

GLEAM-X: Exploring the Universe in Radio Colour

The Murchison Widefield Array (MWA) is a low frequency (80 — 300 MHz) radio telescope operating in Western Australia and the only SKA_LOW precursor telescope. One of the largest science programs for the MWA is the GaLactic and Extragalactic All-sky MWA (GLEAM) survey, which has surveyed the entire visible sky for two years since the MWA commenced operations.

Research Field

Radio Astronomy

Project Suitability

Honours

Masters

PhD

A large part of the 0.5 PB of GLEAM data has been published as an extragalactic source catalogue (see Figure 1), as well as observations of the Galactic Plane and the Magellanic Clouds. Observations of GLEAM-eXtended have commenced, using the newly-upgraded MWA, which now has double the resolution, allowing images 10x deeper to be created, potentially revealing millions of new radio sources over the next few years.

Project Supervisor

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Co-Supervisors

As needed

Combining the datasets will create the most sensitive survey output from the MWA ever. The wide bandwidth of the MWA makes possible in-band spectrum measurements of many objects, which directly informs us of their astrophysics.

Aims of the project:

- i. Process GLEAM-X data to generate widely useful images and catalogues;
- ii. Undertake **a focused research project** that utilizes the data. This could include (but is not limited to): transient/variable radio sources, scintillation, the ionosphere, and continuum studies on objects such as radio galaxies, galaxy clusters, supernova remnants, and pulsars;
- iii. Publish the results, either as an outreach app or website (Honours) or as scientific papers (Honours, Masters, PhD).

This project is well suited to a student with strong computing skills, an interest in gaining a deep understanding of radio astronomy calibration and imaging, and an interest in a science area that can be addressed by data from the survey.

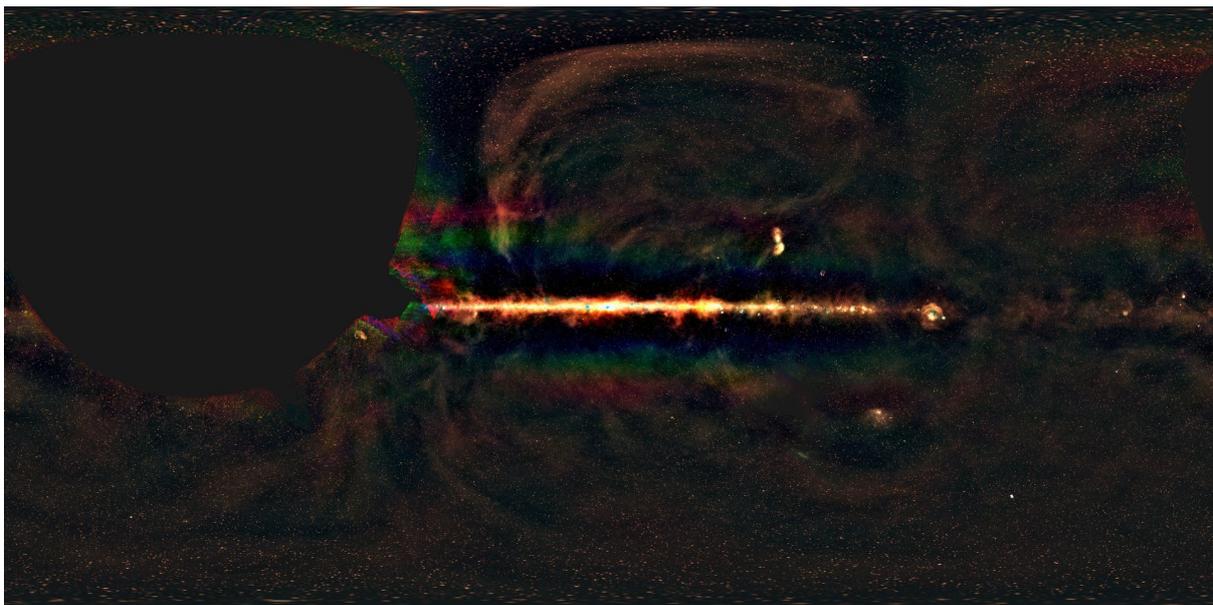


Figure 1 The first year of GLEAM observations, covering the whole Southern Sky. This is the first radio colour view of our universe: find out more via this TED talk: <http://bit.ly/nhwted>.