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A NOTE ON THE ORBITAL PERIOD OF SS Cygni

Smak (1969) has pointed out that the time-distribution of the observed radial velocities of SS Cygni is such that the velocity variation may be represented about equally well by the elements:

$$\text{Zero Phase} = \text{JD hel.}2430267.770 + 0^{d}.2762440\underline{E} + 9^{d}.54\times10^{-11}\underline{E}^{2} \quad (1)$$

derived by Walker and Chincarini (1968), and by

$$\text{Zero Phase} = \text{JD hel.}2430267.700 + 0^{d}.269483\underline{E} + 1^{d}.5\times10^{-10}\underline{E}^{2} \quad (2)$$

derived by himself. The question of which of the above periods is correct is of considerable importance. In 1965, Walker and Chincarini obtained spectroscopic observations of SS Cyg during the rise to maximum of one of characteristic outbursts of this system. Using (1), these observations indicate that the outburst was associated with the hot component of the system. However, if (2) is correct, then the velocity variation observed during rising light would indicate that the outburst originated in the late-type component.

In order to determine which elements are correct, spectroscopic observations of SS Cyg were obtained on July 12 and September 8 and 9, 1970 (UT), using a Spectracon image intensifier tube attached to the focus of the 20-inch camera of the coudé spectrograph of the 120-inch reflector. The dispersion was 48 A/mm. The exposures were made using the single-trail technique described earlier (Walker and Chincarini 1968). The dates of observation were chosen to give a time interval between them such that counting from a common epoch on the first date, the phases predicted by the two values of the period will differ by about 0.5P on the second.

The observed radial velocities are shown in Figures 1 and 2. In Figure 1, the emission line (H and CaII K) velocities are combined using (2) and in Figure 2, the emission and absorption line velocities are combined using (1).In both cases, the observations are plotted against the phase reckoned from an epoch which was the time of the first observation on July 12, 1970.

It is evident from the figures that the observations are represented by the period given by Walker and Chincarini and not by the period given by Smak. Certain complications remain: The time of zero phase observed in 1970 differs by about 0.5P from that predicted by (1). In addition, there appears to be a phase shift of about 0.12P between the velocity curves observed in July and in September, when these are combined using (1). Thus, period changes in addition to that observed by Walker and Chincarini (1968) have clearly occurred. However, since the interval between the observations at minimum and during rising light in 1965 was only 17 days, it appears that despite the occurrence of small changes in the period, the conclusions given by Walker and Chincarini are correct, and that the outburst in SS Cyg originates in the hot star. A more detailed account of these observations will be given at a later date.

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References

Smak,J. 1969, Acta Astronomica, 19, 287
Walker,M.F., and Chincarini, G. 1968, Ap.J., 154, 157.

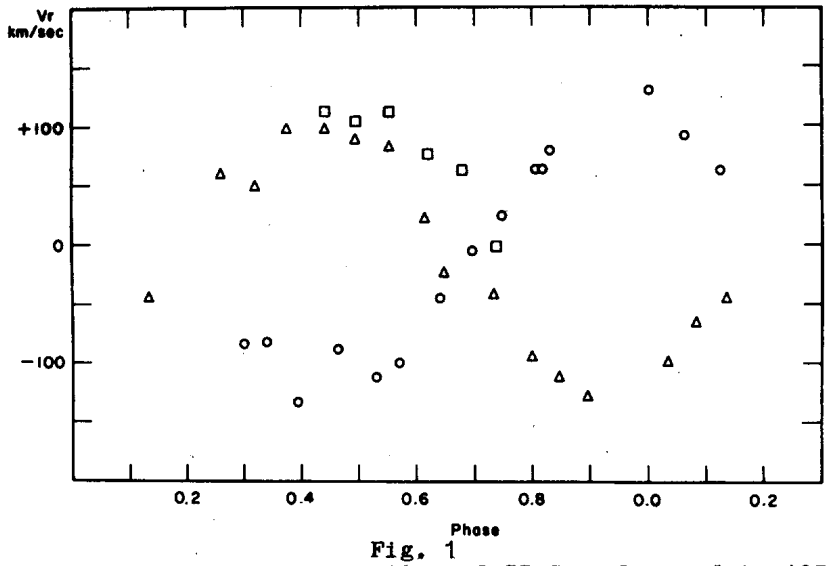

Fig. 1

Emission line radial velocities of SS Cyg observed in 1970, combined using the period given by Smak. Circles denote observations on July 12, triangles observations on September 8, and squares observations on September 9 (UT).

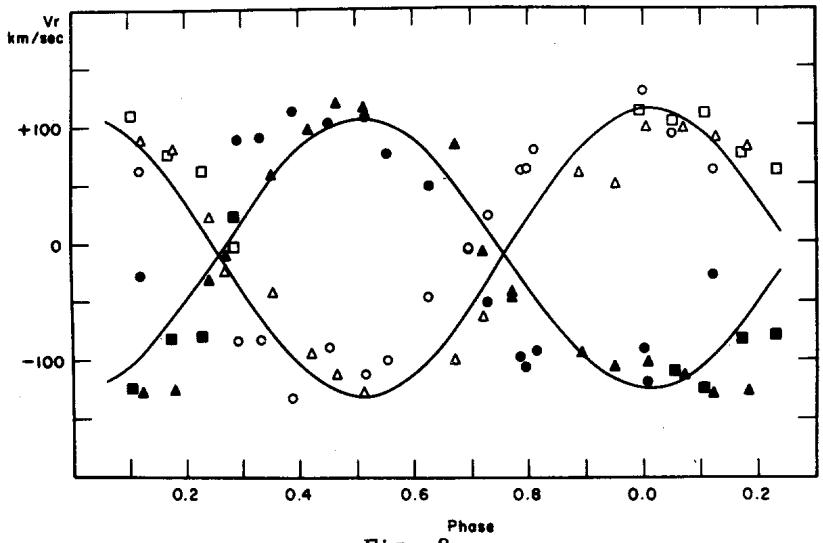

Fig. 2

Emission and absorption line radial velocities of SS Cyg observed in 1970 combined using the period derived by Walker and Chincarini. Symbols as in Figure 1; open symbols indicate emission lines, filled symbols indicate absorption lines.