

Proposal Abstract:

We propose to map HI in part of Coma out to 5R200 (covering center and the west filament). Being massive, rich, close to us and far above the MW plane, Coma cluster is the ideal laboratory to study environmental effects in different evolution stages during cosmic infall. And the effect of peculiar motion is much less severe than that in Virgo cluster for Local Volume galaxies. Compared to pre-existing ALFALFA data, we will push the HI mass detection limit downward by ~ 0.8 dex. Combining DESI SV spectral data, we will achieve much higher sample completeness, especially for galaxies with $\log M_{\text{star}} < 10^9 M_{\text{sun}}$. By covering out to 5R200, we will see the effects of "pre-processing" before galaxies fall into Coma cluster and compare/connect them to the environmental effects in cluster. With both high sensitivity and wide coverage, we will build the particularly important yet long missing complete galaxy sample for Coma cluster. Based on this sample, we will answer questions about the extent of pre-processing and its dependence on local environment, the responses in HI and star formation as a function of galactic properties and infall stages, and the possibly different evolution paths of low- and high-mass galaxies in/near Coma cluster.