THE ORBIT OF THE SPECTROSCOPIC BINARY H.D. 22124

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THE star H.D. 22124, $\alpha(1900)\ 3^h28^m.8$, $\delta(1900)+31°41'$, vis. mag. 6.76, type F2, was announced as a spectroscopic binary from six plates taken at this observatory in 1935-38.[1] Forty-four spectrograms between the dates 1935 and 1939 have been made the basis of a least-squares solution for the orbital elements. All the spectrograms save the first have been taken with the 12-inch camera and one-prism spectrograph giving a dispersion of 66 A/mm. at Hγ.

The velocities are based on the system of wave-lengths published in D.D.O. Publications, Vol. I, No. 3, but were corrected so that the sum of the residuals for each line of this particular star was zero. In all, 30 lines were used in obtaining the velocities given in Table I.

TABLE I

J.D. 242	Vo Km./sec.	Phase from final T	Vc Km./sec.	Vo−Vc Km./sec.
8082.822	+52.4	1.105	+51.6	+ 0.8
8432.830	+19.2	0.946	+14.6	+ 4.6
8784.879	+02.8	0.175	+05.1	− 2.3
8838.764	+22.1	1.005	+30.7	− 8.6
9146.892	+31.4	0.084	+31.6	− 0.2
9167.862	+57.0	1.158	+57.8	− 0.8
9188.823	+09.1	0.897	+00.8	+ 8.3
9189.833	−61.2	0.581	−66.0	+ 4.8
9191.792	+67.6	1.213	+60.1	+ 7.5
9197.756	−64.6	0.545	−67.2	+ 2.6
9199.817	+63.6	1.280	+56.8	+ 6.8
9200.788	+08.7	0.924	+08.3	+ 0.4
9201.845	−57.0	0.655	−58.5	+ 1.5
9202.667	+12.7	0.151	+12.4	+ 0.3
9202.886	−44.3	0.370	−49.2	+ 4.9
9208.707	+05.4	0.885	−03.1	+ 8.5
9209.727	−64.3	0.579	−66.2	+ 1.9
9214.756	−18.8	0.302	−32.8	+14.0
9222.731	−31.6	0.319	−37.3	+ 5.7
9223.681	+64.3	1.269	+57.5	+ 6.8
9224.694	+20.6	0.955	+17.2	+ 3.4
9247.616	+50.9	0.002	+49.7	+ 1.2
9261.590	−53.0	0.712	−48.5	− 4.5
9263.624	+27.0	0.094	+28.9	− 1.9

[1]Pub. D.D.O., vol. I, no. 3, 1939.

TABLE I—continued

J.D. 242	Vo Km./sec.	Phase from final T	Vc Km./sec.	Vo—Vc Km./sec.
9278.563	−70.2	0.442	−61.3	− 8.9
9283.520	+28.3	0.094	+28.9	− 0.6
9283.555	+21.7	0.129	+19.0	+ 2.7
9283.592	+06.3	0.166	+07.9	− 1.6
9283.626	−05.3	0.200	−02.6	− 2.7
9293.535	−31.6	0.824	−20.8	−10.8
9496.892	+52.6	1.243	+59.4	− 6.8
9500.845	+51.3	1.217	+60.1	− 8.8
9503.894	−33.2	0.287	−28.7	− 4.5
9510.892	−61.8	0.653	−58.8	− 3.0
9524.881	+37.9	0.052	+39.5	− 1.6
9530.904	−38.2	0.769	−35.4	− 2.8
9538.790	−55.2	0.697	−51.4	− 3.8
9539.844	−59.0	0.425	−59.0	+ 0.0
9542.791	−42.0	0.719	−47.0	+ 5.0
9543.793	−59.9	0.394	−53.9	− 6.0
9557.724	+40.3	1.061	+43.6	− 3.3
9569.787	+61.8	1.187	+59.6	+ 2.2
9570.790	−15.5	0.864	−09.3	− 6.2
9584.753	−20.3	0.236	−13.7	− 6.6

Column 1 gives the Julian date of the observation; column 2, the final velocities after the wave-lengths had been adjusted; column 3, the phase from the periastron time of the final orbit; column 4, the computed velocity from the final orbit; column 5, the residual O–C.

A preliminary orbit was derived graphically and corrections computed for all six elements. Owing to the small eccentricity the periastron time and angle are very uncertain and a circular orbit fits the observations fairly well.

FINAL ELEMENTS

Period	$P =$ 1.326390 days	± .000012
Eccentricity	$e =$ 0.024	± .013
Angle of periastron	$\omega =$ 32°.6	± 14°
Periastron passage	$T =$ J.D. 2429146.808	± .051
Velocity of system	$\gamma = -4.90$ km.	±0.56
Semi-amplitude	$= 63.67$ km.	±0.93
$a \sin i$	$= 1.161 \times 10^6$ km.	
$\frac{m_1^3 \sin^3 i}{(m_1+m)^2}$	$= .0355\odot$	