

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1654

Konkoly Observatory
Budapest
1979 August 1

PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR UV Cet IN 1974, 1975

Continuous photoelectric monitoring of the flare star UV Cet has been carried out at the Stephanion Observatory ($\lambda = -22^{\circ}49'44''$, $\varphi = +37^{\circ}45'15''$) during the years 1974, 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:

$$\begin{aligned}V &= v_0 - 0.018(b-v) + 2.297, \\(B-V) &= 0.886 + 1.004(b-v)_0, \\(U-B) &= -1.818 + 0.974(u-b)_0.\end{aligned}$$

The monitoring intervals in UT as well as the total monitoring time for each night are given in the Tables Ia, Ib. Any interruption of more than one minute has been noted. In the fourth column of Tables Ia, Ib the standard deviation of random noise fluctuation $\sigma(\text{mag}) = 2.5 \log(I_0 + \sigma)/I_0$ for different times (UT) of the corresponding monitoring intervals is given.

During the 41 hours of the monitoring time 23 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 the maximum (t_b and t_a , respectively), as well as the total duration of the flare, c) the value of the ratio $(I_f - I_0)/I_0$ 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

Table Ia
Monitoring Intervals in 1974

Date 1974	Monitoring Intervals (U.T.)	Total Monitoring Time	σ (U.T.)
Sept.			
11	00 ^h 02 ^m -00 ^h 26 ^m ,0029-0057,0100-0131, 0134-0200.	1 ^h 49 ^m	0.10 (00 ^h 40 ^m), 0.09 (00 ^h 39 ^m), 0.09 (01 15).
15	0014-0045,0048-0117,0210-0227,	1 17	0.08(00 18),0.06 (00 54),0.08(02 12).
16	0019-0049,0052-0120,0123-0149	1 24	0.09(00 28),0.11 (00 59),0.10(01 30).
17-18	2338-0005,0007-0035,0037-0105, 0107-0134	1 50	0.07(23 47),0.06 (00 11),0.05(00 46) 0.07(01 16).
18-19	2359-0029,0031-0059,0101-0129, 0131-0215	1 10	0.06(00 03),0.06 (00 36),0.06(01 06) 0.07(01 34).
19-20	2312-2339,2341-0012,0013-0043 0049-0117,0122-0155	2 29	0.11(23 14),0.08 (23 47),0.07(00 17) 0.08(00 52),0.10(01 27).
Oct.			
8-9	2115-2143,2145-2213,2216-2248, 2300-2328,2330-2358,0000-0016, 0020-0028,0038-0105,0108-0136, 0138-0148,0150-0202,0216-0224, 0227-0232,0235-0242,0245-0300.	4 40	0.07(21 16),0.11(21 45), 0.08(22 13),0.10(22 48), 0.16(23 00),0.16(23 30), 0.13(00 10),0.19(00 28), 0.17(00 38),0.14(01 05), 0.21(00 36),0.25(02 16), 0.20(02 45).
9-10	2114-2141,2143-2211,2213-2249, 2258-2328,2330-2400,0003-0020, 0021-0026,0037-0056,0100-0109, 0111-0138,0140-0202,0216-0226, 0228-0234,0238-0252,0254-0259.	4 45	0.08(21 17),0.08(21 46), 0.06(22 15),0.09(22 46), 0.11(23 28),0.10(00 08), 0.14(00 22),0.13(01 13), 0.15(01 55),0.19(02 16), 0.18(02 40).
11-12	2303-2331,2333-2400,0000-0002, 0005-0041,0052-0121,0125-0144, 0146-0154,0156-0219,0224-0232, 0234-0253.	3 19	0.12(23 03),0.07(23 35), 0.09(00 07),0.12(00 52), 0.11(01 25),0.14(01 54), 0.29(02 26).
16	2048-2112,2115-2130,2132-2141.	0 48	0.10(20 48),0.13(21 17).
17-18	2152-2217,0002-0025,0027-0049, 0053-0118,0131-0156,0159-0206, 0208-0223.	2 22	0.08(21 52),0.07(22 17), 0.08(00 03),0.08(00 29), 0.09(00 54),0.11(01 32), 0.16(02 00),0.16(02 21).
18-19	2248-2315,2317-2343,2345-2400, 0000-0012,0027-0052,0055-0124, 0127-0146.	2 33	0.10(22 52),0.08(23 21), 0.08(23 47),0.08(00 10), 0.11(00 27),0.12(00 56), 0.11(01 37).
21-22	2103-2131,2133-2159,2201-2234, 2245-2313,2316-2352,2354-0008.	2 45	0.08(21 03),0.06(21 33), 0.08(22 03),0.07(22 32), 0.06(23 11),0.09(23 37), 0.09(23 58).
	Total	31 ^h 11 ^m	

Table Ib
Monitoring Intervals in 1975

Date 1975	Monitoring Intervals (U.T.)	Total Monitoring Time	σ (U.T.)
January			
4	18 ^h 08 ^m -18 ^h 36 ^m , 1840-1845, 1847-1908 1911-1936, 1946-1951.	1 ^h 24	0.09 (18 ^h 09 ^m), 0.07 (18 41), 0.07 (19 15).
5	1731-1758, 1801-1831, 1835-1854, 1910-1941, 1944-1955, 1957-2006, 2009-2015, 2018-2027, 2030-2037, 2053-2059, 2103-2106.	2 38	0.07 (17 53), 0.06 (18 20), 0.06 (18 48), 0.09 (19 27), 0.08 (20 00), 0.08 (20 22), 0.15 (20 55).
6	1742-1814, 1816-1847, 1849-1922, 1932-1949, 1952-2005, 2008-2018, 2020-2032, 2038-2054.	2 44	0.08 (17 51), 0.08 (18 05), 0.08 (18 40), 0.07 (19 05), 0.19 (19 56), 0.11 (20 28), 0.11 (20 48).
7	1721-1750, 1753-1827, 1830-1907, 1919-1945, 1949-2013, 2015-2048.	3 03	0.07 (17 23), 0.06 (17 50), 0.07 (18 26), 0.07 (19 06), 0.11 (19 44), 0.12 (02 15).
	Total	<u>9^h49^m</u>	

TABLE II

Characteristics of the Flares Observed

Flare No.	Date	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
1974										
September										
1	11	01 ^h 18 ^m .9	0.7	10.1	10.8	8.01	9.37	2.39	0.09	1.80
2	11	01 44 .6	9.6	14.0	23.6	0.93	7.46	0.71	0.09	1.86
3	17	23 48 .9	0.2	0.3	0.5	0.68	0.08	0.56	0.07	1.80
October										
4	8	21 19 .95	0.57	3.36	3.93	1.07	0.65	0.79	0.07	2.02
5	8	23 14 .6	0.2	0.5	0.7	0.61	0.12	0.52	0.16	1.78
6	9	22 34 .65	0.21	2.19	2.40	0.84	0.63	0.66	0.08	1.79
7	10	00 22 .3	0.8	2.7	3.5	0.66	0.60	0.55	0.14	1.97
8	10	01 55 .35	0.14	3.10	3.24	2.29	1.38	1.29	0.15	2.96
9	18	23 47 .8	0.15	1.6	1.75	1.80	0.41	1.12	0.08	1.96
10	19	00 27 .6	0.5	1.5	2.0	0.75	0.48	0.61	0.11	2.24
11	19	01 37 .7	0.3	9.2	9.5	5.41	6.07	2.02	0.10	3.38
12	21	23 37 .65	3.4	10.3	13.7	0.86	3.37	0.67	0.09	1.97
13	21	23 58 .0	0.1	3.4	3.5	1.84	0.52	1.13	0.09	2.08
1975										
January										
14	4	18 18 .5	8.5	15.7	24.2	4.50	9.37	1.85	0.09	1.88
15	5	18 03 .65	1.65	2.35	4.1	0.29	0.45	0.27	0.07	1.85
16	5	18 50 .4	0.7	0.7	1.4	0.29	0.11	0.27	0.06	2.05
17	5	19 30 .0	0.1	15.0	15.1	0.65	(2.25)	0.54	0.09	2.37
18	6	17 53 .1	0.1	0.2	0.3	0.54	0.06	0.47	0.08	1.83
19	6	18 6 .5	0.1	2.5	2.6	1.52	0.27	1.00	0.08	1.87
20	6	20 21 .35	0.1	1.5	1.6	0.65	0.24	0.54	0.11	3.33
21	6	20 29 .05	0.1	1.7	1.8	1.09	0.28	0.80	0.11	3.56
22	7	18 42 .0	0.2	0.9	1.1	0.65	0.24	0.54	0.08	2.05
23	7	20 21 .2	0.1	21.3	21.4	28.34	54.34	3.67	0.12	3.44

total duration, including pre-flare, if present, $p = \int (I_f - I_0) / I_0 dt$,
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 curves of the observed flares in the b colour are shown in Figs. 1-23.

M.E. CONTADAKIS, G. KAREKLIDIS
L.N. MAVRIDIS, D. STAVRIDIS, A.C. TSIUMIS
Department of Geodetic Astronomy
University of Thessaloniki

Reference:

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











