

The distribution and origin of the excess HI in low mass groups

Abstract

How the dense environment in galaxy groups affect the atomic hydrogen (HI) of galaxies, and how this is related to the differing star-formation properties of group and field galaxies, is a subject of intense research in our quest to understand structure formation. A recent study found substantial amounts of HI not contained in member galaxies but situated in the intergalactic space in groups with average stellar masses (total stellar mass divided by the number of member galaxies) $< 10^{9.5}$ solar-mass. The origins of this substantial mass of extra HI is unclear and can, depending on whether it is of tidal origin or is situated in HI clouds / faint galaxies, help us understand the assembly of groups. Through this proposal we want to undertake the first systematic study to locate and trace the HI in intergalactic space of low mass groups. We have chosen all groups with average stellar masses less than 10^9 solar-mass from the sample used in the above mentioned study, for L-band MeerKAT observations. We aim to be sensitive to HI column densities low enough to trace tidal HI, while at the same time trace more compact HI clouds using higher spatial resolutions. Through this unique search we aim to pin down the excess intergalactic / intragroup gas in low-mass groups and gain important insights into the process of group assembly and galaxy evolution.