MKT-22072

Star formation and radio AGN in the first massive clusters at z~1.5

Abstract

We propose MeerKAT observations of five massive galaxy clusters at 1.4<z<1.7, to probe radio emission from star-forming galaxies and AGN across the whole virial volume and into the infall region. The target clusters are the most distant systems from the South Pole Telescope SPT-SZ Survey, with masses M_200>4e+14 Msun. These are among the rarest, most massive clusters known at these redshifts irrespective of selection, identified with a clean, approximately mass-based selection independent of galaxy properties, making this sample perfectly suited for galaxy evolution studies. Dedicated homogeneous, deep optical/NIR imaging follow-up from HST, ESO/VLT and Spitzer enables a range of galaxy population studies from the core regions out to the cluster outskirts, but is unable to properly quantify star formation and to probe nuclear activity in cluster galaxies. MeerKAT has the sensitivity and resolution to reach "typical" (i.e., main sequence) star-forming galaxies at these redshifts down to about 3e+10 Msun, the stellar mass limit of the current optical/NIR investigations. These observations, coupled with a quantitative comparison with results from cosmological simulations, will constrain environmental effects on galaxy evolution at this fundamental, transitional epoch bridging massively star-forming protoclusters at z>2 and established, largely quenched clusters at z~1, for the first time in a representative sample of the first, very massive clusters emerging from the cosmic web.