

ABSTRACT

THESIS: Harvesting Planets in the Inner and Outer Galaxy

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This thesis project involves the creation of a data analysis pipeline that will be used for the study of the incidence of exoplanets in the midplane of the Galaxy. The procedure for the reduction of data is designed to use IRAF, and the procedure for the analysis of the data uses *pyDIA* and *VaST*. *pyDIA* is a program that performs difference imaging and photometry and is designed for use with crowded fields; *VaST* includes aperture and psf-fitting photometry methods. Sample data of the fields of interest are used in the design of the analysis procedure. These images were obtained using the SARA-S Observatory telescope.

The results from *VaST* and *pyDIA* are compared in order to select the most appropriate analysis method. Seven variable star candidates in the data set were discovered using both programs. Light curves and coordinates of these stars are presented.

Specifically, the analysis pipeline will be used in future research to investigate the incidence of exoplanets at different galactocentric distances. The incidence of exoplanets should decrease with increasing distance from the galactic center. This prediction is based upon two known relationships. The first is the relationship between the incidence of giant planets and stellar metallicity. The second is known as the radial metallicity gradient, which states a decrease

in stellar metallicity with galactocentric distance. Two target fields in the galactic midplane and at different galactocentric distances have been chosen for this comparison.