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Bridging the gap between Milky Way and extragalactic star formation studies

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Measurements of massive star formation from Galactic and extragalactic cloud-scale observations produce conflicting results. Theory predicts that gas surface density, velocity dispersion, virial parameter, and gravitational freefall time should play a key role in setting the timescale for star formation. Milky Way observations support this prediction. In extragalactic systems, observations find weak, or even anti-correlations, with predictions from theory. There remains, however, a significant gap between the scales probed in extragalactic surveys (50-150pc) and the resolved cloud observations from Milky Way studies (~10pc) which could account for this tension. This work addresses the spatial gap between these studies using new ALMA 12CO(2–1) and 12CO(1-0) observations of M33. The resolution of these data (~10pc) matches the spatial scales resolved in Milky Way studies allowing for direct comparisons to be made. We measure star formation rates using the early embedded phase of massive star formation, enabled by JWST observations. Using these data, we find no strong correlation between the star formation efficiency and molecular gas properties in resolved extragalactic molecular clouds. Our results find that the tension between Milky Way and extragalactic observations cannot be attributed to a gap in spatial scales. Future work will extend our study of resolved cloud observations to local volume galaxies across a range of galactic environments.

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Yes

What is your career level?

PhD

Which keyword describes the area of focus of this talk?

Galaxies

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