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WY Cnc - A PUZZLING SMALL-SCALE ALGOL SYSTEM

The variability of the short period ($0^d.829$) eclipsing binary WY Cnc was recognized by Hoffmeister (1949), though it was Kippenhahn (1953) who first pointed out its Algol type pattern of light variability. Chambliss (1965) published a two colour photoelectric investigation of the system as a result of which he was able to produce a set of geometric elements. The system has been observed subsequently by Ahnert (1973) and again by Chambliss (1975), the former having reported essential constancy of the orbital period over a forty year interval.

Popper (1976), who gave the predominant spectral type as G5, included the star in a list of close binaries exhibiting the H and K lines in emission, as a result of which, perhaps, the star has been included in the "short period" group of RS CVn like binaries studied by Hall (1976). One of the more salient puzzles appears at this stage in the actual appearance of the light curve, i.e., the deep primary and very low level of proximity induced photometric distortion - the short period and intermediate spectral type notwithstanding.

Unfortunately, there appears to be no published radial velocity curve for the system. Popper (1976) identifies the source of the emission lines to be the primary and notes (private communication) that in this respect it is the only exception in his list. This point is perplexing, however, since according to analysis of Chambliss (1965) it is the slightly more luminous star which remains uneclipsed at the occultation (primary) minimum.

From some preliminary results obtained with the 3 prism Cassegrain spectrograph of the 74 inch reflector at Kottamia we can make a tentative identification at elongation of weak emission features in the H and K lines, though we would tend not to associate them, on the basis of apparent Doppler shift, with the predominant G type (primary) spectrum, but we have no conclusive measurements about this as yet.

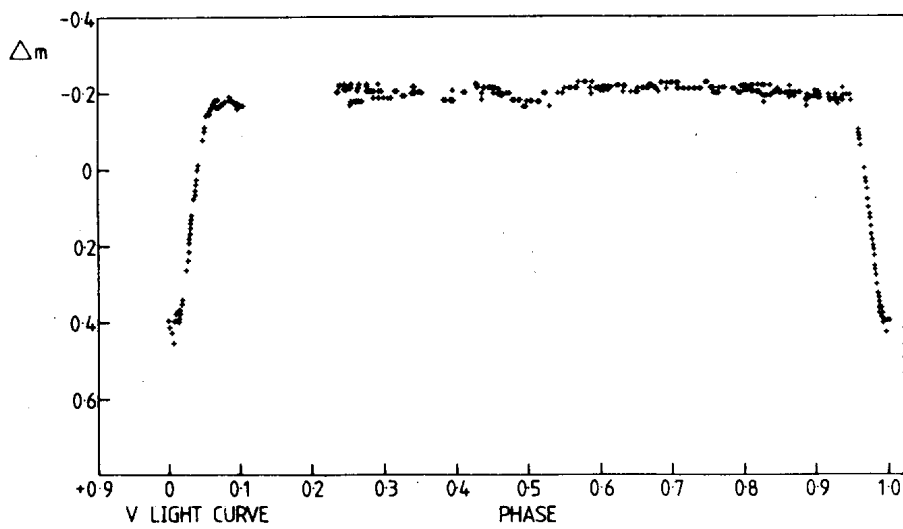


Fig 1.

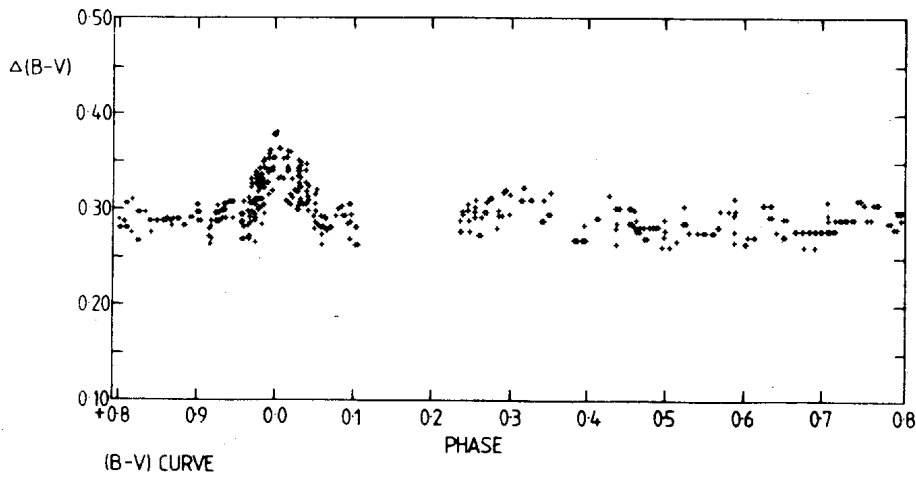


Fig 2

Another problem concerning this primary star is its small size. Even if the mass of the system were as much as 6 solar masses the Chambliss solution yields the primary radius to be still only two thirds that of the Sun.

We have re-observed the system photoelectrically in B and V colours using the photometric arrangement described by Sadik (1978). The main comparison star was BD 27^o 1700 with occasional checks being made on BD 27^o1699. The phases of WY Cnc were computed from the ephemeris

$$\text{JD Hel Min I} = 2426352.3895 + 0.82931722 \text{ E.}$$

We can confirm the essential features of the light curve as given by Chambliss, though there may be some minor differences. It is planned to re-analyze the system, and to obtain more spectrograms when the star again becomes favourably placed for observation.

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