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UBVR LIGHT CURVES OF TY PYXIDIS

The RS CVn binary TY Pyx (No. 67 in the Catalogue of Strassmeier *et al.*, 1988) is considered to consist of two nearly identical, somewhat evolved G5 stars, rotating synchronously in a nearly 3.2 day orbital period. It was the target of an observing campaign involving IUE and ROSAT in November 1990, and was discussed with considerable interest at a recent 'Cool Star Workshop' (Neff, *et al.*, 1991). We were encouraged to follow up with observations in the 1991–92 season by Dr. M. Zeilik of UNM, Albuquerque.

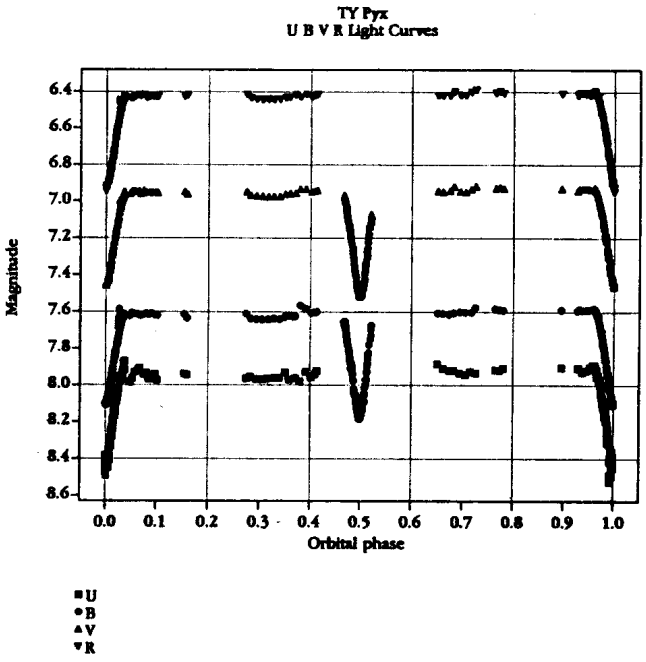

Figure 1

We observed the system on 14 nights at Black Birch Observatory over the period Nov. 1991 – Apr. 1992, and then on one night at the nearby Adams Lane Observatory, Blenheim (NZ). Facilities at these observatories are reported in Budding and McLoughlin (1987) and Allen and Budding (1986). The main comparison star was SAO176851, with SAO176789 and SAO176746 being used as checks. Photometry of nearby δ Pyx has been useful in enabling the differential light curves to be related to standard magnitudes (Figure 1).

In Figure 1 we have binned about 1200 out-of-eclipse data points in each of U, B, V and R into samplings of around 50 points, while the eclipse minima show individual observations. The data were phased according to the ephemeris of Vivekananda Rao and Sarma (1981). We were unsuccessful in monitoring the secondary eclipse at Black Birch in clear weather, however, the minimum was finally observed from Adams Lane on the night of April 19 through B and V filters. Using recent inter-calibration data the separate observation sets have been combined.

In the IUE's FES light curve, which Neff *et al.* (1991) reported, the secondary minimum was observed to be deeper than the primary. This was attributed to the presence of a 'spot' maculation wave, centred at around phase 0.6, and of amplitude about 0.06 mag. We have observed a similar amplitude wave (in B), though it now appears centred around phase 0.3. The amplitude is noticeably smaller in R — the U data, on the other hand, are subject to significantly more observational scatter, and whilst the maculation minimum is still there, it is more 'noisy'. In any case, the decreasing amplitude with increasing wavelength of this wave gives evidence that the effect is associated with large cool regions of surface maculation.

It also appears in our light curves that the secondary minimum is slightly deeper than the primary. In the rather sparser coverage of the minima of Neff *et al.*, (1991) it seems that the difference in depths could be greater than the scale of the maculation effect, though most literature light curves show the few hundredths of a magnitude difference in the depths of minima in the same sense as originally reported by Vivekananda Rao and Sarma (1981). More recent observations than those we have reported here suggest some secular light decline of the secondary minimum region, which might also play a part in accounting for the apparent extra dimming on April 19.

We plan to follow up with further work and analysis in the near future.

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