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THE LARGE PERIOD VARIATION IN SS CAM EXPLAINED

New UBV photoelectric photometry of the RS CVn-type eclipsing binary SS Cam, obtained during 1972 at Dyer Observatory and Kitt Peak National Observatory, provides support for the theory proposed by Hall (1972) to explain the large period variations which are experienced by the RS CVn-type binaries. In this theory the continuous back and forth period variation is explained as a result of continuous mass loss from an active (dark) region on the equator of the cool star which differential rotation forces to change its orientation in the binary system.

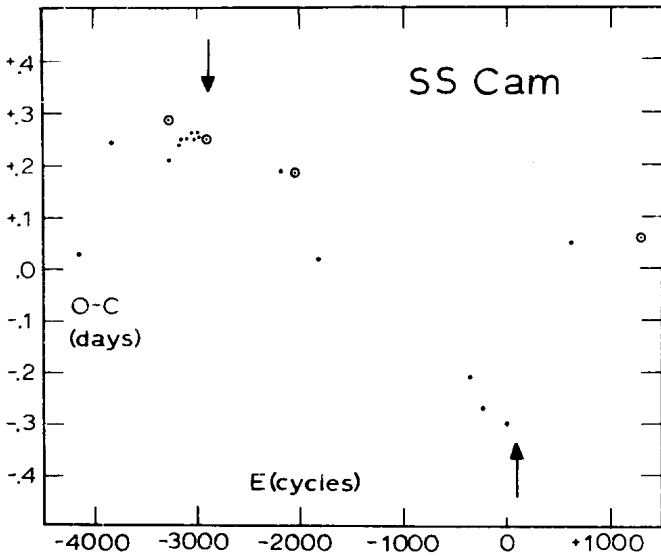
Our 1972 UBV photometry, which will be published elsewhere later, shows the minimum of the out-of-eclipse wave-like distortion to be located at orbital phase $P = 0^P.56$. The 1913-1915 visual observations of McDiarmid (1917, 1924) show the minimum of the wave at $P = 0^P.27$. If these two phases are plotted versus time and if the wave is assumed to have migrated towards decreasing orbital phase, as the theory requires, then we have a migration rate diagram similar to that constructed by Hall (1972, Figure 2) for RS CVn. From such a diagram we can deduce that the minimum of the wave was located at $P = 0^P.25$ around 1917 and at $P = 0^P.75$ around 1956.

The O - C diagram of SS Cam is plotted in this Bulletin, where the residuals have been computed with the ephemeris

$$JD (\text{hel.}) 2435223^d.580 + 4^d.82430 E$$

of Kreiner (1971). The last point is the one based on our UBV photometry and corresponds to a primary minimum at JD (hel.) 2441456.634. The other points are based on times very kindly supplied to us by Dr. J.M. Kreiner of the Krakow Observatory. The circled points are normals representing several individual times.

The arrow pointing down is the time when the minimum of the wave was at $P = 0^P.25$ and the theory would predict that the mass-losing active region was on the trailing hemisphere and should be causing the maximum rate of period decrease. The arrow pointing up



is the time when the minimum of the wave was at $P = 0.75$ and the theory would predict the maximum rate of period increase. Within the limitations imposed by this less than ideal C - C diagram, we would say that the predictions of the theory are confirmed perfectly.

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