

# MeerKAT-discovered radio shock and large-scale relic emission: UHF-enabled spectral age measurements

## Abstract

AGN jets and outflows are key drivers of the evolution of massive galaxies over cosmic time, and Ultraluminous Infrared Galaxies (ULIRGs) serve as an important snapshot thereof. However, these are a challenge to observe due to their steep spectra, low surface brightness emission at low-redshift, and difficulty to decouple morphological features at higher redshift, especially where higher-frequency observations are required to gain resolution. The study of exemplars in the nearby universe remain important laboratories for high-resolution comparison with hydrodynamical simulations and extrapolations to higher-redshift objects. MeerKAT observations hold a significant advantage in this endeavour, demonstrated in several published examples with early results. Here we propose UHF observations of one of MeerKAT's distinctive early L-band discoveries, that of complex, multi-epoch, Mpc-scale radio emission centred on the dual AGN, local-Universe ULIRG, NGC 6240. The primary motivation for this is to perform spectral age comparisons, with the L-band inferred dynamical timescales. This is not possible with low signal-to-noise L-band observations, which preclude robust in-band spectral indices. Accurate spectral aging from these newly-discovered, multi-epoch radio lobes add important information to the holistic understanding of this postmerger, dual AGN system, and relation between the merger's dynamical, starburst, and jet triggering timescales.