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PHOTOELECTRIC SURVEILLANCE OF THE FLARE
STARS YZ CMi, AD Leo AND EV Lac

The results of the photoelectric patrolling of the dMe flare stars YZ CMi, AD Leo and EV Lac on a total of 28 nights, through a standard B filter, on a 56-cm reflector equipped with an unrefrigerated 1P21 photomultiplier, are herein reported. Tables Ia, Ib and Ic give details of the coverage of the stars.

Four flares were recorded on the stars observed. Details of the flares, are given in Table II.

The light curves of the flares show that while the flare of YZ CMi is reminiscent of a Type I flare in Oskanyan's classification (Oskanyan, 1969), those of AD Leo and EV Lac resemble his Type II.

On a few nights the observations were taken by Messers T.R. Bhatt and T.C. Tewari, to whom our thanks are due.

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References:

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Oskanyan, V.S.: 1969, Non-periodic Phenomena in Variable Stars,
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TABLE Ia
 COVERAGE OF YZ CMi

(Times are rounded to the next minute of U.T.)

Date, 1972

9 Feb.	17 ^h 15 ^m -18 ^m ,	17 ^h 21 ^m -33 ^m ,	17 ^h 35 ^m -18 ^h 31 ^m .
18 Feb.	17 04 -24,	17 15 -27,	
21 Feb.	17 35 -47,	17 51 -18 13,	18 14 -19 , 18 22 -41,
	18 43 -51,	18 53 -56,	19 12 -32 , 19 35 -43.
14 Mar.	15 06 -29,	15 33 -38,	15 42 -58 , 15 59 -16 41,
	16 44 -17 02,	17 11 -15 ,	17 18 -22 , 17 25 -44,
	17 46 -18 09,	18 20 -31 ,	18 34 -19 04.
16 Mar.	15 02 -23 ,	15 24 -16 09,	16 11 -15 , 16 18 -23,
	16 30 -52 ,	16 53 -17 18,	17 27 -18 03, 18 06 -23,
	18 39 -19 05,		
17 Mar.	15 03 -16 16,	16 18 -23 ,	16 29 -17 18, 17 26 -18 04,
	18 06 -27 ,	18 39 -19 06,	
18 Mar.	14 46 -53 ,	14 55 -15 37,	15 42 -16 10, 16 17 -17 04.
22 Mar.	14 14 -39 ,	14 40 -15 24,	15 26 -59 , 16 02 -30,
	16 35 -45 ,	16 59 -17 41,	17 43 -18 28.
3 Apr.	15 13 -15 ,	15 19 -25 ,	15 28 -43 , 15 44 -16 22,
	16 28 -17 02,	17 12 -19 ,	17 20 -22 , 17 25 -29,
	17 36 -39 .		
7 Apr.	14 46 -15 38,	15 39 -50 ,	15 52 -16 18, 16 23 -46,
	16 48 -17 07,	17 08 -30 .	
6 May	14 57 -15 31,	15 37 -43 .	

Total Coverage : 24^h30^m spread over 11 nights

TABLE Ib
 COVERAGE OF AD Leo

(Times are rounded to the next minute of U.T.)

Date, 1972

11 Apr.	1 ^h 39 ^m -18 ^h 24 ^m ,	18 ^h 25 ^m -34 ^m ,	18 ^h 36 ^m -19 ^h 08 ^m ,	19 ^h 10 ^m -20 ^h 23 ^m .
12 Apr.	16 12 -17,	16 29 -45,	16 47 -17 01,	17 05 -12,
	17 17 -53,	17 56 -18 07,	18 10 -23,	18 25 -38,
	18 39 -59,	19 00 -05,	19 07 -18,	19 20 -38,
	19 39 -20 08,	20 10 -21.		
14 Apr.	18 38 -42,	18 44 -49,	18 51 -19 08,	19 10 -16,
	19 28 -40,	19 41 -46,	19 47 -20 04,	20 05 -24,
	20 25 -40.			
3 May	14 46 -52,	14 54 -15 20,	15 24 -35,	15 38 -16 20,
	16 24 -48,	16 51 -17 20,	17 31 -18 00,	18 06 -26,
	18 31 -49.			
6 May	16 13 -33.			
7 May	15 37 -56,	16 01 -08,	16 12 -36,	16 42 -17 12,
	17 13 -35,	17 38 -56,	18 00 -12,	18 14 -28,
	18 31 -35.			
8 May	15 14 -16 29,	16 32 -34,	16 45 -57,	17 04 -07,
	17 14 -55,	17 57 -18 18,	18 26 -48.	
9 May	16 17 -23,	16 30 -36,	16 38 -17 18,	17 23 -39,
	17 52 -18 21,	18 27 -19 09,	19 13 -31.	
10 May	15 37 -39,	16 24 -28,	16 32 -49,	16 52 -17 29,
	17 33 -46,	17 58 -18 08,	18 09 -25,	18 26 -44,
	18 46 -56,	18 58 -19 15.		
12 May	14 42 -44,	14 46 -15 03,	15 04 -21,	15 23 -36.
15 May	15 21 -30,	15 39 -43,	15 45 -51,	15 53 -16 02,
	16 04 -21,	16 26 -30.		
16 May	15 15 -38,	15 40 -45,	16 50 -17 20,	17 22 -36,
	17 39 -46,	17 48 -18 09.		

Total Coverage : 25^h10^m spread over 12 nights

TABLE Ic
 COVERAGE OF EV Lac

Times rounded to the next minute of U.T.

Date				
27 Oct. 1971	16 ^h 29 ^m -31 ^m ,	16 ^h 43 ^m -53 ^m ,	16 ^h 55 ^m -17 ^h 13 ^m ,	
	17 16 -33 ,	17 35 -47 ,	17 49 -59 ,	
	18 01 -14 ,	18 18 -28 ,	18 30 -19 C3,	
	19 06 -15 ,	19 16 -18 ,	19 19 -38 ,	
	19 45 -49 ,	19 50 -52 .		
2 Nov. 1972	16 10 -19 ,	16 20 -40 ,	16 41 -17 16,	
	17 17 -18 03,	18 05 -19 02,	19 03 -19 41.	
6 Nov. 1972	16 44 -17 12,	17 16 -27 ,	17 29 -48 ,	
	17 52 -18 43,	18 59 -19 30.		
8 Nov. 1972	15 26 -16 30,	16 31 -18 54.		
13 Nov. 1972	15 43 -16 27,	16 24 -16 51,	17 11 -18 55.	

Total Coverage : 14^h33^m spread over 5 nights

FIG-1
FLARE ON YZ CMI
MAR 16, 1972

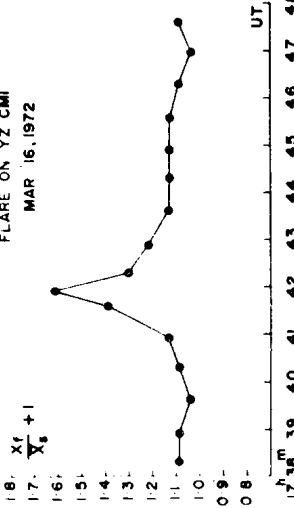


FIG-2
FLARE ON AD Leo
MAY 8, 1972

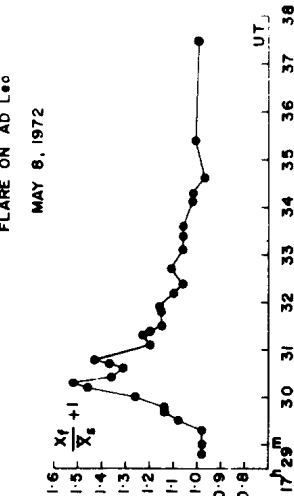


FIG-3
FLARE ON EV Lac
OCT 27, 1971

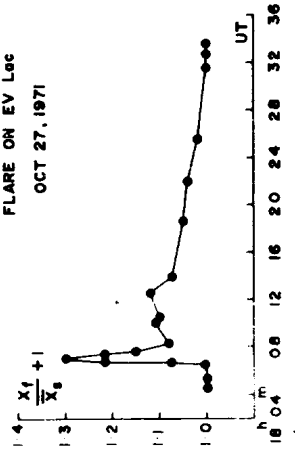


FIG-4
FLARE ON EV Lac
NOV 13, 1972

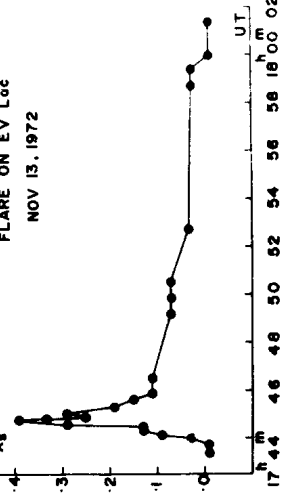


TABLE II
CHARACTERISTICS OF THE FLARES ON YZ CMI, AD Leo AND EV Lac^x

Star	Magnitude and colour (Erro, 1971)	Date	U ^m _{max}	Flare duration Before max t _b	Flare duration After max t _a	$\frac{\bar{X}_{fm}}{\bar{X}_s}$	$\frac{\Delta m_B}{\bar{X}_s}$	$\frac{\sigma}{\bar{X}_s}$	P min	F(z) Energy released at flare max. (10 ²⁹ ergs/sec)	Excess energy liberated during the event (10 ³⁰ ergs)	
YZ CMI	V=+11. ^m 20	16 March 1972	17 ^h 41 ^m 54 ^s	1. ^m 6	4. ^m 4	0.61	0.52	0.006	0.67	1.51	1.75	4.37
B-V=+1. ^m 61												
AD Leo	V=+9. ^m 43	8 May 1972	17 ^h 30 ^m 18 ^s	1. ^m 0	4. ^m 3	0.52	0.46	0.004	0.90	2.19	7.02	24.81
B-V=+1. ^m 54												
EV Lac	V=+10. ^m 09	27 Oct. 1971	18 ^h 07 ^m 09 ^s	1. ^m 8	24. ^m 6	0.30	0.26	0.022	1.41	1.28	1.02	6.80
B-V=+1. ^m 36												
		13 NOV. 1972	17 ^h 44 ^m 37 ^s	0. ^m 9	15. ^m 4	0.32	0.36	0.005	1.19	1.42	1.12	5.74

^xBased on notation proposed by Oskanyan (1970).