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# UBV PHOTOMETRY OF THE ECLIPSING BINARY SYSTEM SV TAURI

The variability of SV Tauri was discovered in 1908. The system has proven to be an Algol-type eclipsing binary with a period of $2^{d}.1669$. Between 1930 and 1936 Lassovszky (1938) obtained 1260 visual observations of this system. His analysis of these observations is the most extensive discussion of SV Tauri thus far published. Using the Russell model orbital elements were obtained for both limb-darkened and undarkened cases. He found the primary eclipse to be an occultation. The eclipses are partial, and the secondary is observed to show a slight phase shift from 0.50 indicating a small amount of orbital eccentricity. The depth of the primary was found to be $1^{m}.09$ and that of secondary $0^{m}.15$. Another investigation of SV Tauri was made by Koshkina (1961), who based her study on 316 photographic estimates. The depths reported in this paper were $1^{m}.15$ for primary and $0^{m}.16$ for secondary.

Thus far no photoelectric investigation of SV Tauri has been carried out. This fact was noted by Koch et al. (1979), who listed eclipsing binaries for which little or no photoelectric data were available.

This invesitgator observed SV Tauri on three nights in December, 1981, with the 0.4 meter telescope no. 4 of Kitt Peak National Observatory. An RCA 1P21 photomultiplier, refrigerated with dry ice, was used. Each observation is the mean of at least two 10-second integrations on the pulse counting photometer. The comparison star used was BD $+28^{\circ}920$. The colors and magnitudes obtained for this star were V = 8.99, B-V = -0.03, and U-B = -0.01.

A total of 351 observations of SV Tauri was obtained. These observations, corrected for light time and differential extinction, have been placed in the archives of the Royal Astronomical

Society. The magnitude differences are in the sense SV Tauri - BD $+28^{\circ}920$. They range from +0.69 to +1.79 in V, +0.84 to +2.02 in B, and +0.71 to +1.96 in U. In Figure 1 on which they are plotted each marking on the vertical scale represents 0.20 mag. Unfortunately, only about one-third of the light curve was covered in this session. Additional observations are planned for the following season.

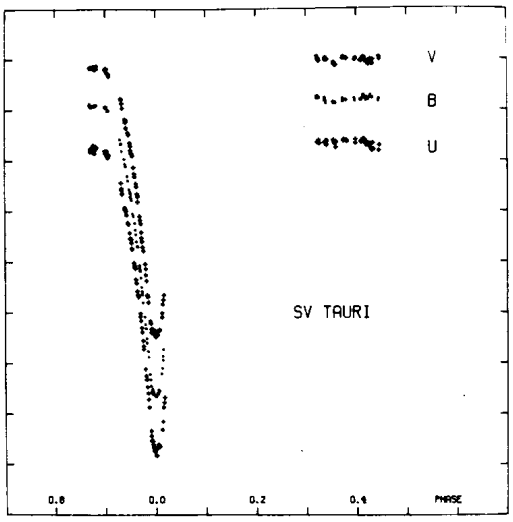


Figure 1

The magnitudes and colors obtained for SV Tauri, whose spectral type is given as B9, are as follows:

| | | | |
|---|---|---|---|
| at maximum | V = 9.68 | B-V = +0.10 | U-B = -0.13 |
| at primary | 10.78 | +0.21 | -0.08 |

Thus the primary eclipse has depths of $1^{m}.10$ in V, $1^{m}.19$ in B, and $1^{m}.24$ in U. The previous finding that the eclipses are partial is also confirmed by this investigation. The duration of the primary eclipse was found by this investigator to be $0^{d}.421$ or $10^{h}06^{m}$. This value is significantly less than that reported by Lassovszky and by Koshkina.

One time of minimum light was found in this investigation, JD Hel. 2444967.9092. Thus far it is the only photoelectric time of minimum light which has been published for this system. Visual and photographic times of minimum light for SV Tauri have been listed by Koshkina, Szafraniec (1976), and Kreiner and Winiarski (1977). Koshkina listed 103 times of minimum light observed between 1898 and 1956. Szafraniec listed an additional 11 times of minimum light observed between 1957 and 1975. Using these observations, together with his own, this investigator obtains the following ephemeris for SV Tauri:

JD Hel. $2434423.7491 + 2^{d}.1669051\ E.$

$\pm$ 13 $\pm$ 3 p.e.

In the least-squares analysis the photoelectric time of minimum light was given 20 times the weight of the others. The period obtained is slightly longer than those quoted by Lassovszky ($2^{d}.1669028$) or by Koshkina ($2^{d}.1669036$). This does not necessarily indicate that the period has increased, however, as many of the earlier times of minimum light are imprecise. Kreiner (1971) gives an O-C diagram for this system. It does not show any systematic change in period.

The author hopes to obtain additional photoelectric observations of SV Tauri and to publish a detailed analysis of this system in the coming year. The system is of interest since it apparently displays a small amount of orbital eccentricity. It is typical of a large number of 10th and 11th magnitude eclipsing binaries for which few, if any, photoelectric data are available.

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CARLSON R. CHAMBLISS

Dept. of Physical Sciences
Kutztown State College
Kutztown, Penna., USA

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