CONTINUOUS PHOTOELECTRIC PHOTOMETRY OF AD LEO

DURING THE 1973 INTERNATIONAL PATROL

The flare star AD Leo was observed photoelectrically with the 30cm
Cassegrain reflector at Oslo Solar Observatory $(\lambda=0^h43^m02^s$, $\phi =$
$=+60^{\circ}12'30"$, h= 585 m) which is operated by the Institute of Theo-
retical Astrophysics, University of Oslo. The observing session last-
ed January 27 - February 9, 1973, according to the program of the IAU
Working Group on Flare Stars (1). The monitoring was performed with
a filter combination (1 mm Schott BG 12 + 2 mm Schott GG 385) which
gives a bandpass equal to the B-band in Johnson's photometric system.
The applied diaphragm has a diameter of 1 mm, corresponding to a
field of 57.8 seconds of arc. The observations in intervals 4 and 5
on February 8 were performed with a 1/2 mm diaphragm (28.9 seconds of
arc). The photomultiplier is a RCA 1P21, working at air temperature.
All nigths except February 2-3 the air temperature was well below $0^{\circ}C$,
and it never changed more than $2^{\circ}C$ during a night.

Using a paper speed equal to 240 cm/hour, the time resolution on
the recording paper is better than the time constant of the equipment,
which is 1 second. The photometer system is described by Sivertsen (2).

A detailed presentation of the monitoring intervals is found in
Table 1, noting all interruptions exceeding 1 minute. The last column
contains weighted mean values with respect to time of σ/I_o. A total
coverage of 20.8 hours resulted in 2 observed flares, the physical
characteristics of which are presented in Table 2, according to Andrews
et. al. (3).

U-band (2mm Schott UG 2) observations of flare no.1 4^m20^s after
maximum give $\Delta m(u)= 0.7 \pm 0.2$ magnitudes, compared to $\Delta m b = 0.09$
magnitudes 15 seconds earlier.

Flare no. 2 was observed in the B-band only. This flare should be
recorded as "suspected". Some minutes after the flare had ended we dis-
covered that the recorder pen was out of position, and this could have
caused a spurious flare. However, there are no unusual recording pre-
ceding the flare.

For flare no. 1 the points of the rising and declining branch of
the light curve was determined by taking 15 seconds and 60 seconds

means of the intensity, respectively. For flare no.2 both rising and
declining branch was constructed from 5 seconds means. As light curve
was taken the best fit to the points, and the smoothed curves are pre-
sented in the figures.
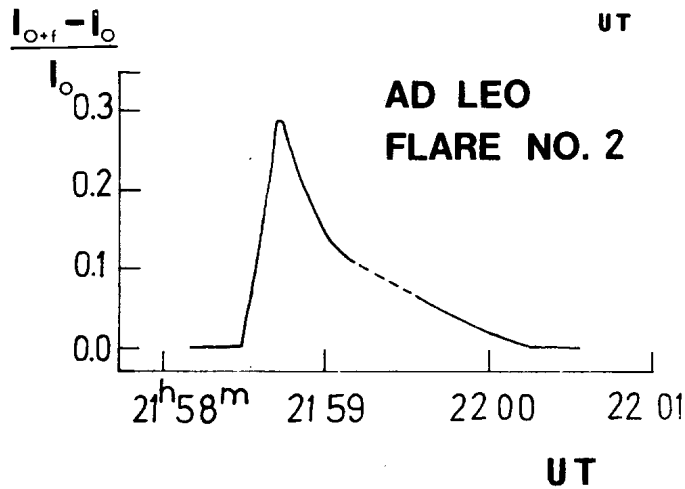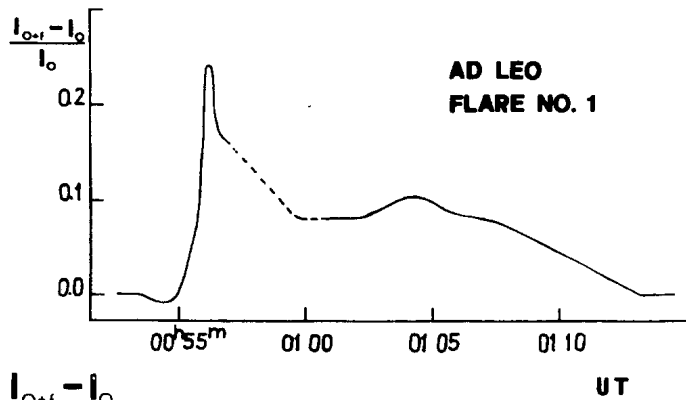
Institute of Theoretical Astrophysics
University of Oslo
P.O. Box 1029,Blindern, Oslo 3.
Norway.

Oslo, May 14, 1973.   B. R. PETTERSEN

                                             B. N. ANDERSEN

Table 1

Monitoring Intervals

Date 1973	Monitoring Intervals UT	Monitoring Time	$<\sigma/I_o>$
Jan. 27	$18^h45^m- 19^h05^m,19\ 11 - 19\ 23,22\ 36 - 23\ 14,$ $23\ 17 - 23\ 27\ ,23\ 31 - 24\ 00.$	1^h49^m	0.10
28	$00\ 00 - 00\ 57\ ,01\ 00 - 01\ 15,01\ 20 - 01\ 28,$ $01\ 31 - 02\ 19\ ,02\ 24 - 03\ 44,03\ 48 - 03\ 58,$ $04\ 01 - 04\ 10\ ,04\ 12 - 04\ 21,04\ 25 - 04\ 54,$ $05\ 00 - 05\ 21\ ,05\ 23 - 05\ 43,05\ 43 - 05\ 51,$ $05\ 52 - 05\ 59$.	5 21	0.09
Feb. 2	$21\ 30 - 21\ 43\ ,21\ 46 - 22\ 13,22\ 27 - 22\ 36,$ $22\ 38 - 22\ 55\ ,22\ 57 - 23\ 00,23\ 04 - 23\ 10,$ $23\ 12 - 23\ 25\ ,23\ 36 - 23\ 49,23\ 54 - 24\ 00.$	1 47	0.10
3	$00\ 04 - 01\ 12\ ,01\ 17 - 02\ 02,02\ 52 - 03\ 08.$	2 09	0.08
4	$18\ 19 - 18\ 28\ ,18\ 31 - 18\ 42,18\ 45 - 18\ 56,$ $18\ 58 - 19\ 00\ ,21\ 37 - 21\ 43,21\ 45 - 21\ 51,$ $21\ 53 - 22\ 00\ ,22\ 02 - 22\ 23,22\ 27 - 22\ 50,$ $22\ 52 - 23\ 35\ ,23\ 37 - 24\ 00.$	2 09	0.07
5	$00\ 00 - 00\ 08\ ,00\ 10 - 01\ 08.$	1 06	0.08
7	$23\ 21 - 23\ 25\ ,23\ 26 - 23\ 31,23\ 36 - 24\ 00.$	33	0.08
8	$00\ 00 - 00\ 16\ ,00\ 18 - 00\ 28,01\ 22 - 01\ 49,$. $01\ 52 - 02\ 00\ ,02\ 12 - 02\ 23,02\ 27 - 04\ 03,$ $04\ 17 - 05\ 00\ ,05\ 02 - 05\ 25,05\ 27 - 05\ 30,$ $05\ 31 - 05\ 33$.	3 59	0.06
9	$18\ 00 - 18\ 21\ ,18\ 55 - 19\ 09,19\ 12 - 19\ 14,$ $19\ 27 - 19\ 41\ ,19\ 50 - 20\ 20.$	1 21	0.14

Total coverage: 20^h47^m

Table 2

Physical Characteristics of the Observed Flares

Flare No.	Date 1973	t_{max} UT	Duration τ_b	τ_a	Maximum Intensity $\frac{I_{o+f}-I_o}{I_o}$	Δ m(b) (mag.)	Stand. dev. σ(b)	Equiv. Energy P(min.)	Air mass X
1	Jan.28	00^h56^m10s	1^m21s	18^m50s	0.24	0.21	0.07	1.45	1.31
2	Feb. 2	21 58 45	15	1 30	0.29	0.28	0.08	0.15	1.43

References:

[1] Chugainov, P.F. Comm.27 IAU, I.B.V.S. No. 744, 1972.
[2] Sivertsen, S. Institute of Theoretical Astrophysics, Blindern-Oslo. Report No. 34, 1972.
[3] Andrews, A.D., Chugainov, P.F., Gershberg, R.E., and Oskanian, V.S. Comm. 27 IAU, I.B.V.S. No.326, 1969.

ERRATA TO I.B.V.S. No.723.

The UT times for EV Lac flare no.2 presented in I.B.V.S. no.723 are 5 minutes wrong. The time interval on the light curve should run from 24^h47^m to 49^m. In table 2 the time of maximum, Max UT, should be $21^h46^m.5$.

B.N. ANDERSEN, B.R. PETTERSEN