

COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Number 5460

Konkoly Observatory
Budapest
13 October 2003

HU ISSN 0374 – 0676

**STRÖMGREN PHOTOMETRY OF THE BE STAR θ CrB:
VARIABLE AGAIN IN 2003**

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The Be star θ Coronae Borealis (= HR 5778 = HD 138749) has experienced periods of both activity and inactivity (see, e.g., Percy et al., 1988 and Percy & Attard, 1992). Fabregat & Adelman (1998), Adelman (1999), Percy & Bakos (2001), and Adelman (2002) presented photometry of this star from 1994 to 2002 at which time neither short term periodic variability with an amplitude ≥ 0.005 mag. nor long term variations ≥ 0.01 mag. were seen. Further in this period the Hipparcos observations of θ CrB show no evidence of short-term variability (Percy et al., 2002). Guerrero et al.'s (1992) observations obtained in 1989 show that this star was then in an active phase. But no data taken between 1990 and 1993 has appeared yet in the literature. Rivinius, Stefl, Stahl, & Baade (2003) recently reported that their spectroscopic observations of θ CrB indicate that it has become active again. Photometry reported in this contribution confirms this conclusion. Harmanec (1983) suggested that θ CrB might be a long period spectroscopic binary based on 19 published radial velocity measurements during the period 1904-1979. McAlister and his associates have obtained speckle observations of this star (e.g., McAlister et al., 1993).

The Four College Automated Photometric Telescope (FCAPT) began its 2002-03 observing season in February 2003 as its photometer had to be replaced. Sixty sets of u, v, b, and y measures were obtained. The observing sequences and the comparison (HD 136849 = 50 Boo) and check (HD 135502 = 48 χ Boo) stars were the same as in Adelman (1999), namely after obtaining the dark count, the telescope measures in each filter the sky-ch-c-v-c-v-c-v-c-ch-sky where sky is a reading of the sky, ch of the check star, c of the comparison star, and v of the variable star. The new photometer uses four new neutral density filters differing by 1.25 magnitudes while the old photometer used 2.5 magnitude neutral density filters. This photometry has a 1.25 mag neutral density filter difference between the variable and the comparison and check stars while previous values had a 2.5 mag neutral density difference. The c-ch values have not changed. For 2003, the standard deviations of the c-ch values are 0.006, 0.005, 0.006, and 0.006 mag. for u, v, b, and y, respectively, while the standard deviations of the respective v-c values are 0.011, 0.010, 0.010, and 0.010 mag. which indicate variability.

The differential photometry in the instrumental system is available at the IBVS website as 5460-t1.txt. Figure 1 shows the u and the v photometry plotted against the date of observation; the left panel shows u(v-c) values (solid squares) as well as the ch-c values (x's) to which -0.20 has been added and the right panel the v(v-c) values (solid circles)

as well as the $ch-c$ values (plus signs) to which -0.06 mag. has been added. The $v-c$ plots for b and y look similar to those for u and v . The u and the v data were examined with the Scargle periodogram (Scargle, 1982; Horn & Baliunas, 1986) and no frequencies in the range 0 to 10 cycles per day showed a power S/N for 1% significance. Given that for u the $ch-c$ scatter is slightly less than the $v-c$ scatter from HJD 2452700 to about HJD 2452800, at best θ CrB was then marginally variable in this filter. At this time the $v(v-c)$ values are more suggestive of variability. However, beginning at HJD 2452800 in early June 2003 there was some sort of absorption event in both u and v (as well as in b and y). This is well after the event described by Rivinius et al. (2003) near JD 2452725. The photometry obtained at HJD 2452720.87 indicates the star was fainter then. But values taken the next two nights do not. It is unfortunate that simultaneous photometry is not available to add additional information about this event.

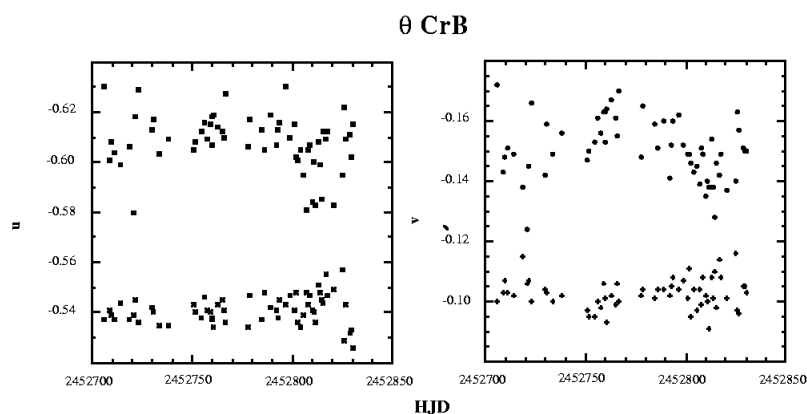


Figure 1.

Acknowledgements: This work was supported in part by NSF grant AST-0071260 and in part by grants from The Citadel Development Foundation. I appreciate the continuing efforts of Louis J. Boyd, Robert J. Dukes, Jr., and George P. McCook to keep the FCAPT operating properly as well as useful conversations with Geraldine J. Peters on Be stars.

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