THE ECLIPSING VARIABLE HD 35921

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The sixth magnitude O-type star HD 35921 has proved to be an eclipsing variable with period $4^d.0026$, large amplitude of light variations, and a double-line spectrum.

In a recently published note on the variability of the star HD 35921 ($=$BD $+35°1137$: $\alpha=05^h23^m.0$, $\delta= +35°18'$ (1900)) (Mayer 1965a), this star was suggested as an irregular variable. However, further observations proved its eclipsing binary character. Up till now, photometric as well as spectroscopic observations have been rather scarce. However, the star's MK type, O9.5 III, makes it of importance, and it seems reasonable to publish the data available.

As can be seen from Table I, where data from newer observations made at Ondřejov, Czechoslovakia, and at Yerkes Observatory are collected, the star was bright on even Julian days and faint on odd ones. This applies also to the *UBV* observations published in the note quoted above. Therefore, the period of this star should be close to four days. A comparison with photographic estimations from 1957 to 1965 yields the following approximate elements:

$$\text{Primary Min.}=\text{JD } 2439061.48+4^d.0026 \text{ E.}$$

This period, so close to exactly four days, was apparently the reason for the star's erroneous original classification as an irregular variable.

During October 15–27, 1966, 150 *UBV* observations were made at Kitt Peak National Observatory with the No. 4 16-inch (41-cm) telescope. In all cases, the comparison star HD 35619 was used, the nonvariability of which had been proven during the study of HD 35652 (Mayer 1965b). The Kitt Peak observations are presented in Figure 1, after being reduced by our elements. The light curve, of only limited coverage due to the particular period of this

variable, is of β Lyrae type, with maximum brightness $V = 6.68$ and depths of minima 0^m67 and 0^m55 in V.

The system is redder in the minima. At least a part of this color change is an effect of the close companion ($0\rlap{.}''5$) of this visual double star.

According to Plaskett and Pearce (1931) the radial velocity of HD 35921 is variable. Eight radial velocity measures obtained at the Dominion Astrophysical Observatory, Victoria, were kindly sent to the writer by Dr. A. H. Batten; however due to the inaccuracy of our elements, they could not be used for a determination of the radial velocity amplitude. Several spectrograms were obtained at McDonald Observatory with the 500-mm camera and quartz prisms of the Cassegrain spectrograph (dispersion 40 Å/mm at 3930 Å) during November 1966. The velocities are given in Table II. On spectrograms from favorable phases, the lines are very plainly dou-

TABLE I

OccASIONAL *UBV* ObsERVATIONS OF HD 35921

Date JD 2439000+	V	$B-V$	$U-B$
059.446	7.21	0^m18	-0^m73
.549	7.19	.20	— .78
.609	7.12	.20	— .77
061.416	7.34	.21	— .78
.478	7.37	.20	— .75
.604	7.11:	.23:	— .75
123.434	7.16	.19	— .76
124.317	6.68	.19	— .75
.442*	6.66	.19	— .78
219.600	7.21	.18	— .76
228.577	6.56	.19	— .69:
229.577	7.3::	—	—
231.571	7.22	.18	— .79
232.575	6.67	.19	— .74
237.579	7.39	.23	— .70

* The last observation made at Ondřejov. Later observations were made at Yerkes Observatory.
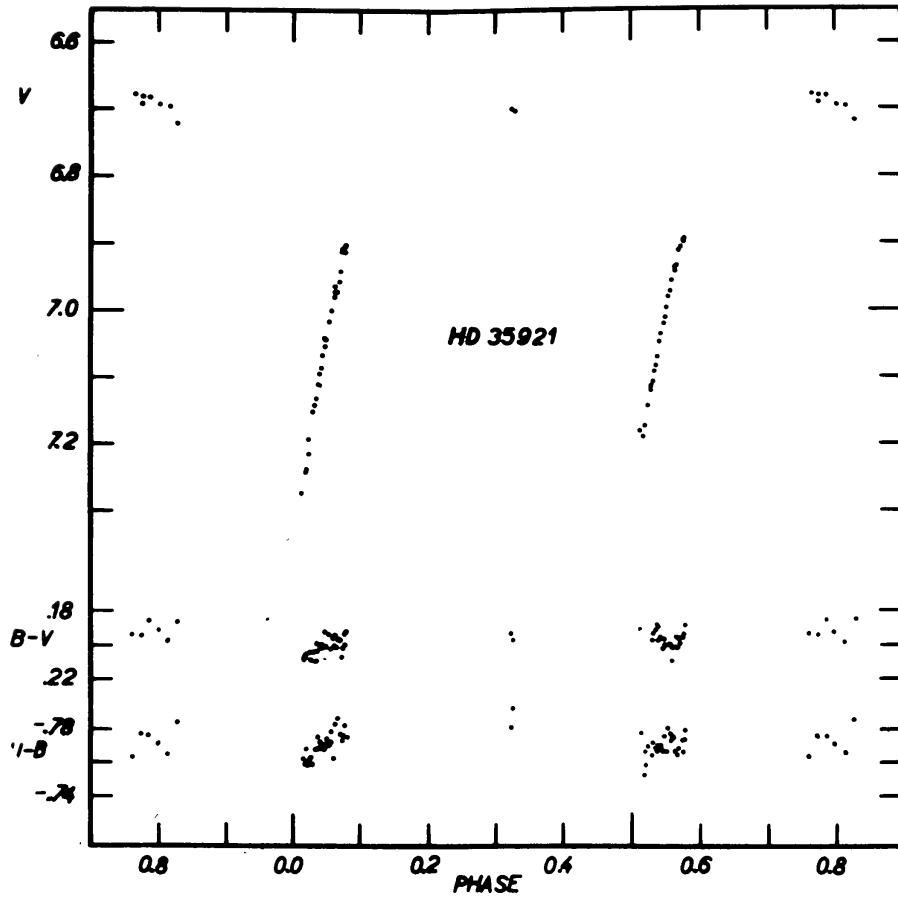
Fig. 1 — Kitt Peak observations of HD 35921. Dots represent averages of 2 or 3 measurements.

TABLE II

RADIAL VELOCITIES OF HD 35921

Plate No.	Date (UT) 1966	JD 2439000+	Phase	Velocity (km/sec)	Number of Lines	Note
9611	Nov. 5	434.73	0ᴾ251	—165	8	1
				+284	8	
9614	Nov. 5	434.85	.282	—135	8	1
				+283	8	
9618	Nov. 5	435.00	.320	—156	10	1
				+264	9	
9623	Nov. 6	435.72	.501	— 23	10	
9636	Nov. 7	436.74	.753	+130	6	2
				—329	6	

Notes: 1, brighter component to violet; 2, brighter component to red.

ble. Despite these limited data some rough results can be obtained: $K_1 = 138$ km/sec, $K_2 = 304$ km/sec, $\gamma = -18$ km/sec, and, assuming the inclination $i = 80°$, we find: $\mathfrak{M}_1 = 26\ \mathfrak{M}_\odot$, $\mathfrak{M}_2 = 12\ \mathfrak{M}_\odot$, $a = 35\ R_\odot$.

When the star HD 35921 is compared with other O-type eclipsing variables, it is found that it has the largest amplitude of light variation among the brighter ones, and therefore it is well suited for the precise determination of masses and radii.

REFERENCES

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