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**UBV PHOTOMETRY OF FK Com DURING 1990**

The photometric behaviour of FK Com is similar to that observed in RS CVn stars but the observational data could be interpreted both as hot and cool surface spots (Panov and Antov, 1990). There are two alternative models regarding the configuration of FK Com: as a single star and as a binary system with low-mass companion. The evolutionary status in these cases is different too. A choice between the two alternatives can be made after prolonged observations of this object.

We observed FK Com in order to study its light variations during 1990 and to try to answer the question whether the spots on its surface are hot or cool.

Photoelectric UBVR observations of FK Com were carried out with a photon-counting photometer attached to the 60cm telescope of Belogradchik Observatory (Bulgaria) on 12 nights in March/July 1990. The comparison and check stars were HD 117567 and HD 117876 respectively. The integration time was 10 s. The observations were corrected for the atmospheric extinction and reduced to the standard photometric system.

We tried to phase our data by different periods and it turned out that the smoothest curve was obtained using a period value of  $2^d.41$ . It coincides with the first one of Chugainov (1966). That is why our observational data are phased by his ephemeris

$$\text{J.D. (Min)} = 2447981.145 + 2.41 \times E.$$

The data are plotted in Figure 1. Every point here represents a mean value of at least five measurements. The mean errors are respectively  $0^m.01$  in V and B colours and  $0^m.02$  in U. It is seen that variations correlate in the different colours.

Figure 2 presents (B-V) residuals with respect to the same ephemeris. Although the scatter is large it is obvious that (B-V) variations show phase dependence and the maximum value of (B-V) corresponds to the brightness minimum.

The evident asymmetry of the light curves mean that at least two circular spots or an elongated spot are necessary to explain the observational brightness variations.

We tried to fit our observational data accepting a model with two circular spots and changing all parameters of the configuration:

inclination of the stellar rotation axis with respect to the line-of-sight  $i$ ; spot temperatures  $T_1^{sp}$  and  $T_2^{sp}$ ; spot angular sizes  $\alpha_1$  and  $\alpha_2$ ; latitudes of the spot centres  ${}^1\beta_1$  and  ${}^2\beta_2$ ; longitudes of the spot centres  $\lambda_1$  and  $\lambda_2$ .

A number of good fits were obtained in the case of cool spots. Table 1 presents the parameters of some of them. The last column gives the ratio of the total spot area to the whole star surface. Figure 3 illustrates the fit with parameters shown on the third line of Table 1.

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Table I

$i$	$\alpha_1$	$\alpha_2$	$\beta_1$	$\beta_2$	$\lambda_1$	$\lambda_2$	$T_1^{sp}$	$T_2^{sp}$	$S^{sp}$
45°	25°	15°	48°	52°	63°	310°	3860 K	3600 K	6.4%
55°	25°	15°	48°	60°	58°	310°	3910 K	3600 K	6.4%
65°	30°	15°	40°	50°	65°	314°	4025 K	3820 K	6.8%
75°	33°	15°	30°	50°	60°	315°	3890 K	3910 K	8.0%
84.5°	37°	22°	30°	30°	63°	320°	3600 K	3540 K	13.6%

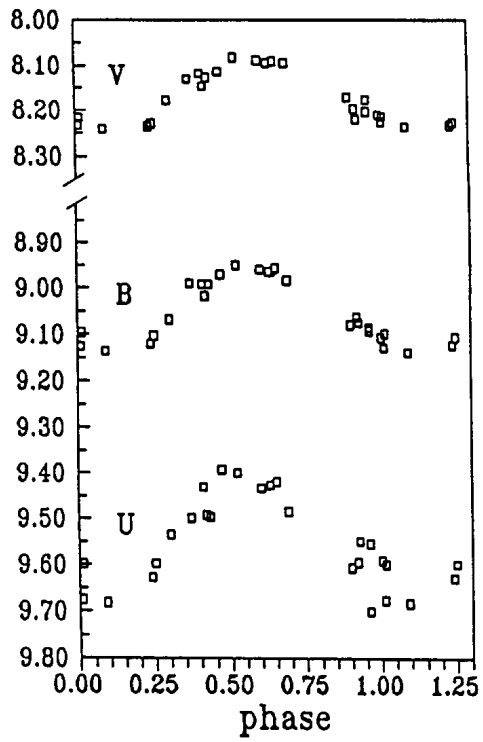


Figure 1.

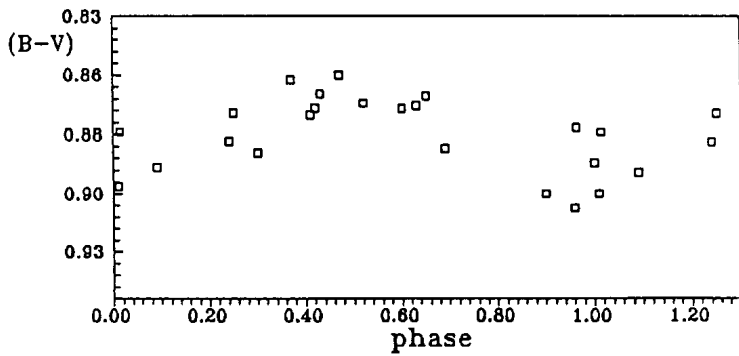


Figure 2.

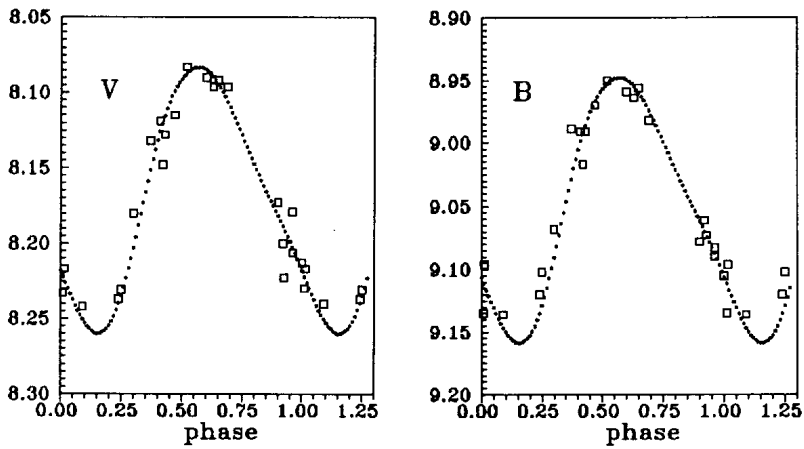


Figure 3.

In spite of the correlation of  $(B-V)$  residuals and V curve that might be explained only by a cool spot, we attempted to fit our observational B and V data by different parameters of hot spots also but there was not any result.

Our data strengthen once again the previous conclusions about the changing period and strongly variable amplitude of the light curve of FK Com. Besides it turned out that they could fit only by cool spots. This fact supports the concept that FK Com is a differentially rotating single star.

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