

## “The A-Team”: Low-frequency Observations of the Brightest Radio Galaxies in the Southern Sky

Murchison Widefield Array (MWA) is a low frequency (80 — 300 MHz) radio telescope operating in Western Australia; its location in the southern hemisphere gives it an excellent view of the Galactic Plane, and several bright radio galaxies: Hercules A, Fornax A, Virgo A, Hydra A, Centaurus A, and Pictor A: colloquially and collectively called “The A-Team”.

These radio galaxies are some of the closest and brightest objects visible with the telescope, but are so bright that they are often removed or “peeled” from observations without being well-characterised, in order to reveal fainter sources. However, these objects are interesting, because they are powerful, bright, and close enough that even with the MWA, relatively fine details can be observed. At low frequencies, this can give insights into the nature of the jets emitting from the central black hole; for instance, it is suspected that the jets of Pictor A become partially synchrotron self-absorbed, causing the spectrum to flatten at low frequencies.

This project aims to use the best observations from many hundreds of hours of observations of these very bright sources to completely characterise them over the entire MWA band, as well as new high-resolution observations from the extended MWA and the GMRT to explore their complex morphologies at low frequencies. The resulting sky models will be extremely useful for calibration and peeling for the rest of the international MWA team, and also for future work with the Square Kilometre Array. Insights into the astrophysics of the individual sources may well result in papers in refereed journals.

This project is suited to a student with a strong grounding in astrophysics and a will to learn various software data reduction packages in order to create the best images possible.

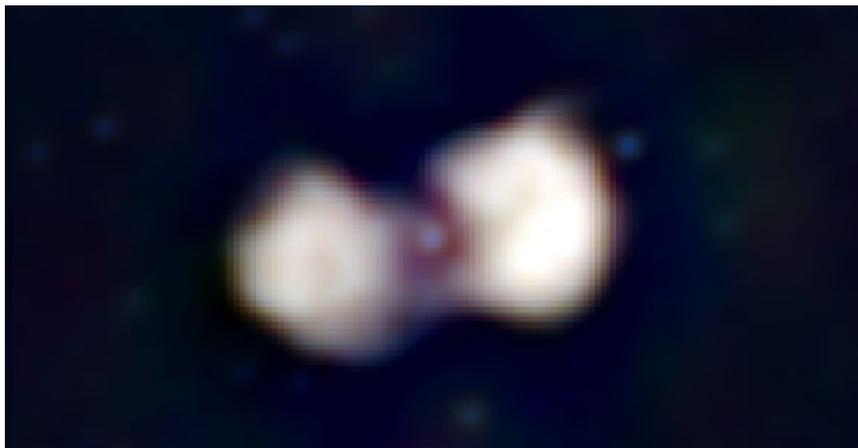


Fig 1: Fornax A, as seen in radio “colours” via the GLEAM survey; red = 72 — 103 MHz; green = 103 — 134 MHz; blue = 139 — 170 MHz; the lobes have a different spectral behaviour to the central core.

### Research Field

Radio Astronomy

### Project Suitability

Honours

### Project Supervisor

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