

Title

The first systematic study of magnetic field in galaxy clusters using a uniform radio and X-ray sample: a pilot study

Abstract

With this proposal, we want to start the first systematic study of magnetic field evolution in galaxy clusters using a unique uniform X-ray sample (CHEX-MATE). Galaxy clusters are massive objects that form at the intersection of intergalactic filaments by accretion of lower mass groups and clusters. Radio observations have probed since decades the existence of magnetic fields in the intra-cluster medium, but their properties and impact of the cluster evolution are yet unconstrained. This is mainly due to the challenges and time-expensive, multi-band observations that were needed - until now - to perform this kind of study. Now, thanks to the sensitivity of MeerKAT, and given the existence of an X-ray sample of clusters for which we have a uniform coverage, it is possible to undertake this project. We have divided the sample of 86 CHEX-MAKE clusters observable by MeerKAT in bins in the mass-redshift space, and we aim at studying the magnetic field evolution as a function of mass, redshift, dynamical status, and cluster thermal properties. In this proposal, we ask for observations of a pilot sample to establish the feasibility of our project.