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**THE DECEMBER 1993 LIGHT CURVE OF AB Dor**

The variable nature of the photometric light curve of AB Doradus (HD 36705) has been the subject of several studies in recent years. There exists an extensive history of optical observations of this K0/K1 object, with the first long-term light curve analysis presented by Innis, Thompson & Coates (1988). The star has also been studied at radio, microwave, X-ray and  $H\alpha$  wavelengths. More recently, Anders, Coates & Thompson (1992) applied a two-spot modelling procedure to all the available photometric data for AB Dor from 1980 to 1992. The trend of the mean stellar magnitude during this period seems to suggest a cyclic phenomenon.

In a two-week observing program in November and December 1993, a total of 21 data points were recorded over three nights in each of the B,V,R<sub>c</sub>,I<sub>c</sub> filters used at the Monash Observatory. Observations were made with the 0.45 meter telescope, using a thermoelectrically cooled S-20 photomultiplier tube with an extended red response. Comparison and check stars were HD 37297 and HD 35537 respectively, and the variation in magnitude differences between these stars was less than 0.011 in all cases. The data, after calibration to the standard UBV system, are given below. Phases have been calculated with respect to a period of 0.51479 days and an epoch 2444296.575 (Innis, Thompson & Coates, 1988).

Figure 1 shows the V-band light curve for AB Dor. Despite the relatively small number of data points, there exists a clear sinusoidal-like variation in the stellar brightness, presumably due to the presence of one or more large starspot regions. Recent high-resolution  $H\alpha$  spectra obtained in late November 1993 (Cameron, private communication), indicates a gradual trend in the underlying stellar profile to go from weak absorption to moderate emission throughout the night. This suggests a strong contrast in plage coverage between the opposing hemispheres of the star, which would be in agreement with the photometric data shown in Figure 1.

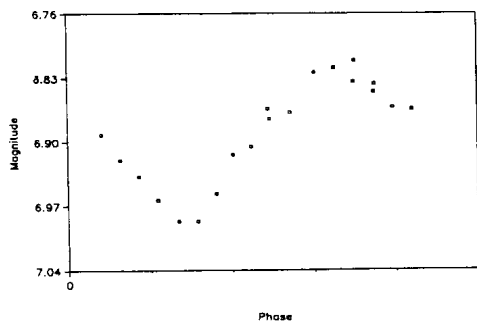


Figure 1. November/December 1993 V-band light curve for AB Dor

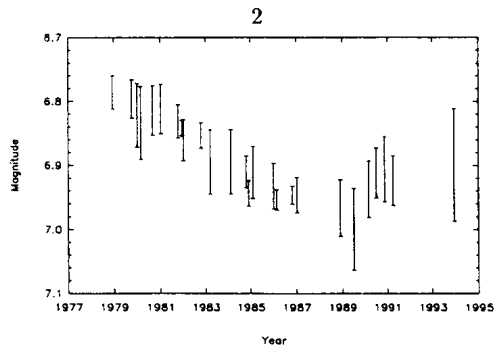


Figure 2. The trend in the mean light level of AB Dor since 1980

Table 1

HJD(-2440000.000)	(Phase)	B-V	V-R	V-I	V
9317.013	0.700	0.822	0.483	0.943	6.811
9317.038	0.749	0.841	0.484	0.961	6.836
9319.995	0.493	0.827	0.492	0.967	6.875
9320.021	0.543	0.795	0.532	0.994	6.868
9320.051	0.602	0.816	0.473	0.941	6.824
9320.076	0.650	0.823	0.488	0.953	6.819
9320.100	0.697	0.824	0.482	0.959	6.834
9320.126	0.747	0.791	0.495	0.986	6.845
9320.150	0.794	0.838	0.491	0.968	6.862
9320.174	0.841	0.835	0.499	0.975	6.864
9326.991	0.083	0.813	0.503	0.965	6.892
9327.014	0.128	0.829	0.500	0.966	6.920
9327.037	0.172	0.844	0.499	0.973	6.938
9327.060	0.217	0.842	0.506	0.984	6.964
9327.086	0.267	0.842	0.512	0.990	6.987
9327.110	0.314	0.858	0.510	0.990	6.987
9327.134	0.361	0.846	0.510	0.989	6.957
9327.156	0.403	0.852	0.493	0.972	6.914
9327.179	0.448	0.816	0.508	0.983	6.905
9327.200	0.489	0.828	0.491	0.957	6.864

The range in V for this light curve is approximately 0.18, which is the largest yet seen for AB Dor. These data are plotted in Figure 2, which shows the behaviour of the mean light level of the star since 1980. Since reaching a minimum level around 1989 the magnitude of AB Dor has been steadily increasing, and the 1993 light curve is consistent with this trend. Future photometric observations will be important in establishing the existence of cyclic activity on this well-studied star.

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 Innis J.L., Thompson K. and Coates D.W., 1988, *Mon. Not. R. Astr. Soc.*, **233**, 887