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Probing Extreme Star Formation in the Local Universe with ALMA¹

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Star formation is arguably one of the most fundamental physical processes in determining the properties of the visible universe. Observationally constraining the physical conditions that gave rise to different modes of star formation has been long-standing challenge. Now with the ALMA Observatory on-line, we can begin to probe the birth environments of massive clusters in a variety of "local" galaxies with sufficient angular resolution. I will give an overview of ALMA observations of galaxies in which candidate proto-globular cluster molecular clouds have been identified. These new data probe the physical conditions that give rise to globular clusters, providing information on their densities, pressures, and temperatures. In particular, the observations indicate that these clouds may be subject to external pressures of $P/k > 10^8 \text{ K cm}^{-3}$, which is consistent with the prevalence of optically observed adolescent super star clusters in interacting galaxy systems and other high pressure environments. ALMA observations also enable an assessment of the molecular cloud chemical abundances in the regions surrounding infant globular clusters. Molecular clouds associated with these clusters are strongly correlated with HCO⁺ emission, but appear to have relatively low ratio of CO/HCO⁺ emission compared to other clouds, indicating that the star clusters are impacting the molecular abundances in their vicinity.

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