

Is cluster-scale diffuse emission common in cool-core clusters that experienced a minor merger?

Abstract

Diffuse radio emission at centre of galaxy clusters has been observed both in merging clusters on scales of Mpc, called as giant radio halos, and in relaxed systems with a cool-core on smaller scales, named as mini halos. Giant radio halos and mini halos are thought to be distinct classes of sources. However, recent observations have revealed the presence of diffuse emission on cluster-scales in few clusters that host a central mini halo, without any strong dynamical activity. This emission is characterised by an ultra-steep spectrum (spectral index > 1.5) and is detected in systems with cold fronts, suggesting its origin is connected with the sloshing of the cluster core after a minor merger. With this proposal, we request MeerKAT UHF-Band observations of seven cool-core cluster located in the southern hemisphere, which present diffuse emission on small scales and signatures of cold fronts. With the proposed observations we will detect and characterise the diffuse emission in the clusters and test the connection between large-scale diffuse emission and cold fronts. This study has an important impact on the understanding of particle acceleration mechanisms at work in relaxed clusters.