

The MeerKAT Survey of the Virgo cluster II

Abstract

We propose to complete the deepest blind survey of the Virgo cluster extending the current coverage beyond the virial radius and including the most relevant cluster substructures, where most of the infalling galaxies are located. This project will deliver: images at GHz frequencies of our closest rich galaxy cluster 60 times deeper than existing data, in full polarisation, and including a blind HI survey that aims at mapping four times more galaxies than previous experiments and without selection biases. The combination with state-of-the-art surveys in optical (NGVS, VESTIGE), X-ray (eROSITA) and low-frequencies radio (LOFAR) will massively increase the scientific potential of this dataset, making its legacy value outstanding. Our main scientific goals rely on using Virgo as a test bed for galaxy evolution. We aim at detecting 330 galaxies in continuum and >370 with resolved HI emission for the whole mapped region. In both cases, this will enable for the first time to deeply explore the parameter space of dwarf galaxies in this environment. For each detected galaxy we will identify if there are signs of interaction with the ambient, and what is the perturbing mechanisms including the fate of stripped gas. The survey will also detect emission from tens of AGNs that will be used to quantify the contribution of satellite galaxies to AGN feedback. Finally, large scale magnetic fields and emission from diffuse sources in the ICM will also be explored. The project requires 162 observing hours including overhead.