Abstract

THESIS: MODELING OF SELECT SHORT PERIOD ECLIPSING BINARY STARS IN THE SOUTHERN HEMISPHERE

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In this thesis, I present the modeling of select short period eclipsing binary star systems in the southern hemisphere. Each eclipsing binary candidate was chosen from the All Sky Automated Survey (ASAS), which is an all-sky survey that performed photometric monitoring of stars brighter than 14^{th} magnitude in the Johnson V band. This survey has catalogued over ten thousand eclipsing binary candidates. Due to the vast number of these candidates, few have been extensively studied. Because of the large area (all-sky) coverage of the ASAS, time resolution of individual systems is poor (~24 hours). I have selected eclipsing binary candidates with orbital periods ranging from 6 to 7 hours and magnitudes between 12^{th} and 13^{th} in the Johnson V band. By focusing on these individual systems, I am able to provide better time resolution that will compliment the survey. The candidates were observed using the Southeastern Association for Research in Astronomy (SARA) telescope at the Cerro Tololo Inter-American Observatory (CTIO) in Chile.

I obtained the photometric data using Johnson B and V filters as well as the Cousins R (R_C) filter. The data was then calibrated and reduced using Image Reduction and Analysis Facility (IRAF) software to create a light curve for an extensive photometric study. Physics of Eclipsing Binary (PHOEBE) software suite was used to create a model of each eclipsing binary system that is consistent with the observed light curve. From these models, I was able to extract orbital parameters as well as provide a basis for further studies on these systems.