

# Abell 3667: understanding the structure of cluster shocks

## Abstract

We propose to observe the galaxy cluster Abell 3667 in the UHF band to complement existing L-band observations. The cluster hosts a radio relic, unique for its brightness and size, making it the best target in the sky for this type of study. The combination of UHF and L-band data will allow the derivation of resolved wide-band spectra (including curvature) and precise rotation measure measurements. These results will enable the localized study of particle acceleration and fading processes in isolated filaments, as opposed to spectra integrated over larger regions in which this information is hidden. It will also enable the 3D reconstruction of the filament geometry for an unprecedented comparison with current cosmological and non-cosmological MHD simulations where various particle acceleration models can be explored. The low-frequency images of the shock front region will also enable a more robust estimation of the shock Mach number minimising the confusion from radiative losses and allowing a direct comparison with X-ray predictions. Finally, the MeerKAT's UHF band will be crucial in enabling a rare, spatially resolved study of the very faint and extended radio halo formed in the wake of a bullet-like merger. For this project we ask 10 hrs including overhead.