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UBVRI TIMES OF MINIMA OF VW CEPHEI

The Automated Filter Photometer at Kitt Peak was used on the number two 0.9 meter telescope during the interval 19-26 August, 1980, for UBVRI observations of VW Cephei. Useful data were obtained on all or parts of four nights. The single comparison star was BD + 74°889, comparison star "a" in the list by Kwee (1966). One second integration times for each filter permitted accumulation of a large body of observational data. The small range in air mass for the comparison star, a result of its large declination, produced a low weight determination of extinction coefficients. Since differential extinction between the variable and comparison star is very small, it was sufficiently accurate to use mean first and second order coefficients in all colors for a first pass extinction correction for both the variable and comparison star. Calculated magnitude residuals, for the comparison star, from predicted constant extra-atmosphere magnitudes and colors then were examined for time-dependent variation. Where appropriate, time-dependent corrections were applied to both variable and comparison star. This procedure will be described in a separate publication.

The times of observation received an initial heliocentric correction, followed by a light time correction for orbital motion relative to the close visual companion. The visual binary orbital elements of Hershey (1975) were used for this correction. (See also Linnell (1980)). The correction, added to heliocentric times, was -0.01453 days.

The final J.D. times of primary minima are in Table I and secondary minima in TableII, listed by spectral band. The calculated times are among the output of a computer program which will be described in a separate publication. Approximately 150 observations entered the equations of condition for each spectral band in each minimum.

Table I

Primary Minima, VW Cephei

Date	Filter	Time of Min.		Date	Filter	Time of Min.	
Aug.19	I	2444470.77895	±.00017	Aug.25	I	2444476.90234	±.00024
	R	470.77835	±.00015		R	476.90228	±.00021
	V	470.77840	±.00015		V	476.90198	±.00016
	B	470.77850	±.00015		B	476.90179	±.00015
	U	470.77820	±.00015		U	476.90189	±.00015
Aug.21	I	2444472.72680	±.00011	Aug.26	I	2444477.73699	±.00010
	R	472.72667	±.00011		R	477.73673	±.00010
	V	472.72699	±.00013		V	477.73661	±.00010
	B	472.72658	±.00010		B	477.73644	±.00009
	U	472.72666	±.00010		U	477.73613	±.00009

Table II

Secondary Minima, VW Cephei

Date	Filter	Time of Min.		Date	Filter	Time of Min.	
Aug.19		No Data			V	476.76488	±.00018
Aug.21	I	2444472.86721	±.00016		B	476.76516	±.00014
	R	472.86818	±.00022		U	476.76541	±.00015
	V	472.86813	±.00018	Aug.26	I	2444477.87697	±.00018
	B	472.86807	±.00016		R	477.87735	±.00022
	U	472.86834	±.00018		V	477.87757	±.00019
Aug.25	I	2444476.76450	±.00020		B	477.87815	±.00017
	R	476.76495	±.00018		U	477.87844	±.00017

An effect is apparent in the solutions which does not appear to have been discussed previously. To within the errors of observation for all nights, the time of primary minimum comes first in U followed successively by B, V, R and I. The total range of times of primary minimum is the same, within the error of determination, on all nights. It is approximately 60 seconds, from U to I. The sequence is reversed for secondary minimum, with earliest minimum occurring in I, followed successively by R, V, B, and U. The time range of secondary minimum approximates 150 seconds. Light asymmetry is such that the higher maximum follows primary minimum. Color data indicate a higher source temperature at the elongation following primary minimum.

It is worth noting that the difference in depths of minima precisely equals the difference in heights of the maxima. This rule holds in all color bands even though the

differences gradually and monotonically increase from the I band to the U band.

A more detailed discussion of these effects will appear in a separate publication.

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