

The MeerKAT view of the Shapley Supercluster Core at UHF

Abstract

Inter-cluster radio bridges are extremely faint, diffuse synchrotron sources found to connect pairs of galaxy clusters. Only a handful have been discovered thus far. Recent MeerKAT L-band observations of the Shapley Supercluster Core (SSC) have led to the detection of the first inter-cluster bridge at GHz frequencies, found between cluster A 3562 and group SC 1329–313. This emission is barely detected in new follow-up uGMRT band 3 (400 MHz) observations, giving a rough integrated spectral index estimate of $\alpha \sim 1.3$. To investigate the dynamics and merger activity of the SSC and interpret the results in the framework of large-scale-structure (LSS) formation, we request two pointings totalling 15 hours of MeerKAT UHF-band observation time. With this data, the bridge will be detected at an $\text{SNR} \geq 4$, allowing us to perform the first dedicated spectral analysis of a radio bridge and to confirm its postulated turbulent (re)-acceleration origins. We can also further investigate the spectral nature, polarisation and magnetic field structure of the other features probing the dynamics and non-thermal content of the remaining SSC.