

Title

A MeerKAT survey of the most massive $z > 1$ galaxy clusters

Abstract

We propose to perform an L-band imaging survey with MeerKAT of a complete sample of the 30 most massive galaxy clusters at $z > 1$, found within a survey area of 10,861 square degrees (approx. 1/4 of the sky). This will be the first time this part of the cluster population has been studied in the radio using a homogeneous, statistical sample. We will: (i) Investigate how common diffuse radio halos and relics, associated with merging clusters, are at $z > 1$. This may give new insight into how this emission is produced, and place constraints on magnetic field strengths in clusters at a time when the universe was less than half its present age. Preliminary explorations with MeerKAT data have revealed extended emission in several of the clusters fitting the redshift and mass cut of the proposed sample. (ii) Study star formation activity and the AGN population in and around these extreme environments. In particular, we will examine evolutionary trends in total star formation rate with cluster mass and dynamical state. This project is highly complementary to other MeerKAT cluster surveys, which will be used to provide a low redshift comparison sample.