COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1572

Konkoly Observatory
Budapest
1979 March 21

PHOTOELECTRIC OBSERVATIONS OF AD Leo

The results of photoelectric monitoring of the flare star AD Leo, made through a standard B filter are reported herein. Four flares were detected during a total of 17^h28^m monitoring, spread over 7 nights. All flare events were observed using the 104-cm reflector equipped with a refrigerated EMI 6094S photomultiplier. Flare events of 12 February 1977 are within the programme of Cooperative flare star observations for 1977 (Mavridis, 1977).

Table 1

Monitoring Intervals

(Times rounded off to nearest minute of U.T.)

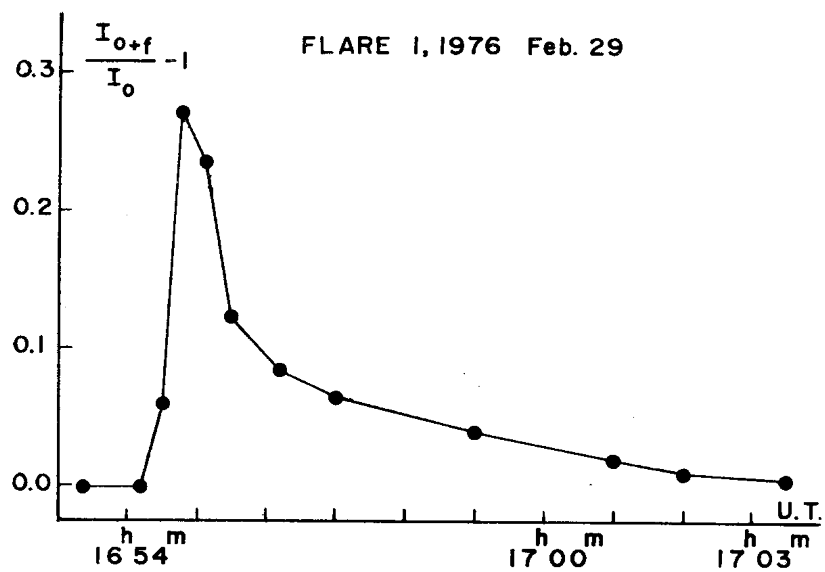
Date	Telescope		
1976 Feb.29	104-cm	16^h12^m - 17^h04^m	17^h05^m - 17^h33^m
		17 58 - 18 55	18 56 - 19 14
		19 20 - 19 34	20 03 - 20 21
		20 45 - 21 03	
1977 Feb. 2	104-cm	17 32 - 17 48	17 56 - 18 54
10	56-cm	15 06 - 15 24	15 26 - 15 48
		15 50 - 16 12	16 13 - 16 40
		16 42 - 17 03	18 01 - 18 13
		19 34 - 20 02	20 26 - 21 04
11	56-cm	15 14 - 15 51	16 16 - 17 20
12	104-cm	16 48 - 17 16	17 18 - 21 31
1978 May 17	56-cm	17 47 - 18 30	
1978 Dec.23	56-cm	18 25 - 18 31	18 32 - 18 47
		18 49 - 19 07	19 08 - 19 16
		19 18 - 19 30	

The flare light curves (Figs. 1-4), monitoring intervals (Table 1) and flare characteristics (Table 2) are presented.

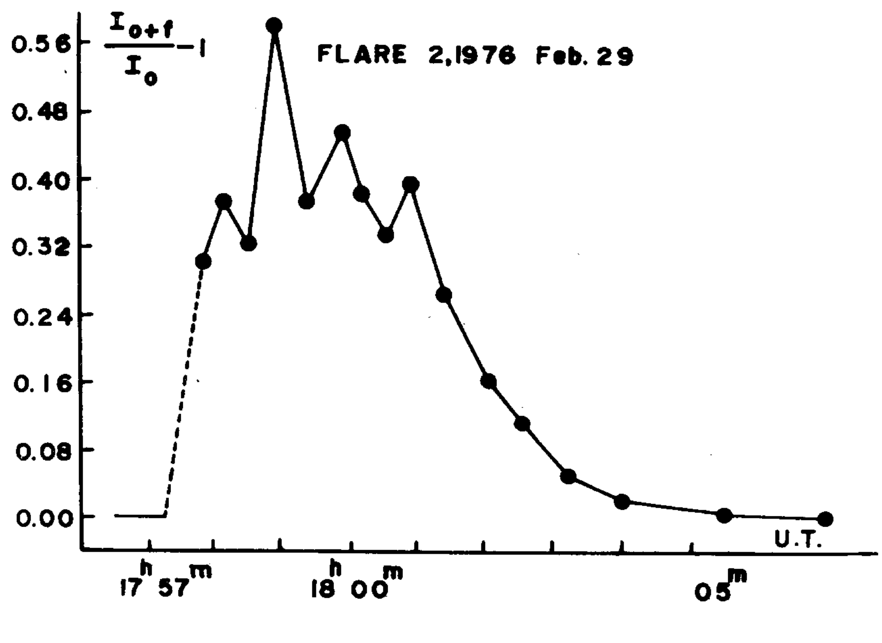
Energy released during a flare event is computed using the following equation (Cristaldi and Rodono, 1973):

$$E_B = 4\,\pi d^2 \times 10^{-0.4 m_B} \times \pi_B \times 60 \times P_B \text{ ergs}$$

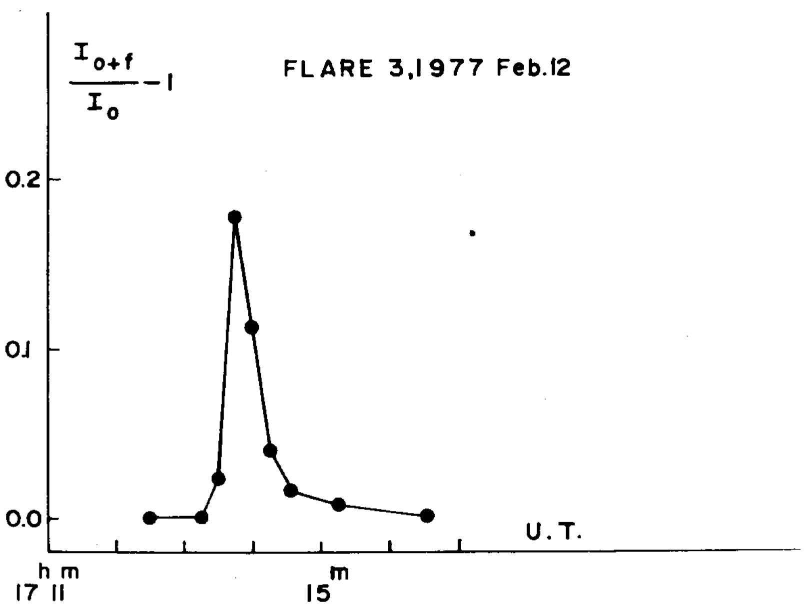
Where d is the distance of the star, m_B its apparent magnitude in B colour, π_B the energy flux produced by a zero magnitude star outside the terrestrial atmosphere which is taken



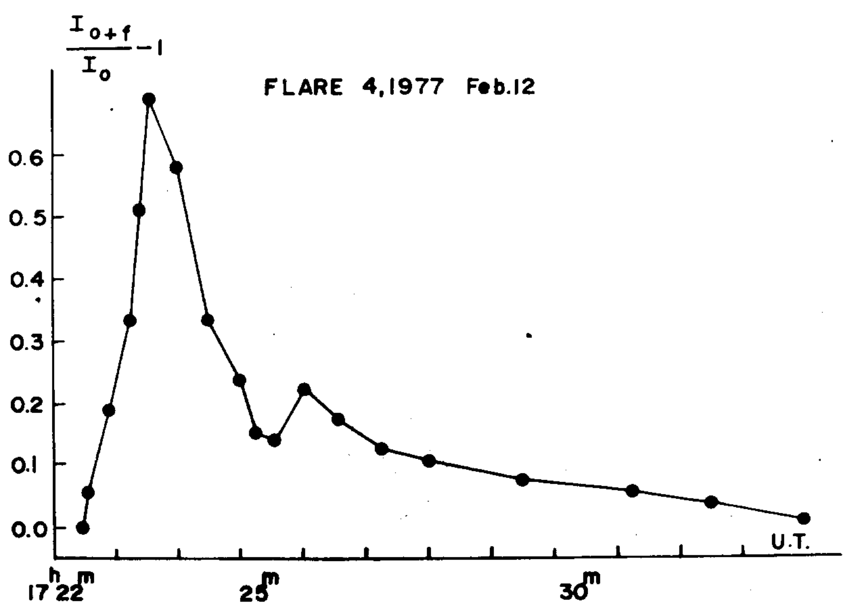
$\frac{I_{o+f}}{I_o} - 1$
FLARE 1, 1976 Feb. 29
0.3
0.2
0.1
0.0
U.T.
$16^h 54^m$
$17^h 00^m$
$17^h 03^m$



$\frac{I_{o+f}}{I_o} - 1$
FLARE 2, 1976 Feb. 29
0.56
0.48
0.40
0.32
0.24
0.16
0.08
0.00
U.T.
$17^h 57^m$
$18^h 00^m$
05^m



$\frac{I_{o+f}}{I_o}-1$
FLARE 3, 1977 Feb.12
0.2
0.1
0.0
U.T.
17 11
15



$\frac{I_{o+f}}{I_o}-1$
FLARE 4, 1977 Feb.12
0.6
0.5
0.4
0.3
0.2
0.1
0.0
U.T.
17 22
25
30

Table 2

CHARACTERISTICS OF FLARE EVENTS OF AD Leo

(V = 9.43, B-V = 1.54, Parallax = .204, Spectral type = dM 4.5e)

Date	U.T. max	Flare duration (in minutes) Before max t_b	After max t_a	$\frac{I_{o+f}}{I_o} - 1$	Δm_B	$\frac{\sigma}{I_o}$	P_B (min)	F(z)	Energy released at flare max, 10^{30} ergs/S	Total emission during the event 10^{31} ergs.
1976 Feb.29	$16^h54^m.8$	0.6	1.13	0.296	.28	.011	0.51	1.08	0.97	2.28
	17 59.8	1.6	8.10	.585	.41	.011	1.77	1.02	1.08	7.89
1977 Feb.12	17 13.7	0.5	2.75	.177	.18	.010	0.10	1.05	0.87	0.45
	17 23.7	1.1	11.00	.687	.57	.010	1.82	1.04	1.25	8.13

6.3×10^{-6} ergs $cm^{-2}sec^{-1}$ (Cristaldi and Rodono, 1973) and

$$P_B = \int \left(\frac{I_{o+f}}{I_o} - 1\right) dt,$$

where I_{o+f} is the intensity deflection due to the quiet star (I_o) plus that of the flare (I_f) at maximum.

In the case of multipeaked light curves, the peaks may belong to independent flare events even when separated by small interval of time during which the relative intensity should drop to zero. Thus the energy lost during an event should be the total energy lost by numerous weaker events.

The author is thankful to Dr. C.D.Kandpal for going through the manuscript.

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