LIGHT VARIATIONS OF THE SPECTRUM VARIABLE HD 4778 = HR 234

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HD 4778 shows light variations with a period of 2^d156. The light curve obtained with the *V* filter is phase shifted by nearly 180 degrees with respect to the light curve in blue and ultraviolet. The maximum light in *U* and *B* corresponds to the maximum of the intensity of the Ca II K line.

Recently, E. Guderley (1967) reported in this journal the discovery of periodic changes in the spectrum variable HR 234 with a period of 2^d156. Following a suggestion of A. J. Deutsch, the writer has carried out photelectric measurements of this star during his stay at Lowell Observatory in the years 1963 and 1964.
Table I shows the data for the spectrum variable and the first and second comparison stars.

Table II gives the dates of observation, the phase of the light curve and the magnitude differences measured with *U*, *B* and *V* filters between the spectrum variable and the first comparison star. The magnitude differences are plotted against the phase in Figure 1. The light of HD 4778 varies periodically with the same period as the spectrum. For the elements of the light variations in the ultraviolet and blue regions of the spectrum one obtains

$$\text{Maximum light} = \text{JD}_\odot 2438365.03 + 2^d156\ E$$

The light maximum coincides with the maximum of the intensity of the Ca II K line in the spectrum of this star. The same correlation between light and spectrum changes was found for HD 15089 (Rakos 1963a). Both stars are very similar. Very remarkable is the phase shift observed in the yellow light curve with

TABLE I

VARIABLE AND COMPARISON STARS

HD No.	BD No.	α (1900)	δ	m_{pv}	m_{pg}	Sp
4778	+44°176	$0^h44^m.7$	+44°27′	6^m12	6^m12	A0p
4335	+44°160	0 40 .7	+44 18	5 .99	5 .94	B8
4364	+44°162	0 40 .9	+44 53	7 .82	7 .90	A3

TABLE II

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$JD_{\odot}$	Phase	U	B	V
2438364.71	$0^{d}850$	$0^{m}415$	$0^{m}194$	0.127
369.69	.160	.406	.187	.139
370.60	.582	.447	.211	.113
371.56	.027	.420	.192	.133
376.67	.397	.415	....	....
377.58	.819	.410	.194	.126
378.60	.292	.426	.....	.122
380.63	.234	.420	....	.108
381.58	.675	.427	.200	.130
383.58	.602	.431	.202	.112
391.61	.327	.431	.192	.137
2438392.65	0.809	0.408	0.187	0.131

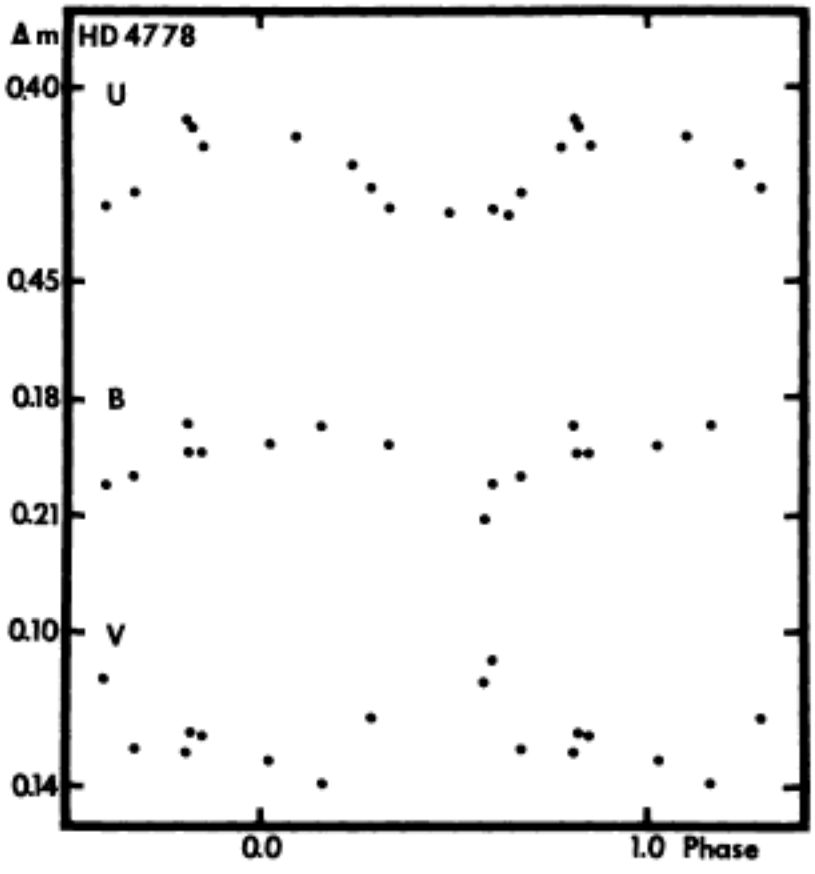

FIG. 1 — U, B, and V magnitude differences for HD 4778 and comparison star plotted with a period of $2^{d}156$ days.

respect to the light curves in blue and ultraviolet light. The same kind of phase shift is shown by the well-known magnetic variables HD 65339 and HD 25334 (Rakos 1963a). In contrast to the internal accuracy of the single observations, the great scatter of measured points around an average curve should be mentioned. This is a common phenomenon in the family of magnetic and spectrum variables. One of the greatest deviations from the average curve ever measured occurred on December 16, 1963, at phase $0^{p}234$. This "flash" in yellow light was not visible in the ultraviolet observations on the same night. Similar rapid changes in brightness, in the order of $0^{m}02$, are exhibited by γ Arietis (S). This star also belongs to the group of Cr-Eu stars (Rakos 1963b).

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PRELIMINARY COLORS OF FAINT OBJECTS AROUND M 87

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Preliminary *P,V* photometry of faint objects surrounding M 87 supports their identification as globular clusters.

A large body of data is now available on the integrated colors of globular clusters associated with the Galaxy, the Magellanic Clouds, M 31, M 33, NGC 205, NGC 185, and the Fornax system (Kron and Mayall 1960; Hiltner 1960; Vetésnik 1962a, b; Kinman 1963; Gascoigne 1964; Hodge 1965; Koehler 1965; Racine 1965; van den Bergh 1967, 1968; van den Bergh and McClure 1968). This material