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PHOTOELECTRIC OBSERVATIONS OF AD LEONIS, EV LACERTAE AND A SUSPECTED  
FLARE STAR NEAR HZ HERCULIS

Photoelectric observations of flare stars AD Leo, EV Lac and a suspected flare star near HZ Her were obtained on several nights during the past year. The 61 cm reflector of the Morehead Observatory was used in conjunction with an uncooled 1P21 photomultiplier tube which fed a DC amplifier (time constant 1 second) coupled to a strip chart recorder (speed 2 inches per minute).

The dates and times of the observations are noted in Table I. All interruptions in the observing which exceeded one minute are noted. No flares of AD Leo were observed, however, a flare of EV Lac was noted on 27 September 1974 at 3:05:49 ( $\pm 2$  sec.) UT. The flare, shown in Figure I, had a duration of 82 seconds and the ratio of the peak recorded intensity to the quiescent was 2.78 which corresponds to a magnitude change of 1.11 in the natural photometric system of the unfiltered tube. This is uncorrected for the light of the companion star which was monitored simultaneously with the flare star. The flare itself shows much structure on a time scale of one second or less and a rise time equal to or less than the time constant of the electronics.

Recently, Moffett and Vanden Bout (1973) reported the discovery of a flare star near HZ Her. They quote unpublished work of P.E. Boynton which shows the star to be about 10th magnitude and having colors consistent with a K-dwarf. As Table I shows a total of 20 hours of monitoring this star produced no definite flares. On 24 May, 1974 numerous randomly spaced, low amplitude "flashes" with average duration of 10 seconds were observed; however subsequent observations have failed to confirm this behaviour and a terrestrial source is strongly suspected.

The visual magnitude and color indices of this star were redetermined this spring with the results;

$$\begin{aligned} V &= 10.00 \pm .02 \\ B-V &= 1.06 \pm .02 \\ U-B &= 0.86 \pm .04 \end{aligned}$$

These values are based on measurements made on two nights. The first night

the star was observed in B and V with the 1P21 tube. On the second night the star was observed in U, B and V with an EMI 9789 tube.

If a luminosity class of V is assumed the above colors imply the star is a K4 dwarf. The General Catalogue of Variable Stars and its supplements (Kukarkin, 1969 - 1974) lists only one other UV Ceti star of type K4 and only four others of a slightly earlier type.

In light of the many hours of null observations, the low amplitude of the discovery flare, and the early spectral type it would seem that caution should be used in conclusively calling this star a UV Ceti type. However, as Moffett and Vanden Bout point out, if this is a UV Ceti star it is a very interesting one. The need for more observational work is obvious.

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References:

- Moffett, T.J. and P.A. Vanden Bout 1973, IBVS No.833  
Kukarkin, B.V., et al. 1969-1974, Gen.Cat.of Var.Stars,Academy of Sciences of the U.S.S.R.

TABLE I

Star	Date	Filter	Coverage (UT)	Notes
Ab Leo	5/18/74	B	2:09 - 3:12	Poor sky conditions
	2/20/75	None	3:58 - 6:00	
	3/4/75	V	3:18 - 3:31	
			3:34 - 3:48	
			3:50 - 4:16	
EV Lac	9/27/74	None	0:38 - 3:14	Flare at 3:05:49
			3:16 - 4:03	
	10/13/74	None	2:23 - 4:45	
	11/5/74	None	2:25 - 3:04	
	11/8/74	None	3:07 - 3:43	
Suspected flare star	5/24/74	None	4:02 - 6:30	Sporadic "flashes" between 4:15 - 4:44
	5/28/74	None	8:05 - 8:26 8:29 - 8:47 8:49 - 9:00	
	5/31/74	None	3:13 - 3:46	Poor sky conditions
			3:49 - 3:57	
			4:00 - 4:09	
			4:14 - 4:23	
			4:26 - 4:29	
			4:33 - 4:36	
	6/4/74	None	4:38 - 5:30	
			2:44 - 3:43	
			5:08 - 5:58	
			6:03 - 6:59	
	6/7/74	None	7:02 - 8:01	
			3:02 - 3:15	
			3:18 - 4:21	
			4:25 - 4:38	
			5:25 - 5:43	
	6/26/74	None	5:47 - 8:30	
			6:23 - 6:32	
	7/1/74	None	6:36 - 6:55	
2:04 - 2:28				
2:38 - 7:42				
7:45 - 8:30				
4/4/75	B, V	7:25 - 7:37	Mag. and color measured	
5/20/75	U, B, V	4:36 - 4:48	Mag. and color measured	

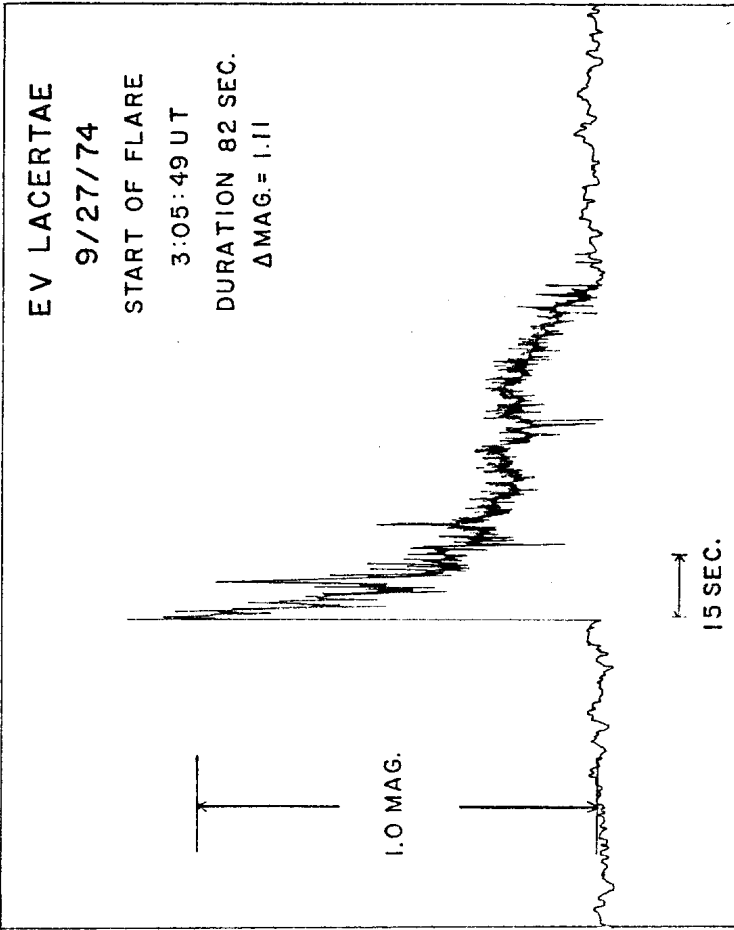


FIGURE 1.