

PHOTOELECTRIC PHOTOMETRY OF VW CEPHEI IN 1993

VW Cephei (HD197433; BD +75°752) is a short period ($P=0^d27831347$), W Ursae Majoris-type eclipsing binary with components of spectral types G5V+K0V. VW Cep has been monitored at the Villanova University Observatory since 1978. Asymmetries in the light curve have been interpreted as arising from the presence of cool starspots, located chiefly on the photosphere of the larger, more massive component of the system (Bradstreet and Guinan, 1990).

The data were acquired over six nights: July 17, 18, 21, 23, 31, 1993 UT using the 38-cm Cassegrain telescope at the Villanova University Observatory. This telescope is equipped with a photoelectric photometer that uses a refrigerated EMI 9558 photocell. Differential magnitudes were computed from observations made with the intermediate-band Strömgen γ filter ($\lambda=5500\text{\AA}$, FWHM= 350\AA) and in the intermediate-band H α filter ($\lambda=6585\text{\AA}$, FWHM= 280\AA). A total of nearly 600 observations were secured in both band-passes. An integration time of 20 seconds was used for each observation. The observing sequence used was the usual sky-comparison-variable-comparison-sky routine; BD +76°809 ($m_v=7.6$, F2) was the comparison star.

The yellow and red light curves, shown in Figure 1, were formed from the observations using the ephemeris given by Hill (1989):

$$T_{minI} \text{ (HJD)} = \text{HJD } 2437469.3939 + 0^d27831347 \times E \quad (1)$$

$\pm 7 \qquad \qquad \qquad \pm 6$

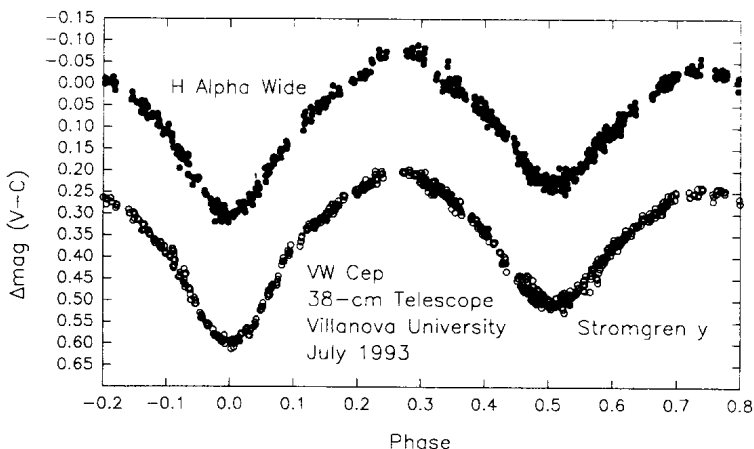


Figure 1. Yellow and red light curves of VW Cep.

The light levels of the extrema are listed in Table 1. They are given in terms of delta magnitude (variable minus comparison) and are relative to the comparison star.

	Yellow $\Delta m(v-c)$	H α $\Delta m(v-c)$
Primary Minimum	+0.597	+0.303
Maximum I	+0.205	-0.070
Secondary Minimum	+0.506	+0.232
Maximum II	+0.249	-0.031

As shown in Figure 1 and Table I, the light curves are asymmetrical in which the Maximum I (0.25P) is brighter than the corresponding Maximum II (0.75P) by $\cong 0.04$ magnitude in each filter. This is probably due to the presence of spots at the 0.75 phase.

The times of the minimum light were calculated using the nights of July 17 and July 18, 1993 UT, in which the eclipses were completely observed. The times of mid-eclipses were found using a parabolic least squares fit to the data in each filter. Table 2 lists the type of minimum, the time of minimum (times in each filter in terms of heliocentric Julian Date averaged from both filters), the number of cycles elapsed (E), and the (O-C) residual in days from equation 1.

	HJD 2449100+	E	(O-C)
Primary (07/17/93 UT)	85.6369	42097.0	+0 ^d 0809
Primary (07/18/93 UT)	86.7501	42101.0	+0.0808
Secondary (07/18/93 UT)	86.6141	42100.5	+0.0840

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