Masters Thesis Topic

Erupting Dwarf Nova discovered by MASTER

Starting 2025

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We are proposing a Masters research project (nominally 2 years, although could be altered to support a 1.5 year NASSP Masters "mini-thesis". The topic is related to Cataclysmic Variables, binary stars with accreting White Dwarfs, and specifically Dwarf Novae, which undergo periodic eruptions where their accretion disks suddenly become hotter and brighter.

The MASTER-SAAO optical transient detection survey has discovered many new Dwarf Novae and their characterization will be the main topic of this thesis. Many of the extreme amplitude systems are intrinsically faint, with low accretion rates, near the period minimum for non-degenerate secondaries. This is where there is an expected "pile up" of systems and their study is important for understanding CV evolution, particularly the nature of angular momentum loss. There is also the possibility of finding previously missed interesting and important systems, whose characterizations can also lead to new discoveries.

This project will primarily involve the analysis of existing optical photometry and spectroscopy of newly discovered MASTER CVs, both utilizing existing data, plus new ones still to be undertaken. In some cases spectroscopy of some newly identified Dwarf Nova has already been obtained (e.g. with SALT), while new observations are also possible using SALT or the SAAO 1.9-m telescope. Similarly more intensive followup photometry utilizing some of the robotic telescope facilities at SAAO could also be undertaken.