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PHOTOELECTRIC OBSERVATIONS OF THE FLARE STARS

BD+13°2618 and BD+16°2708

Continuous photoelectric monitoring of the flare stars BD+13°2618 and BD+16°2708 has been carried out at the Stephanon Astronomical Station ($\lambda=-22^{\circ}49'44''$, $\phi=+37^{\circ}45'15''$) during the period May 7-14, 1972 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 color 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:

$$V=v-0.001(b-v)+2.040,$$

$$B-V=0.844+1.031(b-v),$$

$$U-B=-1.182+0.966(u-b).$$

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.

During the 9.45 hours of monitoring time of the star BD+16°2708 one flare was observed. Only one flare was also observed during the 12.44 hours of monitoring time of the star BD+13°2618. The characteristics of these two flares are given in Table 2. 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 $(I_f - I_0)/I_0$ 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, $P = \int (I_f - I_0) / I_0 dt$, 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 our instrumental system, f) the standard deviation of random noise fluctuation $\sigma(\text{mag}) = 2.5 \log(I_0 + \sigma) / I_0$ and g) the air mass. The light curves of the observed flares in the b color are shown in Figs. 1-2.

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References

Andrews, A.D., Chugainov, P.F., Gershberg, R.E., and Oskanian, V.S.
 1969, Comm.27 IAU, Inf.Bull.Var.Stars No. 326.

TABLE 1
 Monitoring intervals(UT)

Star	Date 1972 MAY	Monitoring intervals	Total Monitoring Time
BD+16°2708	7-8	20 ^h 46 ^m -20 ^h 54 ^m , 2056-2109, 2112-2138, 2140-2206, 2212-2243, 2245-2313, 2315-2336, 2342-2345, 2347-0013, 0015-0042, 0044-0115, 0117-0200,	4 ^h 43 ^m
	11-12	2324-2331, 2344-0007, 0009-0028.	49 ^m
	13-14	1923-1936, 1937-1957, 1958-2040, 2045-2202, 2204-2302, 2304-2340, 2357-0044, 0046-0106	4 ^h 13 ^m
		Total	9 ^h 45 ^m
BD+13°2618	9-10	2059-2122, 2124-2156, 2157-2226, 2231-2301, 2303-2330, 2333-2358, 0000-0005, 0007-0011, 0017-0031, 0034-0102, 0103-0158.	4 ^h 32 ^m
	11	1953-2022, 2024-2053, 2055-2127, 2133-2147, 2203-2230, 2232-2300, 2304-2307.	2 ^h 42 ^m
	12-13	1941-2007, 2008-2035, 2037-2103, 2106-2150, 2202-2300, 2304-0000, 0007-0059, 0104-0145.	5 ^h 30 ^m
		Total	12 ^h 44 ^m

TABLE 2
 Characteristics of the flares observed

Star BD	Date 1972 May	UT max.	t_b min.	t_a min.	Du- ra- tion min.	$\frac{I_f - I_0}{I_0}$ max.	P min.	Δm mag.	σ mag.	Air Mass
+13°2618	12	22 ^h 00 ^m .3	0.4	4.0	4.4	0.15	0.17	0.15	0.01	1.24
+16°2708	13	22 ^h 34 ^m .0	0.5	4.9	5.4	0.26	0.38	0.25	0.01	1.09

