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PHOTOELECTRIC OBSERVATIONS OF EV Lac IN 1984

Photoelectric monitoring observations of the flare star EV Lac in the U bandpass have been carried out in the National Astronomical Observatory of the Bulgarian Academy of Sciences, using the 60 cm telescope and the one-channel photoelectric photometer.

Table I gives the monitoring intervals in UT, number of flares observed and mean errors (σ/I_o) for the respective run. The characteristics of the individual flares observed are given in Table II:

a) Date and Universal Time of maximum;

b) Flare rise time;

Table I. Coverage of the flare star EV Lac in 1984

Date 1984	Monitoring intervals UT	Total monit. time	Number of flares	σ/I_o
July 24/25	$23^h50^m28^s$ - $00^h25^m53^s$, 00 26 42 - 00 51 00.	$0^h59^m43^s$	3	0.11
July 31/ Aug. 1	23 39 36 - 00 13 21, 00 14 15 - 00 35 42, 00 36 30 - 01 07 42.	1 26 24	2	0.12
Aug. 29	22 06 45 - 22 24 19, 22 25 58 - 22 46 50.	0 38 26	1	0.07
Aug. 30	22 45 36 - 23 08 34, 23 09 27 - 23 49 12.	1 02 43	1	0.11
Oct. 1	18 15 06 - 19 32 38.	1 17 32	3	0.10
Nov. 23	18 34 15 - 18 48 07, 18 51 21 - 18 57 37, 18 58 37 - 19 44 02.	1 05 33	1	0.09
Nov. 24	18 37 53 - 19 43 06, 19 45 43 - 20 06 14.	1 25 44	2	0.08
Nov. 25	16 24 16 - 16 41 15, 16 46 14 - 16 48 09, 16 49 18 - 19 00 46, 19 05 54 - 19 44 16.	3 08 44	1	0.09
Nov. 26	17 22 42 - 18 52 09, 18 55 43 - 19 13 38, 20 16 25 - 21 01 14.	2 32 11	6	0.10
	Total:	$13^h37^m00^s$	20	

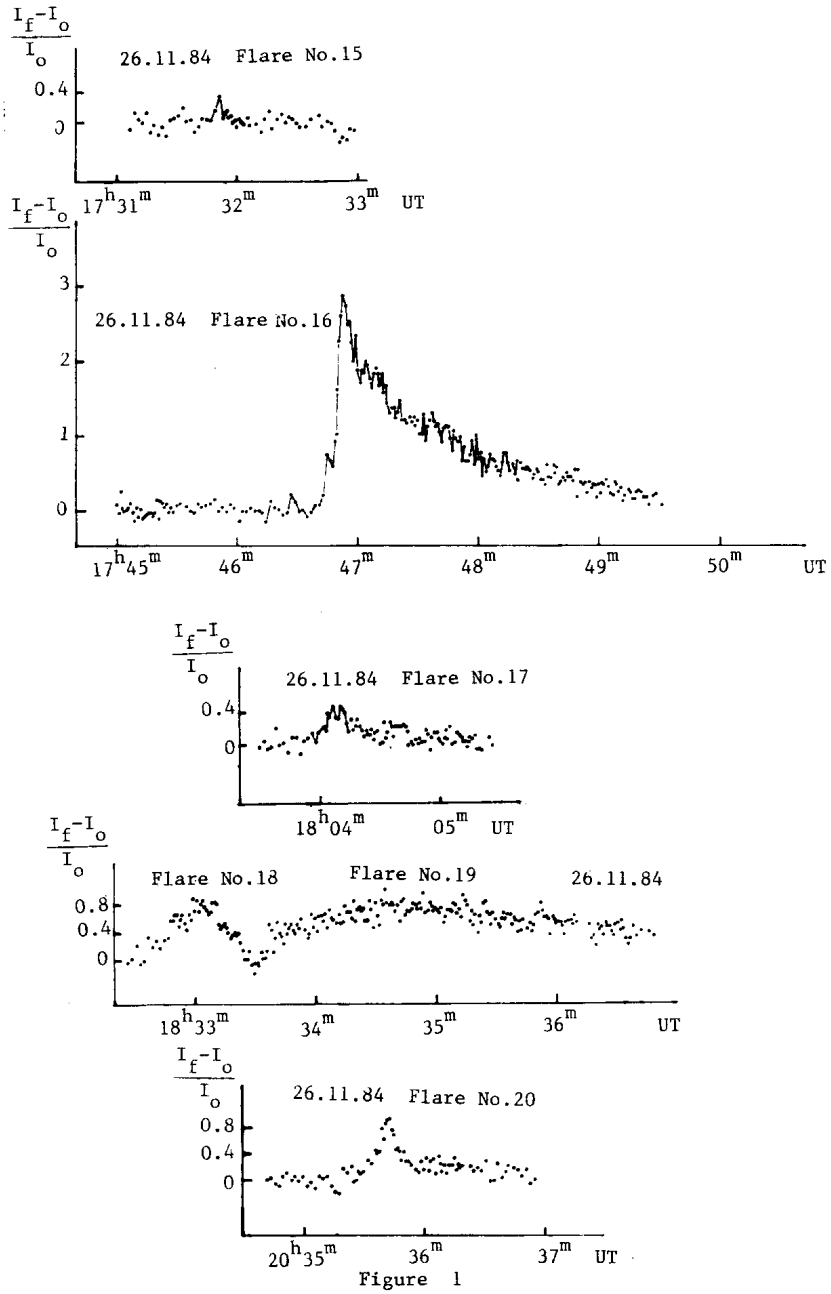
$\frac{I_f-I_o}{I_o}$
26.11.84 Flare No.15
0.4
0
17^h31^m
32^m
33^m UT
$\frac{I_f-I_o}{I_o}$
3
2
1
0
26.11.84 Flare No.16
17^h45^m
46^m
47^m
48^m
49^m
50^m UT
$\frac{I_f-I_o}{I_o}$
26.11.84 Flare No.17
0.4
0
18^h04^m
05^m UT
$\frac{I_f-I_o}{I_o}$
Flare No.18
Flare No.19
26.11.84
0.8
0.4
0
18^h33^m
34^m
35^m
36^m UT
$\frac{I_f-I_o}{I_o}$
26.11.84 Flare No.20
0.8
0.4
0
20^h35^m
36^m
37^m UT

Figure 1

Table II. Characteristics of the flares observed

Flare No.	Date 1984	UT max.	t_{rise} sec	$t_{0.5}$ sec	Duration sec	$(I_f-I_o)/I_o$	σ/I_o	log E ergs
1	25 July	$00^h14^m25^s$	2	3	12	0.43	0.10	29.39
2	25 July	00 24 11	71	7	300	3.10	0.11	31.13
3	25 July	00 38 26	26	10	80	0.49	0.11	30.27
4	1 Aug.	00 09 52	4	8	52	0.63	0.12	30.23
5	1 Aug.	00 32 37	7	8	80	0.88	0.13	30.36
6	29 Aug.	22 12 24	144	155	1740	3.47	0.07	32.31
7	30 Aug.	22 49 55	20	4	35	0.49	0.11	29.98
8	1 Oct.	18 53 50	13	50	163	0.55	0.11	30.67
9	1 Oct.	19 12 29	2	4	23	0.48	0.11	29.85
10	1 Oct.	19 17 21	5	1	20	0.54	0.09	29.75
11	23 Nov.	18 35 44	15	26	121	0.58	0.08	30.59
12	24 Nov.	18 42 57	4	3	8	0.23	0.07	29.07
13	24 Nov.	19 57 53	10	3	22	0.36	0.10	29.71
14	25 Nov.	17 43 56	34	44	108	0.56	0.09	30.49
15	26 Nov.	17 31 51	4	1	13	0.33	0.10	29.44
16	26 Nov.	17 46 53	36	22	643	2.91	0.09	31.37
17	26 Nov.	18 04 10	18	10	98	0.50	0.12	30.42
18	26 Nov.	18 32 59	30	21	61	0.87	0.10	30.49
19	26 Nov.	18 34 35	65	65	390	0.99	0.10	31.40
20	26 Nov.	20 35 43	23	5	160	0.92	0.08	30.61

Remark: the optical companion of EV Lac has been excluded

c) Flare decline time to 0.5 of the maximum;

d) Total flare duration;

e) Intensity of the flare radiation at maximum, $(I_f-I_o)/I_o$, where I_f is the intensity of star plus flare (reduced for background) and I_o is the quiet-state star intensity (reduced for background);

f) Random noise σ/I_o;

g) Total flare energy, estimated by integration of the flare intensity over the total duration of the flare.

Fig. 1 shows 6 flares of EV Lac, observed on November 26, 1984 in the U-filter.

During the total of 13.62 hours monitoring time 20 flares were registered. Therefore the frequency of flares for our patrol is: $f = 1.47 \pm .33$ flares per hour. Comparing this frequency with previously reported for EV Lac by Moffett, 1974 (22 flares in 66.3 hours) we come to the conclusion, that during August-November 1984 EV Lac was in an enhanced activity state.

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Reference :

Moffett, T.J.: 1974, Astrophys. J. Suppl. Ser. 29, No. 273.