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PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR BY Dra IN 1975

Continuous photoelectric monitoring of the flare star BY Dra has been carried out at the Stephanion Observatory ($\lambda = -22^{\circ}49'44''$, $\varphi = +37^{\circ}45'15''$) during the year 1975, 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:

for the time interval from 5-2-1975 to 24-6-1975

$$V = v_{\circ} + 0.001(b-v)_{\circ} + 2.278$$

$$(B-V) = 0.908 + 1.037(b-v)_{\circ}$$

$$(U-B) = -1.895 + 1.031(u-b)_{\circ}$$

for the time interval from 25-6-1975 to 30-7-1975

$$V = v_{\circ} + 0.119(b-v)_{\circ} + 2.163$$

$$(B-V) = 0.819 + 1.047(b-v)_{\circ}$$

$$(U-B) = -1.509 + 1.006(u-b)_{\circ}$$

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 noise fluctuation $\sigma(\text{mag}) = 2.5 \log(I_{\circ} + \sigma) / I_{\circ}$ for different times (UT) of the corresponding monitoring intervals is given.

During the 22.27 hours of monitoring time one flare was observed the characteristics of which are given in Table II. For this flare following characteristics (Andrews et al. 1969) are given: a/ the date and universal time of flare maximum, b/ the duration before and after the maximum (t_b and t_a , respectively),

Table I

Monitoring intervals in 1975

Date	Monitoring intervals (UT)	Total monitoring time	σ (UT)
1975			
June			
20	21 ^h 59 ^m -22 ^h 28 ^m , 22 ^h 32 ^m -23 ^h 01 ^m	1 ^h 04 ^m	0.01(22 ^h 15 ^m), 0.002(22 ^h 51 ^m).
21-22	23 05 -23 11, 23 44 -23 55, 00 04 -00 18, 00 22 -00 57, 01 01 -01 25.	1 24	0.01(23 46), 0.01(00 25), 0.01(01 03).
26-27	23 36 -00 02, 00 06 -00 40, 00 44 -01 18.	1 34	0.01(23 38), 0.01(00 08), 0.01(00 46).
29-30	19 56 -20 23, 20 26 -20 44, 20 57 -21 30, 23 05 -23 34, 23 37 -24 00, 00 04 -00 29, 00 43 -01 07, 01 10 -01 37.	3 26	0.01(19 59), 0.01(20 29), 0.01(20 59), 0.002(23 08), 0.01(23 40), 0.01(00 08), 0.01(01 00), 0.01(01 12).
June-July			
30-1	20 26 -20 57, 21 00 -21 27, 21 30 -22 02, 23 27 -00 01, 00 04 -00 36, 00 39 -01 25.	3 22	0.01(20 27), 0.01(21 03), 0.01(21 33), 0.01(23 30), 0.01(00 05), 0.01(00 41).
July			
1-2	21 32 -22 00, 22 04 -22 34, 22 37 -22 48, 22 51 -23 07, 23 21 -23 50, 23 54 -00 26, 00 30 -00 50, 01 04 -01 24.	3 06	0.02(21 41), 0.01(22 30), 0.02(22 58), 0.01(23 37), 0.01(00 10), 0.01(00 32), 0.01(01 17).
3-4	20 30 -20 57, 21 16 -21 38, 21 42 -22 15, 22 30 -22 58, 23 02 -23 12, 23 19 -23 23, 23 26 -23 59, 00 21 -00 48, 00 51 -01 24.	3 37	0.01(20 33), 0.01(21 19), 0.01(21 45), 0.01(22 32), 0.01(23 41), 0.01(00 26), 0.01(01 10).
6-7	20 59 -21 28, 21 34 -22 01, 22 04 -22 35, 23 49 -00 24, 00 28 -00 57, 01 00 -01 21.	2 52	0.01(21 00), 0.003(21 38), 0.003(22 23), 0.01(23 54), 0.01(00 30), 0.01(01 15).
7	21 33 -21 59, 22 14 -22 43, 22 47 -23 11, 23 14 -23 46.	1 51	0.01(21 50), 0.01(22 20), 0.01(23 05), 0.01(23 23).
Total: 22 ^h 16 ^m =22 ^h 27			

Table II

Characteristics of the flare observed

Flare No	Date	U.T.	t_b	t_a	Duration	$\frac{I_f - I_0}{I_0}$	P	Δm	σ	Air mass
		max	min	min	min	max	min	mag	mag	
1	July 1	22 ^h 38 ^m .92	0.51	3.89	4.40	0.19	0.21	0.19	0.01	1.92

as well as the total duration of the flare, c/ the value of the ratio $(I_f - I_0)/I_0$ corresponding to flare maximum, where I_0 is the intensity deflection less sky background of the quiet star and I_f is the total intensity deflection less sky background of the star plus flare, d/ the integrated intensity of the flare over its total duration including pre-flares, if present, $P = \int (I_f - I_0)/I_0 dt$,

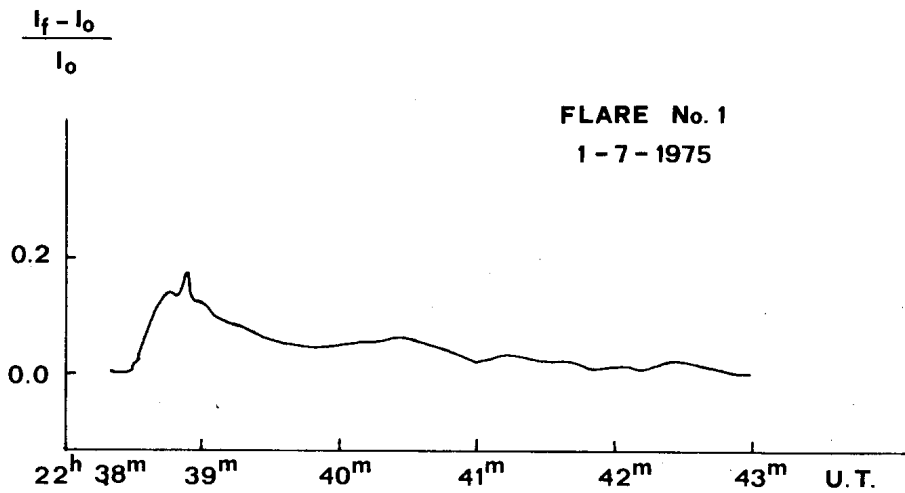


Figure 1

e/ the increase of the apparent magnitude of the star at flare maximum $\Delta m(b) = 2.5 \log(I_f/I_0)$, where b is the blue magnitude of the star in the instrumental system, f / the standard deviation of random noise fluctuation $\sigma(\text{mag}) = 2.5 \log(I_0 + \sigma)/I_0$ during the quiet-state phase immediately preceding the beginning of the flare and g / the air mass at flare maximum. The light curve of the observed flare in the b colour is shown in Fig. 1.

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