

Searching for radio transients at low radio-frequencies (50 - 350 MHz) using the Engineering Development Array 2

The low-frequency (<400 MHz) radio sky is not reported to be highly variable in terms of transient objects. However, these makes any potential detections at these frequencies highly valuable from a scientific perspective. The number of astrophysical transients of unknown origin detected at low radio-frequency is increasing with the increasing sensitivity and number of the instruments operating the these frequencies.

There have been several recently reported low-frequency transient detections, such as for example detection of a very bright transient (> 800 Jy) of unknown nature by the Long Wavelength Array ([Varghese, S. et al \(2019\)](#)) or detection of radio emission associated with Soft Gamma Repeater ([SGR 1935+2154](#)). Moreover, fast radio-bursts (FRBs) have been observed even down to 328 MHz ([Pilia, M. et al \(2020\)](#)), but they are yet to be observed below 300 MHz.

The Engineering Development Array 2 (EDA2; Wayth et al in preparation) is a precursor station of the low-frequency component of the Square Kilometre Array ([SKA-Low](#)), which will be built at the Murchison Radio-astronomy Observatory in the next decade. The EDA2 consists of 256 MWA dipoles with analogue signals from each antenna individually digitised, which enables formation of all-sky images at frequencies between 50 and 350 MHz. Instantaneous all-sky imaging is a very attractive feature of low-frequency radio-telescopes which is not available at higher radio-frequencies.

Many long observations (exceeding 24 hours) have already been conducted with the EDA2, but the data are still to be fully analysed. The goal of this project is to analyse already collected data in search for radio-transients and other forms variability of astrophysical origin. The project will also gravitate towards development of the real-time all-sky monitoring system for the EDA2 and SKA-Low stations in general. As the project progresses new data can be collected with the transient monitoring running in real-time. Therefore, development of automatic classification of detected candidates will be a significant component of this project.



Panorama of the Engineering Development Array (EDA) at the Murchison Radio-astronomy Observatory

Research Field

Radio Astronomy/Engineering

Project Suitability

Masters, Honours, PhD

Project Supervisor

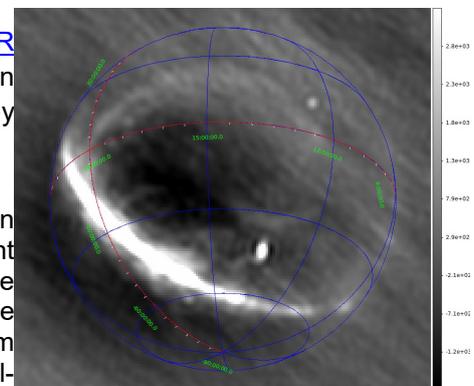
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Example of an all-sky image created with the EDA2 radio-telescope.