A Photometric and Spectroscopic Study of Southern RV Tauri Stars

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Abstract

A program to obtain photometric and spectroscopic (high and medium resolution) observations of a number of southern RV Tauri stars has been undertaken over the past two years at the Mount John University Observatory (MJUO). Eleven RV Tauri stars of both RVa (constant mean magnitude) and RVb (varying mean magnitude) photometric type have been chosen as well as normal and weak metal lined RV Tauri stars.

Most program stars display the alternating deep and shallow semi-regular light variations as well as the light curve – colour curve phase lag characteristic of RV Tauri stars. Fourier analyses of the light curves have revealed the dominant periodicities (see figure 1) and allowed phasing of the spectroscopic observations.

High resolution échelle spectra obtained of these stars around the Hα region display the complex emission and absorption structure of the Hα line at various phases. Metallic lines show emission and line doubling or 'splitting' – profiles characteristic of the shock wave that propagates through the line-formation regions of these stars during a pulsational cycle. Spectra at specific phases will be used in an abundance analysis of selected RV Tauri stars.

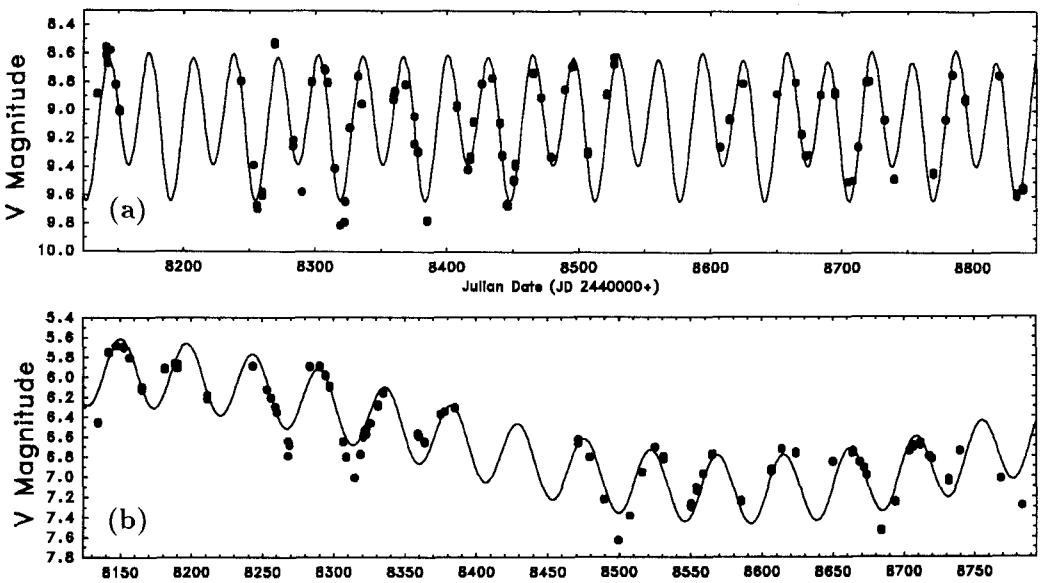

Figure 1 Comparison of the fit of the synthetic light curves (composed of periods determined from the Fourier analyses) to the MJUO photometric data of two southern RV Tauri stars, (a) RU Cen and (b) U Mon.

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