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VARIATIONS OF THE LIGHT CURVE OF VW Cep

VW Cep(HD 197433 :G5; 7.2) is an eclipsing binary system of the W UMa type.

This system shows some peculiar light variations, like asymmetries on both sides of the maximum, sporadic changes of the level of two consecutive maxima (see Fig. 2) small humps on both sides of both minima , asymmetry of the (B-V) curve , and finally intrinsic light variations.

The system also shows the Kwee effect (that is a delay or advance of the primary minimum according to which maximum , II or I , is the higher). This effect was interpreted by Kwee (1966) as produced by an inhomogeneous and absorbing cloud of circumstellar matter, rotating around the double star with a period of little longer than the orbital period of the binary system.

Van't Veer (1973) has proposed that the Kwee effect is originated by gas flows from regions in the neighbourhood of the first Lagrangian point L_1 to the outer envelope of the system. Walter (1979) has associated this event with the precessional periods of the rotational axes of the components.

Pustylnik and Sorgsepp (1976) proposed a model for VW Cep which consisted of a thin gas shell in the form of a disk and a hot spot produced by a gas stream, impacting on a circumstellar shell.

Linnel (1980) reported X-ray emissions for this system. In same way, this one could be the origin for the cited humps near the minima of our measurements during the night 12/13 August, 1985. It was observed like two small humps, near the secondary minimum, at phases 0.45 and 0.53 (see Fig.3). During these nights, the colour index (b-v) was unusually elevated , as it is shown by the dispersion of the points of the observation carried out in the Mojon de Trigo Observatory, Sierra Nevada (see Fig. 1).

The photometric observations were obtained at the Mojon de Trigo Observatory at 2616 m height , during the nights of 30/31 July , 10/11 August, and 12/13,13/14 October 1985.We have employed the 32 cm Cassegrain telescope (f/14)

FIG. 2

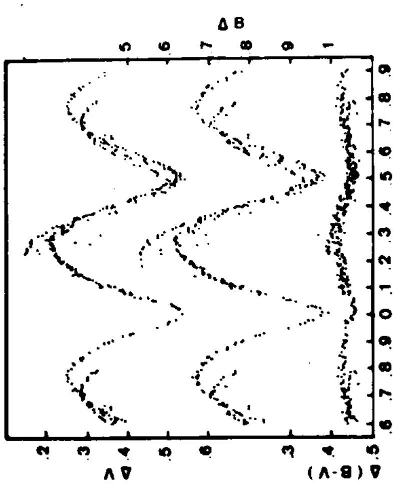


FIG. 3

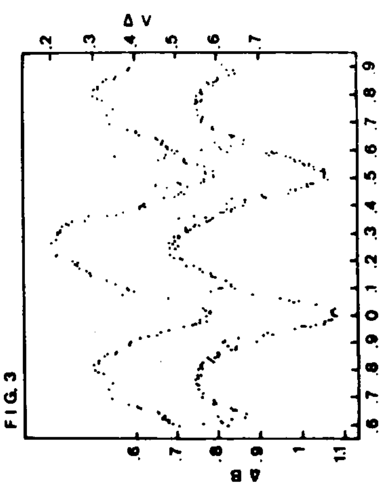
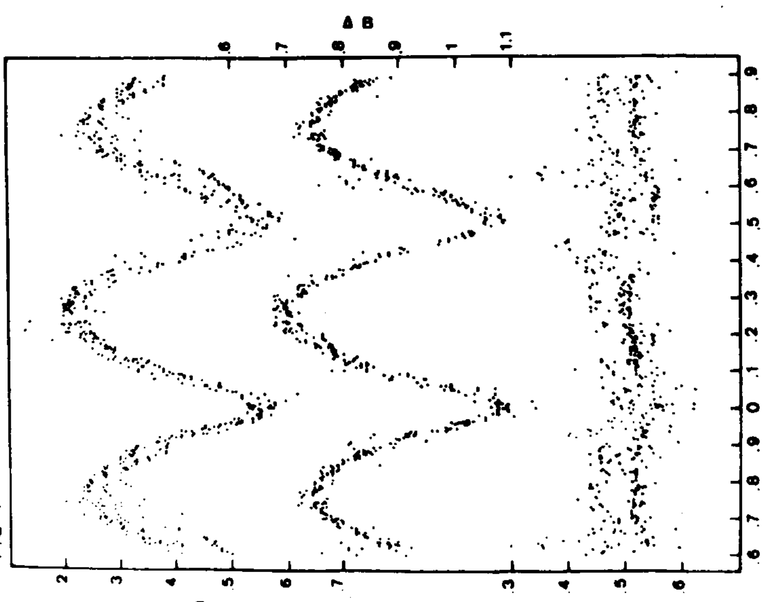


FIG 1



equipped with photoelectric photometer using an EMI 6256A photomultiplier. We used the B, V Johnson filters. The 450 points obtained in each colour are plotted in Figure 1. The acquisition system used was a voltage-frequency converter linked to a Vic 20 personal computer, using a pulse counting program.

Additionally a second set of observations was made at Calar Alto Observatory in Almeria (Spain) employing the 1.23 m telescope (f/8) and one photometer using the RCA 3134 photomultiplier , during the nights of 30/31 August, 31 August to 1 September and 1/2 September. We used the standard UBV Johnson filters. Figure 2 shows the 285 points measured at Calar Alto in each colour. We always used HD 197665, SAO 9836 as comparison star.

In total, using the Mojon de Trigo plus Calar Alto observations, we determined 14 times of minima , of which 8 are primary and 6 are secondary ones listed in Table I.

The O-C residuals and the epoch are also given in this Table.

The O-C residuals have been calculated using Kwee's ephemeris :

Min. I = HJD 2433898.4410 + $0^{d}.2731793$ x E

or Min II with E+0.5 .

The epoch was evaluated with the ephemeris given by Hopp et al.(1979)

Min. I = HJD 2443410.4180 + $0^{d}.2783148$ x E

Table I

HJD 2446000 +	EPOCH	O-C	TYPE MIN.
277.5912	44479	-0.1530	I
287.6104	44515	-0.1533	I
288.4439	44518	-0.1547	I
288.5885	44518.5	-0.1493	II
289.4221	44521.5	-0.1507	II
289.5565	44522	-0.1554	I
308.6248	44590.5	-0.1519	II
309.4612	44593.5	-0.1505	II
309.5963	44597	-0.1545	I
310.5768	44597.5	-0.1481	II
350.5087	44741	-0.1548	I
351.4888	44744.5	-0.1489	II
351.6213	44745	-0.1555	I
352.4563	44748	-0.1555	I

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