

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1014

Konkoly Observatory
Budapest
1975 July 1

1974 SPECTROPHOTOMETRY OF SIX RS CANUM VENATICORUM-TYPE BINARIES

Photoelectric spectrum scans of RS CVn, Z Her, AR Lac, LX Per, SZ Psc, and UX Ari were obtained during 1974. A preliminary analysis showed significant variations in the emission line intensities of the H and K lines of calcium and H α (Weiler 1975). A closer inspection has now revealed a correlation between maximum emission intensity and phase in RS CVn, UX Ari, Z Her, and SZ Psc.

The phases of maximum emission for both H α and H and K in RS CVn and UX Ari were also found to coincide with the minimum of the wave-like distortion observed in these two binaries (Catalano and Rodono 1974, Evans and Hall 1974, and Hall et al. 1975). In a paper by Hall (1972), the minimum of this wave was interpreted to be caused by large scale starspot activity on one hemisphere of the later type component in RS CVn. The current observations seem consistent with Hall's results as both H α and H and K emission on the sun are associated with regions of sunspot activity.

At this time no definite conclusion can be drawn for Z Her, as the position of the wave of minimum during 1974 is not well known. Any light curves of this binary obtained in the period 1973 through 1975 would be most useful in fixing the position of the wave minimum and in providing a further test of the correlation observed in RS CVn and UX Ari.

In the case of SZ Psc, the problem is even more difficult, as the last reliable primary eclipse epoch was published over 17 years ago (Bakos and Heard, 1958). Bakos and Heard observed SZ Psc again in 1968, but could not rediscover primary minimum (Heard and Bakos, 1968). They did report period variation and intrinsic variation of the later type component. Before any correlations can be drawn for

the data on SZ Psc, a recent epoch is needed along with a light curve which might show a wave-like distortion outside of eclipse. Although this binary shows the same correlation between maximum emission intensity and orbital phase as the others, the position of this peak intensity cannot be reported at this time due to the lack of a recent primary eclipse epoch.

The observed phases of maximum emission intensity are listed in the table below. The phases of the wave minima for RS CVn and UX Ari were calculated for the midpoints of their respective observing seasons. Any migration of the waves during the 1974 spectrophotometric observations would be insignificant as both migration rates are relatively slow (Hall 1972, Evans and Hall 1975).

Binary	Phase of Maximum Emission	Minimum Phase of Wave
RS CVn	.30 ± .03	.39 ± .03
UX Ari	.16 ± .16	.09 ± .07
Z Her	.73 ± .01	?

The analysis of the 1974 data is continuing, and I encourage others to observe Z Her and especially SZ Psc as photometry of these two systems is needed to test the emission-wave correlation found for UX Ari and RS CVn.

EDWARD J. WEILER

Lindheimer Astronomical Research
Center, Northwestern University
Evanston, Illinois 60201, U.S.A.

References:

- Bakos, G.A. and Heard, J.F. 1958, A.J. 63, 302
 Catalano, S. and Rodono, M. 1974, P.A.S.P. 86, 390
 Evans, C.R. and Hall, D.S. 1975, I.B.V.S. No. 945
 Hall, D.S. 1972, P.A.S.P. 84, 323
 Hall, D.S., Montle, R.E., and Atkins, H.L. 1975, Acta Astr. 25, 125,
 (in press)
 Heard, J.F. and Bakos, G.A. 1968, J.R.A.S.C. 62, 67
 Weiler, E.J. 1975, B.A.A.S. 7, 267