

COMMISSION 27 OF THE I. A. U.  
 INFORMATION BULLETIN ON VARIABLE STARS

Number 2253

Konkoly Observatory  
 Budapest  
 1982 December 20  
 HU ISSN 0374-0676

FLARES OF EV Lac AND UVB PHOTOMETRY DURING THE QUIESCENT PHASE IN 1975

Concluding a series of observations of the dMe flare star, EV Lac ( $22^{\text{h}}44^{\text{m}}40^{\text{s}}$ ,  $+44^{\circ}04'6$ , 1950, Chart G216-16, Lowell Obs.Bull.140,1967), made at the Royal Greenwich Observatory, Herstmonceux, using the 2-star photometer on the 36-inch reflector, we present unpublished results for 1975. Both pulse-counting and additional, simultaneous strip-chart recording were made, the former with a 10-second sampling time. For a description of the equipment and a discussion of results, see Andrews 1973 and 1982. The comparison star used in channel 2 was BD  $+43^{\circ}43'10$  (Sp K0,  $22^{\text{h}}46^{\text{m}}25^{\text{s}}$ ,  $+44^{\circ}25'4$ , 1950). EV Lac was monitored for  $11^{\text{h}}42^{\text{m}}$  over six nights between 29 August and 9 September 1975 in one of the standard UVB bands. Universal Times (UT) of monitoring are given in Table I to the nearest minute, those in parentheses indicating poor sky conditions.

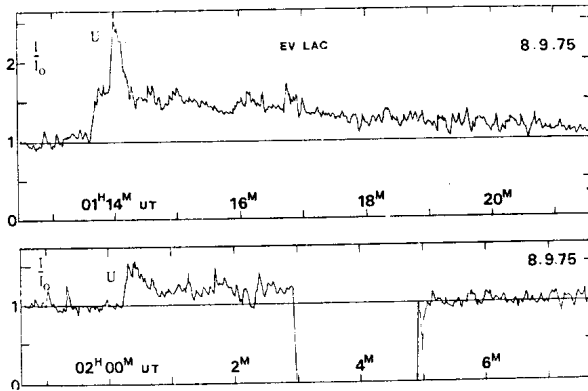
Table I

Monitoring Times of EV Lac

1975	Filter	UT
30 Aug	V	0044-0120,0136-42.
1 Sept	U	2120-42,2145-2248,2250-2300,(2301-20).
2 Sept	U	(2108-18,2124-35,2136-2207,2210-15),
	B	(2216-19,2222-49,2252-2304),
	U	(2305-07),
3 Sept	B	(2311-17,2319-34,2337-47,2351-2400),
	B	(0000-03,0005-15),0018-36,0040-45,0046-56,0057-0114,
	U	0120-24,0125-45,
7 Sept	U	0146-52.
	U	(2120-45,2148-56),
	B	(2227-37),
8 Sept	U	(2241-44),
	B	(2252-54,2256-2300,2314-19,2323-29,2331-38),
	U	2340-2400,
9 Sept	U	0000-21,0023-31,0033-58,0104-26,0129-0202,0205-45.
	U	2038-55,(2059-2126),2138-2202,2207-11,(2212-29),
	U	2230-35,2310-22,2346-49,2354-2400,
10 Sept	U	0000-02.
	U	(0102-10,0112-17,0118-19,0122-24).

TOTAL COVERAGE 11h42m over 6 nights.

One moderate ultraviolet flare (No.3) of amplitude  $1.04^m$  with a duration of 10 minutes and a slow decline was well recorded on 8 September (See Fig.1 and Table II). A second smaller flare (No.4) of amplitude  $0.48^m$  followed



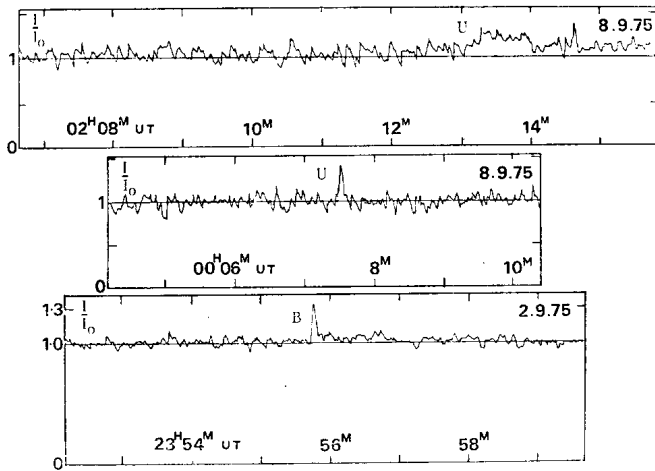
Figures 1-2

Table II

Flare Characteristics (Observed on 36-inch at RGO)

No.	1975	UT	Filter	$\Delta m$	P(mins)	$m_f$	Fig.
1	2 Sept	23 <sup>h</sup> 55 <sup>m</sup> 45 <sup>s</sup>	B	0 <sup>m</sup> .31	0.06	12.65	5
2	8 Sept	00 07 30	U	0.40	0.03	13.12	4
3	8 Sept	01 14 00	U	1.04	2.94	11.41	1
4	8 Sept	02 00 20	U	0.48	0.68	12.57	2
5	8 Sept	02 13 20	U	0.28	0.46	13.26	3

46 minutes later. However, as judged from the falling count-rate in the comparison channel during what appeared to be a normal slow decline in EV Lac, it was suspected that both stars were drifting out of their diaphragms. After checking and finding no adjustment necessary, it was found that the flare star had already returned to its quiescent level 2.5 minutes later. The shape of the later part of the light curve of No.4 is therefore doubtful. Three other flares are also listed in Table II and shown in Figs.3,4 and 5. Table II contains the observed amplitude,  $\Delta m$ , the apparent magnitude of flare light at maximum ( $m_f$ ), corrected for the faint companion (See Andrews and Chugainov 1969), and the integrated intensity (P) or equivalent duration in minutes (See Andrews, Chugainov, Gershberg and Oskanian 1969), uncorrected for the faint companion. Corrected P' may be found from  $P'(U) = 1.76 P(U)$  or  $P'(B) = 1.43 P(B)$ , which includes allowance for the slow change in the quiescent level which pertains to the 1975 observations, as described below.



Figures 3-5

The author continued collaborative observations of EV Lac from the Catanian Astrophysical Observatory using the 61-cm reflector for simultaneous 3-colour photometry from 29 September until 10 October 1975. These joint results will be published separately, together with the full Catania data, in a forthcoming Bulletin. Photometric measurements on five nights of EV Lac and a comparison star of similar colour, BD +43°4303 (22<sup>h</sup>44<sup>m</sup>19<sup>s</sup>, +44°01'7, 1950) listed by Andrews and Chugainov (1969) were made, together

Table III

Standard Photometry (Observed on 61-cm telescope at Catania)

1975	UT	V	U-B	B-V	n
29 Sept	23 <sup>h</sup> 02 <sup>m</sup>	10. <sup>m</sup> 113	0. <sup>m</sup> 570	1. <sup>m</sup> 362	2
1 Oct*	23 00	10.082	0.586	1.353	3
4 Oct	19 59	10.042	0.587	1.352	4
8 Oct	20 47	10.091	0.526	1.373	3
8 Oct	21 55	10.123	0.631	1.344	3
9 Oct	21 16	10.068	0.692	1.346	4
Means (EV Lac incl.opt.comp.)		10.086 ±.027	0.599 ±.052	1.355 ±.010	
c.f. Andrews and Chugainov 1969		10.05 ±.015	0.75 ±.03	1.37 ±.015	
* Also BD +43°4310		9.597	0.745	1.216	

with measurements on a single night of BD +43°4310, the comparison star used at the RGO earlier. Data in Table III for the star, EV Lac, includes the light of the faint companion. Slow variations in UBV are suspected from the present work, and the U-B colour differs by  $0.^m15$  from results from previous photometry. It is important to note, however, that these observations do not confirm the persistent  $0.^m2$  drop in B and V in the quiescent level of EV Lac in 1975 as reported by Mahmoud and Oláh (1981). There is, moreover, a disagreement of  $0.^m05$  in V in the photometric standard, BD +43°4299, used by the two groups of observers. Further work on the slow secular variation of EV Lac, in relation to the dark spot hypothesis, is important.

A. D. ANDREWS  
Armagh Observatory  
Armagh BT61 9DG  
Northern Ireland

References :

- Andrews, A.D., 1973, IBVS 851.  
Andrews, A.D., 1982, IBVS No. 2254.  
Andrews, A.D., Chugainov, P.F., Gershberg, R.E. and Oskanian, V.S.,  
1969, IBVS 326.  
Andrews, A.D. and Chugainov, P.F., 1969, IBVS 370.  
Mahmoud, F.M. and Oláh, K., 1981, IBVS 1943.