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The MeerKAT Massive Distant Clusters Survey

Abstract

We propose to obtain L-band imaging with MeerKAT of a complete sample of the 27 most massive galaxy clusters at z > 1, found within a survey area of 10,861 square degrees (approximately 1/4 of the sky). We aim to study star formation activity and the AGN population in and around these extreme environments at a time when the universe was less than half its current age. This will be the first time this has been done for a statistical sample of rare, truly massive clusters at such redshifts. As well as furthering our understanding of galaxy evolution, we will investigate the impact of star forming galaxies and AGNs on measurements of the intracluster medium from Sunyaev-Zel'dovich observations (these MeerKAT observations are complementary to proposed ALMA+ACA observations of the same cluster sample). We will search for radio relics that will indicate if these extreme clusters are undergoing mergers, with the potential for detecting the most distant relics ever found. We will also place constraints on faint, diffuse radio emission from radio halos by a stacking analysis -- at redshifts well beyond those probed by previous studies.