

# Mapping tidal interactions in nearby galaxy groups

## Abstract

We propose to obtain single pointing MeerKAT 21-cm observations of three nearby galaxy groups known to contain wide-spread tidal debris. Our targets are the Vela Cloud in the NGC 3263 group, the massive HI ring in the NGC 2434 group, and the twin HI bridge in the NGC 6221 group. Building on successful MeerKAT HI commissioning studies (e.g., NGC 1316, Serra et al. 2019), we aim to map the low-surface brightness HI emission between and around the interacting group members at close to 10x enhanced sensitivity and resolution compared to the literature. This will allow us to infer the evolutionary state and formation history of these groups, by revealing the structure and density of the intra-group medium, identifying dwarf companions, quantifying the amount of hydrogen removed from the group members, and creating a 3D view of each group based on the high-resolution HI kinematics of all detected structures. Furthermore, we will use MeerKAT's simultaneous radio continuum observations, unobscured by dust, along with supplemental multi-wavelength data to measure the amount and location of star formation activity in the group members and potentially in their tidal features. Additionally, polarised radio continuum will allow us to trace the distribution of magnetic fields within disks and the intra-group medium. Comparing all of the above observations with characteristics of isolated galaxies will reveal the interplay between tidal forces, magnetic fields and star formation activity during the hierarchical evolution of galaxies.