

A study of the lobes of the radio galaxy Hydra A using MeerKAT observations

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The Hydra A radio galaxy is the result of one of the most powerful AGN outbursts known to date. It hosts a pair of 300- kiloparsec diameter radio lobes that have been inflated over multiple generations of activity. Radio observations provide us with a unique perspective for investigating and studying the high-energy particles that reside in the radio lobes. The MeerKAT radio telescope carried out observations of Hydra A, from which we obtained radio maps at several frequencies between 900 MHz and 1500 MHz. The spatial analysis we performed revealed two bright inner lobes, a pair of diffuse outer lobes, and a tail-like region extending outwards from the southern outer lobe. We conducted a spectral analysis by combining the radiative flux densities that we computed using the MeerKAT observations with flux densities we calculated from previous VLA low-frequency observations at 74 MHz and 330 MHz. The spectral analysis showed that the spectrum in the MeerKAT frequency range is well described by a power law and that the tail-like region exhibits a steeper spectral index than the spectral index of the outer lobes. We set constraints on the magnetic field strength and the age of the outer radio lobes through electron spectrum modelling which includes electron ageing.

Track

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