

MeerChoirs: Effects of Group Environment on Galaxy Evolution

Abstract

Galaxy groups are important structures in the hierarchical structure of the Universe, as they lie between the low-density environments of the field and high-density clusters. Groups provide a window into how galaxy interactions and increasing density affect galaxies, as galaxies transition from blue, star forming types to massive, quenched galaxies that are more common in clusters -- which groups eventually coalesce into. Since most galaxies in the Universe are not isolated, it is important to study the effects of the environment on their evolution. HI is a useful tool for studying group environments because it can trace the tidal interactions between group members. It is the fuel for star formation, therefore its distribution provides key insights into the quenching or triggering of star formation in galaxies. MeerKAT's combination of high sensitivity, spatial resolution and large field of view make it the most ideal radio telescope to study nearby groups -- enabling the simultaneous study of large areas, detailed studies of galaxies within groups and the faint signatures of their interactions. We therefore propose 35.9 hours of MeerKAT HI observation to study the neutral gas in 6 nearby (<115 Mpc), carefully selected groups, their constituent galaxies and the role that group environments play on the evolution of galaxies. These will be the deepest and highest resolution observations of these groups and will provide unparalleled views into the HI of the groups and their group members.