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SPECTROSCOPIC AND PHOTOELECTRIC MEASUREMENTS OF νEri

Photometric observations (partly simultaneously with two telescopes) of the β Cep-star ν Eri ($P \approx 4^h10^m$) in 1974 at the ESO site in La Silla/Chile revealed a secondary hump in two out of three light curves. The hump is located in the ascending branch around maximum radial velocity. The data did not allow to decide whether this secondary hump repeats every cycle or not. Additional spectroscopic and photoelectric observations have been performed in 1977 at the same site though the position of the star was not favourable (maximum height above horizon approx. 40°).
All observational data are compiled in Table I and II. The reduction techniques concerning the photometry and scanner observations were the same as described by Haefner et al. (1975) and Schoembs et al. (1976), respectively.

Table I

Photometric observations

a) Photometry

Telesc.	Date	Start (UT)	Duration	Time-Res./ Filt. (s)	Integr.-Time/ Filter (s)	Filter*)
61 cm	1974,Nov.24/25	$02^h33^m00^s$	$4^h17^m00^s$	4	1	H_β(w/n)
61 cm	1974,Nov. 4/ 5	02 30 00	4 17 00	4	1	"
61 cm	1974,Nov.12/13	02 04 30	4 25 30	4	1	"
50 cm	1974,Nov.12/13	02 11 10	4 18 20	1	0.99	Int./Hα
50 cm	1977,March 9/10	00 15 00	2 05 00	6	1	H_β(w/n)
50 cm	" 11/12	00 21 00	1 50 00	6	1	"
50 cm	" 12/13	00 27 15	1 57 45	6	1	"
50 cm	" 15/16	00 23 05	1 26 55	6	1	"
50 cm	" 16/17	00 25 00	1 40 00	6	1	"

*) H_β(w/n): wide ($\Delta\lambda$=175A), narrow($\Delta\lambda$=29A), quasisimultaneously used by means of a rotating filter wheel, cycle time 2s (1974) or 3s (1977), Int./H_α: white light, H_α($\Delta\lambda$=3A), two channel photometer.

b) Scanner

Telesc.	Date	Start	Duration	Line	Band width (A)	Spectr. Res. (A)	Time Res. (s)
50 cm	1974,Nov.24/25	$02^h33^m00^s$	4^h15^m	Hα	230	7	8.192

Table II

Spectroscopic observations

Plate *) No.	Midexposure HJD 2440000+	Exposure Time(min)	Phase
G 8315	3229.5189	4	0.875
G 8332	3230.5057	8	0.562
G 8333	3230.5157	9	0.620
G 8334	3230.5265	10	0.682
G 8335	3230.5383	12	0.750
G 8361	3231.5209	12	0.413
G 8362	3231.5348	10	0.494
G 8363	3231.5500	12	0.581
G 8386	3232.4944	8	0.024
G 8387	3232.5020	7	0.068
G 8389	3232.5250	10	0.200
G 8390	3232.5364	11	0.266
G 8438	3234.4852	8	0.498
G 8439	3234.4929	6	0.542
G 8440	3234.5036	15	0.604
G 8441	3234.5192	18	0.694
G 8442	3234.5317	10	0.766
G 8443	3234.5415	12	0.822

*) 1.5m telescope, Coudé, dispersion 12.4A/mm, emulsion 098-2.

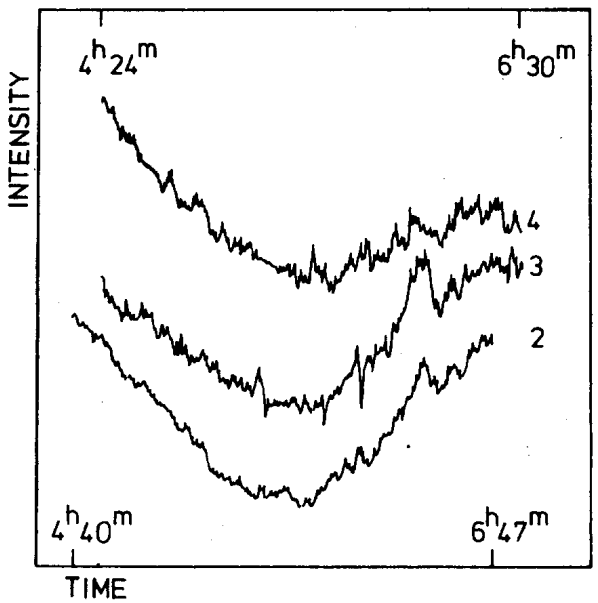

Fig.1. Part of the light curves (not corrected for extinction) of 1974 Dec. 4/5 in H_β-w (2) and the simultaneous runs of Dec. 12/13 in H_β-w (3) and white light (4) showing the secondary peak.

Fig. 1 shows some light curves of Dec. 1974. The duration of the small secondary peak is approx. 1000s≈0.06P and the relative amplitude between approx. 1.0 and 1.5% in H_β(w/n) and somewhat smaller in white light, indicating a connection with the H-lines (see also Fig.3). The photometric runs of March 1977 are generally of worse quality because of the appreciable air mass during the observations. Mostly they cover less than half a period. In order to isolate the secondary hump in these data too, all proposed periods including overtones and resonance oscillations according to Van Hoof (1961) and Saito (1976) have been tested, but without success. Unfortunately the beat period, which would approx. be consistent with the data of Dec. 1974, cannot be checked with the present observations.

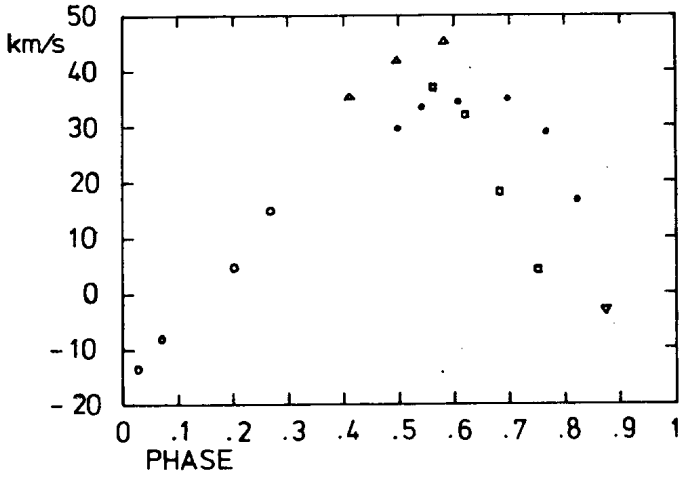

Fig. 2 Radial velocity curve. Average error of the weighted means is ±1.5 km/s. Symbols: ▼G 8315, □G 8332-35, ▲G 8361-63, ○G 8386, 87, 89, 90, ●G 8438-43.

Fig.2 shows the weighted mean radial velocities as determined from the lines listed in Table III. The phases have been computed using the time of minimum radial velocity given by Laskarides et al. (1971) and a period of $0^d.1735089$. The scatter is due to the Blashko-effect. No Van Hoof-effect could be detected and no unusual behaviour around the time of maximum radial velocity (ap-

Table III

Lines used for radial velocity and equivalent width determinations on all plates.

Wavelength (A)	Identification	Weight for RV-det.
6678.149	HeI	1
6582.85	CII	0.5
6578.03	CII	0.5
6562.817	Hα	1
5875.618 .650	HeI	1
5739.762	SiIII	0.5
5722.65	AlIII	0.5
5696.47	AlIII	0.5
5679.56	NII	0.5
5666.64	NII	0.5
5895.923	NaI D_1 interst.	
5889.953	NaI D_2 interst.	

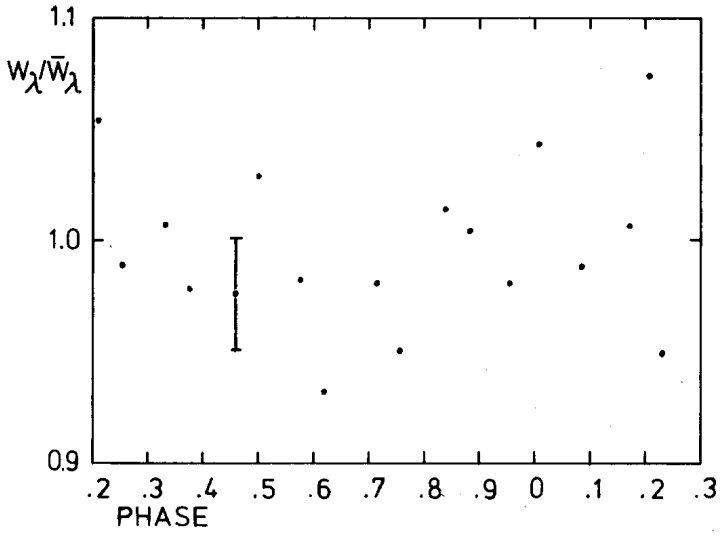

Fig. 3 Variation of the Hα-equivalent widths from scanner observations. Each point is the average of approx. 40 foreward and backward scans of 8.192 s. Vertical bar: mean error. The phases refer to the radial velocity curve (minimum: phase 0).

prox. position of the secondary hump) can be seen. According to Laskaridest et al. (1971) and Laskarides (1973) a "filling in" of the H-lines by emission in the ascending branch of the radial velocity curve (around minimum light) should be observed. A careful examination of the H_α-profiles and equivalent widths did not reveal this effect though especially this line should strongly be affected by possible emission. The equivalent widths remained constant and the line profile variation was the same for all the lines. The failure of the "filling in"-test may be explained by the scanty data around this special phases. Futhermore it might be that the "filling in" only is present with varying strength in different cycles. This is confirmed by the scanner equivalent widths of Hα, which cover one complete cycle. As shown in Fig. 3 there is a slight variability which exceeds the error of the measurements. But only the second minimum around maximum radial velocity phase 0.6 - 0.7 found by Laskarides et al. (1971) is clearly present whereas around phase 0.2 (expected "filling in") no minimum can be noticed. The radial velocity and equivalent widths for the interstellar D1 and D2-lines are (22.0 ± 0.5) and (21.3 ± 0.3) km/s and (103 ± 4) and (138 ± 5) mA, respectively. These values are in good agreement with values given for D1 by Hobbs (1978).

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