NEAR-IR IMAGING SPECTROSCOPY OF CD GALAXY NGC1275

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1. The Continuum and Molecular Line Emission

H and K band imaging spectroscopy of the central 12″ (4.2 kpc) of NGC1275 using the Max-Planck-Institut für extraterrestrische Physik imaging spectrometer "3D" maps the gas density and temperature in the core and separates the contribution of Seyfert emission to the core light.

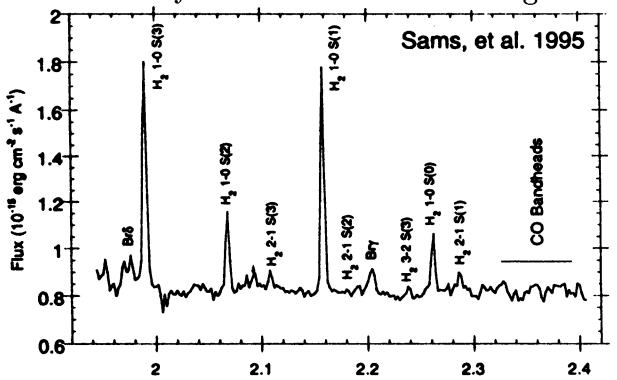

Figure 1: Integrated K-band spectrum of central 3″.25

The K band spectrum integrated over the central 3″.25 shows many H_2 lines whose excitation is 1750 K, consistent both with shock heating and excitation by a central source. The derived H_2 column density is $N(H_2) = 7.6 \times 10^{15}\text{cm}^{-2}$. The continuum slope varies from $I(\lambda) \propto \lambda^{-2.7}$ within the central 1″, to a nearly black body slope of $I(\lambda) \propto \lambda^{-3.6}$ at a radius of 3″, showing that The central source dominates the continuum emission. We fit the K-band continuum emission from the central 1″with a combination of K5III stars which dominate the light in the NIR, emission from hot dust with emissivity $\propto \lambda^{-1}$, and Seyfert emission $\propto \lambda^{-1}$. We find a a stellar contribution of 0.075, a Seyfert contribution of 0.8, a dust contribution of 0.125 at 475 K, and a K band optical depth of 0.75. This causes dilution of the CO_{sp} index by a factor of roughly 13 in the center.

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