

High Resolution CO Images of Seyfert Galaxies

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Summary

The Berkeley-Illinois-Maryland millimeter array has been used to image the CO (J=1-0) emission of three Seyfert galaxies, NGC 3227, NGC 7469 and NGC 5033, selected for their strong single-dish CO detections. Extensive u-v coverage was obtained for all three galaxies resulting in 2"-3" resolution. The CO emission in NGC 3227 and NGC 7469 appears as compact structures centered on the active nuclei, containing substantial fractions ($\sim 80\%$ and $\sim 50\%$) of the single-dish flux. In NGC 3227, 10% of the CO flux detected by the interferometer is contained within the ionized narrow line region. The unresolved molecular gas concentrations in the nucleus of NGC 3227 imply a CO mass of $6.5 \times 10^7 M_{\odot}$ concentrated within a diameter $\lesssim 50$ pc. The CO emission in NGC 5033 is not detected at this resolution, implying a CO structure size of 20"-60" (1.2-3.6 kpc). Continuum emission at 2.7mm is not detected in any of the three galaxies. In the center of NGC 7469, the H₂ mass is comparable to the dynamical mass. Kinematic studies of the detected gas reveal a rotational motion of the gas in NGC 3227 and NGC 7469, allowing identification of the gas in NGC 7469 with a nuclear starburst. These data are consistent with the idea that interactions between galaxies cause gas to concentrate in their nuclei thereby feeding starburst and Seyfert activity.

Fig. NGC 3227: CO contours overlain on H α emission. Line marks major axis of galaxy.

