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PHOTOGRAPHIC UVB PHOTOMETRY OF FLARE STARS
IN THE GAMMA CYGNI REGION

The observations in the investigated $4^{\circ} \times 4^{\circ}$ area in Cygnus (central star BD+40^o4165 with coordinates R.A. 1950 = 20^h24^m35^s and D. 1950 = 41^o12'52") were initiated in view of the presence of some young objects appearing as active star formation indicators. The close relationship between the T Tau stars, H α emission stars and flare stars is already well established. Thus one can expect the presence of flare stars in every group containing T Tau stars and related objects. In the investigated region only two probable UV Cet type stars were known - V 1381 Cyg and LD21 (Dahlmark, 1982) up to our special searches for flare stars. Fifteen new flare stars were discovered (Melikian et al., 1980, Tsvetkova, 1980, 1982, Tsvetkova et al., 1983).

The identification charts of the discovered flare stars obtained from the E-print of the Palomar Observatory Sky Survey Atlas are presented in Figure 1. Where the nebulae worsen the visibility of the stars the O-print is used. On these charts, north is at the top, east is to the left.

The photometric observations were made with the 40"/52" Schmidt telescope of the Byurakan Astrophysical Observatory in September, 1980. The photometry was carried out with an Ascania iris photometer. Doing the photometry, we adopted the existing photoelectric standards in the association Cygnus OB2 and the photographic standards in the region of the nebula IC 5070. The second photographic standards in this region are in the interval 11.6^m - 18.3^m (V). The presence of dark and emission nebulae in the investigated region requires to determine the influence of the uneven background. The mean quadratic errors are respectively $\pm 0.10^m(V)$, $\pm 0.09^m(B)$, $\pm 0.10^m(U)$.

In Table I the results from the UVB photographic photometry of the flare stars in quiet state (minimum of the brightness) are given.

The designation of the flare stars is according to the General Catalogue of Variable Stars (Kholopov et al., 1985) and to the 67th Name-List of Variable Stars (Kholopov et al., 1985).

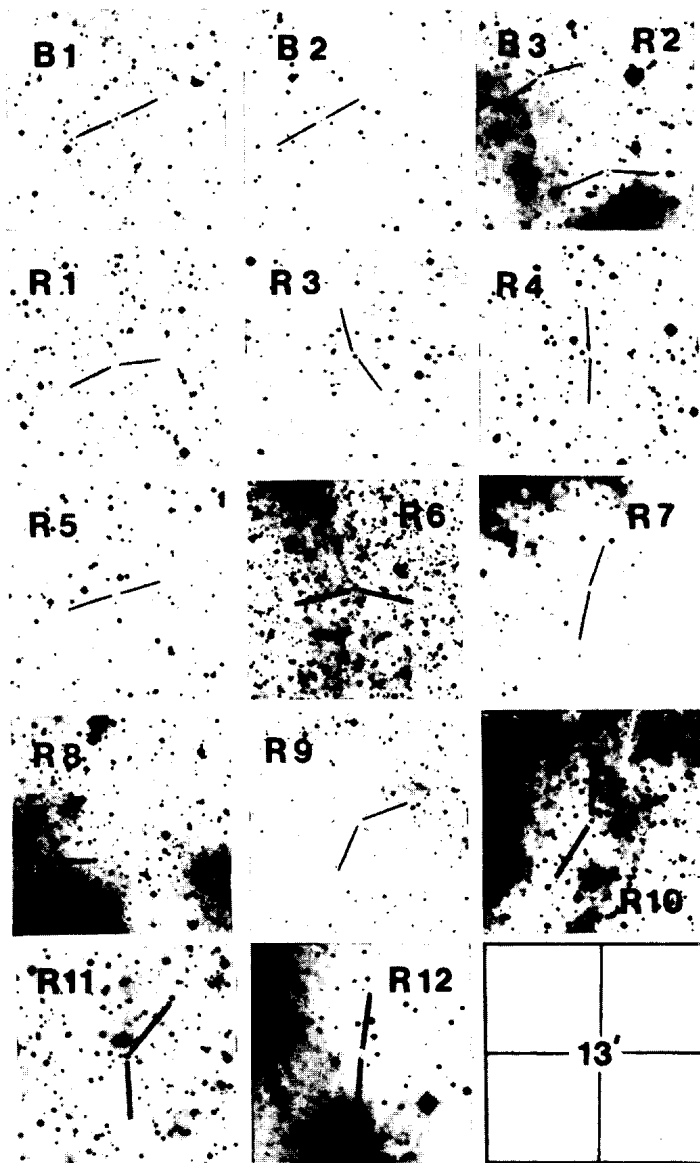


Figure 1

Table I

Name	V	B-V	U-B
V1695Cyg	16. ^m 03	1. ^m 23	1. ^m 02
V1750Cyg	17.39	0.76	0.14
V1752Cyg	17.90	-	-
V1753Cyg	17.74	-	-
V1754Cyg	17.60	0.85	-
V1755Cyg	15.44	1.37	0.99
V1756Cyg	17.79	-	-
V1757Cyg	18.02	-	-
V1772Cyg	15.76	2.17	-
V1778Cyg	16.42	0.87	0.33
V1779Cyg	16.61	0.97	0.73
V1780Cyg	17.82	1.31	-
V1781Cyg	15.19	1.09	0.71
V1785Cyg	15.52	1.34	0.92

Table II

Name	B _{POSS}	B-V _{POSS}
V1752Cyg	20. ^m 00	2. ^m 10
V1753Cyg	19.55	1.75
V1756Cyg	21.00	3.20
V1757Cyg	21.00	3.00
V1777Cyg	21.00	2.20

Table III

Name	Date of flare-up	Telescope	m _U (min)	Δm _U
V1695Cyg	12 Sept. 1977	40"/52"	18. ^m 28	2. ^m 16
V1750Cyg	13 Sept. 1980	"-	18.29	3.34
V1752Cyg	29 Oct. 1980	20"/28"	21.00*	5.40
V1753Cyg	18 June 1980	"-	20.55*	4.78
V1754Cyg	12 Sept. 1980	40"/52"	19.45*	3.33
V1755Cyg	15 Aug. 1980	20"/28"	17.80*	1.50
V1756Cyg	16 Aug. 1980	"-	22.00*	6.24
V1757Cyg	17 July 1980	"-	22.00*	6.10
V1772Cyg	19 Sept. 1981	"-	18.93*	2.13
V1777Cyg	17 Sept. 1982	"-	22.00*	6.32
V1778Cyg	27 Aug. 1981	"-	17.62	1.50
V1779Cyg	03 Aug. 1981	"-	18.31	3.05
"-	20 Sept. 1981	"-	"-	3.19
V1780Cyg	03 June 1981	"-	20.13*	4.22
V1781Cyg	31 July 1981	"-	16.99	1.31
V1785Cyg	29 Aug. 1981	"-	17.78	1.62

* The stellar magnitudes are obtained on the basis of the approximate relation $(U-B)_{\min} = +1$.

The magnitudes of the flare stars fainter than the limit of the photometric plates were obtained by measuring the diameters of the stellar images on the POSS prints with a mean quadratic error of $\pm 0.17^m$ in the magnitude interval $17^m-21^m(B_{POSS})$ (Table II).

A summary of the flare-ups is given in Table III.

In some cases there are differences reaching one magnitude between the stellar magnitudes in the maximum brightness given earlier and estimated now. The reason is in the higher accuracy of the estimation of stellar magnitudes with an iris photometer and in the determination of the influence of the uneven background.

We obtained V- and B-magnitudes of V1381 Cyg, a probable UV Cet type star (Romano, 1969). The star shows rapid changes in the V-light from 16.95^m to 18.30^m and in the B light with a smaller amplitude from 18.33^m to 18.97^m . It is not clear whether these are short time scale irregular changes of the brightness or flare-ups because the star is below the limit on our patrol U-plates.

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