

Title

Tracing diffuse radio emission and starburst galaxies in massive $z > 1$ galaxy clusters

Abstract

We propose to observe 18 massive galaxy clusters with MeerKAT to obtain a complete sample of the 30 most massive galaxy clusters at $z > 1$, found in a survey area of 10,861 sq. deg (approx. 1/4 of the sky). This will be the first time the massive, high-redshift cluster population has been studied in the radio using a homogeneous, statistically significant sample. We will: (i) Investigate how common diffuse radio halos and relics, associated with merging clusters, are at $z > 1$. This will 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 MeerKAT observations have revealed extended emission in several of the clusters fitting the redshift and mass cuts of the proposed sample. (ii) Study star formation 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.