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**OBSERVATIONS OF THE FLARE STAR EV Lac IN 2000-2001**

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In 2000-2001 we continued observations of the flare star EV Lac with the two-channel (U and B) fast photometer (Zalinian & Tovmassian 1989) installed at the 40 cm telescope of the Byurakan Astrophysical Observatory (BAO), Armenia. Observations with this photometer allowed us to study the light curve of a flare with high time resolution (0.5 s). In previous observations we have detected very short spiky flares of a duration less than a second with rising times of about 0.1 s (Zalinian & Tovmassian 1987, Tovmassian & Zalinian 1988, Zalinian & Tovmassian 1997, Tovmassian et al. 1997a). Fast flares of a duration of a few seconds have been registered also by Tsvetkov et al. (1986) and Shvartsman et al. (1988). Tovmassian et al. (1997b) showed that the spiky flares occur mostly after normal, longer lasting flares, and are systematically bluer than the preceding main flares (Tovmassian et al. 1997b).

The log of observations is presented in Table 1. The night sky background was measured several times during one observing run. Therefore, the total duration of observation of the star itself is less than the time between the start and the end of observations. Observations were made with integration time 0.5 s.

Table 1: The log of observations of EV Lac in 2000-2001.

Date	Start UT	End UT	Total duration h m
21 Aug 2000	20 00	20 56	0 45
23 Aug 2000	19 13	22 46	2 25
25 Aug 2000	18 45	22 53	2 35
26 Aug 2000	19 10	19 20	0 10
26 Aug 2000	19 30	22 29	2 30
27 Aug 2000	16 47	22 49	3 10
28 Aug 2000	18 55	00 32	4 15
04 Sep 2000	18 08	22 30	2 45
08 Oct 2001	17 20	18 52	1 10
24 Oct 2001	17 00	19 25	2 05

Since the aim of our observations was detection of fast flares, we measured the brightness of EV Lac in U and B in relation to its quiescent state. It is known that EV Lac

is a variable star with an amplitude  $\Delta V = 0^m08$  (Pettersen, Kern & Evans 1983). In observations with the 40 cm telescope made with integration time 0.5 s such variations are certainly below the accuracy of our measurements. The comparison star C2 from Pettersen et al. (1983) was observed once in a night for controlling the registration system of the photometer.

During 22 hours of monitoring of EV Lac we detected three flares. Light curves of the detected flares, and also the variations of  $(U - B)$  magnitudes of the star during flares, are presented in Figures 1-4. Each point on the  $U - B$  graph is the average of 5 preceding and 5 subsequent measurements.

The flare on 23 August has relatively sharp rise and decline in the initial phase, followed by a slow decline (Figure 1). Unfortunately, the declining part of the flare is interrupted for the sky background measurement. However, the end of decline is seen on the record made after the sky background measurement. The total duration of the flare exceeds 14 min. One may notice a small decrease of the emission of the star during about 70 s which took place before the flare.

The slow rise of the flare on 26 August starts at about  $19^h13^m$  (Figure 2). After  $\sim 2$  m the brightness rose sharply during about 20 s. The slow decline is observed during about  $3^m40^s$ . Then observation was interrupted for sky background measurement. Observations resumed after about 10 m, when the star was at quiescent state.

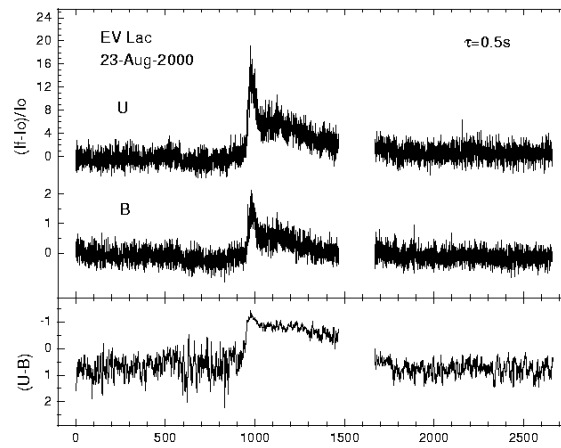
The flare on 4 September has a composite nature (Figure 3). There is a short spiky preflare at  $18^h47^m30^s$ . The main flare started  $\sim 10$  s later and lasted  $\sim 20$  s. It consists, probably, of a few spiky flares. The central part of the light curve of the preflare and main flare is presented in Figure 4. About 2 m later two small and short flares are seen in U. However, their presence in B is not certain. Generally some of the spikes in U are not certainly seen in B due, probably, to their relative faintness, they are smaller of the  $3\sigma$  level.

In Table 2 the following parameters of the detected flares: the date of the flare, the flare magnitudes  $\Delta U$  and  $\Delta B$ , the  $(U - B)$  color of the star at the peak of the flare, and the total duration of the flare are given.

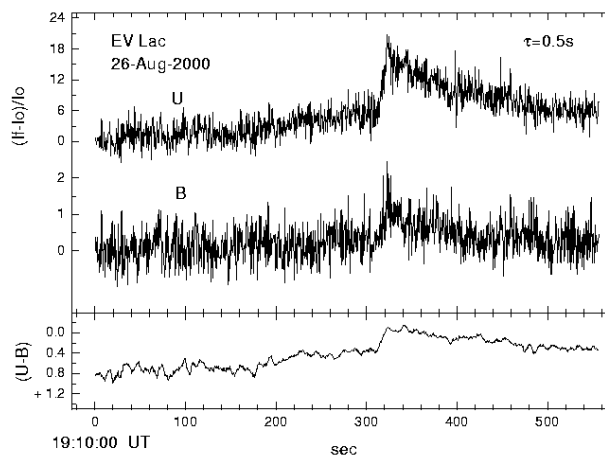
Table 2: The parameters of the EV Lac flares.

Date	$\Delta U$	$\Delta B$	$(U - B)$	Total duration
23 Aug 2000	$3^m1$	$1^m1$	$-1^m20$	$14^m10^s$
26 Aug 2000	$1^m6$	$0^m8$	$-0^m05$	$> 4^m$
04 Sep 2000 <sup>†</sup>	$1^m9$	$0^m6$	$-0^m55$	$\sim 1^s$
04 Sep 2000	$2^m5$	$0^m7$	$-1^m05$	$0^m20^s$

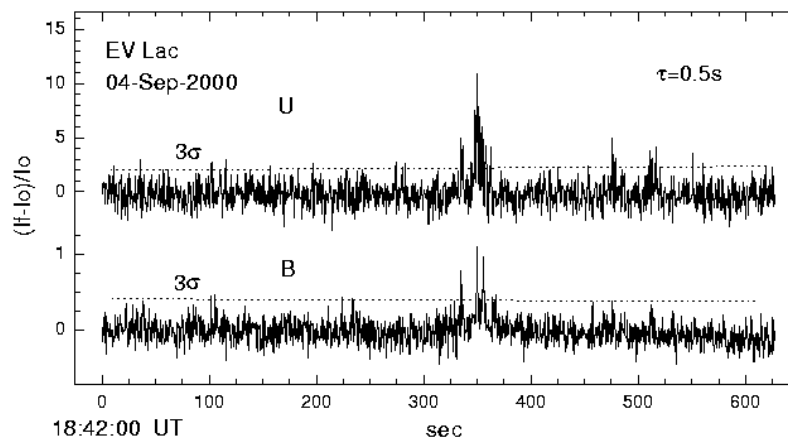
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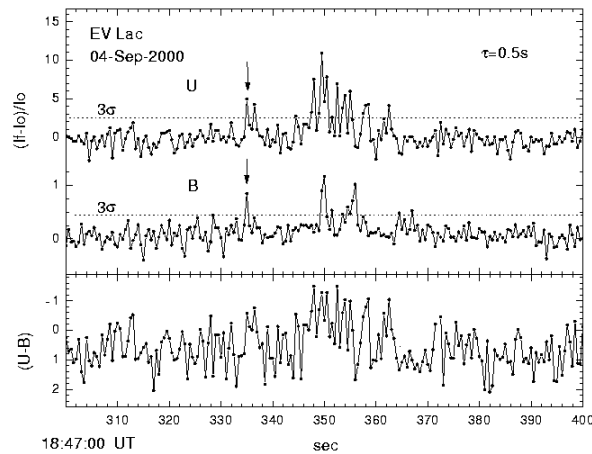
**Figure 1.** The flare of EV Lac on 23 August 2000. In the gap of the light curve the sky background was measured.



**Figure 2.** The flare of EV Lac on 26 August 2000.



**Figure 3.** The flare of EV Lac on 4 September 2000. It consists, possibly, of a few spiky flares.



**Figure 4.** The light curve of the main flare of EV Lac on 4 September 2000 with higher resolution.

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