

NASSP Honours Project 2024

Level: Honours

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Investigating the influence that different PSS's can have on the shape of a light curve

For a single-dish telescope such as the 26 m at the Hartebeesthoek site, of the South African Radio Astronomy Observatory, the standard practice to process spectroscopic data is to follow a recipe that starts with averaging the spectrum of the right-hand circularly (RCP) and left hand circularly (LCP) polarized radiation to improve the signal to noise ratio (SNR). The averaged spectrum is then used to choose where there is no signal in the spectrum, which is used to fit a polynomial to get the SNR level as close as possible to zero. After all the calibration is finished, the last step in the processing procedure is to apply the point source sensitivity (PSS). The PSS is the conversion factor from antenna temperature to flux density in Jansky's, with units (Jy/K). The normal use of the PSS is to use a long-time average and apply it to every single observation, however, we want to investigate what the influence will be on the light curve of a periodic methanol maser when we use different averaging techniques to get the PSS that we use for every single observation made, specifically, whether different average PSS values can influence the results obtained and the interpretations made within the colliding-wind-binary (CWB) hypothesis. What this project's goals are:

- Introduce students to work with data from a radio telescope.
- Learn the processes to reach fully calibrated spectroscopic data.

- Learn the influence of statistics on results.
- Discuss whether the different approaches have influenced the original interpretation.

!!! Please get in touch with supervisors over e-mail to discuss the project in person!!!