

Optical 3D Spectroscopy of Seyfert Galaxies: Kinematics and Excitation of Gas in Centers

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Abstract. We present a set of optical observations of excited gas emission in the central kiloparsecs of nearby Seyfert galaxies, as obtained with the integral-field (3D) spectrograph OASIS. We map the 2D emission distribution as well as the gas kinematics, derive the electron density and estimate the extinction due to dust.

Keywords. galaxies: active, galaxies: Seyfert, galaxies: nuclei, galaxies: ISM

A sample of 14 Seyfert galaxies on redshifts $0.002 < z < 0.05$ have been observed by the integral-field spectrograph OASIS mounted at the CFHT. OASIS makes use of an adaptive optics bonnet and is specialized at high spatial and spectral resolutions for a restrained field of view. From the multitude of OASIS configurations, our data were obtained with the $0.27''$ spatial sampling and $10.4'' \times 8.3''$ field of view in two spectral modes: 1) $4760 - 5558 \text{ \AA}$ range, 2.15 \AA/pix dispersion and 1210 resolving power; 2) $6210 - 7008 \text{ \AA}$ range, 2.17 \AA/pix dispersion and 1525 resolving power.

By analysis of emission lines (H_α , H_β , [O III] $\lambda\lambda 4959, 5007 \text{ \AA}$, [N I] $\lambda\lambda 5198, 5200 \text{ \AA}$, [O I] $\lambda\lambda 6300, 6364 \text{ \AA}$, [N II] $\lambda\lambda 6548, 6583 \text{ \AA}$, [S II] $\lambda\lambda 6717, 6731 \text{ \AA}$), we obtain detailed 2D maps of emission intensity, mean line-of-sight velocity and velocity dispersion. The observed set of lines permits a comparison with excitation mechanism models, via diagnostic diagrams of the line ratios such as [N II] $\lambda 6583 \text{ \AA}/H_\alpha$ vs. [O III] $\lambda 5007 \text{ \AA}/H_\beta$ or [O I] $\lambda 6300 \text{ \AA}/H_\alpha$ vs. [O III] $\lambda 5007 \text{ \AA}/H_\beta$. Applying the models by Kewley *et al.* (2001), we distinguish the (mostly outer) regions of space consistent with ionization by young stars and those under the influence of the AGN. We calculate the (spatially resolved) electron density n_e from the ratio of [S II] lines (Osterbrock 1989). Reddening by dust is estimated from the intensity ratio of Balmer lines H_α/H_β (Osterbrock 1989).

Kinematical properties of the gas will be explored in detail, together with the morphology (see Jungwiert *et al.* in this volume). Diagnostic diagrams are to be compared to theoretical models of gas ionization.

Acknowledgements

This work has been supported by grant AV0Z10030501 of Academy of Sciences of the Czech Republic, grant No. 205/03/H144/2003/02 of the Czech Science Foundation and PhD grant for I.S. provided by the French government.

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