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ALMA Observations and Multi-line Modeling of the Galaxy Center of NGC 3351

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The CO-to-H₂ conversion factor (α_{CO}) is critical to studying molecular gas and star formation in galaxies. The value of α_{CO} has been observed to vary in different regions of a galaxy, and it is dependent on environmental parameters such as gas densities and temperatures. Previous observations on ~kpc scales revealed lower α_{CO} values in the centers of some nearby star-forming galaxies, including NGC 3351. We present new ALMA Band 3, 6, and 7 observations of ¹²CO, ¹³CO and C¹⁸O rotational lines on ~50 pc scales in the center of NGC 3351. Using multi-line modeling and a Bayesian likelihood analysis, we constrain possible values of the H₂ density, kinetic temperature, CO column density, and CO isotopologue abundances at each pixel. The α_{CO} distribution can be derived from the CO column densities and then compared with other parameters. We present initial results from this analysis investigating the physical processes that control α_{CO} in galaxy centers.