

## Near-Infrared Imaging Spectroscopy of the Seyfert Nucleus of the Circinus Galaxy

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The Circinus galaxy is a nearby (4 Mpc) spiral that hosts a Seyfert nucleus as deduced by the emission of intense coronal lines (Oliva et al. 1994) and by the prominent ionization cone observed in [O III] images (Marconi et al. 1994).

We present *K*-band imaging spectroscopy of the nucleus of this galaxy obtained by means of 3D, the MPE imaging spectrometer (Weitzel et al. 1996), and ROGUE, a first-order adaptive-optics system (Thatte et al. 1995), mounted on the 2.2-m ESO telescope. The spectral resolution is 1000 and the average optical seeing was about  $0''.6$  ( $= 12$  pc at the source).

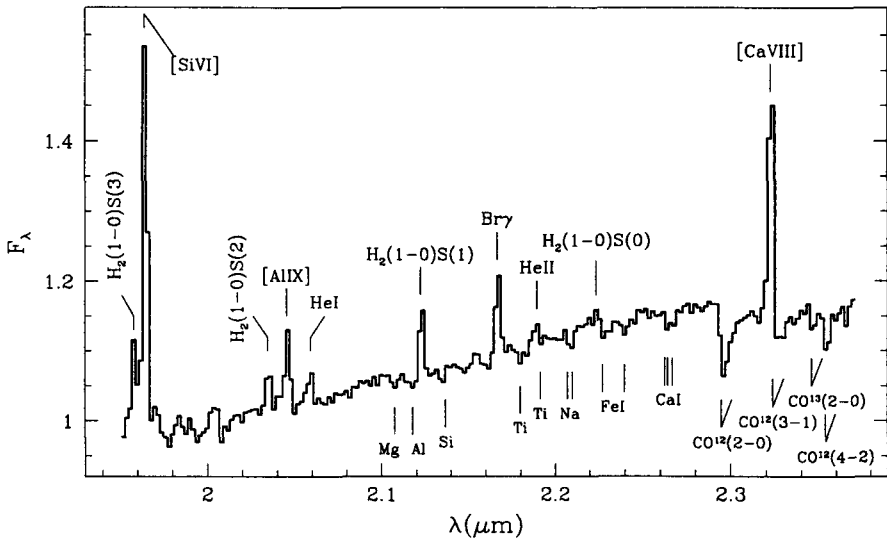


Figure 1. Nuclear spectrum of the Circinus galaxy ( $0''.7$  aperture).

Figure 1 shows the Circinus *K*-band nuclear spectrum in an aperture of  $0''.7$  ( $= 14$  pc). Most prominent are the coronal lines [Ca VIII]  $2.321 \mu\text{m}$  ( $EP = 127$  eV), [Si VI]  $1.963 \mu\text{m}$  ( $EP = 205$  eV) and [Al IX]  $2.044 \mu\text{m}$  ( $EP = 285$  eV), the latter being the very first detection in an extragalactic object. The stellar features are diluted by the nuclear non-stellar continuum, most likely emitted by hot ( $\sim 1000$  K) dust.

The [Si VI] map, in Fig. 2, shows that the coronal-line emission extends from the *K*-band peak (marked with a cross) toward the ionization cone traced by the

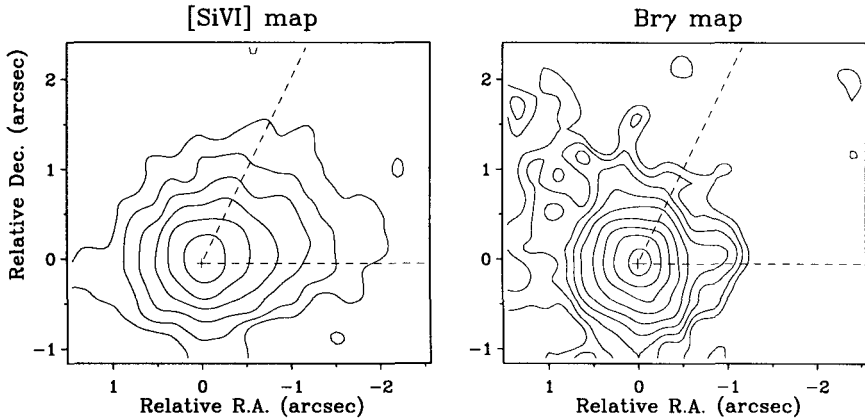


Figure 2. [Si VI] and Br $\gamma$  maps. Contours are separated by 0.2 and 0.1 respectively on a log scale; the lower contour corresponds to  $5\sigma$  above the sky. The cross marks the  $K$ -band continuum peak; the dashed lines indicate the [O III] ionization cone orientation.

[O III] line (roughly indicated by the the dashed lines). The Br $\gamma$  line, whose map is shown in Fig. 2, is detected also outside the ionization cone and extends along the host-galaxy major axis ( $PA \approx 40^\circ$ ). Such extended Br $\gamma$  emission is most likely tracing star forming activity occurring in the vicinity (within  $\sim 20\text{--}30$  pc) of the Seyfert nucleus. The He I map extends in the same direction of the Br $\gamma$ , thus indicating the presence of a population of hot young stars. By comparing the Br $\gamma$  map with the [Si VI] map, we also find evidence for Br $\gamma$  emission at  $0''.5$  from the nucleus, out of the cone, two times in excess with respect to what expected from the [Si VI] nuclear PSF; star-forming activity occurring as close as 10 pc from the nucleus is most likely responsible for such a Br $\gamma$  excess.

## References

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