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The nucleus–host galaxy interplay in AGN: clues from optical spectroscopy

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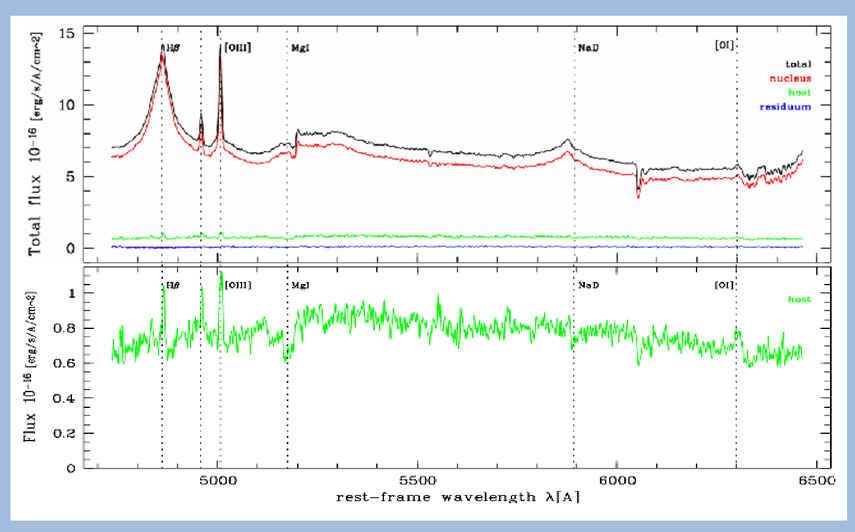
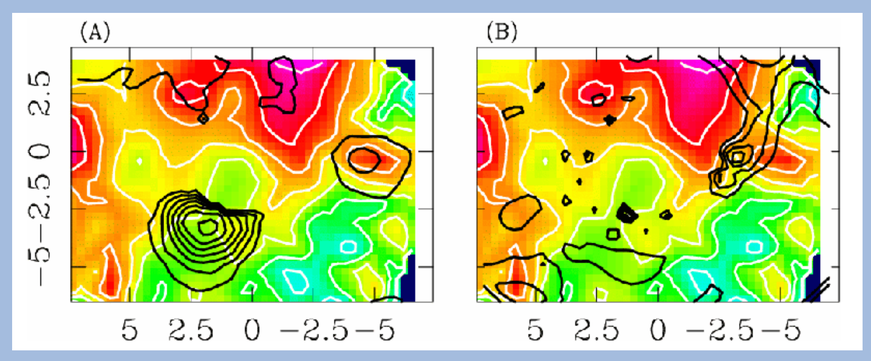
background

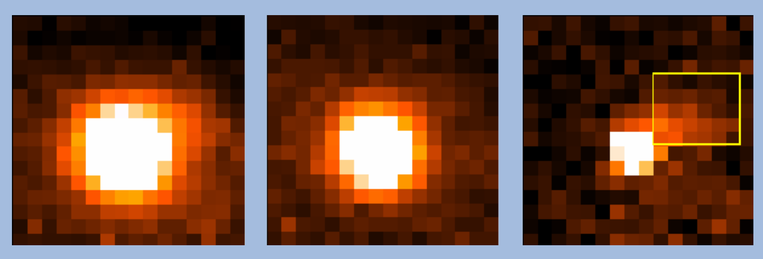
Recent studies showed that host galaxies of luminous active galactic nuclei (AGN) have substantially enhanced amounts of young stars compared to inactive galaxies. The reason is not clear, it could be external events like galaxy interaction or feedback from the nucleus into the host galaxy.

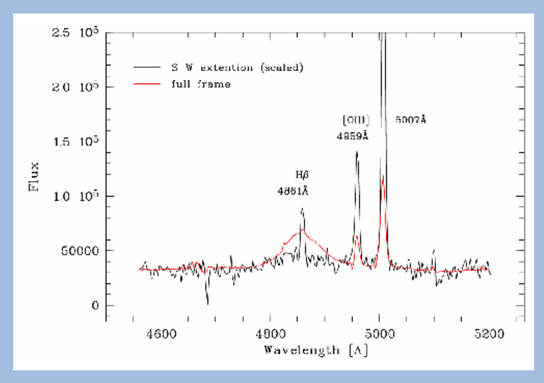
proposal

We started to study the interstellar medium (ISM) and stellar content of luminous AGN host galaxies, using optical long-slit and integral field spectroscopy as well as imaging. For this task we have a large spectroscopic database available.









goals

The first goal is a census of gas content, ISM ionisation state, ISM and stellar kinematics, and stellar composition of AGN host galaxies; this information is so far unavailable in a systematic form.

With these data we then want to address the following questions:

(i) If young stars are universally present in host galaxies, does the amount of young stars depend on nuclear luminosity, on host galaxy mass, its morphological type, or any other properties?

(ii) Are the young stars in AGN host galaxies a result of a general surplus amount of gas in the host galaxies, or due to specific events that cause both stars and AGN to form?

(iii) What are the physical conditions in the ISM of the host galaxies? What can we learn from them about external events and the feedback of the nucleus into the host?

previous own work

- multicolour SED + morphology of AGN hosts z<0.3
- high-z colour imaging of AGN hosts (1<z<3, ADONIS AO, ISAAC, HST ACS 'GEMS')
- 2d decomposition of AGN images, PSF variability modelling
- spatial decomposition of AGN long-slit spectra
- integral field spectroscopy of AGN hosts (Euro3D, with PMAS, VIMOS IFU, WHT Integral)

diagnostics & methods

- ISM abundance & ionisation state, spatially resolved
- gas & stellar kinematics, traces and maps
- stellar composition

with

- optical long-slit spectroscopy (VLT FORS)
- integral field spectroscopy (VLT/VIMOS IFU, PMAS)
- colour imaging (HST, VLT, NOT)

databasis

Data set	Telescope	Instrument	Time	#Obj
(a) lum. Sy1, z<0.33, on-nuc.	VLT	FORS1 MOS	5 nights	20
(b) Sy1, z<0.1, on-nucleus	VLT	FORS2 MXU	2 nights	16
(c) AGN, z<0.2, IFS	VLT	VIMOS IFU	16 hours	10
(d) AGN, z~0.2, IFS	VLT	ARGUS IFU	10 hours	3
(e) AGN, 0.1<z<0.3, IFS	CAHA 3.5m	PMAS	8 nights	20
(f) AGN, z<0.3, IFS	WHT	Integral	3 nights	10
(g) GEMS AGN, 2 band imaging	HST	ACS	156 orbits	~200
(h) QSOs, z~2	VLT	ISAAC	35 hours	7
(i) z<0.3, multiband imaging	NOT	ALFOSC/NOTcam	4 nights	~30
(j) GEMS AGN, 1.5<z<2	HST	NICMOS	31 orbits	15

collaborators

- H.-W. Rix, E. Bell, M. Barden, B. Häußler (MPIA) and other GEMS/COMBO-17 project members (from STScI, Oxford, UT Austin, U Massachusetts)
- M. Salvato, R. Bender et al. (MPE)
- F. Courbin et al. (Lausanne), G. Letawe et al. (Liege)
- P. Ferruit, B. Jungwiert (Lyon, Euro3D)
- J. Dunlop et al. (Edinburgh)
- M. M. Roth, A. Kelz (AIP)