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Citation

Teng, Y., Sandstrom, K., Sun, J., Schinnerer, E., Smith, J., Bolatto, A., ... Blanc, G. (2021). ALMA observations and multi-line modeling of the galaxy center of NGC 3351. *American Astronomical Society Meeting Abstracts*, 126.08. Retrieved from <https://hdl.handle.net/1887/3263976>

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Downloaded from: <https://hdl.handle.net/1887/3263976>

Note: To cite this publication please use the final published version (if applicable).

Bulletin of the AAS • Vol. 53, Issue 1 (AAS237 abstracts)

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

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Published on: Jan 11, 2021

Updated on: Jan 22, 2021

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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.