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PERIOD CHANGES OF THE BRIGHT RR LYRAE STARS SU Dra AND VY Ser

Alerted by visual observers of the Berliner Arbeitsgemeinschaft für Veränderliche Sterne (BAV) we did some photoelectric photometry on the bright RRab stars SU Draconis and VY Serpentis in search of suspected changes in the primary periods. The telescope used was a 0.34 m Cassegrain, equipped with a 1P21 phototube. All measurements were done in V colour.

SU Dra was discussed in detail by Olah and Szeidl (10), who detected no major period changes, apart from some very small fluctuations, and published the elements:

$$\text{JD hel. Max.} = 2420605.762 + 0.66041890 \cdot E \quad (\text{I})$$

Table 1 shows a collection of photoelectric maxima of SU Dra obtained since JD 2442000. O-C residuals (I) are given for the elements of Olah and Szeidl (10) and (II) for elements calculated by us on the method of least squares, namely:

$$\text{JD hel. Max.} = 2448024.4013 + 0.66042153 \cdot E \quad (\text{II})$$

$$\begin{array}{cc} \pm 17 & \pm 28 \end{array}$$

Table 1: Photoelectric maxima of SU Draconis.

JD hel.	O-C (I)	O-C (II)	Observer	Reference
2442403.5545	+0.0063	+0.0008		Olah and Szeidl (10)
42415.4444	+0.0086	+0.0032		Olah and Szeidl (10)
42454.4077	+0.0072	+0.0016		Olah and Szeidl (10)
42948.3975	+0.0037	-0.0039		Olah and Szeidl (10)
43204.6427	+0.0064	-0.0023		Olah and Szeidl (10)
45054.4846	+0.0149	-0.0011	Ag	Braune and Mundry (1)
46833.6643	+0.0261	+0.0030		Liu and Janes (8)
48024.4036	+0.0301	+0.0023	Gr	this paper
48127.4237	+0.0249	-0.0034	Gz/Wu	this paper

The newly established period clearly differs from Olah and Szeidl (10) and, compared with earlier observations, which are mentioned in a more detailed paper by Wunder (13), a major period increase seems to have occurred at around JD 2441000.

The fourth edition of the GCVS (6) already lists a somewhat larger period ($P=0.66042001$) than Olah and Szeidl (10) found, which nevertheless fails to represent recent observations.

Regarding VY Ser Table 2 lists all available photoelectric maxima of this RRab star.

Table 2: Photoelectric maxima of VY Serpentis.

JD hel.	O-C (I)	O-C (II)	Observer	Reference
2437411.531	-.005	+.007		Tremko (12)
38466.958	-.009	±.000		Fitch et al. (4)
39213.901	-.008	-.002		Fitch et al. (4)
39615.933	-.011	-.006		Stepien (11)
41443.309	-.001	-.002		Lub (9)
44738.869	+.016	+.005		Carney and Latham (2)
44764.566	+.006	-.006		Fernley et al. (3)
47307.4768	+.028	+.008	Ls/Sk/Wu	this paper
47653.798	+.014	-.007		Fernley et al. (3)
48356.4777	+.026	+.002	Wu	this paper

Ephemeris (I) refers to the elements of the fourth edition of the GCVS (7) :

$$\text{JD hel. Max.} = 2431225.341 + 0.71409384 \cdot E \quad (\text{I})$$

while O-C residuals (II) are based on the elements derived by us:

$$\text{JD hel. Max.} = 2448356.4756 + 0.71409615 \cdot E \quad (\text{II})$$

±31 ±33

Jones et al. (5) and Fernley et al. (3) also published new elements for VY Ser. Both differ significantly from our elements because of too few observations.

Including non-photoelectric maxima from JD 2415800 to JD 2437000, which are mentioned in a more detailed analysis by Wunder (13), it seems likely that the period variation is not due to an abrupt change, but is reflected by a continuous and slow increase of the period by 1.2 seconds per century. Also this is somewhat uncertain because of the high scatter of these observations, the process can be described by the formula:

$$\text{JD hel. Max.} = 2438873.2763 + 0.71409494 \cdot E + 1.38 \cdot 10^{-10} E^2$$

±17 ±14 ±10

Abbreviations of the observer's names:

Ag = F. Agerer Gz = M. Garzarolli Sk = S. Skaberna
Gr = R. Gröbel Ls = G. Lichtschlag Wu = E. Wunder

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References:

- (1) Braune, W., Mundry E., 1982, BAV-Mitteilungen, No.34
- (2) Carney, B.W., Latham, D.W., 1984, Astrophysical Journal 278, 241
- (3) Fernley, J.A. et al., 1990, Monthly Notices of the Royal Astr. Soc. 247, 287
- (4) Fitch, W.S., Wisniewski, W.Z., Johnson, H.L., 1966, Comm. Lunar and Planetary Laboratory 5, Part 2, No. 71
- (5) Jones, R.V., Carney, B.W., Latham, D.W., 1988, Astrophysical Journal 332, 206
- (6) Kholopov, P.N., Samus, N.N., Frolov, M.S., Goranskij, V.P., Gorynya, N.A., Kazarovets, E.V., Kireeva, N.N., Kukarkina, N.P., Kurochkin, N.E., Medvedeva, G.I., Perova, N.B., Rastorguev, A.S., Shugarov, S.Y., 1985, General Catalogue of Variable Stars, 4th Ed., Vol. II, Nauka, Moscow
- (7) Kholopov, P.N., Samus, N.N., Frolov, M.S., Goranskij, V.P., Gorynya, N.A., Karitskaya, E.A., Kazarovets, E.V., Kireeva, N.N., Kukarkina, N.P., Medvedeva, G.I., Pastukhova, E.N., Perova, N.B., Shugarov, S.Y., 1987, General Catalogue of Variable Stars, 4th Ed., Vol. III, Nauka, Moscow
- (8) Liu, T., Janes, K.A., 1989, Astrophys. Journal Suppl.Ser. 69, 594
- (9) Lub, J., 1977, Astron. Astrophys. Suppl. Ser. 29, 353
- (10) Olah, K., Szeidl B., 1978, Mitteilungen der Sternwarte Budapest-Szabadsaghegy, No. 71, 9
- (11) Stepien, K., 1972, Acta Astronomica 22, 175
- (12) Tremko, J., 1973, Contr. of the Astron. Obs. Skalnaté Pleso 5, 175
- (13) Wunder, E., 1991, BAV-Rundbrief 40, No.4, in print