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Coronal line emission in Cygnus A

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ABSTRACT
Spatially-extended optical and NIR coronal line emission seen in Cygnus A. Spatial association with extended nuclear X-ray source. Conclusions.

Key words: line: formation – galaxies: active – galaxies: individual: Cygnus A – X-rays: galaxies.

1 INTRODUCTION

First hyper-active galaxy. Closest Ultra-luminous radio galaxy. Well-studied at all wavelengths. Relatively recent review by Carilli & Barthel (1996).

Disentangling the kpc-scale structures near the obscured active nucleus at all but radio wavelengths was long hampered by a lack of sub-arcsecond spatial resolution observations. HST and Chandra images in the NIR, optical and X-ray bands have, in the past few years however, enabled us to isolate, identify and study the relationships between the the various component parts of the nuclear region. Use of optical spectropolarimetric observations with the Keck 10-m telescope (Ogle et al. 1997; Fosbury et al. 1999; van Bemmel et al. 2003) has made it possible to distinguish clearly between reflected (scattered) light from the obscured quasar and the other kpc-scale structures. By using a combination of radio and optical constraints, Tadhunter et al. (2003) have concluded that the orientation of the radio axis to our line of sight is $50^\circ \leqslant i \leqslant 90^\circ$.

Description of emission line spectrum. Deduction than black hole mass is normal for a galaxy of this type and that the extreme radio luminosity is a result of the environment and accretion rate (Tadhunter et al. 2003). NLR spatially resolved. Generally similar line ratios on NW and SE sides but for the highest ionization lines, starting from [Fe VII]. Both the coronal and the lower ionization emission lines extend over a region of about 4-kpc centred on the nucleus. The coronal linesare markedly stronger on the SE (far) side.

2 DATA

- Chandra X-ray images from Young et al. (2002)
- Various HST images in continuum and line bands
- Keck optical spectra from Ogle et al. (1997)
- Keck optical spectra and IR spectra from UKIRT Thornton, Stockton, & Ridgway (1999)
- Keck NIR and WHT optical spectra from Tadhunter et al. (2003)
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3 DISCUSSION

3.1 Spatial relationships

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