Proposal Abstract:

The hydrogen element (H) in molecular clouds is mostly in the form of molecular hydrogen (H2), with a small amount existing as atomic hydrogen (HI). Metallicity (Z) is one of the key parameters which influence the HI/H2 ratio in molecular clouds but there exist few observational constraints in low-Z conditions. In our previous FAST observations, we studied the HI content of molecular clouds from the low-Z outer Milky Way through HI Narrow-line Self-Absorption (HINSA). We confirmed a sample of HINSA features but the sensitivity of previous observations was not enough to identify the distant, weak, and narrow features. In this proposal, we plan to obtain deep single-point integration towards a sample of molecular clouds with lower metallicity than our previous observations. By combining the available molecular line observations, we will get robust measurements of the HINSA parameters (optical depth, center velocity, and velocity dispersion), derive the HI/H2 ratio, and constrain the physical conditions (e.g., UV field, cosmic ray ionization rate) of ISM in the low-Z outer Galaxy.