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

Number 1356

Konkoly Observatory
Budapest
1977 October 24

PHOTOELCETRIC OBSERVATIONS OF THE FLARE STAR BD+55°1823 in 1974

Continuous photoelectric monitoring of the flare star BD+55°1823 has been carried out at the Stephanion Observatory (λ=-22°49'44" φ=+37°45'15") during the year 1974 using the 30inch 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:

$$V = v_o+0.053(b-v)_o+2.380,$$
$$(B-V)= 0.858 + 1.043(b-v)_o,$$
$$(U-B)=-1.782 + 1.020(u-b)_o.$$

The monitoring intervals in UT as well as the total monitoring time for each night are given in the 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 $\sigma(mag)=2.5 \log(I_o+\sigma)/I_o$ for different times (UT) of the corresponding monitoring intervals is given.

During the 39.42 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), 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

Table I

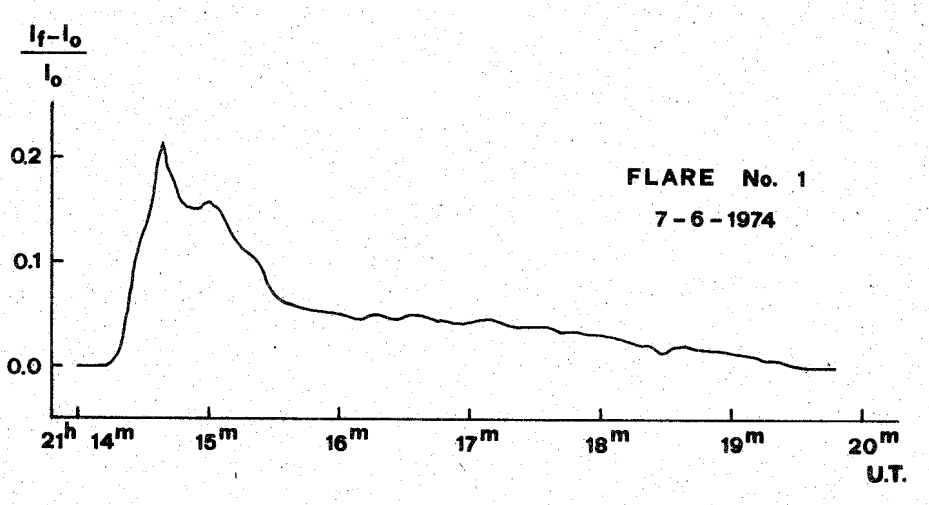
Date 1974 June	Monitoring Intervals (U.T.)	Total Monitoring Time	σ(U.T.)
5	20^h34^m-21^h03^m, 21^h07^m-21^h35^m, 2138-2208, 2257-2325.	1^h55^m	0.03(20^h40^m), 0.02 (21 23), 0.03(21 57), 0.03(23 13).
7-8	2004-2030, 2035-2107, 2110-2121, 2125-2139, 2254-2324, 2327-2358, 0001-0020.	2 43	0.02(20 12), 0.02 (20 57), 0.02(21 11), 0.02(23 11), 0.02 (23 48), 0.02(00 13).
9-10	2046-2112, 2116-2148, 2151-2213, 2231-2300, 2303-2327, 2331-2342, 2344-0015.	2 55	0.02(21 01), 0.02 (21 33), 0.02(22 02), 0.02(22 46), 0.02 (23 18), 0.02(00 01).
11-12	2149-2216, 2219-2248, 2251-2326, 2341-0019.	2 09	0.02(22 07), 0.02 (22 33), 0.02(23 14), 0.02(00 03).
13	2031-2058, 2101-2129.	0 55	0.01(20 41), 0.02 (21 21).
14-15	2018-2047, 2050-2121, 2320-2351, 2354-0006, 0011-0023, 0025-0052, 0106-0131.	2 47	0.01(20 28), 0.01 (21 07), 0.01(23 30), 0.02(00 14), 0.01 (00 36), 0.02(01 17).
15-16	2055-2122, 0015-0045, 0049-0123.	1 31	0.01(21 07), 0.02 (00 28), 0.02(01 05).
17-18	2117-2141, 2147-2218, 2225-2236, 2239-2250, 2303-2334, 2338-2348, 2351-0001, 0006-0025, 0028-0038.	2 37	0.01(21 32), 0.01 (22 01), 0.02(22 41), 0.02(23 26), 0.02 (23 45), 0.01(00 29).
19-20	2211-2239, 2242-2255, 2257-2308, 2313-2323, 2326-2332, 2334-2344, 2356-0010.	1 32	0.01(22 20), 0.01 (23 00), 0.02(23 36), 0.02(00 08).
20-21	2103-2129, 2131-2152, 2154-2200, 2236-2351, 2353-2400, 0002-0038, 0041-0056, 0059-0115.	2 32	0.01(21 12), 0.01 (21 45), 0.01(23 36), 0.01(00 12), 0.01 (00 53).
24-25	2005-2035, 2038-2043, 2047-2109, 2158-2219, 2222-2231, 2235-2302, 2306-2334, 2355-0023, 0026-0033.	2 57	0.01(20 21), 0.01 (20 54), 0.01(22 13), 0.01(22 56), 0.01 (23 27), 0.01(00 19).
25-26	2017-2021, 2022-2057, 2158-2222, 2225-2248, 2250-2300, 2303-2315, 2317-2329, 2331-2333, 2343-2400, 0002-0008, 0011-0037.	2 51	0.01(20 33), 0.01 (22 08), 0.01(22 40), 0.01(23 19), 0.01 (23 52), 0.01(00 24).
26-27	2033-2107, 2151-2221, 2223-2245, 2247-2253, 2311-2338, 2341-2350, 2352-0006, 0010-0028, 0030-0039.	2 49	0.01(20 52), 0.01 (22 02), 0.01(22 36), 0.01(23 21), 0.01 (23 54), 0.01(00 20).
27	2149-2220, 2222-2233.	0 42	0.02(22 05).

Table I (cont.)

Date 1974 June	Monitoring Intervals (U.T.)	Total Monitoring Time	σ(U.T.)
30	20^h10^m-20^h43^m, 20^h45^m-21^h19^m, 2158-2210, 2212-2232, 2251-2321, 2325-2334, 2336-2343.	2^h25^m	0.01(20^h31^m), 0.02 (21 01), 0.02(22 15), 0.02(23 04), 0.02 (23 31).
July 1-2	2014-2042, 2045-2113, 2154-2225, 2236-2258, 2300-2308, 2310-2332, 2334-2340, 2342-2349, 2352-0004, 0006-0017, 0022-0030.	3 03	0.02(20 30), 0.02 (21 05), 0.03(22 07), 0.03(22 50), 0.02 (23 24), 0.02(23 54), 0.02(00 24).
2-3	2023-2059, 2139-2208, 2211-2233, 2236-2242, 2252-2316, 2317-2325, 2328-2345, 2347-2355, 0002-0024, 0025-0035.	3 02	0.02(20 39), 0.03 (21 57), 0.02(22 27), 0.02(23 06), 0.03 (23 38), 0.02(00 15).
		Total 39^h25^m	

Table II
Characteristics of the Flare Observed

Flare	Date 1974 June	U.T. max.	t_b min.	t_a min.	Duration min.	$\frac{(I_f-I_o)}{I_o}$ max.	P, min.	Δm mag.	σ mag.	Air mass
1	7	$21^h14^m38^s.4$	0.44	5.00	5.44	0.21	0.29	0.21	0.02	1.06



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, $p = \int(I_f-I_o)/I_o dt$, 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 the instrumental system, f) the standard deviation of random noise fluctuation $\sigma(mag)=2.5\log(I_o+\sigma)/I_o$ during the quiet - state phase immediately preceding the beginning of the flare and g) the air mass at flare maximum. The light curve of the observed flare in the b colour is shown in Fig.1.

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