

Title

HI study of ultra-diffuse galaxies and galaxy evolution in Hydra I cluster

Abstract

Ultra-diffuse galaxies (UDGs) are the largest and faintest low-surface brightness (LSB) galaxies, with sizes close to those of typical spirals yet surface brightnesses of dwarf galaxies. Surprisingly, given their extended sizes but low stellar masses, UDGs have been found in the harsh environment of galaxy clusters, where one naively expects them not to survive the strong gravitational potential and dense hot ICM. The lack of available deep-wide HI observations and our incomplete understanding of the effect of environmental mechanisms such as ram pressure stripping on cluster assembly and galaxy evolution hinder the study of the origin of UDGs and LSBs.

To investigate further the formation and evolution of UDGs and LSBs in clusters, we propose a 10-pointing MeerKAT 32k mosaic of the Hydra I Cluster spanning out to its virial radius and the connection to the main large-scale structure filaments feeding the cluster. Based on a list of optically identified UDG candidates we will build a full census of HI-UDGs in Hydra, measuring redshifts, baryonic masses and rotation velocities, characterising morphology and interactions along with cluster substructure. The detection and analysis of the faintest traces of stripped gas will provide constraints on the location of UDGs relative to the cluster, enabling the study of external mechanisms on the gas supply of galaxies. Combining HI-MeerKAT data with in-hand data from the ionised and molecular gas components of Hydra, will enable us to perform some of the most detailed studies of UDG origins and environmentally-driven evolution in the nearby Universe.