
Multiwavelength study of a restarted radio galaxy across 1 GHz of bandwidth

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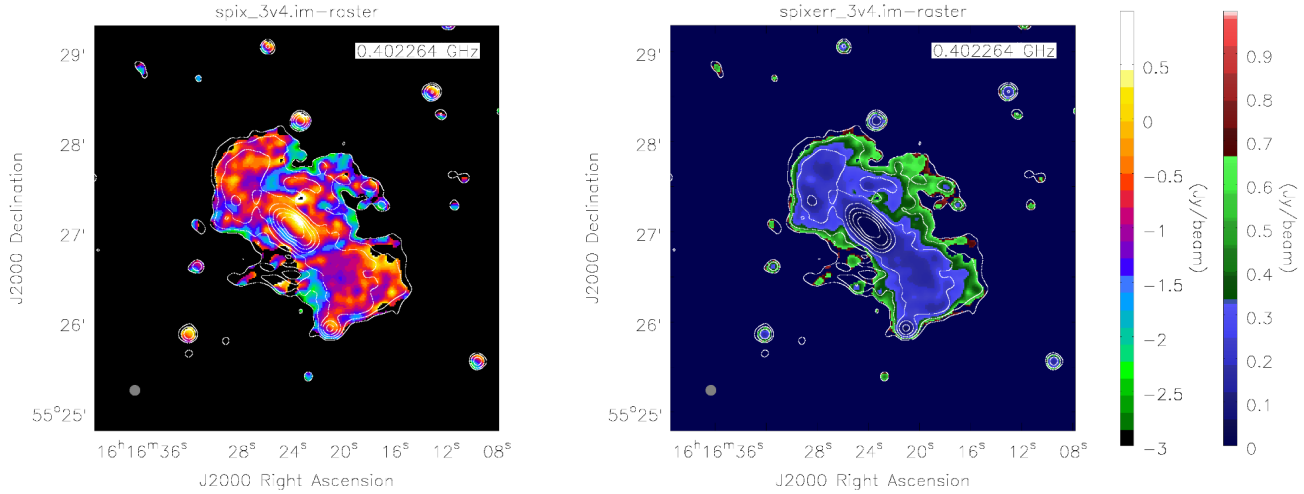
This project studies a restarted radio galaxy using wideband data from the Giant Metrewave Radio Telescope (GMRT) and the Jansky Very Large Array (JVLA). The student will learn how to analyse astronomical images and to create spectral index maps and multiwavelength overlays. The work will potentially contribute to a journal article.

Rationale: Active galactic nuclei (AGNs) are galaxies which exhibit unusually high luminosity in one or more regions of the electromagnetic spectrum, with the hike in power not attributed to star formation, but rather to the accretion of matter onto the galaxy's central supermassive black hole. Due to their high luminosity, together with the fact that the radio waves are least affected by dust obscuration, they serve as powerful tools for finding distant objects, and understanding their cosmic evolution can provide constraints on cosmological models. Many AGN produce collimated jets, visible in the radio, which may result in large diffuse lobes. These jets can ‘switch off’ and, sometimes, restart, producing more than one pair of lobes for a given radio source. Studying such sources can help us understand AGN processes and their effect on the galaxy and its environment.

The project: Multi-band observations of the ELAIS-N1 field were carried out with the GMRT and the JVLA as part of a low frequency study of the properties of faint radio sources. One of the sources in this field is an extended radio galaxy which shows evidence of being a restarted AGN. In this project the student will use radio and multiwavelength data to study this radio galaxy and determine if it is indeed a restarted AGN. The student will learn how to analyse multiwavelength images, create radio spectral index maps, and produce image overlays.



Required skills / knowledge: Familiarity with Python is required. Familiarity with the SAO DS9 software is advantageous.

Interested students to please contact the supervisor well in advance of project selection deadlines. Interviews will be undertaken.