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Physical Conditions of the Molecular Gas in the SMC's Star Forming Region NGC 346

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The brightest star forming region in the Small Magellanic Cloud (SMC), NGC 346, is host to roughly 100 young stellar object (YSO) candidates, thousands of pre-main sequence stars, and more than 30 OB stars which are major sources of ionization and feedback in this region. Using ~0.5 pc scale ALMA observations of 12CO(1-0), 12CO(2-1), and 13CO(2-1), we characterize the properties of molecular gas (H2) clumps we identify in NGC 346 using the astrodendro package and investigate the impact of the presence of YSOs. We derive the sizes, linewidths, and molecular gas masses from 12CO(1-0) and a CO-to-H2 conversion factor and 13CO(2-1) assuming local thermal equilibrium (LTE). This allows us to derive the size-linewidth relation and to investigate the boundedness of the molecular gas structures for each CO line. Our results show elevated linewidths for a given size and less bound structures in 12CO(1-0) compared to 12CO(2-1). and 13CO(2-1). In addition, we use the non-LTE code RADEX to model the observed line intensities and constrain the H2 densities, temperatures, and CO column densities of each structure we identify in this region. We will present the results of this modeling and discuss the implications of our results. Finally, a James Webb Space Telescope survey of NGC 346 allows us to study the correlation between the molecular gas and infrared emission originating from, for example, polycyclic aromatic hydrocarbons, and we will present preliminary results highlighting this.