

# An HI perspective on galaxy evolution in Abell 2626 and its surroundings

## Abstract

We propose HI observations in 32k-mode of four pointings in the ENE-SSW sector of the Abell 2626 galaxy cluster at  $z=0.055$ . This will expand the area inside  $1 R_{200}$  that is covered by our existing, single MeerKAT pointing, to the radial range of  $1-3 R_{200}$ . Our principal science objective is to investigate the importance of 'pre-processing' of galaxies in the Perseus-Pegasus filament before they reach the inner cluster environment. We will also study the gas content of so-called 'back-splash' galaxies that were once inside  $R_{200}$  on their infall trajectory. Our observational goal is to image the morphologies and kinematics of the HI disks of galaxies in the outskirts of the cluster, as they are sensitive diagnostic tracers of various gravitational and hydro-dynamical processes at play. Cluster substructure and the cosmic environment of galaxies are characterised by  $\sim 560$  optical redshifts, largely from our MMT/Hectospec campaign, combined with optical imaging from DECaLS. Given an HI mass limit of  $5 \times 10^8 M_{\text{sun}}$  and considering the 219 galaxies detected in HI in our existing data, we expect several hundred more HI detections in this over-dense region. The scientific analysis of our MeerKAT data will be further enhanced by forthcoming ancillary data. Optical spectroscopy from WEAVE will reveal the evolutionary state of the stellar populations. Synergy with LOFAR will allow spectral index mapping. Analysis of the Hydrangea hydro-dynamical simulations will provide insights in the gas removal processes. This will be the first blind HI imaging survey to explore galaxy transformations from filaments to cluster cores.