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UBV OBSERVATIONS OF AB Dor, 1993

The peculiar, active, cool dwarf AB Dor (= HD 36705, SAO 249286) has received considerable international attention in recent years (cf. Vilhu *et al.*, 1993), being the target of several multi-site, multi-wavelength ‘campaigns’, most recently in 1994 when the HST, EUVE, ASCA and other major facilities were brought into concerted action in its direction.

A good earlier photometric review is that of Innis *et al.* (1988), who supplied the ephemeris $\text{Min} = \text{JD } 2444296.575 + 0^{\text{d}}51479 \times E$, that has been generally favoured in subsequent studies. AB Dor has been usually assigned a peculiar, early K spectral type.

The star was observed using the automated photometer (‘APT’) of the Kotipu Place Observatory (Hudson *et al.*, 1993) on six nights between 29 Sep and 14 November, 1993, using the *UBV* filters provided with the SSP 5 photometer of Optec Inc. The observation period overlaps with the recently published data set of Anders (1994) and Bos (1994). The (partial) light curves of these authors for the time interval involved are essentially confirmed by the APT.

The main comparison star was HD 37297 ($V = 5.34$, $B - V = 1.04$, $U - B = 0.85$, sp. type K0III — cf. SIMBAD) with occasional checks being made on HD 35537, also a K0III star. For this star we derive the following: $V = 7.84$, $B - V = 0.99$, $U - B = 0.71$.

The observations have been reduced on a PC (cf. Budding, 1993), and the resulting *V* light curve is presented in Figure 1. This light curve results from binning some 683 individual data into 85 “normal” points, and correcting slightly the magnitudes due to the small redness excess of the comparison star with respect to AB Dor ($\Delta(B - V) = 0.20$, $\epsilon = 0.019$).

The *B* and *U* light curves are essentially similar in shape to the *V* one. The *B* magnitude ranges from 7.68 at brightest ($V = 6.82$) to 7.82 at the phases 0.0 and 0.2, corresponding to the lowest (6.94) on this *V* data set. Individual *B* observations have a scatter of about 0.02 mag, i.e. comparable to that of the raw data in *V*. The *U* data, on the other hand, has a noticeably larger dispersion — up to 0.04 mag around the phase region 0.4-0.5, where the raw data quality appears to be at its poorest. The *U* light curve ranges from about 8.03 to 8.19 mag. The conformities in shape, though slightly greater ranges in the *B* and *U*, when set against the *V* light curve, support maculation as a likely explanation for the photometric behaviour. The slight reddening at the minimum was also noted by Bos (1994).

These light curves are almost complete, though there is a small phase interval close to the bottom of the minimum not covered by the present dataset. Bos (private communication) observed this region on Nov 13 1993, just before the last APT night presented here, and essentially confirmed the phase, magnitude range and shape of this minimum.

AB Dor
Binned V data

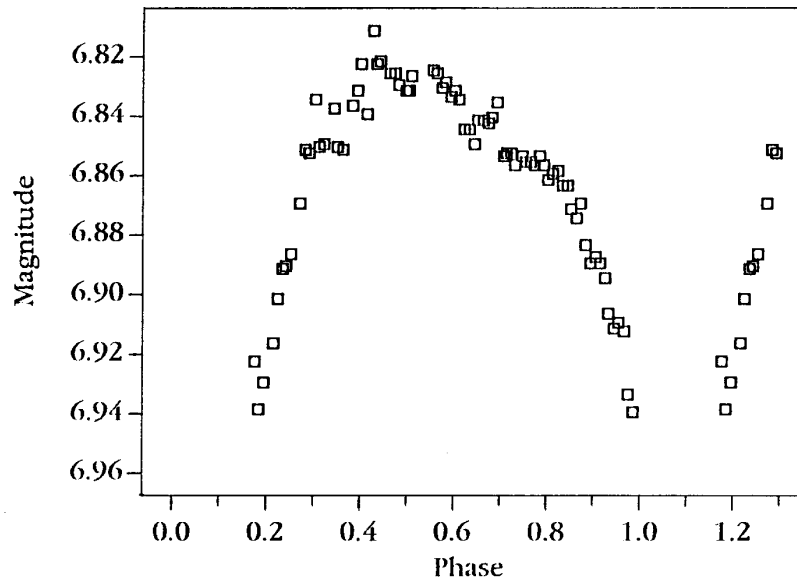


Figure 1

There is a slight difference in phase of Bos' minimum (~ 0.06) and ours, however, which, from the shape of the descending sides would be located somewhat closer to 0.1. Anders' (1994) minimum, which derives from observations a few weeks later, is still earlier in phase — close to zero, in fact. Hence, there is a suggestion, from these three data sets, which range over the later months of 1993, of a tendency for the 'spot(s)' associated with the maculation, to have drifted slightly backwards in phase, relative to the ephemeris of Innis *et al.* (1988), while preserving the overall shape of the photometric effect.

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