

3D Observations of QSO Host Galaxies

Knud Jahнке

Lutz Wisotzki

Sebastián Sánchez
(AIP)

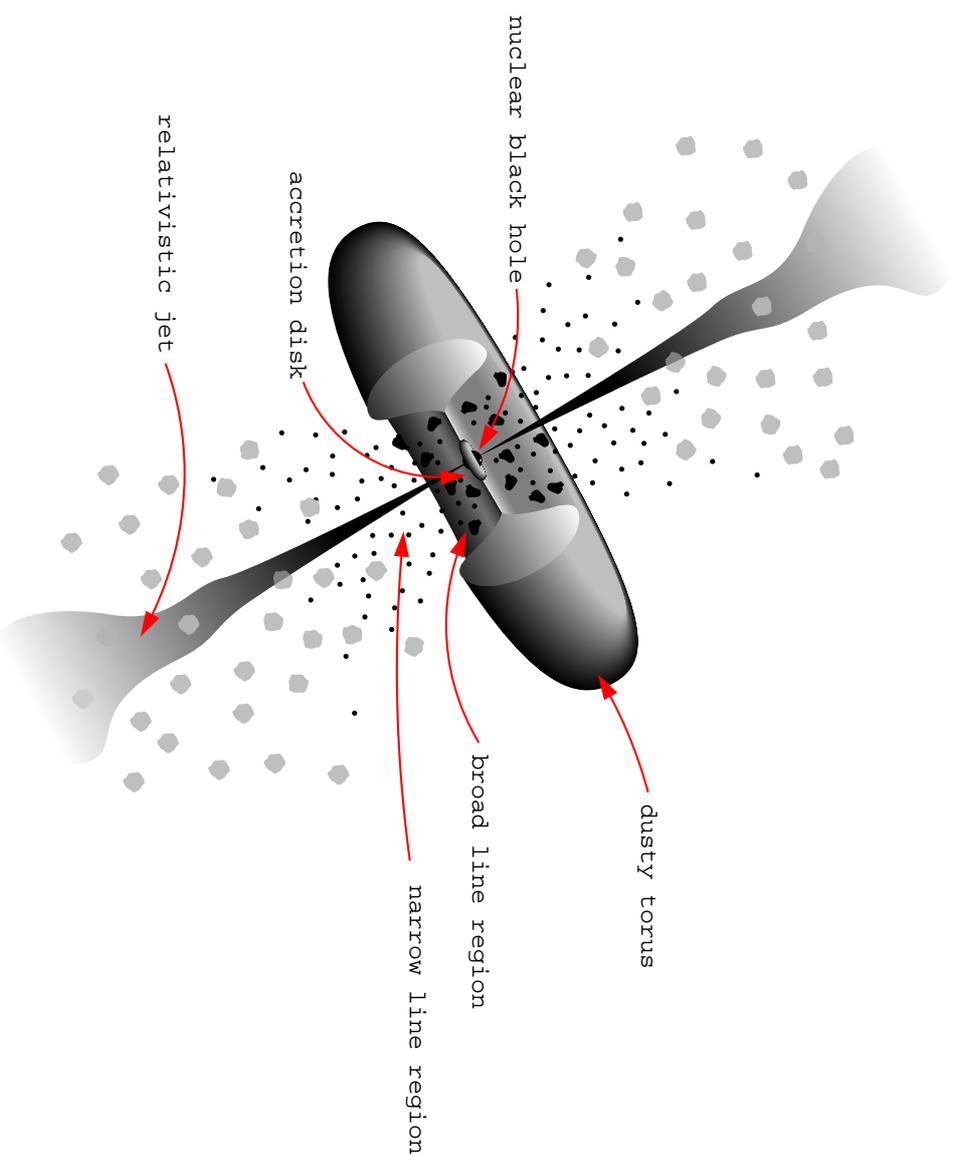
Euro3D meeting

Cambridge, 21.-23. May 2003

The questions

1. how does the nuclear emission influence processes in the host galaxy?
2. QSOs/AGN nuclei produce high fraction of UV background in early universe
→ what about today?
3. the unified models for AGN predicts dust torus around nucleus
→ can we see its shadow?
4. any signs for strong (merger induced) starformation?
→ study the state of the ISM round local QSOs

Nuclear model (Urry & Padovani 1995)



Things to explore

Scientifically:

- ISM ionisation visible?
- ionisation state/emission line ratios (e.g. [OIII]/H β)
 - radiation source, starformation vs. active nucleus → UV radiation escape
- shape compared to stellar component
 - distribution of gas; local star formation; shadowed regions, torus?
- rotation

Things to explore

Technically:

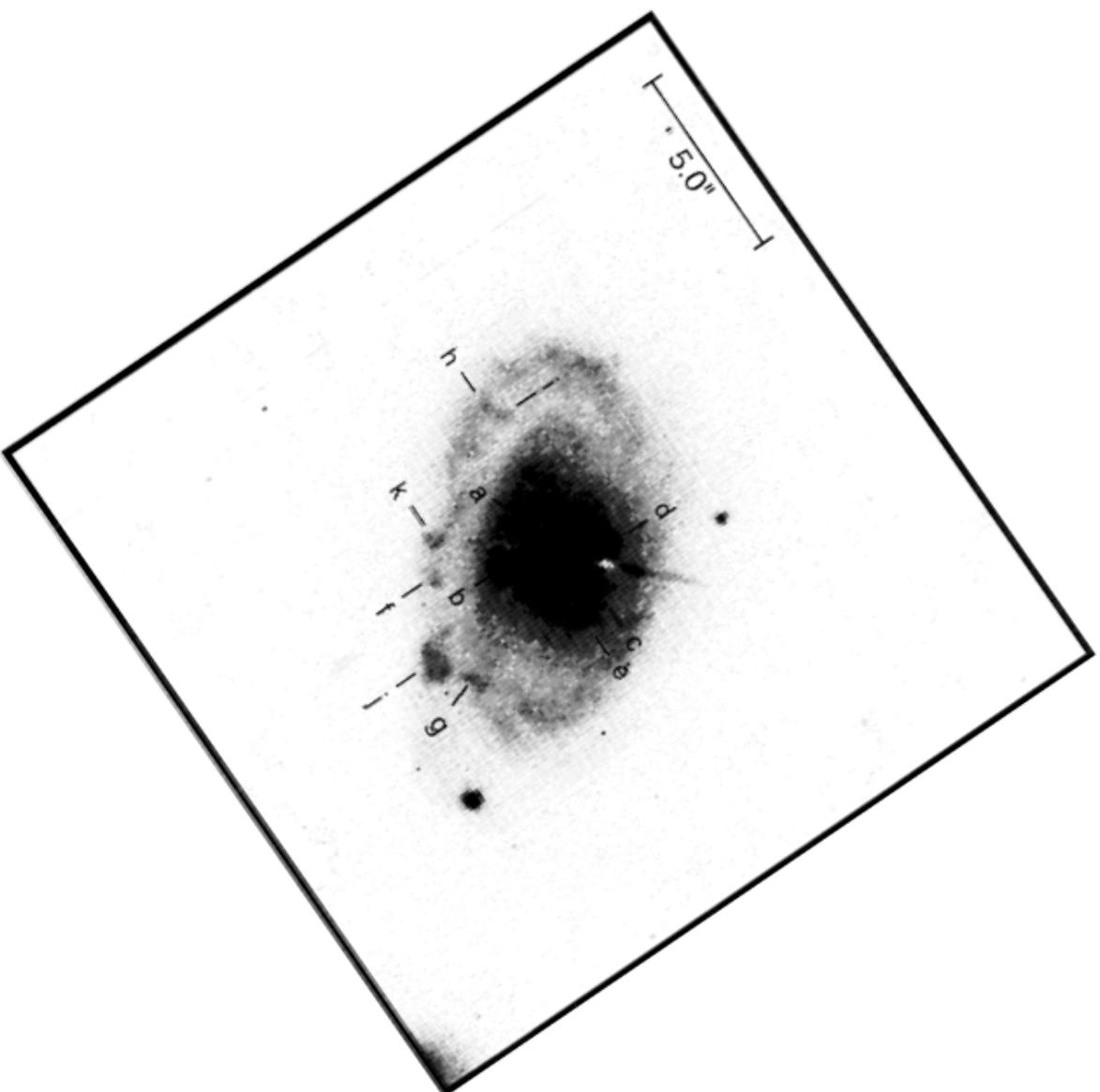
- PSF treatment!
 - important for nucleus (point source) treatment
 - autoguider to spectrograph
 - PSF from AGN 3d-spectrum itself
- a lot of general image treatment techniques...

Existing data

- ~ 20 QSOs, $z < 0.3$, $V = 14.17$ (from PG and HES)
- observed with PMAS at Calar Alto 3.5m (Sep 02 and May 03)
- integrated 1–2 h on target
- V300 grism, resolution ~ 700 , range $4000 \text{ \AA} < \lambda_0 < 7000 \text{ \AA}$
- 16×16 array, $0''.5/\text{lenslet} \rightarrow 8'' \times 8''$ FOV

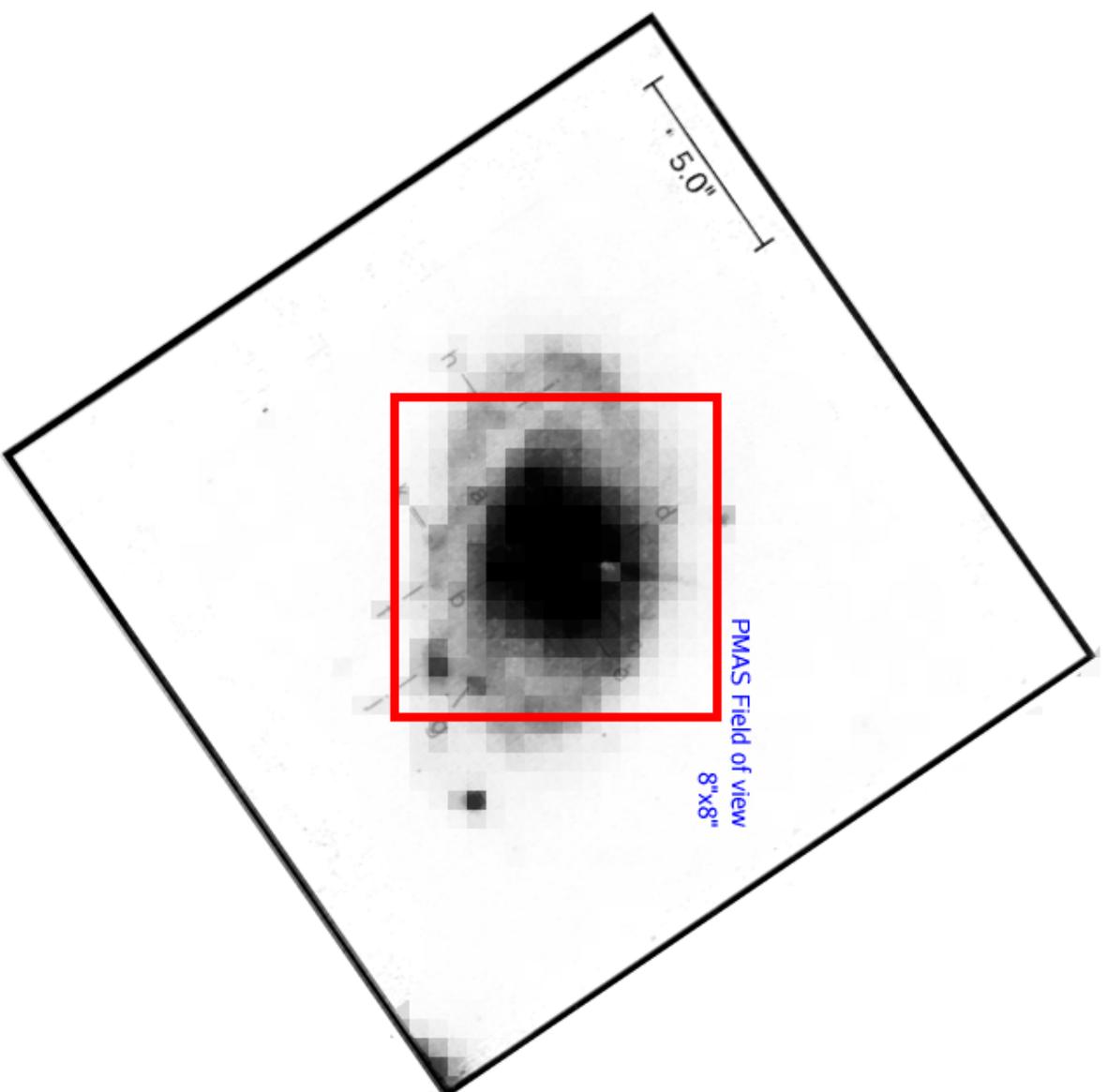
PG 0052+251

$z=0.155$

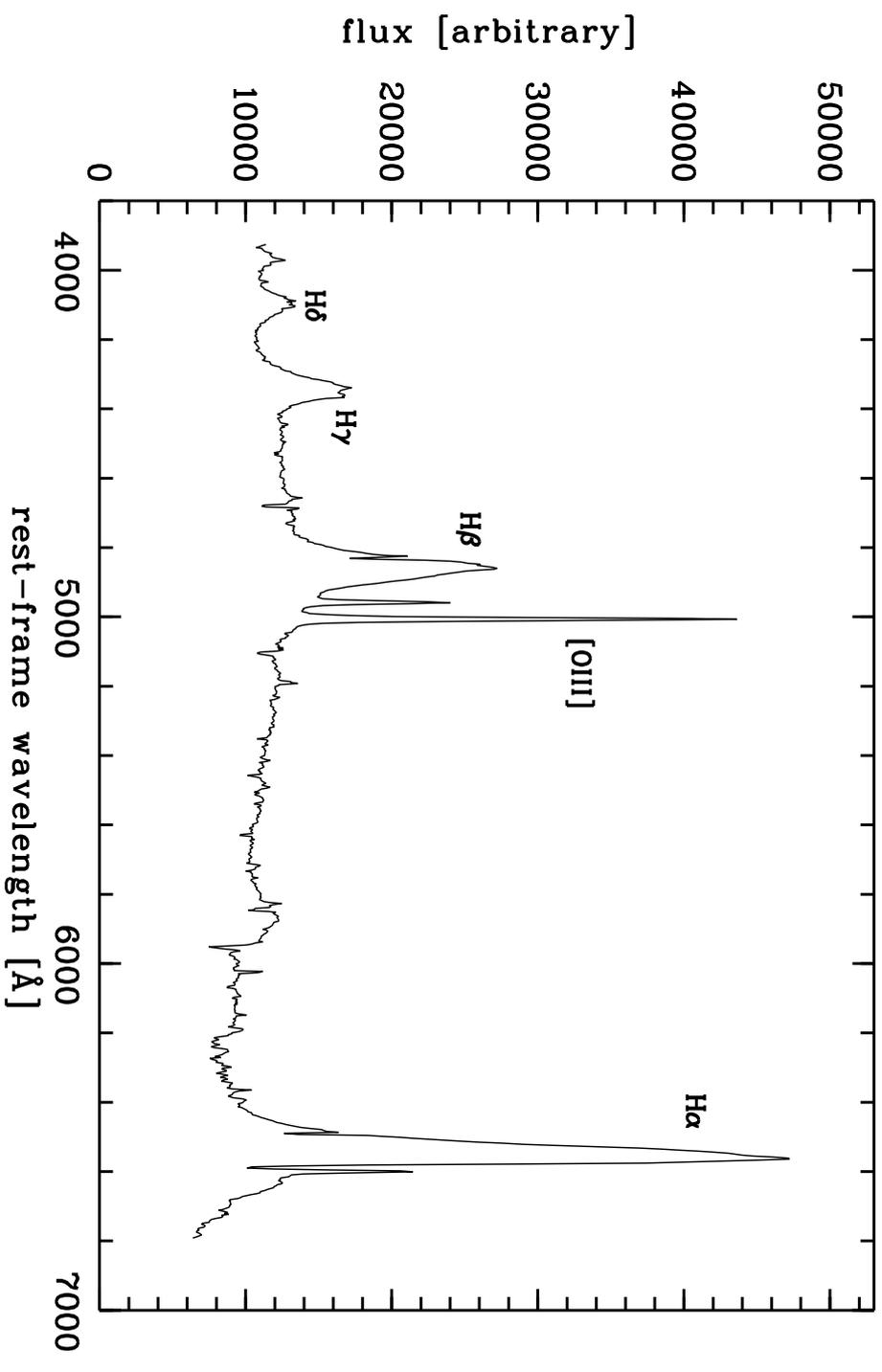


Bahcall et al. 1996, ApJ, 457, 557

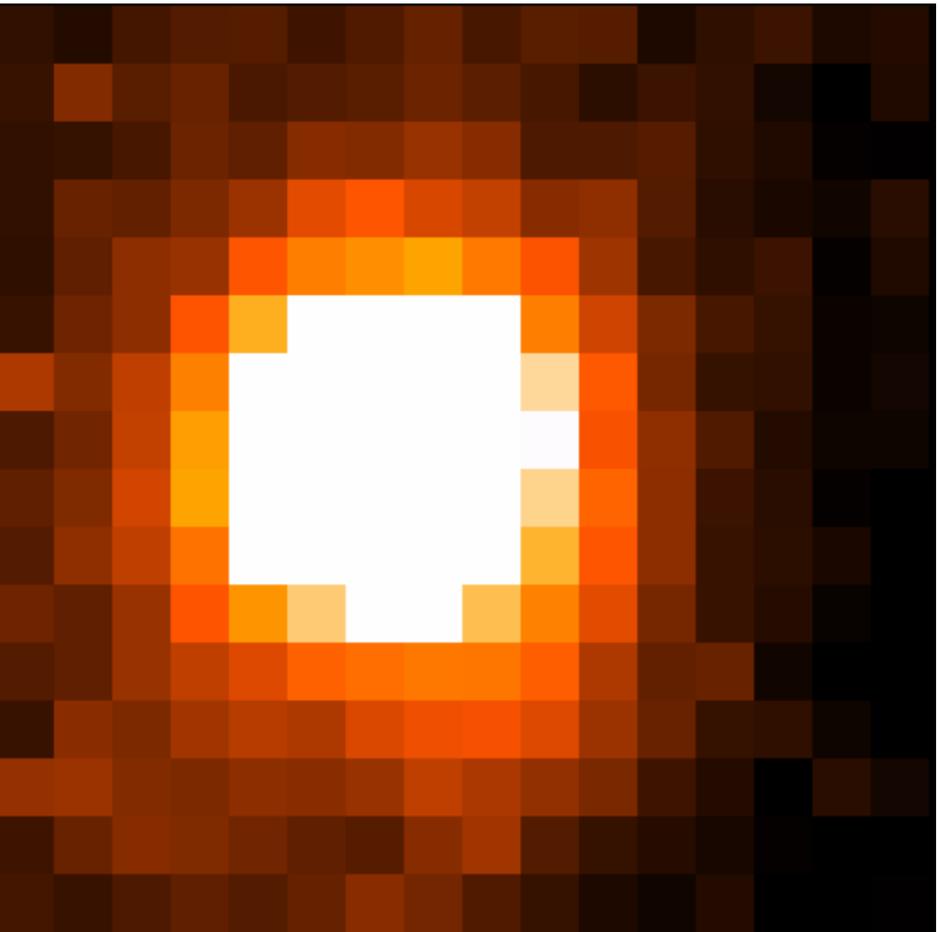
PMAS resolution and FOV



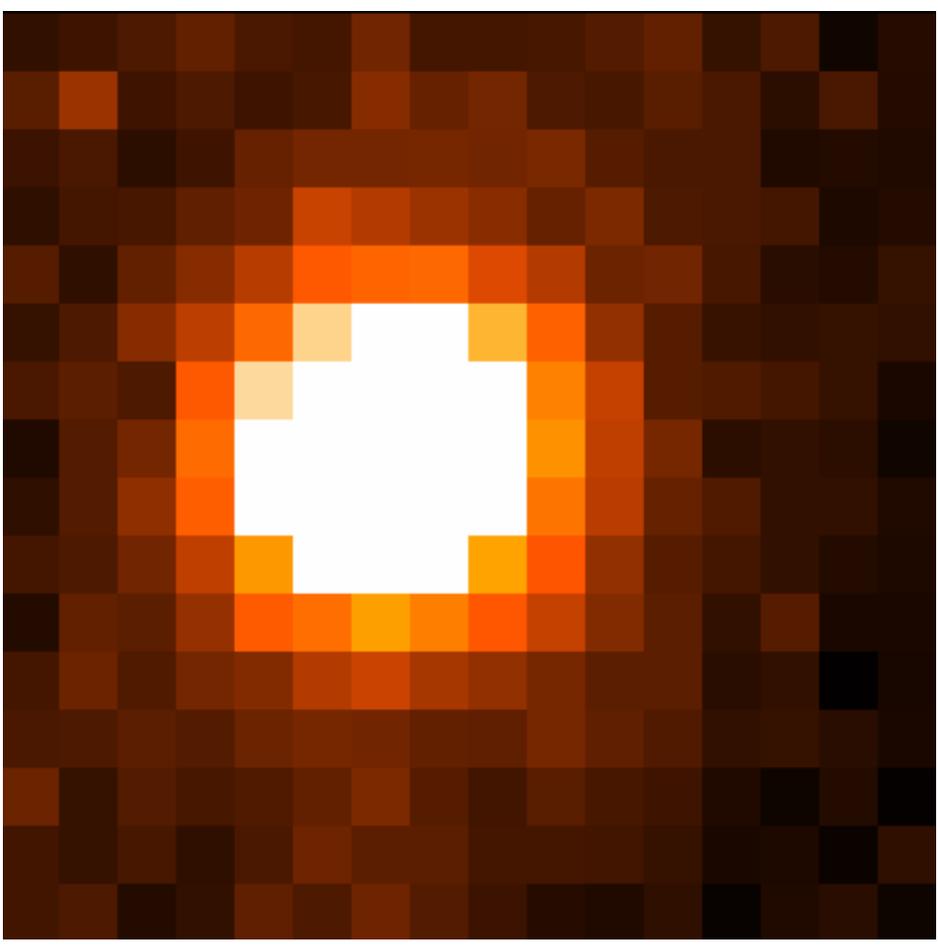
Total Spectrum



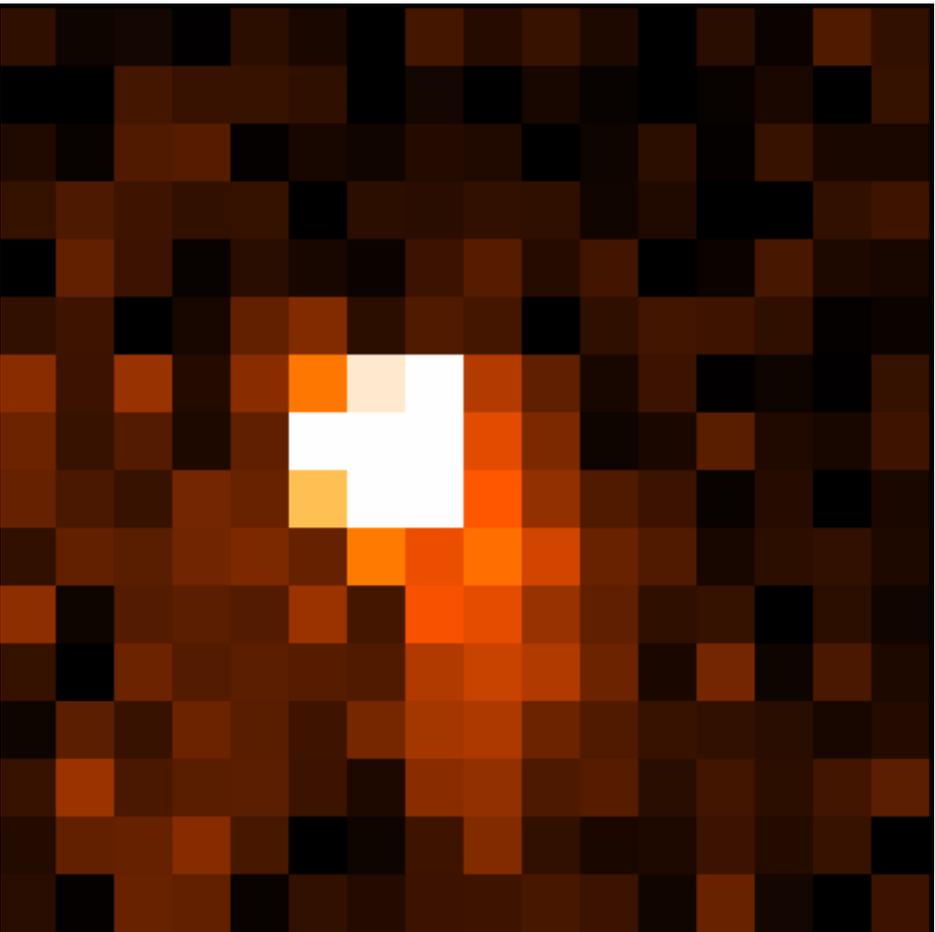
[OIII] slice



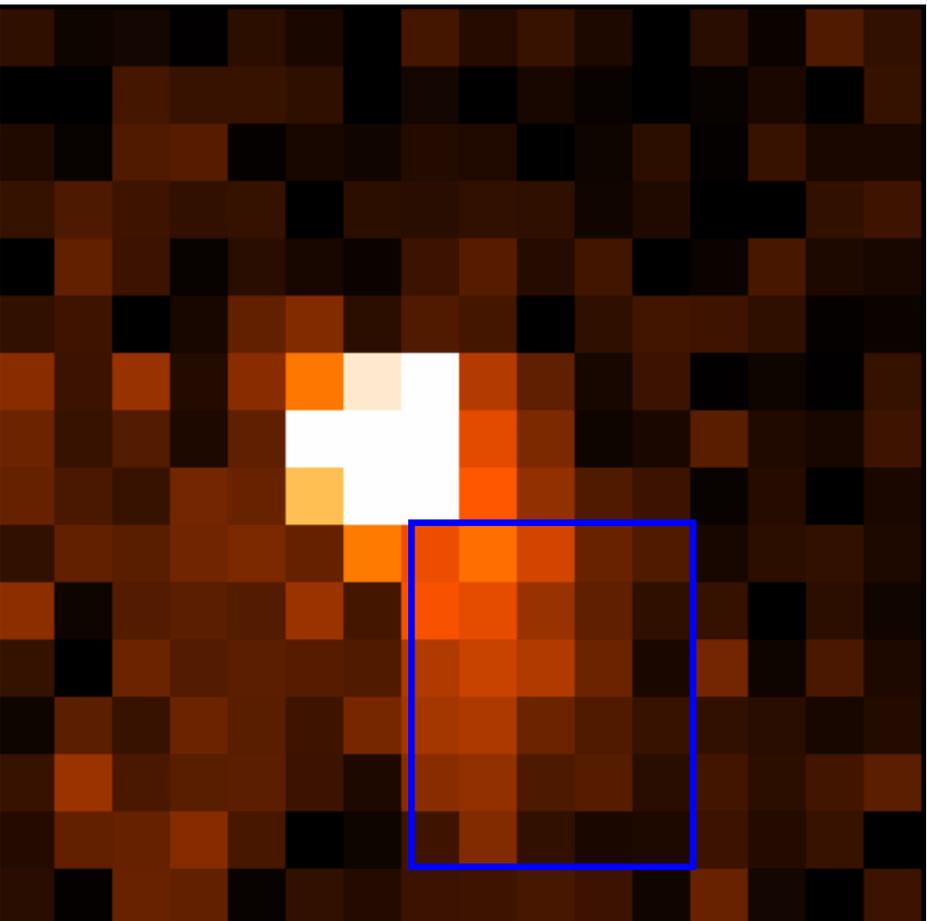
[OIII] continuum slice



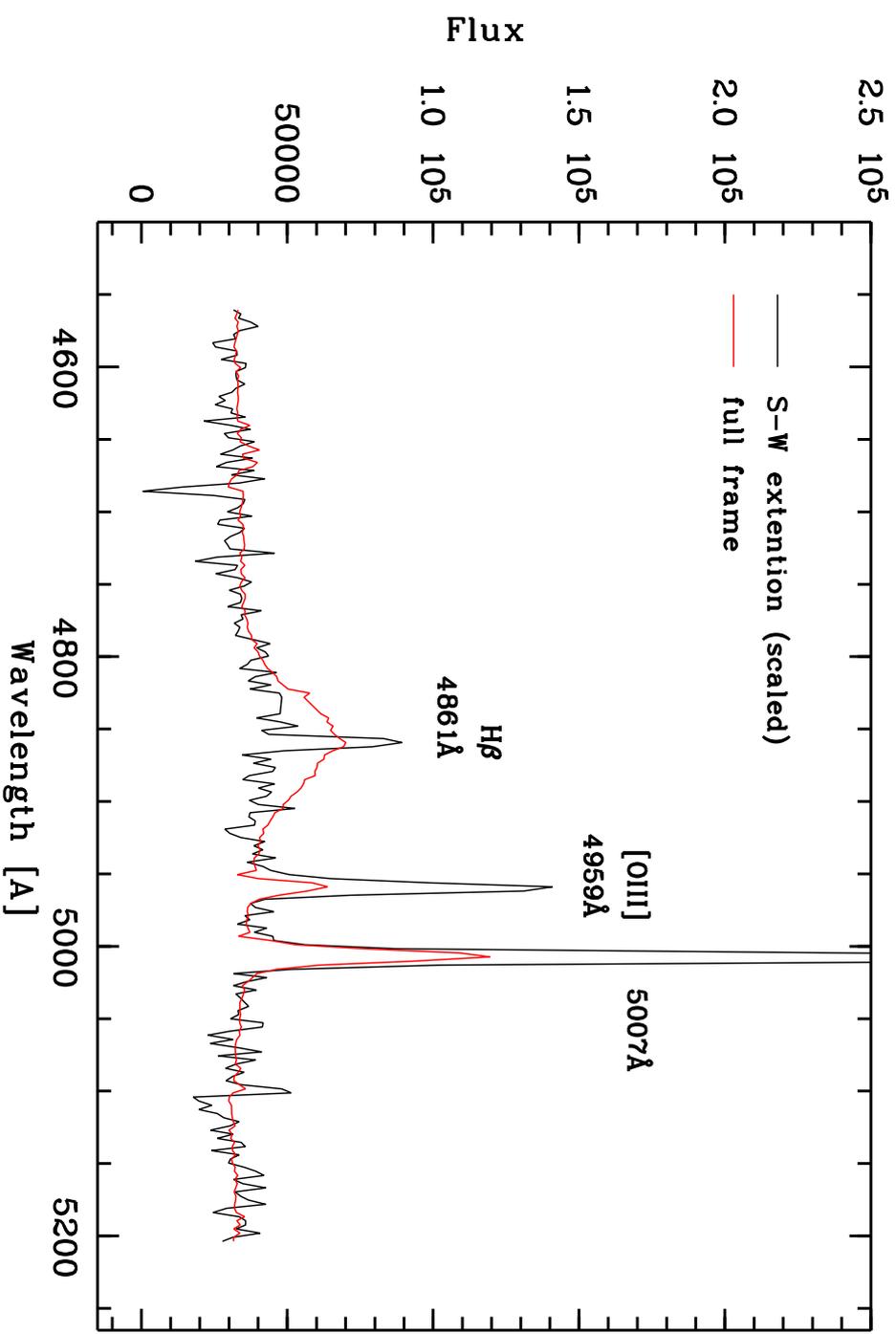
difference



difference



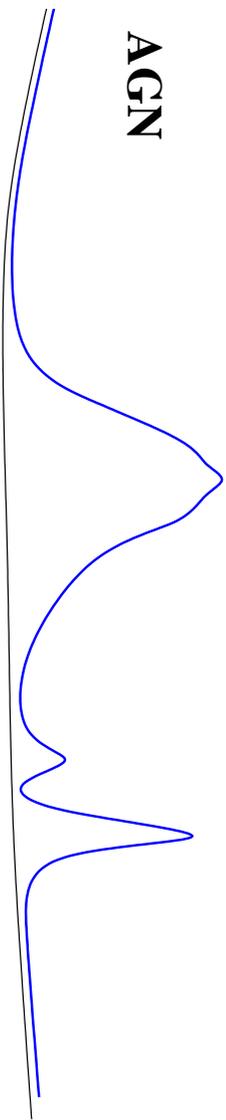
H β -[OIII] Spectrum



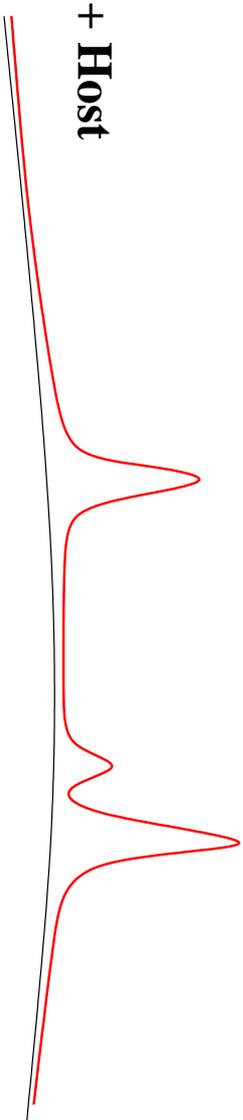
H β

[OIII]

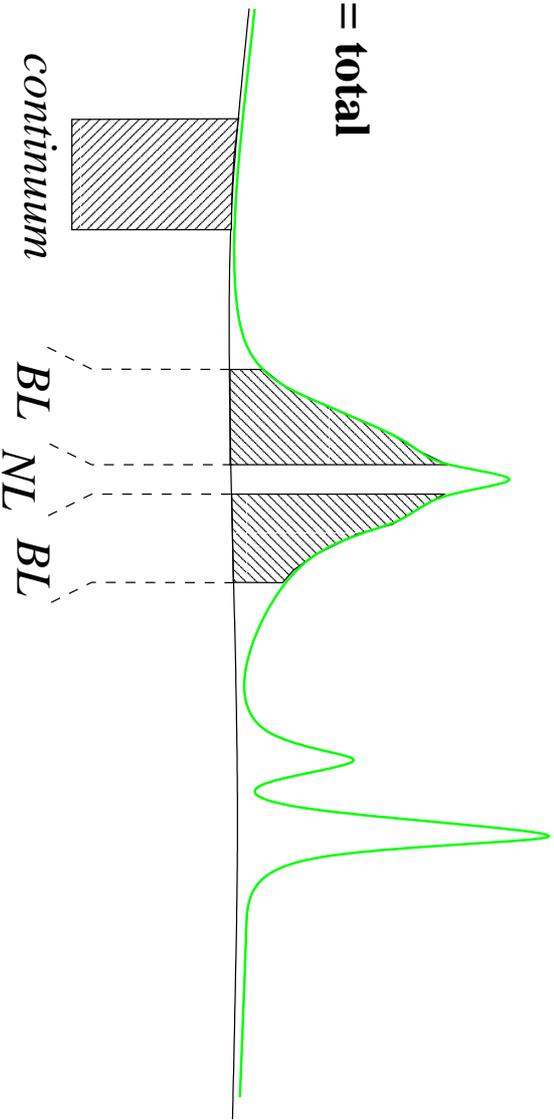
AGN



+ Host

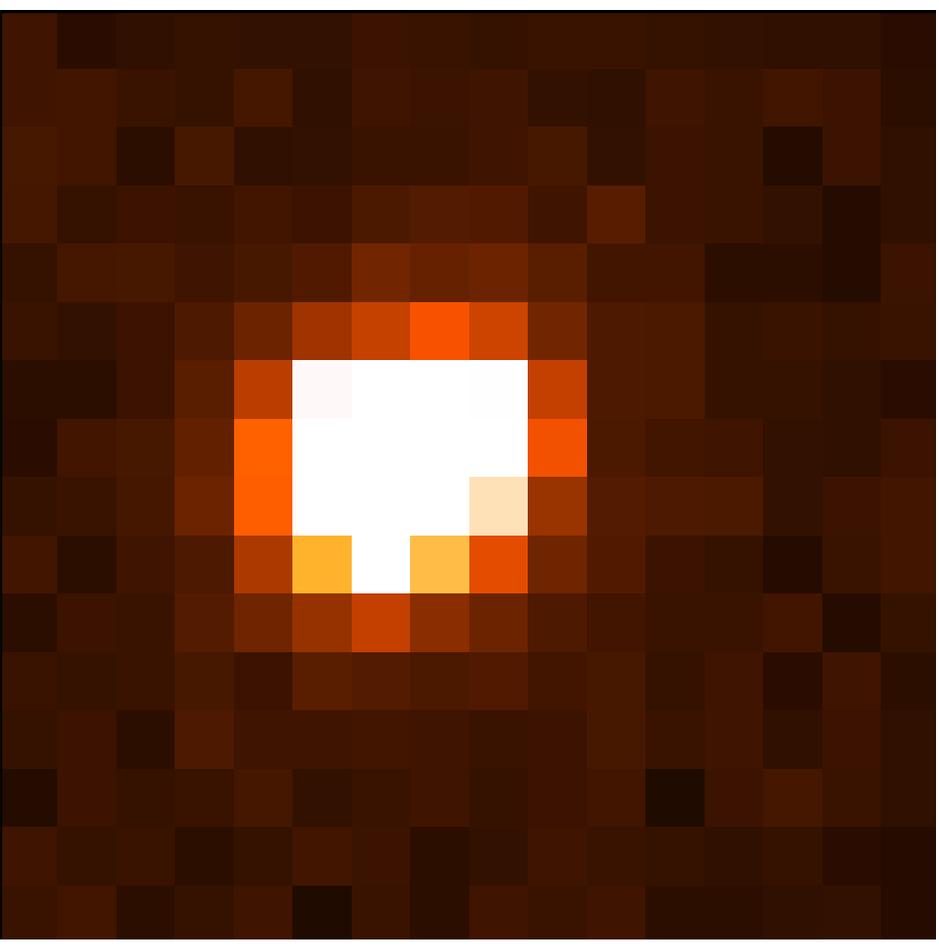


= total

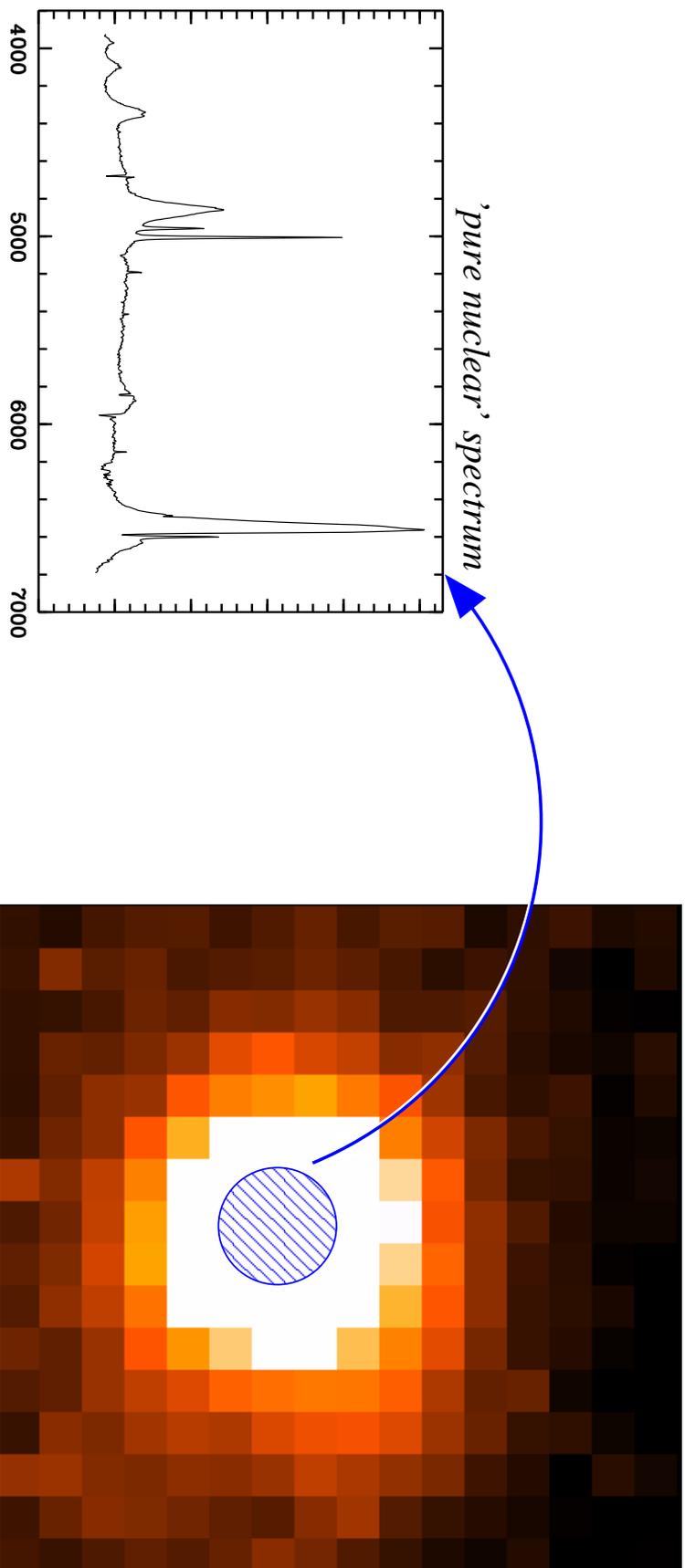


PSF extraction

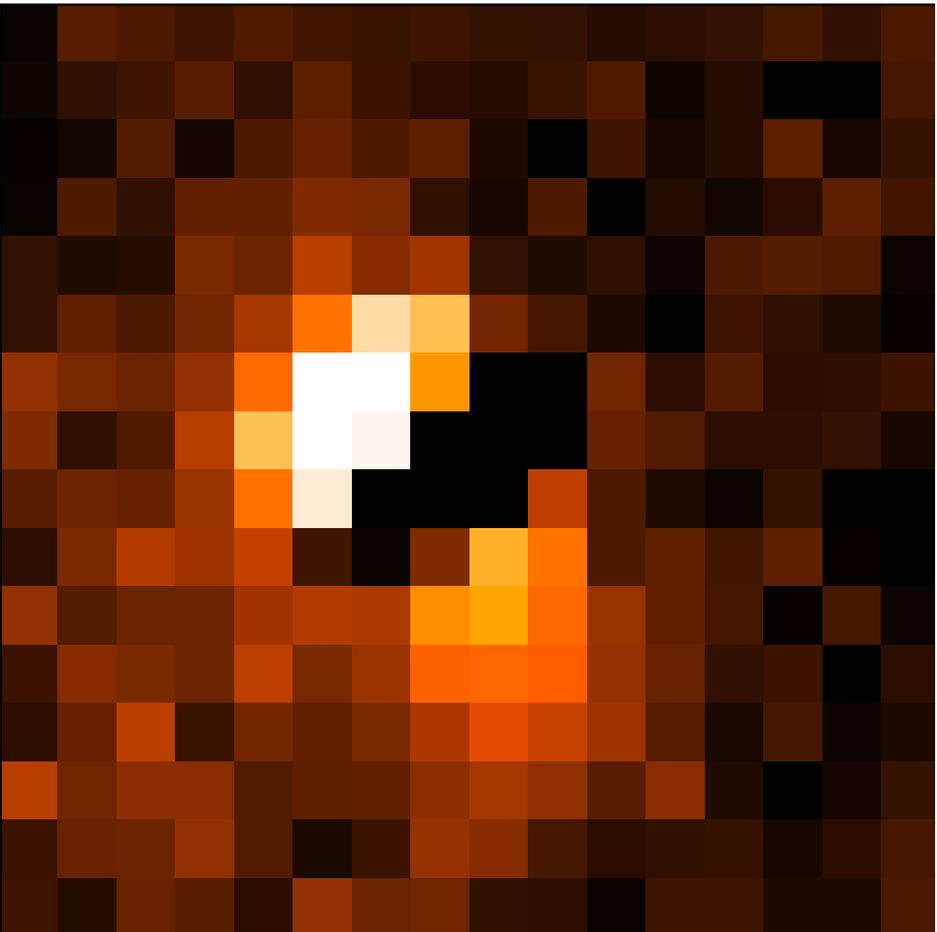
resulting PSF (FWHM 0".9)



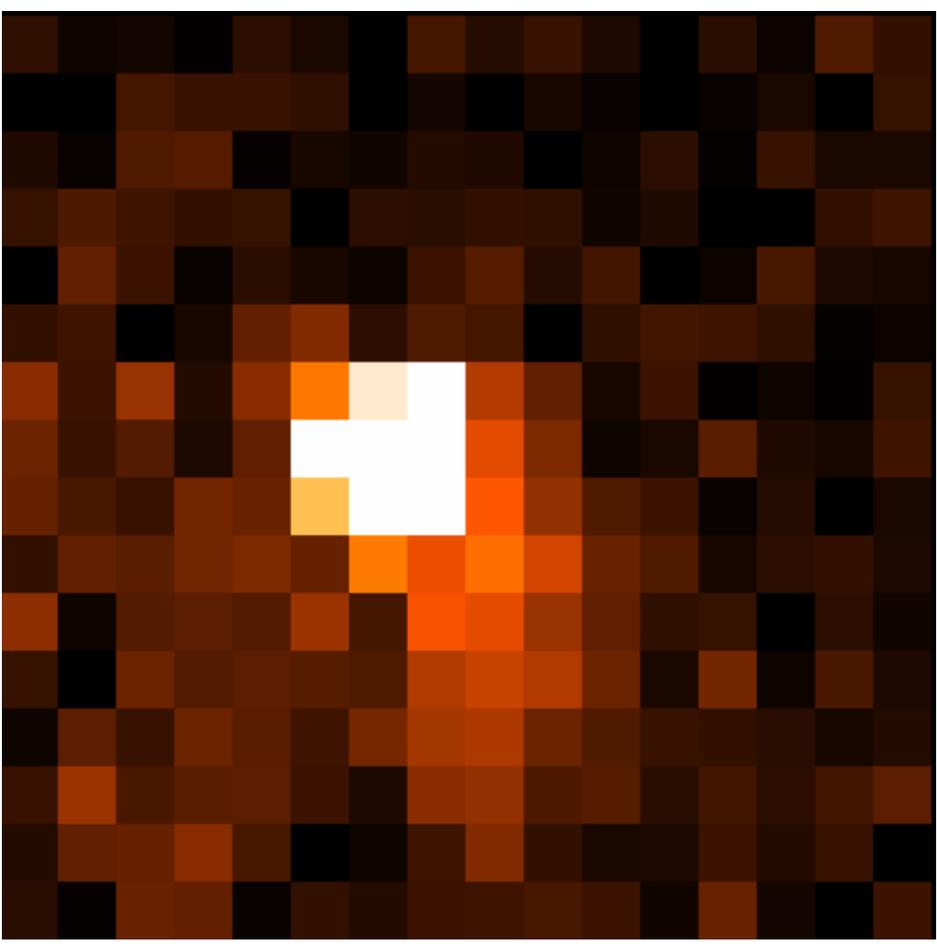
PSF extraction



PSF subtracted



continuum subtracted (from before)



The End

- ISM line emission is accessible
- so are line ratios (really spatially resolved)
- removal of nuclear contribution is possible
- TBD: PSF determination using PMAS AG camera
- TBD: full data analysis

(No, not the end, the beginning...!)