

Line Observations of NGC1068, NGC1808 and other Southern Galaxies with FAST, the MPE NIR Fabry-Perot Imaging Spectrometer

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Abstract. Images with subarcsec spatial resolution in the light of near infrared atomic ($\text{Br}\gamma$) and molecular (1-0 and 2-1 S(1)) hydrogen emission lines have been obtained for some southern starburst and Seyfert galaxies for the first time. The data were obtained with the Max-Planck-Institut für extraterrestrische Physik (MPE) near-infrared array spectrometer (image scale $0.8''/\text{px}$, resolving power 950) during an observation run in January 1990 at the ESO/MPI 2.2m telescope. We investigated NGC253, NGC5253, Cen A, M83, LMC, He2-10, NGC1068 and NGC1808. Some results on the last two galaxies are presented.

Figure 1 shows the Seyfert 2 galaxy NGC1068: the outer contour of the VLA radio map at 4.9GHz from Wilson&Ulvestad (1983) superimposed on our H_2 map (1-0 S(1)). The H_2 exhibits a torus like shape with a P.A. of approx. 74° (extension $6'' \times 3''$). Spectrally resolved data suggest that the torus rotates antiparallel with respect to the galaxy. The intensity of the $\text{H}_2(2-1)\text{S}(1)$ line is much weaker than that of the $\text{H}_2(1-0)\text{S}(1)$ line. This implies that the molecular emission is likely to be produced in hot dense gas which has either been shocked or been heated by external ultraviolet radiation. The inferred mass of warm H_2 ranges from $\sim 600M_\odot$ to $\sim 10^4M_\odot$ for a temperature range from 1000 to 2000K. NGC1808, a southern Sbc spiral galaxy, contains a bright Seyfert nucleus and several nuclear 'hot spots'. Figure 2 shows our $\text{Br}\gamma$ map, which unravels more than 10 condensations of different fluxes and diameters, mostly super HII regions and supernova remnants. There is hardly any obvious coincidence between the structure of this image and the optical CCD, our near-IR continuum image, the 6 cm emission or the $10\mu\text{m}$ broad band emission. The $\text{Br}\gamma$ -luminosity ($1.5 \cdot 10^8 L_\odot$) of the O/B-stars leads to a total luminosity of $1.5 \cdot 10^{10} L_\odot$ in good agreement with low spatial resolution data.

