

The MeerKAT + South Pole Telescope UHF Survey of the distant universe

Abstract

The past two decades have demonstrated a clear synergy between wide-area, high-sensitivity cm- and sub/mm-wave surveys to probe fundamental problems in galaxy evolution and cosmology. Here we propose one such synergy between the South Pole Telescope (SPT) and MeerKAT, by carrying out a deep (10 μ Jy/beam), wide (100 sq. deg) survey in the UHF band. The two primary science goals are: (1) multi-wavelength counterpart identification of mm-wave sources in the SPT Deep Field; and (2) the selection of $z > 5$ dusty star-forming galaxies. Commensal and serendipitous science cases include the study of luminous, dust-obscured active galactic nuclei, the study of galaxy clusters, high redshift measurements of the radio-FIR correlation, the discovery of exotic radio morphologies, cross-correlations with CMB lensing maps, the cross-correlation of [H I] x [C II] across the peak of cosmic star formation, and radio detections of strong gravitationally lensed sources. This survey sits in a unique and highly complementary part of the frequency, areal, and depth parameter space for SKA Pathfinders/Precursors, and will undoubtedly have legacy value well into the SKA era.