# Environmental variation of molecular cloud structure toward NGC 248 in the SMC Southwest Bar

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The Small Magellanic Cloud (SMC) is a nearby low-metallicity galaxy and provides an important laboratory for studying molecular cloud evolution and star formation under conditions different from those in the Milky Way. We present high-resolution ALMA 12CO(J = 2-1) and 13CO(J = 2-1) observations toward the NGC 248 region in the Southwest Bar of the SMC. The observed field contains an active southern region associated with the NGC 248 H II region and young stellar objects, and a relatively quiescent northern region. This contrast allows us to examine how local star-forming activity is related to the structure and dynamical state of molecular gas.

We identify hierarchical CO structures using dendrogram analysis, separating extended trunks from compact leaves and comparing diffuse 12CO(J = 2-1) emission with denser 13CO(J = 2-1) components. We then examine their size-linewidth relations, virial states, and mass spectra in the South and North regions. In addition, a wider ACA 7 m 12CO(J = 2-1) map is used to place the high-resolution ALMA field in the large-scale kinematic context of the Southwest Bar.

The South and North regions show distinct molecular-cloud properties. The active South contains more complex CO-bright structures and a richer population of compact substructures, whereas the North is dominated by simpler and less active molecular gas. The wide-field ACA map further indicates that the two regions are associated with different large-scale kinematic components along the line of sight. These results suggest that local star-forming activity and the surrounding kinematic environment can modify the observable CO hierarchy from diffuse envelopes to compact substructures. This study provides a sub-parsec view of how molecular clouds are structured around an active star-forming region in the low-metallicity SMC.