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PHOTOMETRY OF THE ACTIVE STAR UZ LIBRAE

We present new UBV photometry for the RS CVn binary UZ Librae (BD $-08°3999$, $V = 9.3$ mag). This star is one of the most active binary systems of the RS CVn class. In the past UZ Librae showed photometric variations with an amplitude of up to 0.35 mag in V. Evans & Bopp (1974) suggested that UZ Lib was most probable a spotted flare star. Further photometry of UZ Librae was presented by Heckert & Hickman (1991) from 1988, 1989 and by Heckert (1992, 1993) from 1990 to 1992. Its photospheric line-profile variability was first detected by Bopp et al. (1984) confirming that the stellar surface is indeed covered by large starspots. Grewing et al. (1989) discovered the – optically unseen – companion star in the ultraviolet spectrum ($T_{\rm eff} \approx 8000\,$K and $R \approx 1 R_\odot$). They also concluded that the binary-system properties fit well the evolutionary scenario of a coalescing binary with almost bound rotation. Table 1 summarizes the stellar parameters for UZ Librae from the papers by Grewing et al. (1989) and Strassmeier (1996).

Parameter	Adopted
Spectral type	K0III
$\log g$	2.5
$T_{\rm eff}$	4800 K
$v \sin i$	67 km s^{-1}
Inclination i	30°
Rotation period	4.73574 days
Orbital period	4.76864 days

Our new observations were made with the 50cm ESO-telescope at ESO, La Silla (observer E. Paunzen) in the nights between July 22nd and July 30th, 1994. We chose BD $-07°4044$ as the comparison star and BD $-08°3998$ as the check star. All measurements were transformed to the Johnson UBV system. Integration times of 40 seconds were used for B and V, respectively and 90 seconds for U. All data were corrected for sky background and extinction. Phases were computed with the photometric ephemeris of Grewing et al. (1989)

$$\mathrm{T}[\phi{=}0] = \mathrm{HJD}\ 2445426.122 + 4.73574{\times}\mathrm{E}\ .$$

Figure 1 shows the differential data in the sense UZ Librae − BD $-07°4044$) in V, $(B-V)$ and $(U-B)$. The data of the comparison minus check star show no variability above the uncertainties and we conclude that both are constant as reported before.

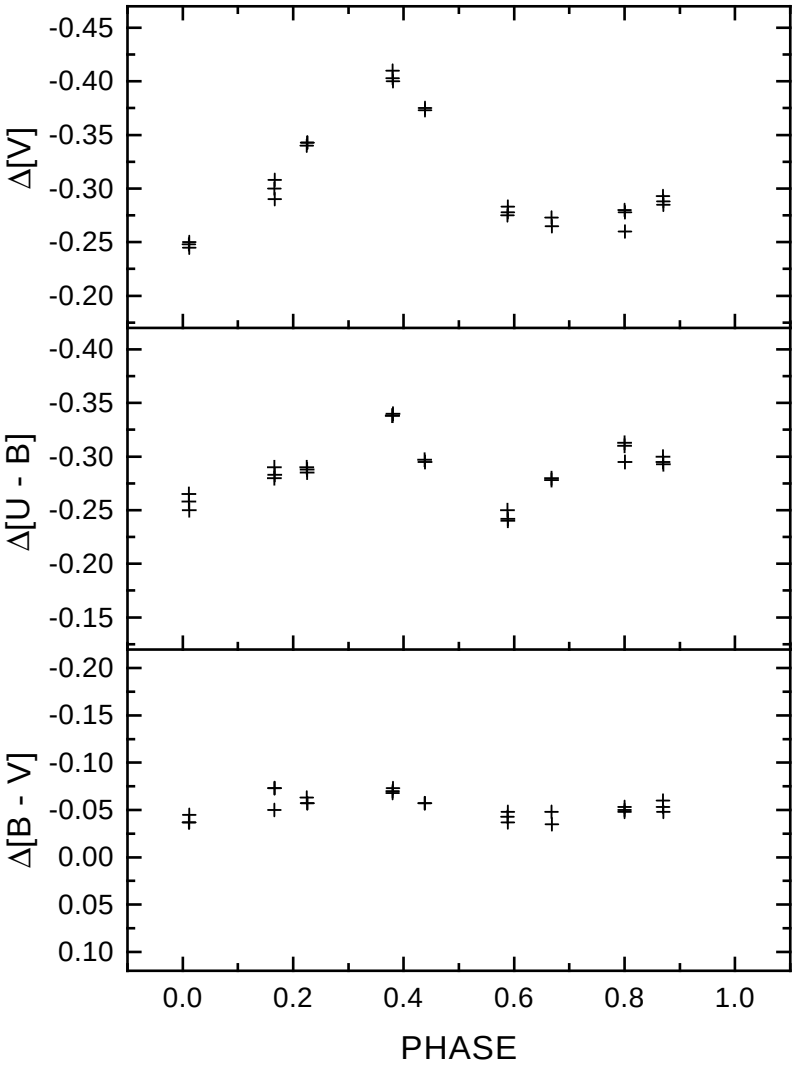

Figure 1. UBV light and color curves for UZ Librae. The data are plotted with the photometric ephemeris T[ϕ=0] = HJD 2445426.122 + 4.73574×E

We used a standard period-finding program to confirm the four-day period; the formal value from our small data set is 4.9±0.2 days. The full amplitude in V is 0.16±0.01 mag, and 0.06±0.02 mag and 0.10±0.02 mag in $(B-V)$ and $(U-B)$, respectively. We note that the $(U-B)$ color curve is in phase with the V-light curve, as is the $(B-V)$ color curve, and shows a well-defined and large amplitude as already indicated by Heckert (1992). Compared to previous observations, however, UZ Librae seems to be in a low-amplitude state but maintained its "two-spot" character.

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Table 1. Johnson UBV photometry for UZ Librae

UZ Librae − BD −07°4044					
HJD 2440000+	ΔV	HJD 2440000+	$\Delta(U-B)$	HJD 2440000+	$\Delta(B-V)$
9556.47355	−0.300	9556.47256	−0.280	9556.47306	−0.050
9556.47506	−0.290	9556.47405	−0.290	9556.47455	−0.073
9556.47654	−0.308	9556.47554	−0.283	9556.47604	−0.073
9557.48613	−0.403	9557.48516	−0.338	9557.48565	−0.070
9557.48822	−0.410	9557.48722	−0.338	9557.48772	−0.068
9557.49029	−0.400	9557.48929	−0.340	9557.48979	−0.073
9558.47230	−0.275	9558.47130	−0.250	9558.47179	−0.043
9558.47438	−0.278	9558.47338	−0.240	9558.47388	−0.048
9558.47644	−0.283	9558.47546	−0.242	9558.47595	−0.037
9559.47554	−0.280	9559.47453	−0.313	9559.47502	−0.050
9559.47762	−0.278	9559.47662	−0.310	9559.47712	−0.053
9559.47968	−0.260	9559.47869	−0.295	9559.47712	−0.048
9560.47589	−0.248	9560.47492	−0.258	9560.47541	−0.037
9560.47796	−0.250	9560.47699	−0.265	9560.47748	−0.037
9560.48003	−0.245	9560.47904	−0.250	9560.47953	−0.045
9561.48771	−0.340	9561.48670	−0.290	9561.48720	−0.063
9561.48976	−0.343	9561.48877	−0.288	9561.48926	−0.057
9561.49182	−0.343	9561.49082	−0.285	9561.49132	−0.057
9562.49892	−0.373	9562.49814	−0.297	9562.49853	−0.057
9562.50039	−0.375	9562.49965	−0.295	9562.50001	−0.057
9563.58574	−0.273	9563.58499	−0.280	9563.58537	−0.048
9563.58722	−0.265	9563.58647	−0.278	9563.58685	−0.035
9564.54091	−0.293	9564.53990	−0.300	9564.54041	−0.060
9564.54292	−0.288	9564.54200	−0.295	9564.54240	−0.053
9564.54497	−0.285	9564.54398	−0.293	9564.54448	−0.048

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