

NRO/OVRO CO(1-0) SURVEY: CENTRAL REGIONS OF NEARBY SPIRAL GALAXIES

K. SAKAMOTO, S. K. OKUMURA AND S. ISHIZUKI
Nobeyama Radio Observatory; Nagano, 384-13, Japan

AND

N. Z. SCOVILLE
Caltech; MS 105-24, Pasadena, CA, 91125, USA

We have done a CO(1-0) imaging survey of the central regions of nearby spiral galaxies using the Nobeyama and Owens Valley Millimeter Arrays. The survey aims to reveal the nuclear gas properties in *normal* galaxies that have been paid relatively little attention compared to Seyferts, mergers, and ultraluminous IRAS galaxies. The sample consists of 20 galaxies that meet the following criteria: (1) $i < 70^\circ$ (2) $\delta > +5^\circ$ (3) $I_{\text{CO}dV} \geq 10 \text{ K}(T_A^*)\text{km s}^{-1}$ in the FCRAO Extragalactic CO Survey (4) no evidence of significant perturbation (e.g. merging). No selection was made on the basis of nuclear activity or IRAS data. The average distance of the galaxies is 15 Mpc and the average linear resolution is 300 pc.

The integrated intensity maps in Fig. 1 show the diversity of gas distributions. It is notable, however, that many galaxies have strong concentrations of molecular gas at the nucleus. The exponential scale length of the gas distribution is less than 0.5 kpc in 10 galaxies and less than 1 kpc in 15 galaxies. The large frequency of gas concentration itself may be partly due to selection criterion (3). However, an interesting point is that in spite of the huge gas concentrations ($M_{\text{gas}}(r \leq 500\text{pc}) \sim 1 - 3 \times 10^8 M_\odot$), there are only two Seyferts in our sample. This suggests that the amount of gas in the central kiloparsec is not a critical factor for hosting high-luminosity AGN. The other interesting point is that the gas concentrations are found not only in barred galaxies but also in unbarred galaxies. There are four SA spirals in our sample that have axisymmetric gas distributions and show little non-circular motions (i.e., NGC 4014, 4414, 4826, 5055). Three of them have nuclear gas concentrations. Clearly bar-induced streaming is not the only mechanism which can create a nuclear gas concentration.

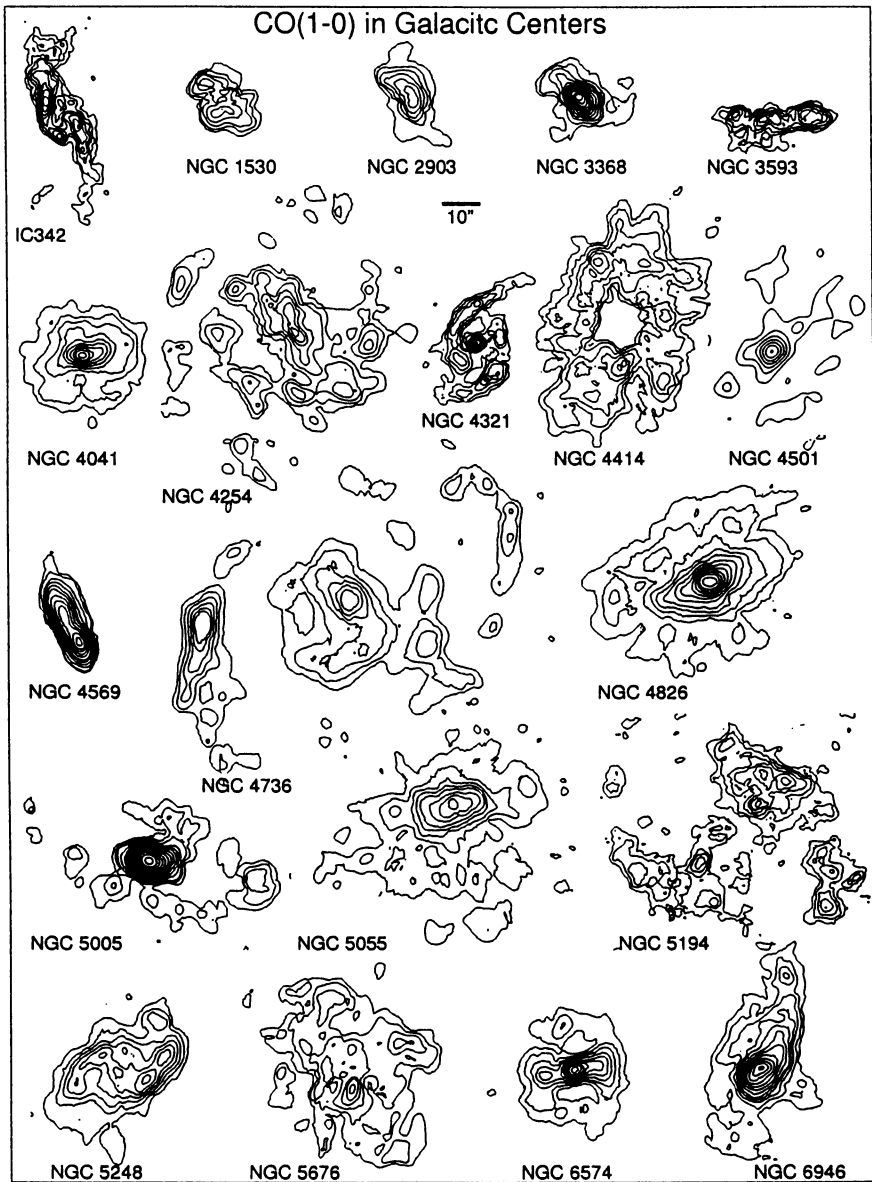


Figure 1. CO(1-0) emission in the central regions of 20 nearby spiral galaxies observed with the Nobeyama and Owens Valley Millimeter Arrays. NGC 5194 is from Kohno *et al.* (1996, ApJ, 461, L29).