

COMMISSION 27 OF THE I. A. U.  
INFORMATION BULLETIN ON VARIABLE STARS  
Number 1197

Konkoly Observatory  
Budapest  
1976 October 29

BC DRACONIS - AN RR LYRAE VARIABLE

BC Draconis (=Bamberg Variable No.222) was discovered to be variable (1) in the Bamberg sky survey and reported (2) to be a cepheid of period 2.566033 days. Its spectral type was originally described (3) as late B and subsequently (4) as of type F5. On the basis of period-luminosity relationships Irvine (4) noted that BC Draconis was either a Population I cepheid 1730pc from the galactic plane or, more probably, a Population II cepheid 950pc from the galactic plane. Szabados (5) obtained a series of photoelectric observations of this star and in an attempt to resolve the scatter about the light curve of period 2.566033 days he proposed that the light curve is modulated with a beat period of 10.96 days. He suggested that the two periods present in the star were  $P_2 = 2.566033$  days and  $P_1 = 3.351$  days giving a period ratio  $P_2/P_1 = 0.766$ .

Fourier analysis (in the range  $P > 0.2$  days) of Szabados' observations has shown that the original period identification is incorrect and is a 1 cycle/day alias of the true period  $P = 0.71957$  days. The V and B light curves of the variable are shown in Fig. 1. The scatter about the mean light curves has a mean error of 0.036 mag in V and 0.035 mag in B, consistent with the observational error. Apart from the  $P/2$  harmonic of the main period no evidence was found for other periodicities in the data. The light curve appears to be typical of a low amplitude, fundamental mode RR Lyrae variable. Adopting an RR Lyr absolute magnitude of  $M_B = +1.1$ , photographic interstellar extinction of 1.1 mag (4) and mean apparent photographic magnitude of 11.7, the distance of BC Draconis from the galactic plane is 380pc.

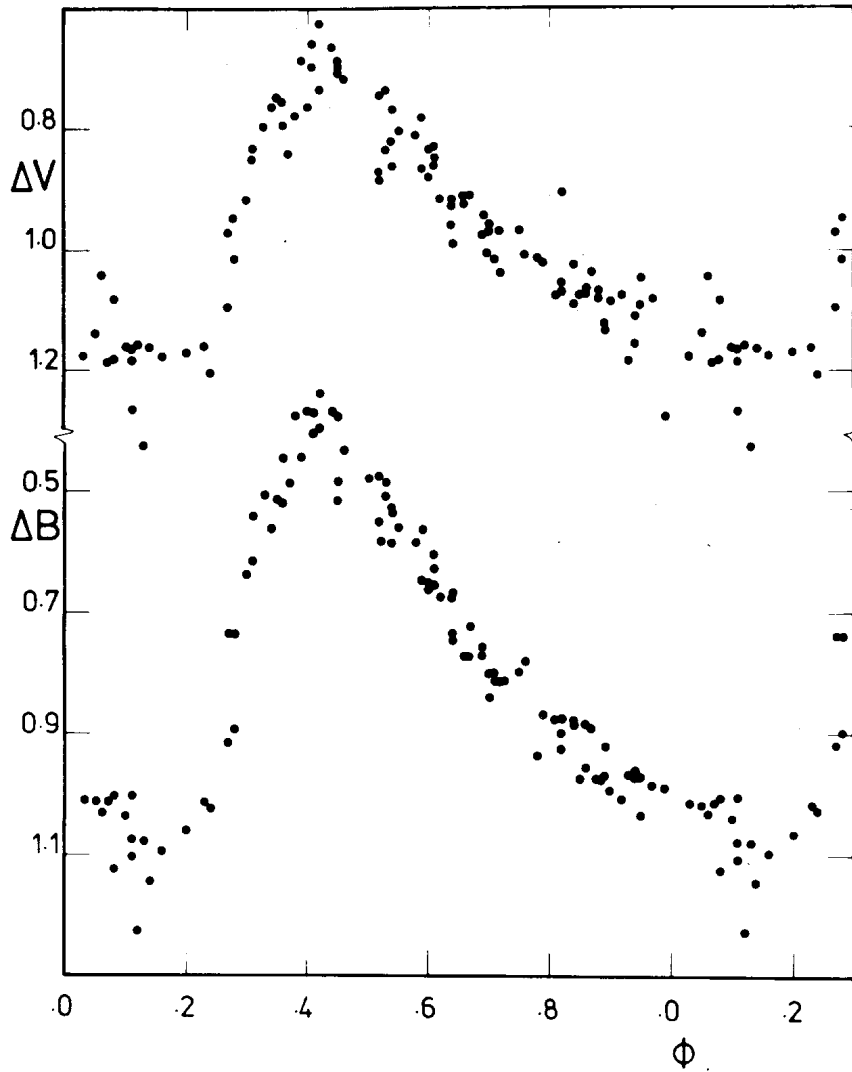


Fig.1: V, B observations of BC Dra plotted with phase  
 $\phi = (\text{JD} - 2440000) \cdot 1.38972$

It is interesting to note that in the Fourier analysis the structure of the main peak at  $f = 1.38972$  c/d is single as expected whereas the structure of the major alias peaks at  $f \pm 1$  are double. This unusual alias structure is a direct consequence of the star being circumpolar at the latitude from which it was observed. Thus both the 1 c/d and 1 cycle/sidereal day (or 1.0027 c/d) aliases dominate the alias structure.

From Szabados' observations we derive the following elements for maximum light

$$\text{JD (max. light)} = 2442278.45 + 0^{\text{d}}.71957 \cdot E.$$

$$\begin{array}{cc} \pm 0.01 & \pm 0.00001 \end{array}$$

L. SZABADOS  
Konkoly Observatory  
Budapest

R.S. STOBIE, D.A. PICKUP  
Royal Observatory Edinburgh  
Blackford Hill  
Edinburgh EH9 3HJ  
Scotland

References:

1. Strohmeier, W. 1958. Kl.Veröff.Bamberg No. 23
2. Strohmeier, W. and Knigge, R. 1961. Bamberg Ver., 5, No. 11
3. Götz, W. and Wenzel, W. 1964. Mitt. Ver. Sterne Berlin-Babelsberg und Sonneberg, 2, H4, 85
4. Irvine, N.J. 1974. I.B.V.S. No.858
5. Szabados, L. 1976. Multiple Periodic Variable Stars, IAU Colloquium No. 29, Budapest