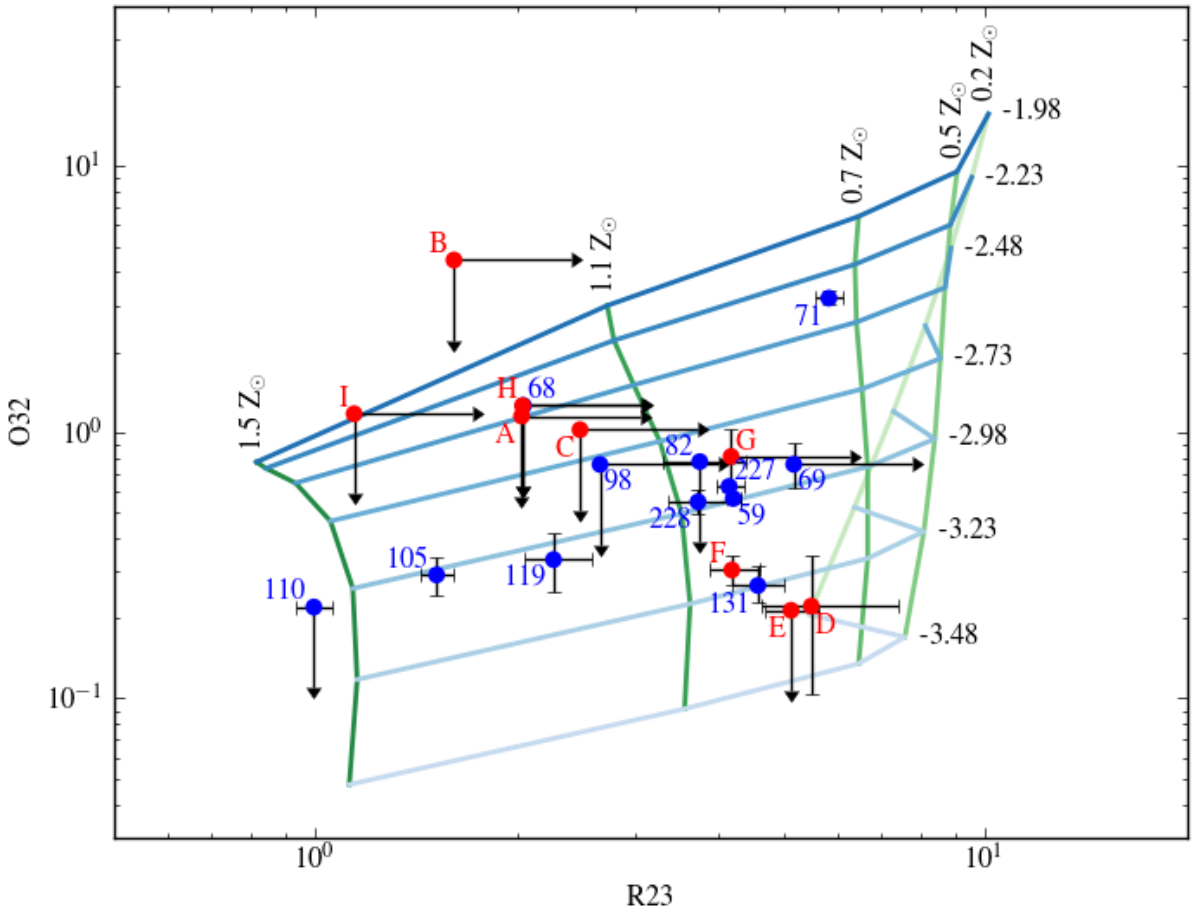
Spectra extraction



Line diagnostics

Blue: group members
Red: extended regions

MAPPINGS V photo-ionisation models (Sutherland et al. In prep)



$$\mathrm{R23} = \frac{[\mathrm{O\,III}]\lambda5007 + [\mathrm{O\,III}]\lambda4959 + [\mathrm{O\,II}]\lambda3729 + [\mathrm{O\,II}]\lambda3726}{\mathrm{H}\beta}$$

Metallicity proxy

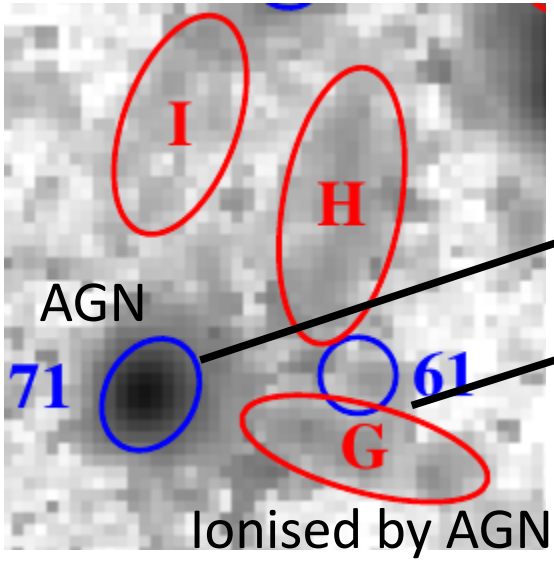
$$\mathrm{O32} = \frac{[\mathrm{O\,III}]\lambda5007 + [\mathrm{O\,III}]\lambda4959}{[\mathrm{O\,II}]\lambda3729 + [\mathrm{O\,II}]\lambda3726}$$

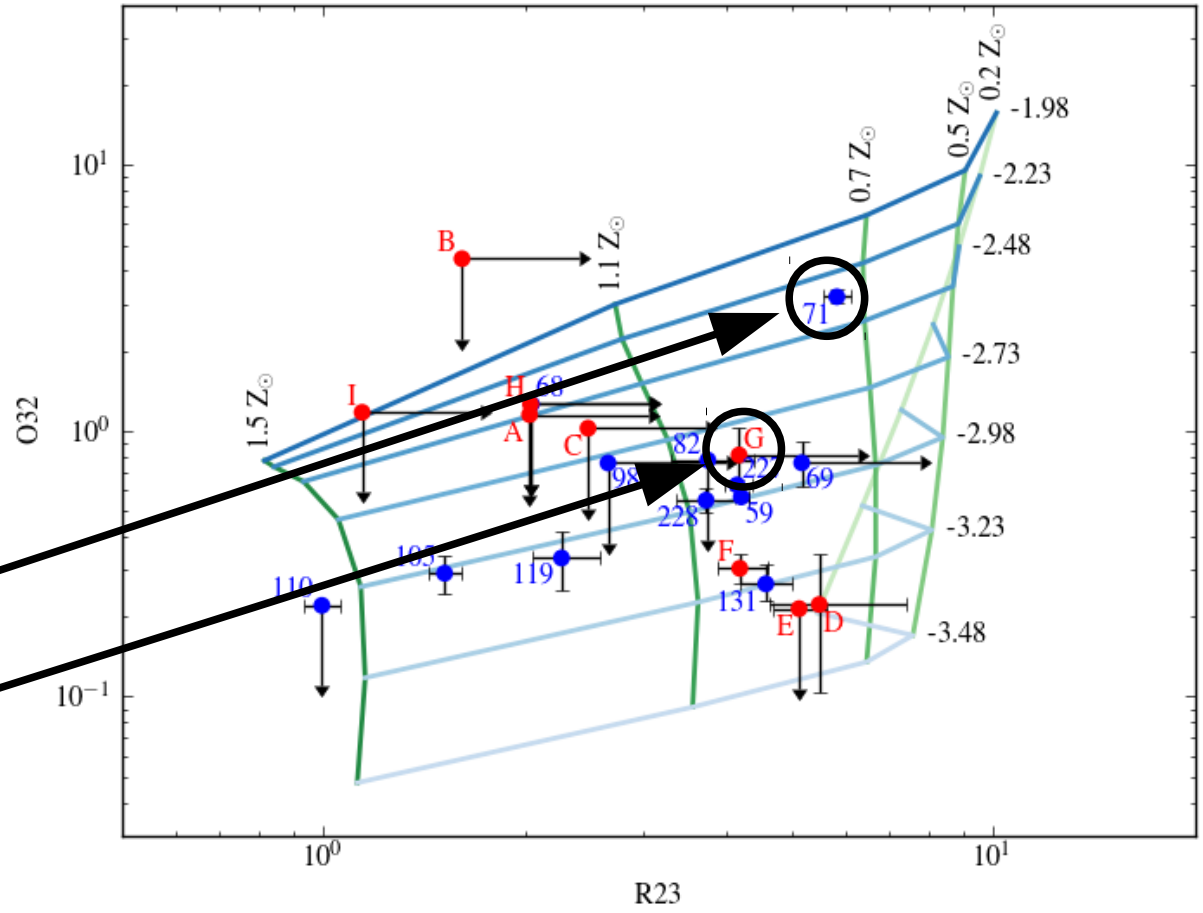
Ionisation degree

Line diagnostics

AGN ionisation induces a higher parameter:

$$[\mathrm{O\,III}]/\mathrm{H}\beta = \frac{[\mathrm{O\,III}]\lambda5007 + [\mathrm{O\,III}]\lambda4959}{\mathrm{H}\beta}$$

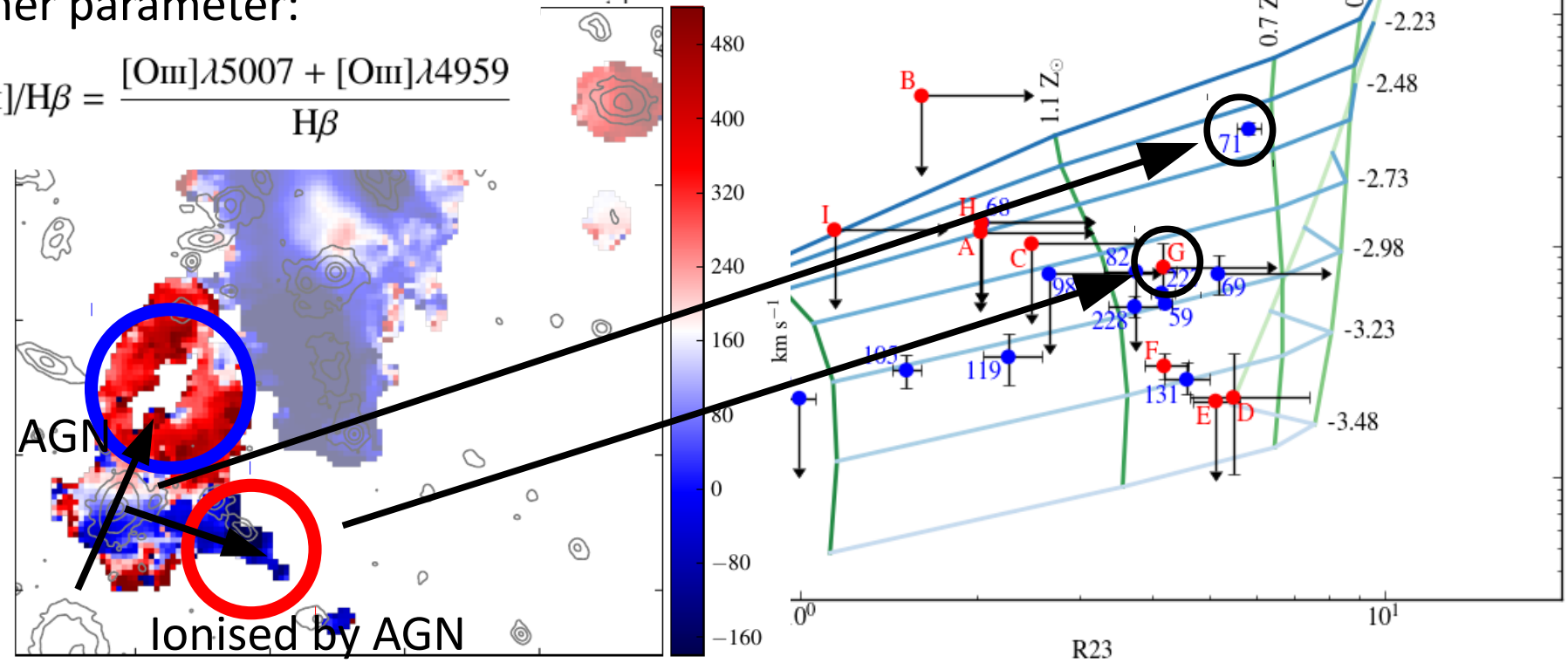




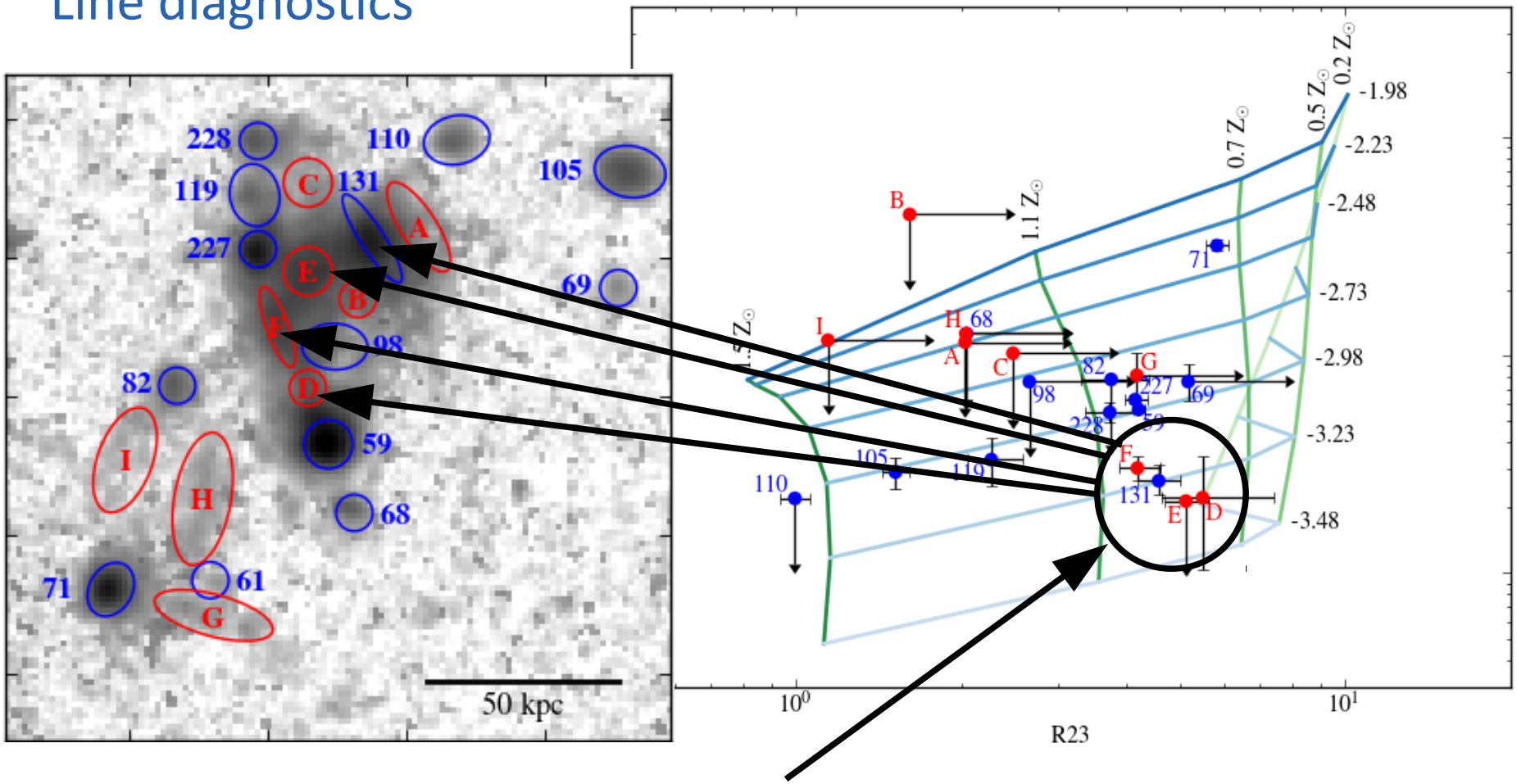
Line diagnostics

AGN ionisation induces a higher parameter:

$$[\mathrm{O\,III}]/\mathrm{H}\beta = \frac{[\mathrm{O\,III}]\lambda5007 + [\mathrm{O\,III}]\lambda4959}{\mathrm{H}\beta}$$

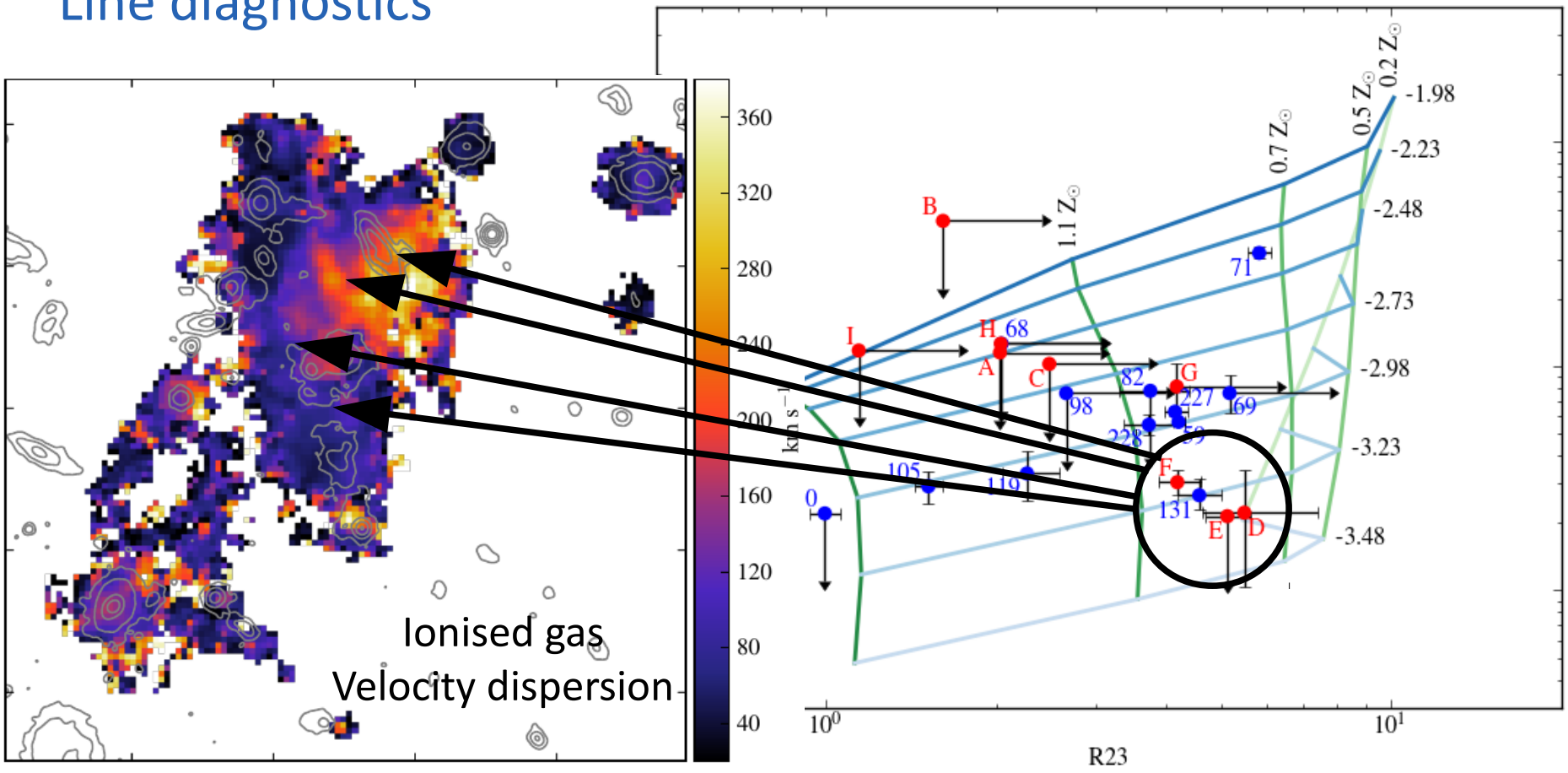


Line diagnostics



Peculiar ionisation degree

Line diagnostics

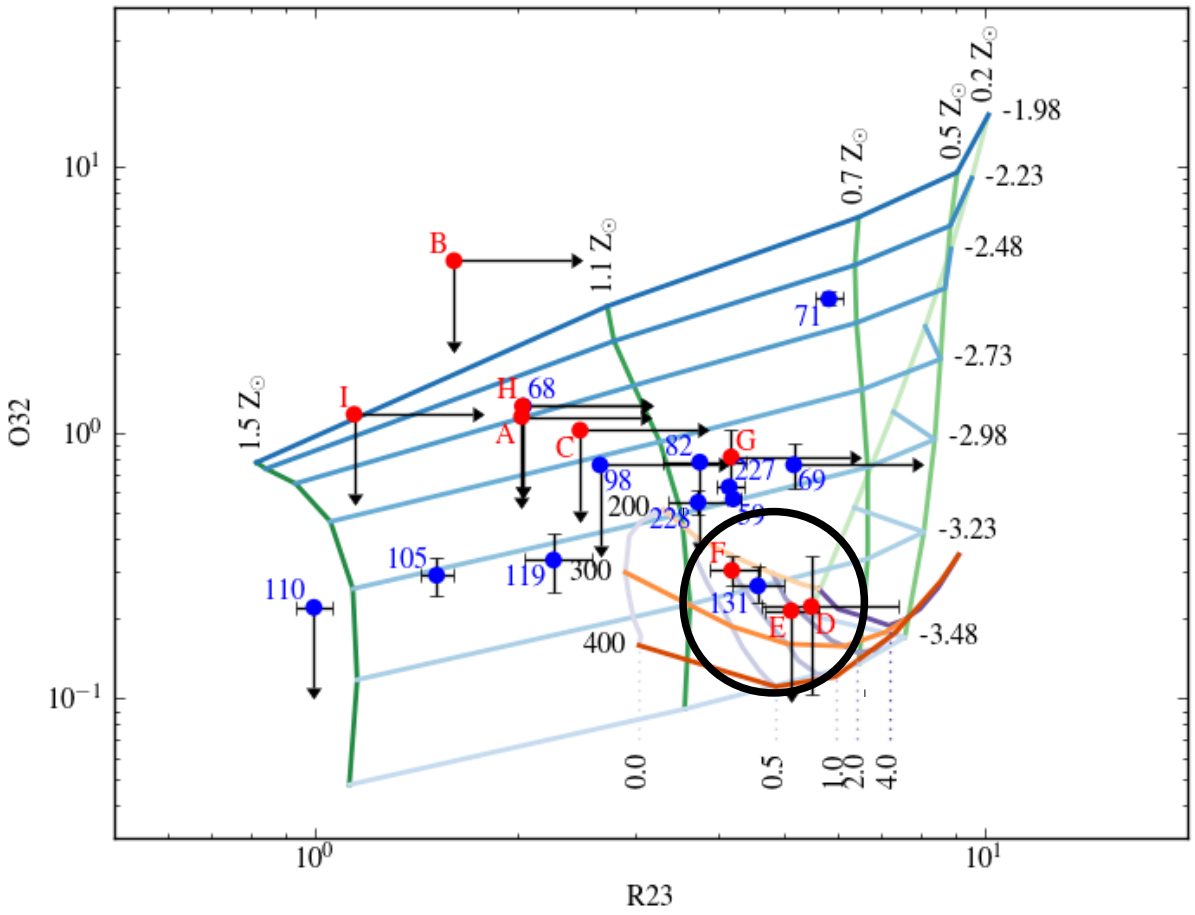


Extended regions + edge-on galaxy
→ higher velocity dispersion

Line diagnostics

MAPPINGS III shock models (Allen et al. 2008)

Good agreement:
- ~200 km/s shock
- sub-solar metallicity
- no precursor
- 1 particle / cm^3



Shock + column density → gas in a thin disk

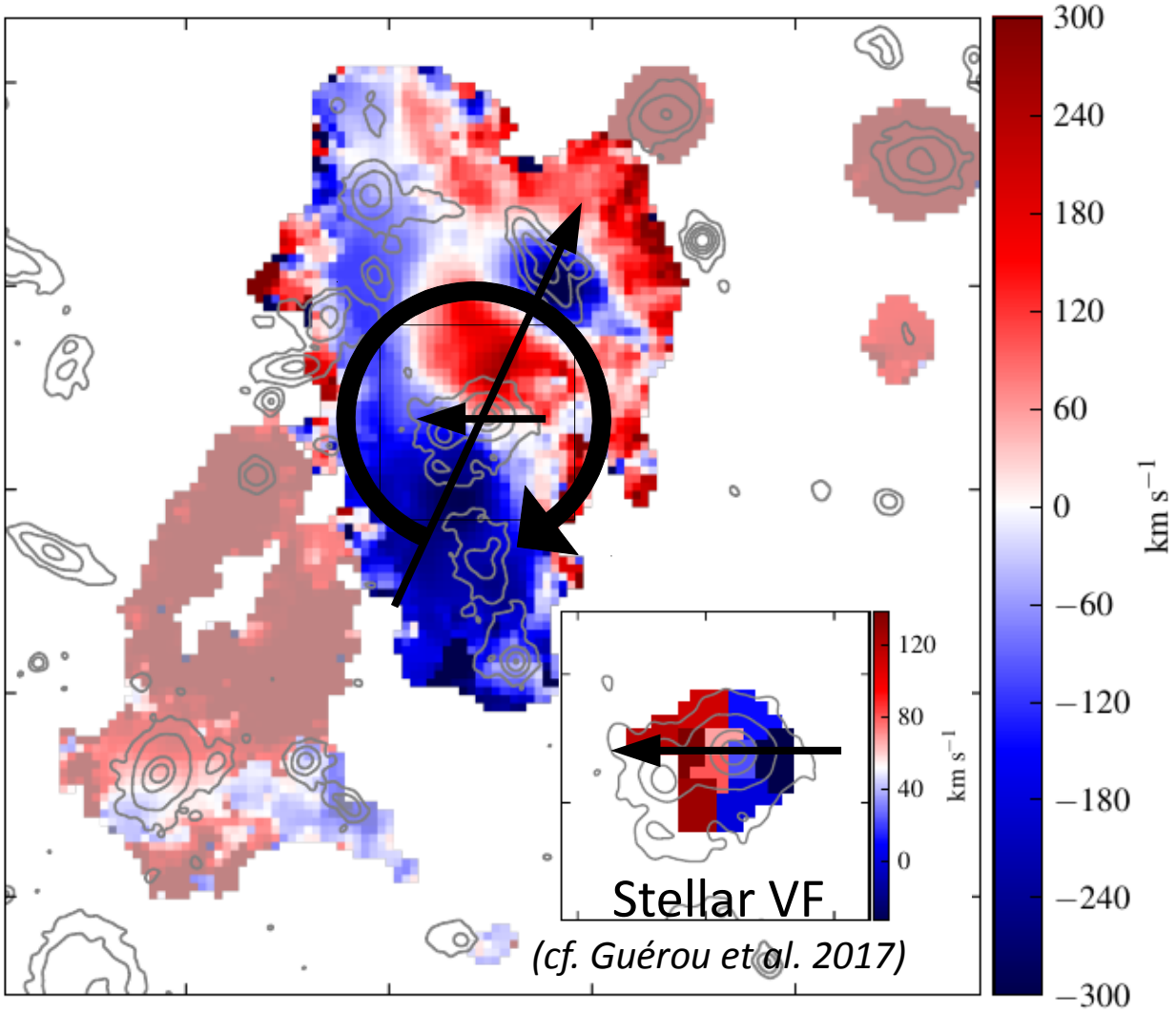
[OII] kinematics

Gas and stellar spins are different

- ➔ BUT gas and stars lead to similar dynamical masses: $M_{dyn} \sim 3 \times 10^{11}$ Msun

Rotation around the most massive galaxy favoured

Small galaxies follow ionised gas motion: tidal galaxies?



(cf. Guérou et al. 2017)

Interpretation

M_{gas} ~ $5x10^{10}$ Msun

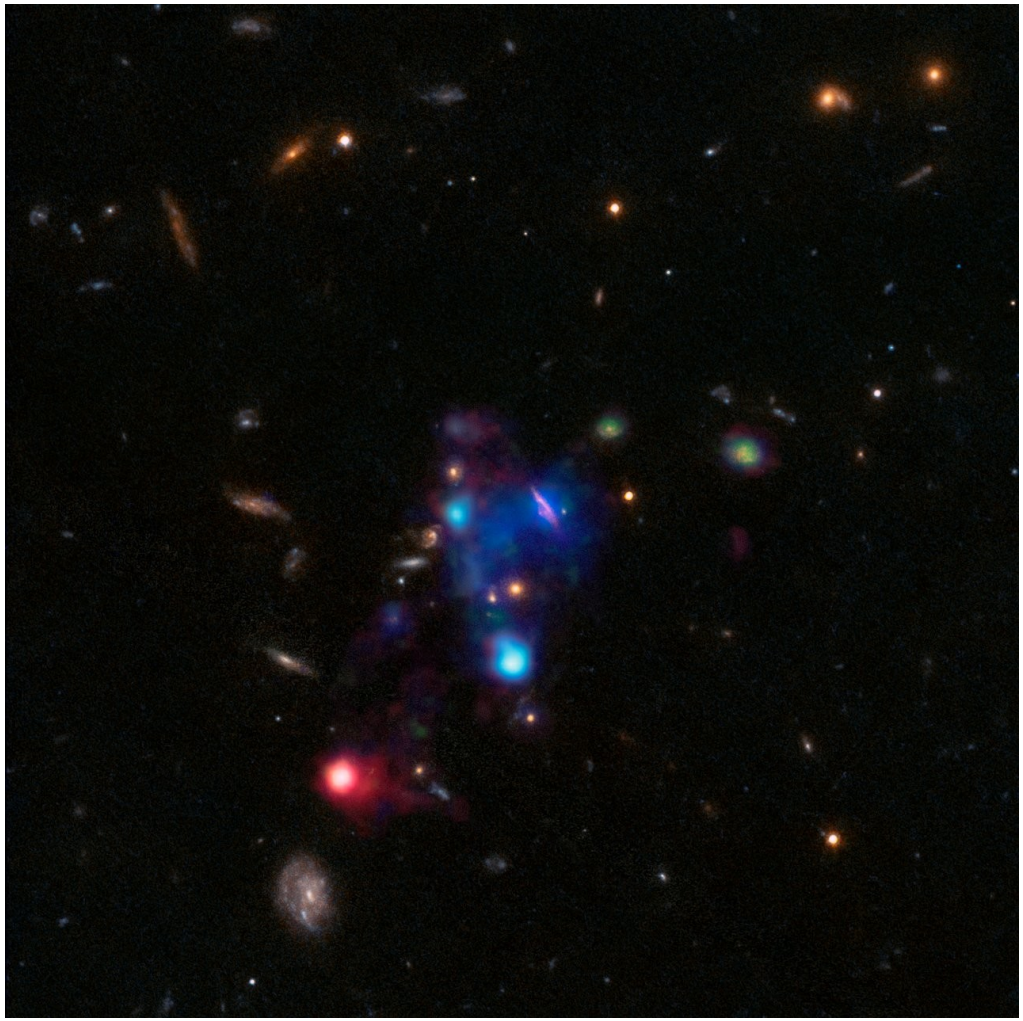
Galactic origin of the gas

- AGN outflows
- Tidal forces due to interactions

Source of ionisation

- Star formation in tidal tails
- Shocks between extended and galactic gas
- AGN power for the jet-like feature
- Fast particles?

Induced by interactions



Next steps

- NOEMA CO follow up
- KMOS NIR follow up