MOLECULAR CLOUDS IN NGC 3256

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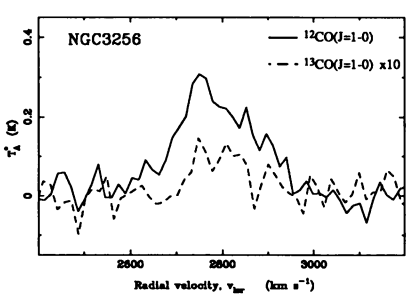
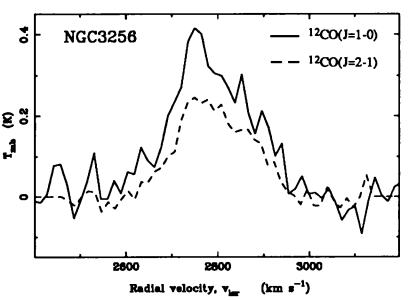
ABSTRACT. A spectacular morphology , including two diffuse tidal tails, and high infrared luminosity suggest that the starburst NGC 3256 is a merger of two gas-rich disk galaxies. NGC 3256 exhibits strong and extended ^{12}CO emission. A conventional interpretation of the observed ^{12}CO and ^{13}CO line ratios yields contradictory results.

Observations and Results

We have mapped NGC 3256 in the J=1–0, J=2–1 transitions of ^{12}CO, and measured single positions in the J=1–0, J=2–1 transitions of ^{13}CO, using the Swedish-ESO Submillimetre Telescope (SEST) at La Silla, Chile. Examples of profiles are shown in the figure.
The observed line ratios imply unusual properties of the H_2 clouds:
i) The ratio of main beam brightness temperatures in ^{12}CO (2-1)/(1-0) ~ 1.0±0.1, suggests optically thick emission.
ii) The unusually large value of $^{12}CO/^{13}CO$ in J=1-0, 30±5, conventionally implies optically thin emission.
iii) The corresponding ratio in the J=2-1 line is smaller, $^{12}CO/^{13}CO$ ~ 12±4.

When the four lines are interpreted in terms of an LVG model, they fail to constrain a narrow region of parameter space.
These data provide further clues to the mechanism by which a strong interaction modifies the properties and dynamics of molecular gas





F. Combes and F. Casoli (eds.), Dynamics of Galaxies and Their Molecular Cloud Distributions, 281.