

# A broad, shallow HI absorption line in a compact radio galaxy

## Abstract

We will observe a known compact radio galaxy, a population of young or retriggered radio AGN, to confirm a tentative detection of associated neutral hydrogen (HI) in absorption made with the Australia Telescope Compact Array. HI absorption detections provide information on the distribution and kinematics of atomic gas in the innermost regions of very young radio galaxies.

The absorption feature to be confirmed here is unique in that it is one of only two broad ( $>200$  km/s) and shallow ( $<5\%$  optical depth) detections with no associated narrow component. Furthermore, unlike the one other example in the literature, this case is significantly blue-shifted from the known systemic redshift of the host galaxy, suggesting this is the first of a unique set of HI gas outflows in radio galaxies to be detected. Such outflows can have a significant effect on star formation and the evolution of the host galaxy, and so this source presents a novel opportunity to study a new population of absorbers associated with just the gas close to the AGN.

The MeerKAT telescope offers the sufficient sensitivity to confirm this result in a relatively short observation. This will be important to also verify the capabilities of MeerKAT and line finders developed and used for upcoming HI absorption surveys with SKA Pathfinder telescopes, such as MIGHTEE-HI and the FLASH survey, in detecting such faint and unique absorption features.