

THE SPECTROSCOPIC BINARY β CEPHEI.

By EDWIN B. FROST.

Six spectrograms of this star were obtained during the winter by Mr. W. S. Adams with the Bruce spectrograph. His measures of the third plate suggested that the radial velocity of the star varied, and the subsequent plates have confirmed this.

The spectrum is, in general, of the *Orion* type, Vogels' Ib, and in particular of Miss Maury's IIIa, of which group the typical star is β *Canis Majoris*.

The principal lines in the region of spectrum in good focus on our plates are due to oxygen, silicon, helium, and magnesium. The lines are, of course, rather broad and difficult to set upon, although much better than in many of the sub-groups of the *Orion* type. A statement of the accordance of the measures made on spectra of this character by different observers will, therefore, perhaps be of interest.

I accordingly give the results of the measures of Mr. Adams and myself on the five plates which we have both measured, together with those I have made on five other plates I have recently taken to determine the period.

RADIAL VELOCITY OF β CEPHEI.

Plate No.	Date	Taken by	RADIAL VELOCITY			
			Adams	No. of lines	Frost	No. of lines
B 255	1901 Dec. 18	Adams	— 5.2 km	6	— 3.9 km	15
A 304	1902 Jan. 8	"	— 9.1	5		..
B 302	Mar. 13	"	+ 4.3	11	+ 4.7	12
A 338	Mar. 26	"	— 15.1	8	— 9.0	10
B 307	April 2	"	— 19.3	12	— 20.3	10
B 325	April 16	"	+ 10.1	11	+ 11.3	12
B 336	April 23	Frost		..	— 0.8	11
B 345	May 14	"		..	— 2.2	12
B 349	May 14	"		..	— 16.3	11
B 350	May 16	"		..	+ 6.4	11
B 353	May 23	"		..	— 16.8	11

These values are only provisional, as they may be appreciably changed when we obtain more accurate determinations of the wave-lengths of the oxygen lines, a piece of work upon which we are at present engaged.

It should be remarked that the observer assigns a weight to each star line, according to its sharpness, as he measures it; of course he is wholly unconscious of the effect this weighting will have on the result.

The agreement between the measures by the two observers is better than had been expected, the difference averaging 1 km for the four plates taken with camera B, but the decimal of the kilometer has no significance. Plate A 338, taken with the short camera, is poor, and the comparison lines were overexposed, which accounts for the large difference of 6 km. As plate A 304 was a broken one I did not attempt to measure it.

We had assumed from the first plates that the period would be rather long, but a suspicion to the contrary led me to take two plates on the night of May 14, and during the interval of five and one-half hours the velocity changed by 14 km, or nearly half of the whole range so far observed.

It has not so far been possible to obtain other observations of the star at short intervals, so that the period cannot now be stated with certainty. This will be settled as soon as the weather permits observations on two consecutive nights.

At certain phases of the star's variation of velocity there are suggestions of additional complexities in some of the lines, which may prove of interest, but the data are at present insufficient for drawing further conclusions.

YERKES OBSERVATORY,
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