

R10b Spatially-resolved CO(2–1)/CO(1–0) Ratio in NGC 1365

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NGC 1365 is the nearby ($D = 18.1$ Mpc) barred spiral galaxy in the southern hemisphere. We use ALMA data to obtain maps of molecular gas and of the CO(2–1)/CO(1–0) ratio (R21) in the central area of this galaxy. With an angular resolution of $2''$ (corresponding to 180 pc), galactic structures within the field of view (e.g. center, bar, bar-arm transition) are clearly resolved. Molecular gas is mostly confined to leading edges of the bar, forming a ring-like structure in the center, while the emission is rather faint in the bar-arm transition. Overall structures traced by the both CO transitions are similar, but R21 varies significantly within the FoV. While the median value is 0.64, higher ratios are found in the innermost area of the bar.

We compare the R21 map with the GALEX NUV map which traces young stars, and find that the scatter of R21 is large where NUV is faint while R21 slightly increases with NUV where NUV is bright. This bimodality likely reflects that R21 depends on both density and temperature. We deduce that high R21 with low NUV corresponds to dense gas without (or before) star formation, and high R21 with high NUV corresponds to warm gas due to recent star formation.