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THE SPECTROSCOPIC BINARY HD 35079

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RESUMEN

En este trabajo se derivó la órbita de la binaria espectroscópica HD 35079. La estrella pertenece a la Asociación de Orión; la órbita resultante es de excentricidad elevada y tiene una semiamplitud de 80 km s^{-1}.

ABSTRACT

We derived the orbit of the spectroscopic binary HD 35079. This star belongs to the Orion Association. The amplitude of the velocity curve is large (80 km s^{-1}), and the eccentricity is high.

Key words: CLUSTERS-ASSOCIATIONS — STARS-BINARIES

I. INTRODUCTION

Since 1978 we have been working in a program devoted to determine the percentage of spectroscopic binaries among the brightest members ($V < 7.0$) of the Orion Association. The observing list was taken from the study of Warren and Hesser (1977). Several interesting objects were discovered during the preliminary reduction of the data and they were selected to be observed more intensively. In this paper, we present the observations of a new spectroscopic binary discovered during the program described: HD 35079.

II. OBSERVATIONS

HD 35079 has the following photometric and spectroscopic characteristics: $V = 7.07$, $B-V = -0.04$, $U-B = -0.53$, MK Type = B4 V (Abt and Levato 1977). We have taken 27 spectrograms of HD 35079 during three observing runs using the cassegrain spectrographs of the 0.9 m telescope (2 runs) and the 1 m Yale telescope (1 run) of Cerro Tololo. Twelve of the spectrograms are direct and 15 were taken through a Carnegie image tube. The direct spectra are 0.3 mm wide and have a dispersion of 42 mm while those taken through the image tube are of the same dispersion and 1 mm wide.

The radial velocity system was monitored observing the standard stars Procyon and β Lep. We have taken 22 spectrograms of Procyon during the first run at the 0.9 m telescope and we obtained a correction to the Lick system (Moore 1932) of +7.5±0.7 km s^{-1}. During the second run with the same telescope we obtained 42 plates of β Lep, and the correction to the Lick system was +3.0±0.3 km s^{-1}. Finally with the image tube spectrograph of the 1.0 m Yale telescope we secured 24 plates of β Lep and found a correction of +15±2 km s^{-1}. The errors quoted are probable errors. In order to refer our observations to the Lick system we applied to our measurements of HD 35079 the corrections established above. Table 1 lists the Julian Days, radial velocities, number of lines measured and probable errors for each plate of HD 35079. The lines used in the radial velocity determination were the Hydrogen Balmer lines (H8, Hϵ, Hσ, Hγ) and the He I lines ($\lambda\lambda$4026, 4387, 4471).

III. THE SPECTROSCOPIC ORBIT

With the results of Table 1, we determined the period using the program written by Morbey (1978). The distribution of our observations permitted us to discard some equally possible periods and finally the adopted one was 9.806 days. To compute the orbit we used a program of least squares fitting with initial elements derived from a Lehmann-Fhilés solution. The orbital elements as well as some additional information are given in Table 2 while Figure 1 is a plot of the radial velocity curve.

The elements of Table 1 and the radial velocity curve of Figure 1 should be regarded as very preliminary. Some spectrograms show a slight asymmetry in the hydrogen lines but we could not find any variation with the phase. Also in some plates the Mg II line λ4481 gives a discrepant radial velocity. These facts added to the shape of the velocity curve make the radial velocity solution not completely satisfactory, and perhaps more material with a higher dispersion should be necessary to conclude safely upon the nature of this system.

According to the large amplitude of the velocity curve,

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TABLE 1

RADIAL VELOCITY OBSERVATIONS

Julian Date 2.440.000+	R.V. (km s^{-1})	p.e. (km s^{-1})	Number of lines
3855.764	+76	± 3.1	7
3856.725	+49	4.5	7
3857.717	+23	5.5	4
3860.715	+ 9	2.3	4
4590.735	+115	3.5	4
4591.602	+73	2.8	5
4592.581	+39	1.3	5
4593.588	+22	2.7	8
4594.570	+26	2.8	6
4595.586	+ 1	3.4	4
4596.602	+22	5.0	4
4597.578	+16	...	1
5244.815	+ 1	4.4	9
5245.891	− 9	4.4	8
5246.883	+130	3.8	8
5247.875	+75	4.2	9
5248.859	+39	2.6	7
5249.844	+36	2.9	9
5250.773	+27	4.6	8
5250.891	+16	3.0	8
5251.875	+13	1.9	8
5252.797	+ 7	3.4	8
5254.805	− 9	3.8	9
5255.836	− 6	4.5	7
5256.812	+126	4.5	9
5258.820	+44	3	7
5260.805	+25	2.8	6

TABLE 2

ORBITAL ELEMENTS

HD 37059
K = 71 ± 5 km s^{-1}
e = 0.67 ± 0.1
ω = 313° ± 30
V_0 = +34 ± 3 km s^{-1}
T_0 = 2,445,247.050 ± 0.1 days
P = 9.807 ± 5 × 10^{-3} days
a sin i = 7.1 × 10^6 km
f(m) = 0.148 $M_\odot$
p.e of fitting = 7.0 km s^{-1}

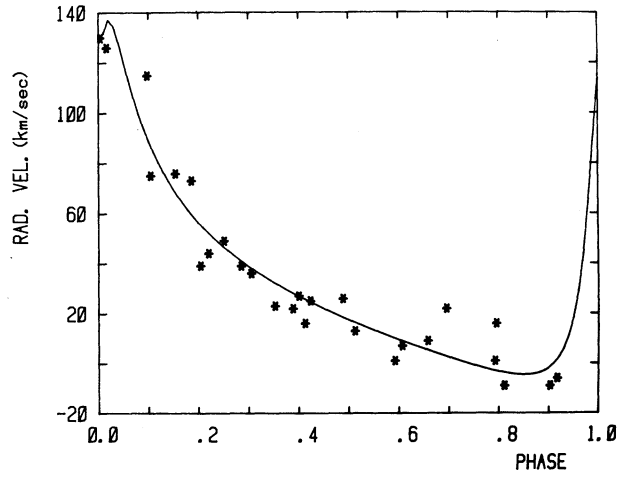

Fig. 1. Radial velocity curve of HD 35079.

probably the inclination of the orbit will be high with respect to the line of sight. So, if we assume a mass of 9.5 $M_\odot$ for the primary (B4 V) and a range between the random distribution value and 90 degrees for the inclination, the mass of the secondary would range between 3 and 4 $M_\odot$. There have been no brightness variations reported for this star.

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REFERENCES

Abt, H.A. and Levato H. 1977, *Pub. A.S.P.*, 89, 797.
Moore, J.H. 1932, *Pub. Lick. Obs.*, 18, 1.
Morbey, C.L. 1978, *Pub. D.A.O.*, XV, 105.
Warren, W.H. Jr. and Hesser, J.E. 1977, *Ap. J. Suppl.*, 34, 115.

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