Proposal Abstract:

Atomic hydrogen (HI) and molecular hydrogen (H2) are major components of interstellar medium (ISM). The transition from HI to H2 is an essential step of cosmic evolution, which allows for the subsequent star formation. The measurement of HI associated with H2 is crucial for understanding the HI-H2 transition. We will obtain an accurate HI surface density map and CO-dark gas map with the help of dust continuum data and CO spectral data. The CO-dark gas will be used to study relatively early stage of HI-to-H2 transition. We will measure the column density of HINSA in cold structures to study the steady state in HI-to-H2 transition. We will utilize these data to construct a transition picture from HI to CO-dark gas and then to cold dense gas in molecular cloud. The results will be compared with predictions of theoretical model to test and maybe complete the model. We will also compare the results with previous works of Perseus to study the influence of ISM properties on HI at steady state.