Probing Massive Star Cluster Formation with ALMA

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Observationally constraining the physical conditions that give rise to massive star clusters has been a long-standing challenge. Now with the ALMA Observatory coming on-line, we can finally begin to probe the birth environments of massive clusters in a variety of galaxies with sufficient angular resolution. In this talk I will give an overview of ALMA observations of galaxies in which candidate proto-super star cluster molecular clouds have been identified. These new data probe the physical conditions that give rise to super star clusters, providing information on their densities, pressures, and temperatures. In particular, the observations indicate that these clouds may be subject to external pressures of $P/k > 10^8$ 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 assessement of the molecular cloud chemical abundances in the regions surrounding super star clusters. Molecular clouds associated with existing super star 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 super star clusters are impacting the molecular abundances in their vicinity.