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VARIATIONS IN THE LIGHT CURVE OF V711 TAURI (HR1099)

The $2\overset{d}{.}838$ RS CVn-type binary V711 Tau (HR1099) was observed on 13 nights from October 30 U.T. through December 04 U.T., 1979. The observations were obtained using the 38-cm Cassegrain telescope at Villanova University Observatory. The photoelectric photometer is equipped with a thermoelectrically cooled (-20°C) EMI 9558 photomultiplier tube and a microprocessor-controlled integrating system. A pair of intermediate- and narrow-band interference filters centered near the rest wavelength of the Hα line at λ6563 was used. The characteristics of the filters are similar to those used in the definition of the Villanova Hα system (Guinan and McCook 1974). The comparison star was 10 Tau and 12 Tau served as the check star. The comparison star was the same used in previous investigations of V711 Tau. The observing sequence was the usual pattern of sky-comparison-variable-comparison-sky, with each observation lasting 20 seconds. The faint K3V companion star (ADS 2265B) about 6 arc seconds from V711 Tau was included in all measurements of the variable. On a night with fine seeing conditions (November 19 U.T.) the magnitude difference between the V711 Tau and its companion was determined to be +2.31 mag through the intermediate bandpass at λ6585. The effects of differential atmospheric extinction were removed, but because of the angular proximity of the comparison star to the variable star, the extinction corrections were insignificant. Normal points were formed from the intermediate bandpass data with up to 10 observations making up a mean. These data are plotted in Figure 1 where the phases were computed according to the ephemeris: JD Hel. 2442766.069 + 2.83782·E
from Landis et al. (1978) where zero phase corresponds to conjunction, with the more active component in front. The solid curve shown in the figure is a schematic representation of the λ6585 observations made from October 1977 through February 1978 at Biruni and Villanova Observatories. The α-indices also formed from the narrow- and

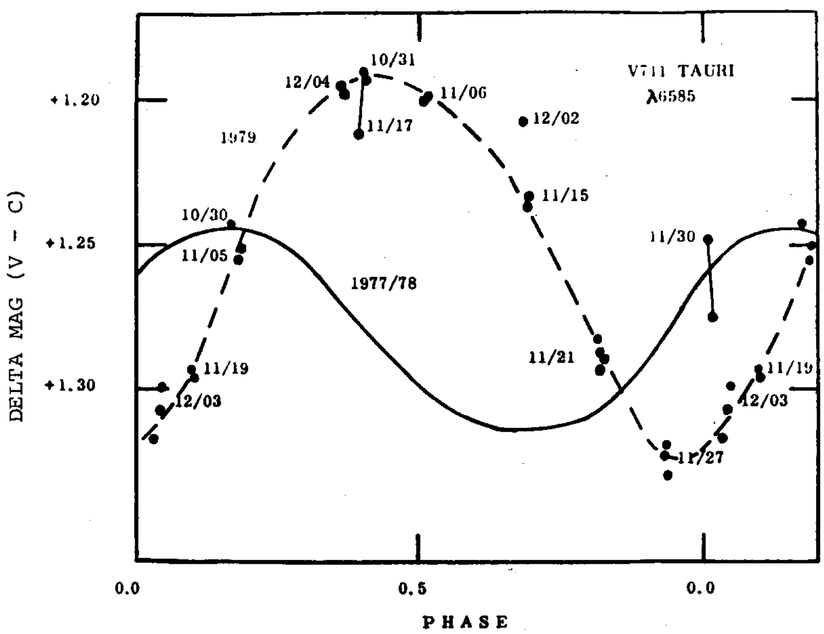

Figure 1. The intermediate-band λ6585 observations of V711 Tauri are plotted against orbital phases where 0.0 phase corresponds to the conjunction with the more active star in front. The broken-line curve is drawn through the Fall 1979 data while the solid curve represents the 1977/78 light variation.

intermediate-band observations and these will be published later together with the intermediate-band data.

As shown in the figure, the 1979 light curve is significantly different from that obtained two years earlier at the same wavelength. The amplitude of the 1977 light curve is about 0.075 mag while the present light amplitude is about 0.130 mag. In addition the wave minimum in 1977 occurred near 0.68 phase while in 1979 the minimum is near 0.95 phase. Further, V711 Tau is now brighter at maximum light by about 0.05 mag than in 1977 while the value of minimum light remains essentially unchanged between the two data sets. The present observations confirm the result of Chambliss (1979) who recently reported an increase in the light amplitude (at V) from data obtained in early 1979.

A significant event appears to have occurred between November 27 and December 03 U. T. On the night of November 27 U. T. the magnitude of the system was consistent with the new curve but three nights later on November 30 U. T. the brightness was 0.06 mag above normal. The Hα index on that night was also enhanced, being about 0.03 mag above the mean, indicating a substantial increase in hydrogen emission. Two nights later on December 02 U. T. the system was only 0.02 mag above the mean curve and the emission had decreased. By December 03 U. T. the system had returned to its previous light level.

V711 Tau was observed by one of us (EFG) on one night during the Fall of 1978 and this data was found to fall on the 1977 light curve. By February 1979, however, the light curve had greatly changed character as shown by Chambliss's V-observations. The rapid migration of the wave minimum from 0.68 phase in 1977 to 0.95 phase in 1979 and the change in the nature of the light curve from 1977 to the present may be associated with the radio outbursts observed in February and March of 1978 (Feldman 1978), and again during the summer of 1979 (Feldman 1979). Assuming that the light variations are caused by star spots on the active component, it would appear that the configuration of the spotted regions has changed significantly. Modeling of both curves is underway using a starspot program developed at Villanova. We also plan to continue to monitor the system for the next few months.

EDWARD F. GUINAN
GEORGE P. McCOOK
JOSEPH L. FRAGOLA
ANDREW G. WEISENBERGER

Department of Astronomy
Villanova University
Villanova, Pennsylvania 19085
U.S.A.

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