

Searching for optical transients with the Desert Fireball Network.

The Desert Fireball Network (DFN, fireballsintthesky.com.au) is a project that aims to detect bright meteors (fireballs) as they fall through the sky, and to retrieve the meteorites that they may drop. The DFN group have deployed cameras all over the southern and western parts of Australia as part of their work. As part of a collaboration between the Murchison Widefield Array (MWA) and the DFN group, a camera has been installed near Wooleen station that is part of the DFN network, but is specially built for astronomy observations. We call this the astrocam!

The astrocam has a very wide field of view ($100 \times 80^\circ$), can detect stars as faint as 10th magnitude, and has a fully automatic observing schedule. We have developed a calibration method that will allow us to extract science quality images from the astrocam data. We are now in the nice position of having a large amount of excellent data that needs to be mined for science results.

The first part of the project is to use the astrocam images to produce light curves for all the known variable stars above 10th magnitude. With the all-night, all-year observations, and generally favorable weather conditions, this will be the most detailed and largest study of its kind.

The second part of the project is to search for variable stars and transient events that are yet unknown. This includes searching for transient events such: cataclysmic variables, novae, and supernovae. With a sensitivity limit of approx 10th magnitude it will also be possible to find new variable stars, which have gone unnoticed by the more sensitive but narrow surveys carried out on large telescopes.

In this project you will learn about the life cycle of stars. You will also gain experience handling large amounts of data in an automated way and will have access to supercomputing facilities such as Pawsey.

Research Field

Transients and Variability

Project Suitability

Honours or PhD

Project Supervisor

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Left: The astrocam that has collected all the data for this project. It is co-located with a normal DFN camera. **Right:** The constellation of Orion as seen by the astrocam.