

Title

Searching for diffuse radio emission in a massive pair of pre-merging galaxy clusters

Abstract

Radio halos and relics are cluster-scale diffuse synchrotron sources commonly observed in galaxy clusters undergoing violent merger events. Very recent observations have however unveiled that non-thermal diffuse emission can be generated also prior to the cluster-cluster collision, in the region in-between the approaching clusters. Cluster pairs in this dynamical state are called "pre-mergers". The processes that lead to the generation of synchrotron emission in these regions, where the average particle energy is much lower than within a cluster, are likely connected to turbulence and shocks. Studying these processes allow us to understand how the kinetic energy is dissipated into non-thermal components in a poorly investigated merger phase and environment. Nevertheless, cluster pairs in pre-merger phase are scarce, as are detections of diffuse radio emission between them. We have characterized the thermal properties of a recently discovered pair of massive clusters and determine that they are in a pre-merger phase. With the proposed MeerKAT observation, we aim to search for the presence of diffuse radio emission in this rare system.