Title

**MeerKLASS: The MeerKAT Large Area Synoptic Survey**

Abstract

Building on pioneering single-dish intensity mapping observations in the MeerKAT L and UHF bands, we will continue our wide survey to map out the neutral hydrogen (HI) distribution from redshifts 0.35–1.45 in the UHF band. The total requested time of 2120 hours will allow to observe most of the Southern sky outside the Galactic plane (~10,000 deg^2) over the next 4 years, allowing us to constrain dark energy, gravity, and massive neutrinos. Crucially, this will permit a first ever detection of Baryon Acoustic Oscillations at radio wavelengths, as well as transformational measurements of the power spectrum on ultra-large scales. This dataset will provide an invaluable radio counterpart for DESI, 4MOST, Euclid, and LSST. Cross-correlations with these surveys will also suppress residual systematic effects in the HI measurements. Additionally, we have demonstrated excellent results from commensal `On-the-Fly' (OTF) imaging, permitting a rapid wide-field interferometric survey to be conducted simultaneously, with an angular resolution of ~14'' and (conservatively) a noise rms of ~35 uJy in continuum Stokes I. For 2024-25, we request 500 hours in the UHF band to survey another 2,000 deg^2 using our established strategy. Adding our 2023-2024 data, this should permit a direct detection of the BAO when combining redshifts, and also in cross-correlation at z ~ 0.6-0.8 using DESI and eBOSS data. This will mark an important milestone for cosmology with SKAO, further strengthening the South African leadership in this future instrument.