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**SORTING OUT W BOOTIS AND ITS COMPARISON STARS**

W Bootis (HR 5490, HD 129712,  $V \sim 4.81$ , SpT M3 III) is a bright example of a small-amplitude red variable. Percy & Desjardins (1996) recently reported that W Boo had changed period in about 1990, from 25 days to 50 days, and suggested that W Boo had switched pulsation mode. Unfortunately, the check star (HD 130446) used in the differential photometry appeared to be slightly variable. A second check star (HR 5524, HD 130603) was adopted, but it too appeared to be slightly variable. We therefore decided to observe all three stars in 1996, relative to the original comparison star, and a new check star. We report the results here.

The comparison star was HR 5534 (HD 130948,  $V = +5.85$ ,  $B-V = +0.56$ , SpT G0-2 V) and the new check star was HR 5454 (HD 128402,  $V = +6.41$ ,  $B-V = +1.1$ , SpT K0). Five observers (Beresky, Luedeke, Smith, Thompson, Wood) carried out the measurements as part of the American Association of Variable Star Observers (AAVSO) photoelectric photometry program (Landis et al. 1992). The observations were made and reduced as described there, and in Percy & Desjardins (1996).

We have a total of 48 V observations of W Boo (and its comparison and new check star), 23 observations of HD 130446, and 25 observations of HR 5524. The standard deviation of the (new check - comparison) magnitudes is  $\sigma = 0.011$ , which is the expected error of the observations, especially considering that they were made by five different observers. These stars therefore appear to be constant. The  $\sigma$  of the (HR 5524 - comparison) magnitudes is 0.010, which suggests that this star is also constant.

The  $\sigma$  of the (HD 130446 - comparison) magnitudes is 0.020, which suggests that this star may be slightly variable. It is also possible that the larger scatter is due to the faintness ( $V = 7.6$ ) of the star. The power spectrum of the previous observations of this star (Percy & Desjardins 1996) showed a peak at 0.1277 cycle/day, but this peak does not appear in the power spectrum of the present observations, nor does it produce a reasonable phase diagram. There are several peaks in the power spectrum of the present observations, none of which is very conspicuous. The star is K0 III type, so the variability, if real, could be due to star spots. Hatzes & Cochran (1996) have recently reported short-term radial velocity variations in K giants, which they attribute to pulsation.

The 1996 light curve of W Boo (Figure 1) is very interesting. The cycle count period is 24 days (very similar to the period of W Boo before 1990), but it is strongly modulated, and there is some evidence for long-term variations. The light curve can be well represented as the superposition of two periods - 25 and 33 days. Periods of 25, 35 and 50 days were found by Percy & Desjardins (1996), and interpreted as adjacent radial modes. The new 25- and 33-day periods were determined independently of the previously-known periods. The mode switching in W Boo is rather similar to that recently reported in RR UMi by Lloyd & West (1996). This star switched between periods of 34 and 61 days, with strong modulation of the amplitude.

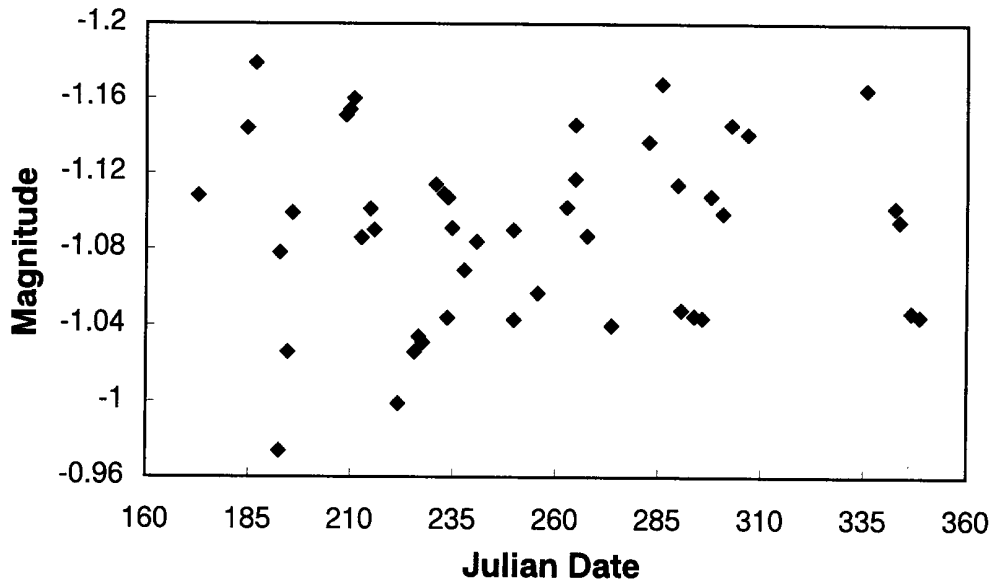


Figure 1. The 1996 V light curve of W Boo, relative to the comparison star HR 5534. The time axis is (JD - 2450000). Note the modulation in the amplitude of the pulsation; the light curve can be represented as the superposition of 25- and 33-day periods

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