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Star formation in the Antennae Overlap

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Published on: Jan 31, 2023 URL: <u>https://baas.aas.org/pub/2023n2i211p05</u> License: Creative Commons Attribution 4.0 International License (CC-BY 4.0) As the closest major galaxy merger and home to thousands of super star clusters (SSCs), the Antennae Galaxies (NGC 4038 and NGC 4039) are an ideal candidate to study the molecular clouds at sites of vigorous star formation. We constructed giant molecular cloud (GMC) catalogs of the region where the two galaxies overlap using high-resolution (~10 pc) Atacama Large Millimeter/submillimeter Array (ALMA) observations of the 12CO(2-1),13CO(2-1), and 12CO(3-2) emission lines. We compared the 12CO(2-1) GMC data to 12 other GMC catalogs that use observations of the same emission line and with similar resolution. The GMCs from galactic centers and SSC-forming galaxies, including the Antennae overlap, have the highest luminosities, surface densities, turbulent pressures, and kinetic energies per size scale. The GMCs in these extreme environments also have higher kinetic energies per size scale although the kinetic energies in the Antennae were even higher. This results in the Antennae GMCs also having the highest virial parameters despite their high densities.