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PHOTOELECTRIC OBSERVATIONS OF THE STAR UV Cet IN 1972

Continuous photoelectric monitoring of the flare star UV Cet has been carried out at the Stephanion Observatory ($\lambda = -22^{o}49'44"$, $\phi = +37^{o}45'15"$) during the period of cooperative optical observations of this star proposed by the IAU Working Group on Flare Stars i.e. October 1-15, 1972 (Chugainov, 1971) using the 30-inch Cassegrain reflector of the Department of Geodetic Astronomy, University of Thessaloniki. Observations have been made with a Johnson dual channel photoelectric photometer in the B colour of the international UBV system. The telescope and photometer will be described elsewhere. Here we mention only that the transformation of our instrumental ubv system to the international UBV system is given by the following equations:

$$V = v_o + 0.018(b-v)_o + 1.788,$$
$$B-V = 0.814 + 0.930(b-v)_o,$$
$$U-B = -0.951 + 0.864(u-b)_o.$$

The monitoring intervals in UT as well as the total monitoring time for each night are given in Table I. Any interruption of more than one minute has been noted. In the fourth column of Table I the standard deviation of random noice fluctuation $\sigma(mag) = 2.5\log(I_o+\sigma)/I_o$ for different times (UT) of the corresponding monitoring interval is given.

During the 10.61 hours of monitoring time 7 flares were observed the characteristics of which are given in Table II. For each flare following characteristics (Andrews et al. 1969) are given: a) the date and universal time of flare maximum, b) the duration before and after maximum (t_b and t_a, respectively) as well as the total duration of the flare, c) the value of the ratio $(I_f-I_o)/I_o$ corresponding to flare maximum, where I_o is the intensity deflection less sky background of the quiet star and I_f is the total intensity deflection less sky background of the plus flare, d) the integrated intensity of the flare over its total duration, including pre-flares, if present, $P = \int (I_f-I_o)/I_o dt$,

e) the increase of the apparent magnitude of the star at flare maximum $\Delta m(b) = 2.5 \log(I_f/I_o)$, where b is the blue magnitude of the star in our instrumental system, f) the standard deviation of random noice fluctuation $\sigma(\text{mag}) = 2.5 \log(I_o+\sigma)/I_o$ during the quiet-state phase immediately preceding the beginning of the flare and g) the air mass at flare maximum. The light curves of the observed flares in the b colour are shown in Figs. 1-4.

Following remarks should be added:

1) The characteristics of flare No.5 given in Table II refer to the v colour instead of the b, because this flare occurred when the v magnitude of the star was measured. For the same reason the value of σ(mag) given for this flare in Table II is smaller than the values of σ(mag) given in Table I for the corresponding monitoring interval which also refer to the b colour.

2) Flare No. 7 has been also observed by B. Lovell using the Mk 1A radio telescope at Jodrell Bank working on a frequency of 408MHz. A joint discussion of both the radio and optical observations for this flare has been published already (Lovell et al. 1974).

3) During the time interval October 7, 1972 UT = $00^h50^m10^s$-$00^h50^m41^s$ an interruption of the monitoring at Stephanion was made, in order to check the position of the star in the field of view of the telescope. For this reason no confirmation of the small flare observed by Cristaldi and Rodono (1973) at October 7, 1972 UT = $00^h50^m39^s$ can be made.

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References:

Andrews, A.D., Chugainov, P.F., Gershberg, R.E. and Oskanian, V.S.: 1969, I.B.V.S. No.326

Chugainov, P.F.: 1971, I.B.V.S. No.605

Cristaldi, S., Rodono, M.: 1973, I.B.V.S. No.760

Lovell, B., Mavridis, L.N., Contadakis, M.E.: 1974, Nature 250, 124

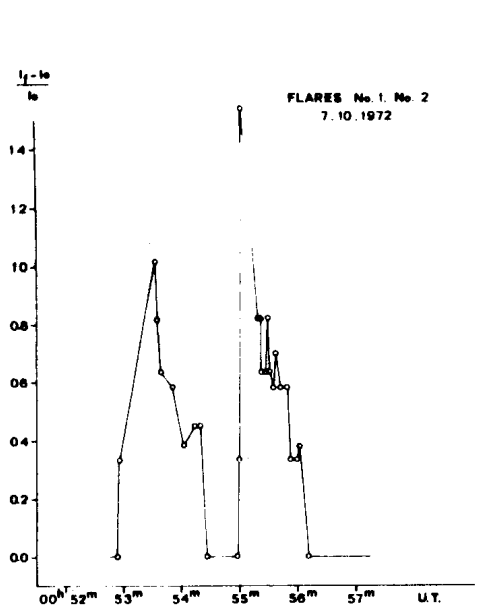
Table I

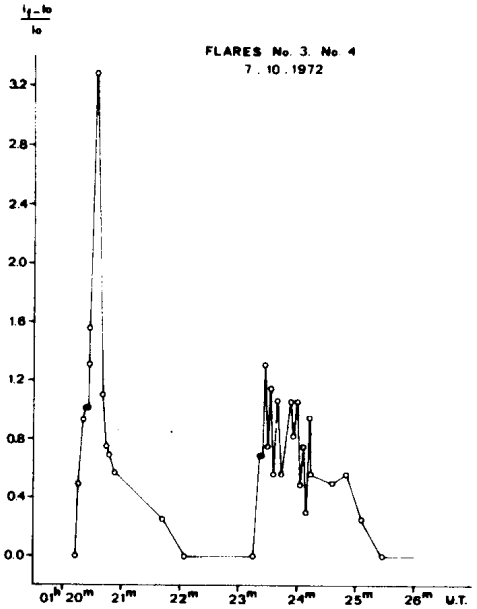
Date 1972 Oct.	Monitoring interval (U.T)	Total Monitoring Time	σ(U.T)
4	21^h31^m-21^h35^m, 2137-2147,2150-2158,	0^h55^m	$0.11(21^h35^m)$
	2200-2232.		$0.13(22^h22^m)$
6-7	2121-2132,2133-2148,2150-2208,		$0.14(21^h25^m)$
	2209-2229,2231-2247,2250-2309		$0.11(22^h00^m)$,0.11 (22^h35^m)
	2320-2348,2349-0019,0021-0100,		
	0102-0116,0117-0131,0133-0146		$0.13(24^h00^m)$,$0.10(00^h30^m)$
	0149-0202,0204-0213,0216-0224	4^h27^m	$0.12(00^h55^m)$,$0.11(01^h20^m)$
			$0.18(01^h58^m)$,$0.27(2^h21^m)$
10-11	2049-2102,2103-2125,2126-2131,2133-2150		$0.14(20^h50^m)$,$0.13(21^h30^m)$
	2151-2206,2207-2222,2223-2243,2249-2302		$0.12(22^h00^m)$,$0.12(22^h30^m)$
	2342-2348,0010-0022,0024-0034.	2^h28^m	$0.10(23^h00^m)$,$0.08(23^h40^m)$
			$0.12(00^h24^m)$
11-12	2118-2128,2130-2136,2138-2232,2234-2243,		$0.11(21^h20^m)$,$0.14(22^h00^m)$
	2244-2257,0049-0100,0103-0135.	2^h24^m	$0.14(22^h45^m)$,$0.14(00^h52^m)$
			$0.14(01^h23^m)$
12	2320-2332,2335-2346	0^h23^m	$0.10(21^h25^m)$.
	Total	10^h37^m	

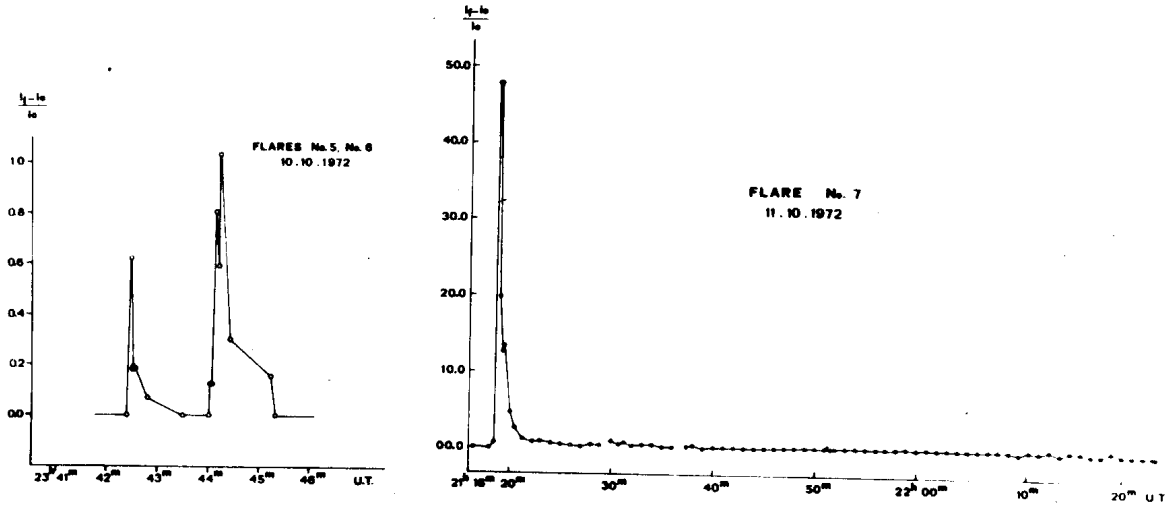
Table II

Characteristics of the Flares Observed

Flare No.	Date 1972 Oct.	U.T. max.	t_b min.	t_a min.	Duration min.	$(I_f-I_o)/I_o$ max.	P min.	Δm mag	σ mag	Air mass.
1	7	$00^h53^m32^s.4$	0.64	0.80	1.44	1.02	0.65	0.76	0.12	2.10
2	7	$00^h55^m1^s.0$	0.08	1.14	1.22	1.53	0.59	1.01	0.12	2.10
3	7	$01^h20^m32^s.8$	0.32	1.58	1.90	3.28	1.57	1.58	0.11	2.32
4	7	$01^h23^m27^s.0$	0.20	2.00	2.20	1.30	0.90	1.33	0.11	2.33
5	10	$23^h42^m27^s.0$	0.05	1.00	1.05	0.62	0.05	0.53	0.07	1.85
6	10	$23^h44^m13^s.3$	0.16	1.08	1.24	1.03	0.46	0.77	0.08	1.85
7	11	$21^h18^m53^s.3$	0.67	65.11	65.78	>47.78	>29.46	>4.55	0.11	1.95


$\frac{I_f - I_o}{I_o}$
FLARES No. 1. No. 2
7.10.1972
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
00h 52m 53m 54m 55m 56m 57m U.T.


$\frac{I_f - I_o}{I_o}$
FLARES No. 3. No 4
7.10.1972
3.2
2.8
2.4
2.0
1.6
1.2
0.8
0.4
0.0
01h 20m 21m 22m 23m 24m 25m 26m U.T.


$\frac{I_f - I_o}{I_o}$
FLARES No. 5, No. 6
10.10.1972
1.0
0.8
0.6
0.4
0.2
0.0
23h 41m
42m
43m
44m
45m
46m
U.T.
$\frac{I_f - I_o}{I_o}$
50.0
40.0
30.0
20.0
10.0
00.0
FLARE No. 7
11.10.1972
21h 18m 20m
30m
40m
50m
22h 00m
10m
20m U T