

Spectroscopic Binaries near the North Galactic Pole Paper 14: HD 118234

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Received 1988 January 20; accepted 1988 February 25

Abstract. Photoelectric radial-velocity measurements show that the Seventh-magnitude star HD 118234 is a spectroscopic binary in a very eccentric 59-day orbit.

Key words: radial velocities—spectroscopic binaries—stars, individual

HD 118234 is a seventh-magnitude object near the south-following boundary of the area covered by the Cambridge radial-velocity survey of the North Galactic Pole field ($b > 75^\circ$). It is on the extreme eastern edge of Coma Berenices, near the fifth-magnitude star 1 Bootis and about 10° preceding Arcturus. Photoelectric magnitude measurements of it have been published by Haggkvist & Oja (1973), who found $V=7.57$, $(B-V)=1.08$, $(U-B)=0.93$. Unpublished photometry in the Copenhagen system (Hansen & Kjaergaard 1971), carried out at Palomar Observatory by Dr G. A. Radford and the author in 1976 and reduced by Dr L. Hansen, indicates that the object is a giant; furthermore, it shows signs of being photometrically composite, having a value of $\text{res } (k)$ of $0^m.12$, very similar to that given (for example) by 73 Leo, which is supposed (Griffin 1966) to consist of a K giant plus a main sequence star with a type of about F1. No modern spectral classification is known to exist for HD 118234; the HD classification is K0, and a type of K0 or K1 III would suit the photometry quite well.

The first radial-velocity observation of HD 118234 was made in 1971, but it was not until 1980 that the second one was made and the spectroscopic-binary nature of the object was discovered. Since then it has been observed systematically, and the 61 measurements listed in Table 1 have been accumulated. They yield the orbit plotted in Fig. 1 and having the following elements:

$$\begin{aligned} P &= 59.054 \pm 0.004 \text{ days} & (T)_{83} &= \text{MJD } 45851.74 \pm 0.13 \\ \gamma &= -19.24 \pm 0.08 \text{ km s}^{-1} & a_1 \sin i &= 6.34 \pm 0.12 \text{ Gm} \\ K &= 9.66 \pm 0.15 \text{ km s}^{-1} & f(m) &= 0.00292 \pm 0.00016 M_\odot \\ e &= 0.589 \pm 0.010 & & \\ \omega &= 271.7 \pm 1.8 \text{ degrees} & \text{Rms residual} &= 0.6 \text{ km s}^{-1} \end{aligned}$$

The period of 59 days is quite short for a giant star. Giants with periods so short tend to show photometric variability of the RS CVn variety, in which the variations arise from non-uniform surface brightness coupled with stellar rotation. However, the widths of the dips on radial-velocity traces do not suggest that HD 118234 has an unusually rapid rotation.

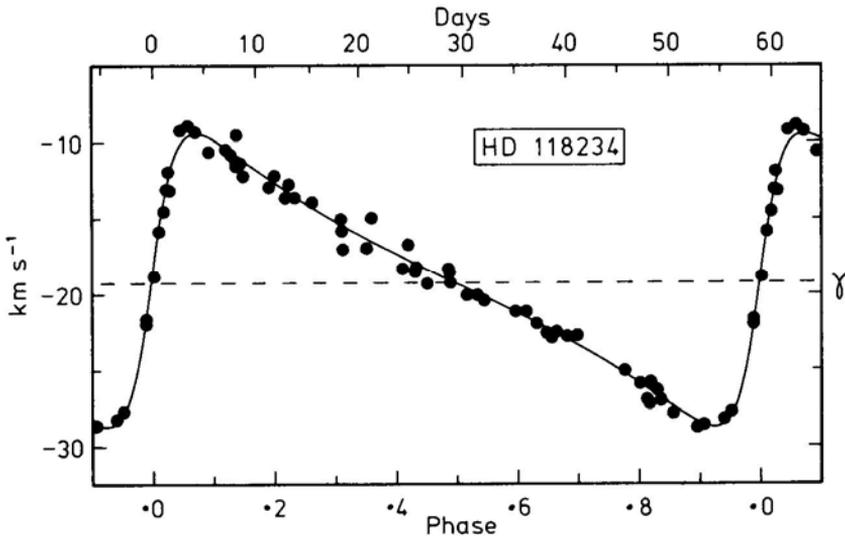


Figure 1. The computed radial-velocity curve of HD 118234, with the measured radial velocities plotted.

Table 1. Photoelectric radial-velocity measurements of HD 118234.

Date	MJD	Velocity km s ⁻¹	Phase	(O - C) km s ⁻¹
1971 Feb 16.22	40998.22	-26.9	0.812	-0.7
1980 May 17.00	44376.00	-15.8	58.010	+0.1
1981 May 5.03	44729.03	-21.6	63.988	+0.5
1982 Jan 21.21	44990.21	-18.3	68.411	-0.7
Mar 4.13	45032.13	-10.5	69.121	-0.1
Apr 15.02	074.02	-26.3	.830	+0.4
May 23.96	112.96	-19.2	70.490	0.0
1983 Feb 3.57*	45368.57	-27.2	74.818	-0.9
4.57*	369.57	-27.0	.835	-0.2
15.36*	380.36	-14.5	75.018	-0.5
18.47*	383.47	-9.3	.070	+0.1
23.12	388.12	-12.2	.149	-1.0
28.13	393.13	-13.6	.234	0.0
Mar 7.11	400.11	-16.9	.352	-0.5
11.14	404.14	-16.7	.420	+1.1
15.12	408.12	-18.5	.488	+0.6
Apr 16.03	440.03	-13.1	76.028	-1.1
22.01	446.01	-10.8	.129	-0.2
May 9.97	463.97	-18.2	.434	-0.1
15.96	469.96	-20.1	.535	-0.1
June 6.94	491.94	-28.6	.907	0.0
8.92	493.92	-28.2	.941	+0.3
15.92	500.92	-8.9	77.059	+0.6
30.92	515.92	-17.0	.313	-1.5

Table 1. Continued

Date	MJD	Velocity km s ⁻¹	Phase	(O - C) km s ⁻¹	
1984 Jan	2.26	45701.26	-19.3	80.452	-0.9
Feb	9.13	739.13	-10.6	81.093	-0.9
Apr	2.06	792.06	-21.9	.989	-0.1
	14.04	804.04	-12.9	82.192	-0.4
	15.96	805.96	-12.7	.225	+0.7
	21.04	811.04	-15.0	.311	+0.5
	23.98	813.98	-14.9	.361	+1.7
May	8.98	828.98	-21.1	.615	+0.5
	11.00	831.00	-22.6	.649	-0.3
	11.93	831.93	-22.5	.665	+0.1
	12.99	832.99	-22.8	.683	+0.2
	13.94	833.94	-22.7	.699	+0.7
June	8.92	859.92	-9.5	83.139	+1.4
1985 Jan	1.20	46066.20	-21.9	86.632	+0.1
	12.26	077.26	-25.8	.819	+0.6
	23.08	088.08	-18.8	87.002	-0.6
	24.22	089.22	-13.0	.021	+0.3
Feb	17.49*	113.49	-18.5	.432	-0.5
	24.15	120.15	-20.4	.545	-0.2
June	1.94	217.94	-12.1	89.201	+0.6
1986 Jan	25.21	46455.21	-13.6	93.219	-0.4
Feb	27.16	488.16	-25.0	.777	+0.3
Mar	6.13	495.13	-28.7	.895	-0.3
Apr	10.09 [†]	530.09	-18.3	94.487	+0.8
May	13.04	563.04	-9.2	95.045	+1.0
	18.93	568.93	-11.3	.145	-0.2
	25.92	575.92	-13.9	.263	+0.5
Aug	24.83 [†]	666.83	-25.9	96.803	0.0
Dec	12.28	776.28	-22.9	98.656	-0.4
1987 Feb	1.16	46827.16	-20.1	99.518	-0.4
	21.18	847.18	-27.8	.857	-0.4
Mar	3.12 [†]	857.12	-11.9	100.025	+0.7
	20.07	874.07	-15.7	.312	-0.2
May	7.94	922.94	-11.5	101.139	-0.6
June	3.97	949.97	-21.1	.597	+0.2
	24.92	970.92	-27.7	.952	+0.2
July	5.91	981.91	-11.2	102.138	-0.3

* Observed with the Dominion Astrophysical Observatory 48-inch telescope (Fletcher *et al.* 1982).

[†] Observed with the Geneva Observatory's 'Coravel' at Haute Provence (Baranne, Mayor & Poncet 1979)

Acknowledgements

I am pleased to acknowledge the guest-investigator privileges granted to me at the Dominion Astrophysical Observatory and on the Geneva Observatory's 'Coravel' radial-velocity spectrometer and 1-m telescope at Haute Provence. This is the first

paper in this series to include observations made with 'Coravel', which will probably feature in most, if not all, succeeding papers.

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