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**OBSERVATIONS OF FLARE STARS EV Lac, V577 Mon AND YZ CMi**

Observations of some flare stars made with the 40 cm telescope of the Byurakan Astrophysical Observatory by using the two-channel (U and B) fast photometer (Zalinian, Tovmassian, 1989) with 0.1 sec integration time allowed to detect very short flares of a duration of a few tenths of a second with rising times of 0.1 sec or perhaps less (Zalinian, Tovmassian, 1987; Tovmassian, Zalinian 1988). Short flares of an order of a few seconds were detected also by Tsvetkov et al. (1986) and Shvartsman et al. (1988).

In this communication we present the results of observations of flare stars EV Lac, V577 Mon and YZ CMi made with the two-channel photometer of the Byurakan Observatory. Observations were made with the 1 m telescope of the IA UNAM in Tonantzintla in November and December 1996, and with the 2.1 m telescope of the INAOE in Cananea in December 1996 and January 1997 (Mexico). Two photomultipliers EMI 9789 AQ were used in the photometer.

Depending on the size of the telescope and on the observing conditions (night sky brightness, brightness of the Moon) different integration times of 0.5, 0.1 and 0.05 sec have been used. In each 15-20 min the sky background was recorded for 20-30 sec. During the monitoring the obtained information has been recorded in the memory of a PC.

The U and B magnitudes of the observed stars during the flare were determined by comparison with their corresponding values in the quiescent state. In this run just the flaring component of the double star EV Lac was observed. The observations lasted during 12.43 hours with the 1 m telescope and 3.2 hours with the 2.1 m telescope. V 577 Mon was observed during 3.25 hours with the 1 m telescope and 3 hours 15 min with the 2.1 m telescope. YZ CMi was observed during 0.75 hours only with the 2.1 m telescope. Nine flares of EV Lac, and five flares of V 577 Mon were detected in these observations. No flare of YZ CMi was detected. Sometimes the flares are composite, and short, spiky flares are observed over, or immediately after the main, relatively slow flare.

The data on the observed flares of EV Lac is summarized in Table 1, and that of the V577 Mon in Table 2. For deducing the parameters of the observed flares it was accepted that U and B magnitudes of the flaring component of EV Lac are equal to 12<sup>m</sup>.79 and 11<sup>m</sup>.81 respectively (Alekseev, Gershberg 1995), and that of V577 Mon are equal to 14<sup>m</sup>.0 and 12<sup>m</sup>.8 (Shvartsman et al. 1988). In consecutive columns of both Tables the following information is given: the date of observation, UT at the maximum of flare, the designation of separate peaks observed during one flare,  $\Delta U$  and  $\Delta B$  magnitudes of the flare, U–B color of the star at the flare maximum, the rising time of the flare  $t_r$ , the full duration of the flare, the integration time of observation, and the telescope, with which the observation was made. For determining the parameters of flares the smoothed by medians light curves of flares were used.

Table 1. Data on flares of EV Lac

Date	UT max h m	Peaks	$\Delta U$	$\Delta B$	U-B	$t_r$ sec	Duration sec	$\tau$ sec	Tel m
16 Nov 96	22 12.2		1.3	0.6	0.3	2.0	4.0	0.5	1.0
19 Nov 96	22 24.0		2.2	0.7	-0.5	1.5	4.0	0.5	1.0
22 Nov 96	22 35.9		1.5	0.8	0.3	0.5	2.5	0.5	1.0
24 Nov 96	22 43.8	a	0.8	0.4	0.6	13.0	44.0	0.5	1.0
		b	1.2	0.6	0.4	0.5	1.	5	
04 Dec 96	23 23.2	a	0.8	0.4	0.6	12.0	45.0	0.5	1.0
		b	0.9	0.3	0.4	0.5	1.0		
30 Jan 97	02 14.6	slow	0.4	0.1	0.7	41*	150.0	0.05	2.1
		spike	0.7	0.1	0.4	<1.0	<1.0*		

\* Not certain

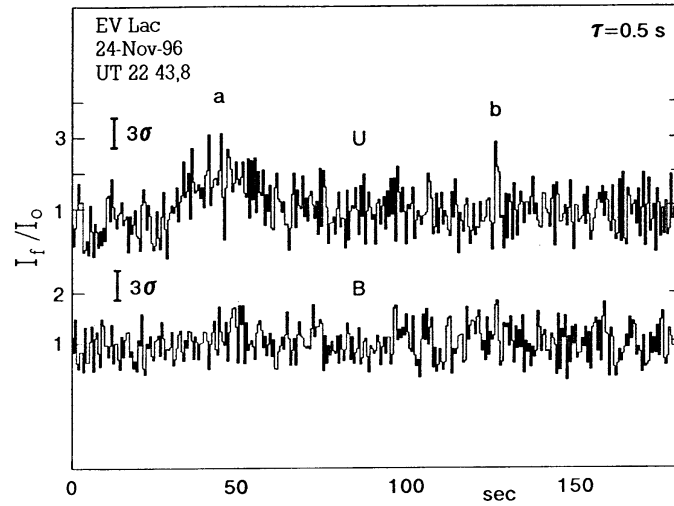


Figure 1

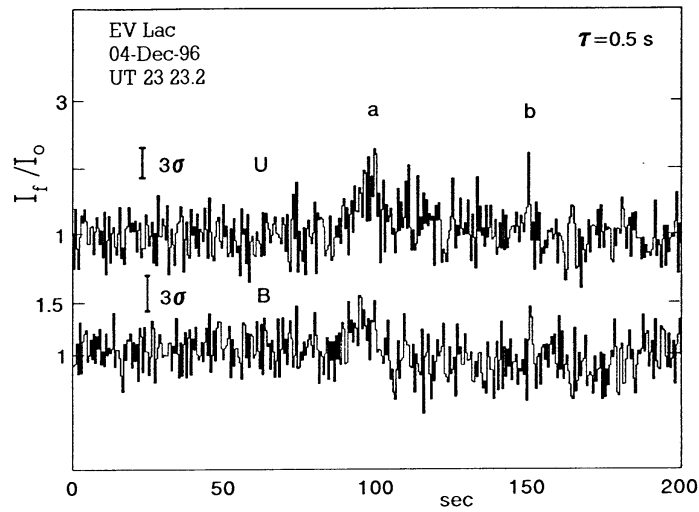


Figure 2

Table 2. Data on flares of V577 Mon

Date	UT max h m	Peaks	$\Delta U$	$\Delta B$	U-B	$t_r$ sec	Duration sec	$\tau$ sec	Tel m
10 Jan 97	04 23.7		1.1	0.4	0.5	1.7	4.0	0.1	2.1
10 Jan 97	05 57.5		2.5	0.9	-0.4	5.0*	30.0	0.1	2.1
10 Jan 97	06 10.8	a	0.6	0.0	0.6	8.0	40.0	0.1	2.1
		b	1.8	0.8	0.2	0.1	0.3	0.1	
10 Jan 97	07 27.0		1.2	0.0	0.0	0.5	1.5	0.1	2.1

\* The small preflare (Figure 4) is not considered.

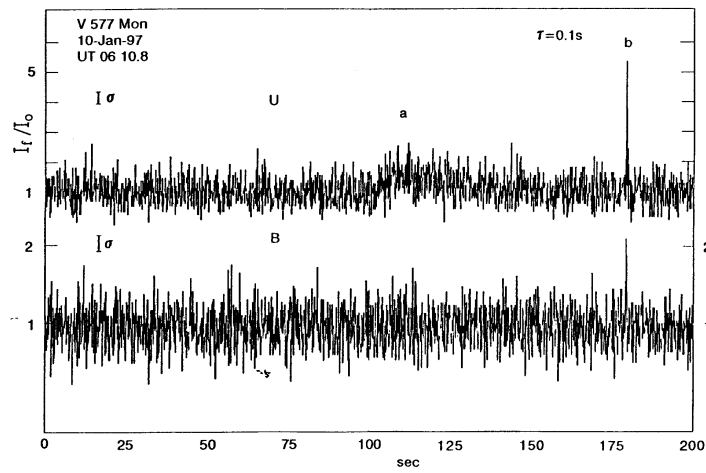


Figure 3

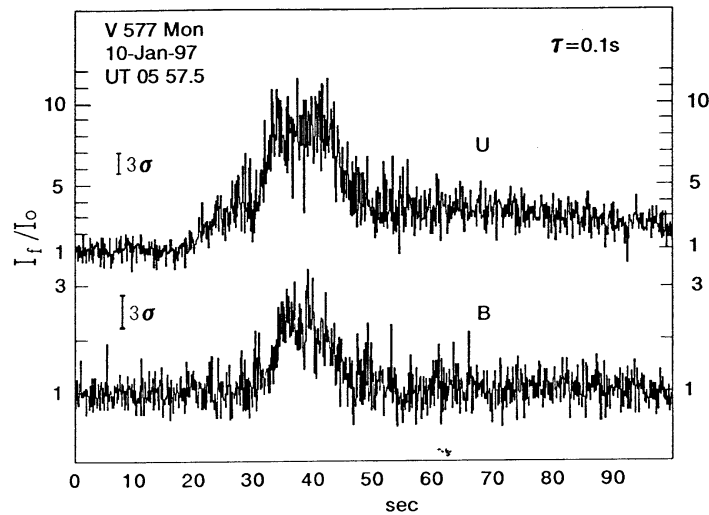


Figure 4

Light curves of some flares are shown in Figures 1-4. The spiky type short flares of a duration less than 1 sec observed simultaneously in U and B are very remarkable (Figures 1-3). Such spiky flares were also detected in previous observations with the two-channel fast photometer (Tovmassian, Zalinian, 1988; Zalinian, Tovmassian, 1997). A chance coincidence of two noise spikes on two independent records in U and B with values of counts exceeding  $5\sigma$  may take place once in  $3 \times 10^4$  hours. Thus the observed spikes are real flares. Shvartsman et al. (1988) stated that they have not detected flares with duration less than 2-3 sec, though on the light curves demonstrated by them there are some very short spikes similar to flares detected by us. We may suggest that Shvartsman et al. assumed that such spikes, registered at only one waveband, were only noise, and for this reason were not considered by them as real flares. The existence of such flares put certain constraints on the theories of the origin of stellar flares.

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H.M. TOVMASSIAN  
Elsa RECILLAS  
O. CARDONA  
Instituto Nacional Astrofisica  
Optica y Electronica  
Puebla, Mexico

V.P. ZALINIAN  
Byurakan Astrophysical Observatory  
of the Armenian National Academy  
of Sciences

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