

AGN feedback, HI and star formation in a sample of nearby galaxy groups

Abstract

Galaxy groups are the environment in which most galaxies reside in close proximity at low velocities, thus an important locus for galaxy interactions and evolution. However, detailed studies require representative samples of nearby groups with multi-wavelength data; such samples are rare. We propose to observe a subset of the Complete Local-Volume Groups Sample (CLoGS), a set of 53 groups within 80 Mpc. The sample has a rich supporting dataset, including X-ray coverage (hot IGM), low-frequency radio (AGN), and optical/CO data (stellar and cold gas components). MeerKAT offers the opportunity to fill two important gaps here: 1) neutral hydrogen mapping to measure the most massive cold gas component of the groups and trace the impact of galaxy mergers and interactions, and 2) deep 1.4GHz continuum maps of radio jet/lobe structure and star formation regions. MeerKAT's extraordinary sensitivity and large FoV is ideal for studies of nearby groups, and its spatial resolution is well matched to the existing GMRT 610/235MHz data, allowing for spectral index and curvature mapping. We propose to observe 10 CLoGS groups, selected for visibility from MeerKAT having particularly interesting features (galaxy interactions, star-forming early-type galaxies, recently active central radio-galaxies). With these observations we will trace the structure and properties of the AGN and star-formation in central galaxies, map their neutral hydrogen content, and survey the satellite galaxy population. Our team will involve a new generation of South African MSc/PhD students in MeerKAT analysis, while building on our radio/multi-wavelength experience for exploring in-depth processes that drive galaxy group development.