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ON THE PERIOD OF LIGHT VARIATION IN THE RS CVn SYSTEM HD 86590

The suspected variability of the spectroscopic binary HD 86590 has recently been confirmed by Hall, Vaucher, and Louth (1), whose photoelectric observations made early in 1979 show a nearly sinusoidal wave when plotted with respect to the spectroscopic period of $1^d.070354$ by Bolton (2). The photoelectric observations in 1976 by Bolton and his colleagues confirm the presence of the wave but the phasing is different (2).

The system has been on our observing program at the University Observatory at Ankara since 1975; the aim was to look for possible eclipses and variability. Although no observations, however, could be obtained since 1977, it will be useful to give an account of these observations in the light of the recent results mentioned above.

We have 321 observations in v and 226 observations in b on a total of 16 nights in two seasons between January 1975 and May 1977 obtatined with the 30-cm maksutov telescope with an EMI 6256S photomultiplier.

The observations in v are plotted in Fig.1a with respect to the spectrocopic period quoted above. The phasses are calculated using the spectroscopically adjusted epoch (2), JD 2442849.896, so that the primary eclipse should fall at phase 0.0. The instrumental magnitudes are relative to the comparison star HD 86132. They are corrected for differential extinction when necessary. Each point in the figure corresponds to the mean of up to 10 individual observations.

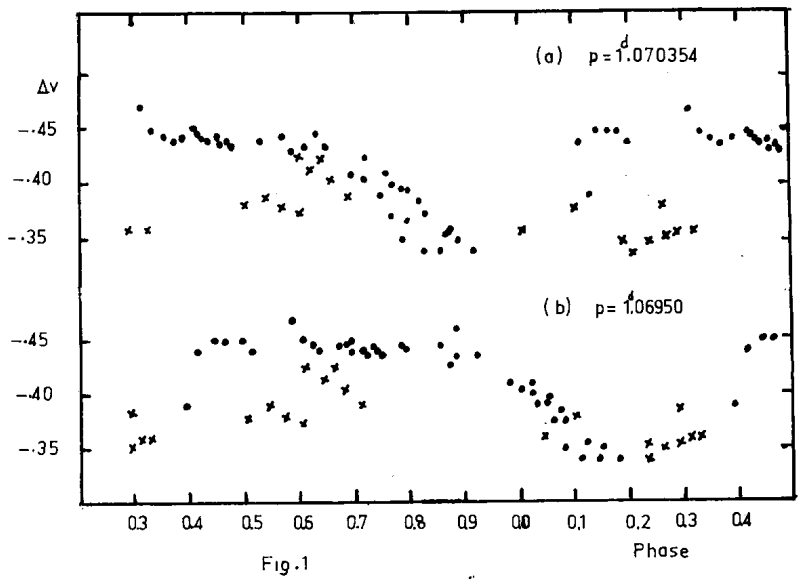

Fig.1

The mean standard error of a single differential measure, obtained using the two check stars HD 86418 and HD 85428 and the comparison star, is about $\pm\ 0^m.012$ in both colours.

The light curve has a full amplitude of $0^m.14$ in v and $0^m.16$ in b, which, apart from any scale differences, agree well with other observations (1,2,3,). But it is seen from Fig.1a that our observations, which are spread over a longer interval of time than those by Hall et al. (1), do not fit the spectroscopic period: 1976 observations, shown as crosses, depart the most while observations on different nights in 1977 fall systematically above or below each other on the descending branch of the light curve. We have looked for systematic errors between the seasons and between nights but found none. The nightly mean differences between the two check stars, and between a check star and the comparison star, have a standard deviation of only $\pm\ 0^m.005$ in v and $\pm\ 0^m.006$ in b (up to 15 observations of a check star are available on a given night). Therefore, unless there are intrinsic variations of the order of weeks, or even days, over and above long term

changes and wave migration encountered in similar objects, it is possible that the photometric period is different from the spectroscopic period.

We have two approximate times of minima JD 2443194.475 and 2443225.45. These, plus that given by Hall et al. (1), namely 2443969.85, imply a period of $1^d.06950$. The observations plotted against this period and the same epoch as before are shown in Fig.1b. The mean wave is better defined but there are observations on two nights in 1976 that fall below the curve around the phase 0.6. It is interesting to note that the phase of a possible eclipse considered by Hall et al. falls here, but the phasing of the points suggests againsts an eclipse and it is possible that the period is still wrong.

A better fit is achieved with a period twice as long, viz., $2^d.13899$. This is shown in Fig.2 in both colours. The minimum observed by Hall et al. fits nicely at phase 0.59. This period also satisfies the BV observations by Bolton and co-workers with a phase shift of about 0.09. Clearly this long period variation, if real, can not be due to eclipse and such a double wave is not expected. The observations around the phases 0.05 and 0.35 which vary in the wrong direction might point to the period as being still wrong. More observations

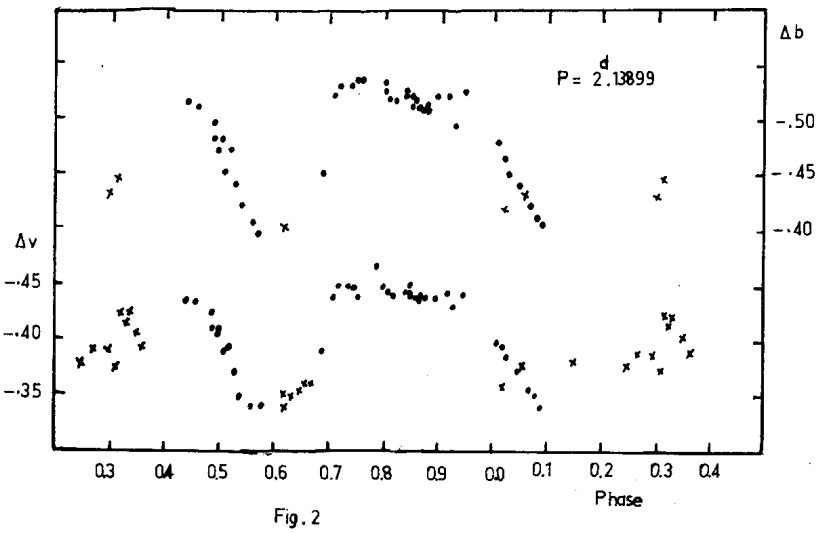

Fig. 2

are needed to eliminate spurious periods and to study the light curve changes. Observations of this system will be continued.

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