

CO EMISSION FROM THE INFRARED GALAXY NGC4418

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¹²CO (J=1-0) emission has been detected in the extremely extinguished galaxy NGC4418 with a 15" beam on the 45-m telescope at the Nobeyama Radio Observatory. The inferred molecular mass is $4 \times 10^8 M_{\odot}$ at a distance of 25 Mpc. The CO line profile is single peaked with the FWHM of 85 km/s, suggesting that molecular clouds highly concentrate towards the center. For the column density estimated from these observations to be consistent with the extinction value $55 < A_V < 120$ derived from the $10\mu\text{m}$ silicate absorption by Roche et al (1986), most of the clouds should be confined within a central region of 3.8" (500pc) in diameter, through which beam Roche et al detected the 10 and $20\mu\text{m}$ fluxes comparable to the IRAS ones.

Combining with the 1.5GHz map recently reported by Condon et al (1990) that measured 38.5mJy in a $0.5'' \times 0.3''$ core (brightness temperature of 150 000 K), we hypothesize that NGC4418 is at the very early phase of its AGN activity whose energy is efficiently absorbed by dense ambient gas and re-emitted in the far-infrared. This may explain the other peculiar properties of the galaxy:

- (1) no emission lines in the optical and the infrared;
- (2) the ratio of the 1.5GHz flux relative to the IRAS flux, 10 times smaller than those of other IRAS galaxies;
- (3) the ratio (=170) of the IR luminosity to the molecular gas, 10 times greater than those of other galaxies with comparable IR luminosities ($L_{\text{IR}} = 7 \times 10^{10} L_{\odot}$) and comparable to that of an ultra-luminous IRAS galaxy Mrk 231 (Seyfert 1/QSO with $L_{\text{IR}} = 2 \times 10^{12} L_{\odot}$).