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UBV PHOTOMETRY OF R CORONAE BOREALIS

Photoelectric observations of R CrB have been obtained at Mount John University Observatory (MJUO) during 1986 and 1987 as part of an ongoing survey of R Coronae Borealis-type (RCB) stars. The observations made during 1986 were obtained with the 0.6-m photometric reflector; the 1987 observations were obtained with the 1-m reflector. The measurements were made with the MJUO No.1 single channel photometer equipped with a cooled EMI6094B photomultiplier tube (S11 photocathode) and UBV filters as described by Bessell (1976).

The differential comparison star chosen (SAO 084005 = BD +28° 2475) was the same comparison star used in other recent photometric programmes of R CrB (e.g. Ashoka and Pukalenthil 1986, Bohme 1986, 1987).

Although transformation constants were derived from observations of E-region standards at MJUO, the magnitude and colours of the comparison star ($V = 7.45$, $B-V = 0.44$, $U-B = 0.02$) were set to the values used by Ashoka and Pukalenthil (1986) and Bohme (1986, 1987). Due to the lack of other suitable comparison stars in the field surrounding R CrB no secondary comparison (check) star was observed.

Despite the southern latitude of MJUO ($\text{lat} = -43^\circ 59'$) and the high airmass of the observations ($X_{\text{min}} = 3.23$) the scatter in the transformed comparison magnitudes and in the differentially determined magnitudes of R CrB indicate that uncertainties of only 0.02 magnitudes were typical. The UBV observations of R CrB are listed in Table 1.

Although we made few measurements of R CrB during 1986, these compare favourably with other published series of observations made during this year (Ashoka and Pukalenthil 1986, Bohme 1986). However, a comparison of our 1987 observations with those obtained by Bohme (1987), which covered the same time period, reveals alarming

Table I. Photoelectric observations of R CrB

	JD-2440000	V	B-V	U-B	JD-2440000	V	B-V	U-B
1986	6597.92	5.81	0.57	0.02	6599.95	5.84	0.57	0.07
	6598.96	5.87	0.57	0.06	6614.93	5.90	0.56	0.08
1987	6923.04	5.96	0.58	0.02	6981.90	5.94	0.57	0.06
	6924.03	5.96	0.56	0.01	6982.90	5.91	0.55	0.06
	6925.03	5.92	0.56	-0.01	6985.89	5.93	0.58	0.09
	6945.00	5.75	0.51	-0.01	7002.87	5.83	0.54	0.02
	6946.98	5.76	0.53	0.00	7016.84	5.85	0.54	0.04
	6954.97	5.79	0.57	0.04	7019.81	5.82	0.58	0.08
	6960.95	5.90	0.54	0.04	7021.81	5.83	0.57	0.08
	6963.95	5.90	0.56	0.04	7030.82	5.81	0.60	0.10
	6965.95	5.92	0.58	0.00	7047.83	5.85	0.53	0.06

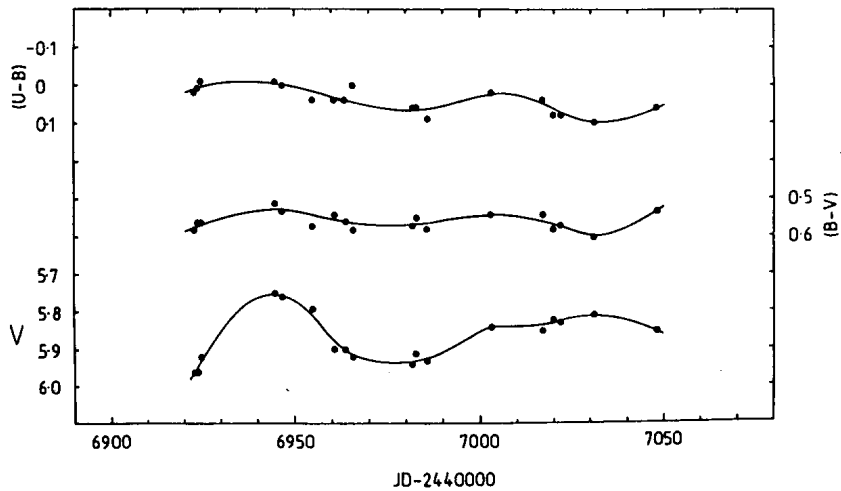


Figure 1

scatter, exceeding 0.1 magnitudes, in his observations.

The light and colour curves for our observations obtained in 1987 are reproduced in Figure 1. The behaviour of the light and colour curves are typical of the semi-regular nature of the pulsations of R CrB. The colour curves show variations of 50 to 60 day duration.

A mean period of 47 day has been noted by Raveendran et al.(1986) in radial velocity measurements published since 1972. We note that this mean can also be derived by averaging the two most dominant periods (54 and 40 day) found in Fourier analyses of the light curve of R CrB by Goncharova et al.(1983).

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References:

- Ashoka, B.N. and Pukalenti, S., 1986, I.B.V.S., 2908.
Bessell, M.S., 1976, P.A.S.P., 88, 557.
Bohme, D., 1986, I.B.V.S., 2962.
Bohme, D., 1987, I.B.V.S., 3115.
Goncharova, R.I., Kovalchuk, G.U. and Pugach, A.F., 1983, *Astrophysics*, 19, 161.
Raveendran, A.V., Ashoka, B.N. and Rao, N.K., 1986, in IAU Colloquium 87, 'Hydrogen deficient Stars and related Objects', eds. K. Hunger et al, (Dordrecht : Reidel), 191.