

## SAAO Masters Project 2023

# Feasibility study for a narrow band survey of the Magellanic Clouds

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### Background:

The Magellanic Clouds are neighbouring, satellite dwarf galaxies of the Milky Way. They are particularly important for studies of star formation because they are near enough to resolve individual stars, yet distant enough to allow treatment as populations. The Magellanic Clouds harbour a vast array of star forming regions, supernova remnants, and planetary nebulae. Many of these systems are key markers in star formation and evolution, and are best studied in narrow bands.

Narrow band imaging refers to filters that transmit light in a narrow range of wavelengths, usually associated with a specific atomic transition. Common filters include H $\alpha$ , [O III] and [S II]. Images in these filters are extremely useful in order to make first guesses at the types of processes that generate this emission, and hence at the nature of the objects observed. They are also extremely useful in the planning of spatially resolved spectroscopy of such interesting objects.



*The Milky Way and Magellanic Clouds in the sky above SAAO in Sutherland, Northern Cape*

**Aim:**

This project will entail a feasibility study for performing a 2 or 3 filter narrow band survey of the Magellanic Clouds using the *Lesedi* telescope and its wide-field imager. We envisage the following components to the project:

1. Literature review of previous narrow band surveys of the Magellanic Clouds in order to understand what can be gained by a new survey, i.e. better resolution, improved sensitivity
2. Literature study of the science cases for such a survey. This will involve looking both at previous surveys, and at the potential for future astronomy areas, i.e. new space mission that may require this type of support, or key objectives of the decadal review of astronomy in the US.
3. Test images to be analysed in order to characterise the performance of both the instrument and the telescope, as well as the potential for mosaicking images and automatic extraction of fluxes.

Depending on the student and the feasibility of the project, this project has the potential to be upgraded to a PhD project.

**Useful references:**

R. Chris Smith and the MCELS team, PASA 15(1), 163