COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 2786

Konkoly Observatory
Budapest
5 September 1985
HU ISSN 0374 - 0676

NEW UBV OBSERVATIONS OF SV Cen

The contact binary SV Cen was recently discussed in detail by Drechsel et al. (1982,=DR82) and by Herczeg and Drechsel (1985, = HD 85). We have observed it in July and August 1984 with the 20" telescope of the South African Astronomical Observatory in Sutherland. Unfortunately, only a few fractions of the light curve could be obtained. The secondary minimum was missed, and both observations of the primary minimum are incomplete.

Table I lists the observing dates. Figs. 1 and 2 give plots of the averaged observations in V and the colour indices B-V and U-B. The relative accuracy in all colours is estimated to be about $0^m.005$. The calibration should, in each night, be better than $0^m.01$. The comparison star was CP-59°3946, for which we used (from comparison with E-region stars) V = 7.932, B-V = 0.082, and U-V = -0.647, the colours somewhat deviating from what DR82 assumed.

Table I: Dates of observations.

HJD 2445900+	Orbital phase
6.24 - 6.31	0.58 - 0.62
7.26 - 7.30	0.20 - 0.22
9.20	0.37
10.21 -10.29	0.97 - 0.02
15.21 -15.29	0.99 - 0.04
18.20 -18.26	0.79 - 0.83
19.22 -19.24	0.41 - 0.42

Table II: Times T=HJD -2445910 and magnitudes m of primary minima.

	T1	Error	m	T2	Error	m
V	0.2500	±.0002	9.972	5.2253	±.0005	9.936
B	0.2497	.0002	10.094	5.2251	.0006	10.058
U	0.2509	.0003	9.559	5.2265	.0006	9.498
B-V	0.247	..003	.120	5.224	.005	.122
U-B	0.261	.003	-.536	5.243	.005	-.555
U-V	0.256	.002	-.417	5.231	.004	-.438
All*	0.2500	.0001	-	5.2253	.0004	-

*All observations, B and U corrected to V by average B-V and U-V (quadratic fit of the data shown in Figure 5).

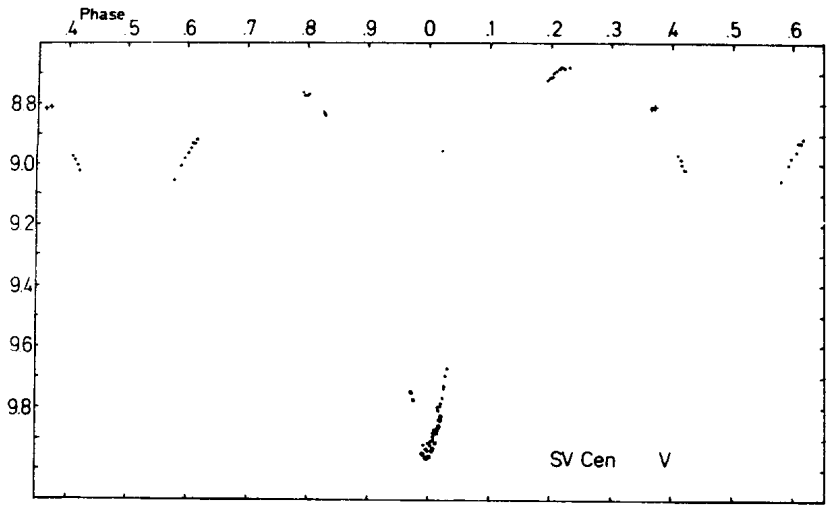

Figure 1. The V observations. Crosses: Uncertain calibration
Rings: epoch no.1557.

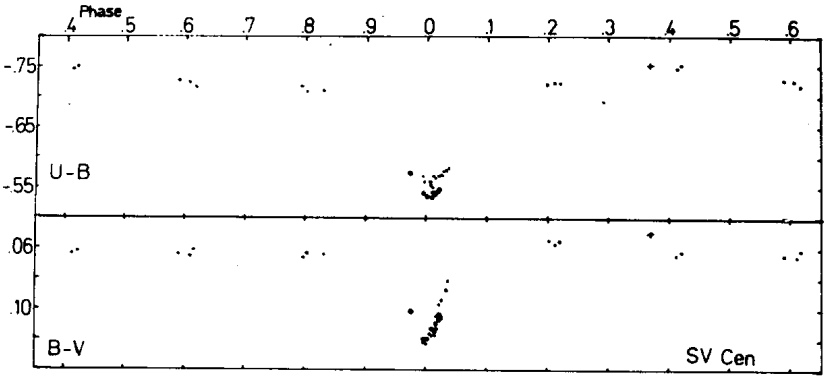

Figure 2. The colour indices. Crosses: Uncertain calibration.
Rings: epoch no.1557.

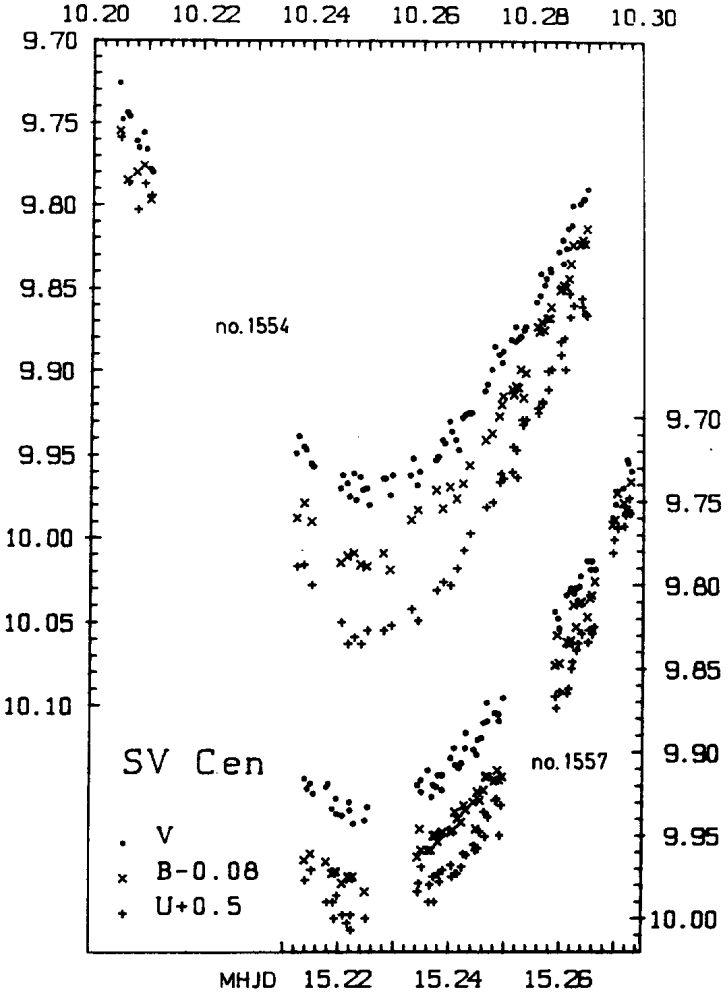

Figure 3. The minimum observations. MHJD = HJD - 2445900

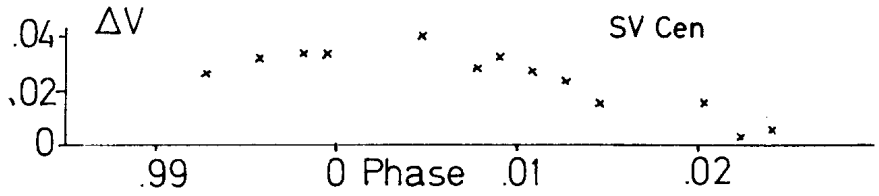

Figure 4. Difference in V for the two minima.

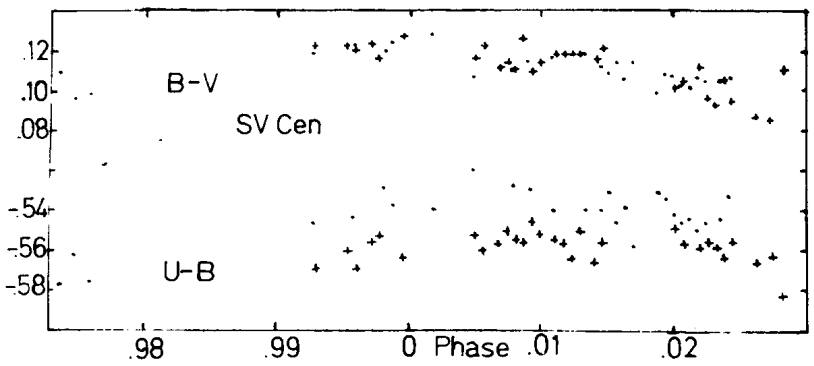

Figure 5. Colour indices during minima. Dots: epoch no.1554, crosses: epoch no.1557.

The shape of the observed parts of the light curve in V fits reasonably well into the light curve of DR82. The star was, however, now brighter by about $0^m.04$ at phases .2 and .4, and by about $0^m.08$ at phases .6 and .8, so that the difference of the maxima before and after the primary minimum is decreased as compared to DR82. The brightness increase at phase 0 (where DR82 give V = 10.00 but their light curve suggests 10.08) is probably still larger.

Taking into account the different assumptions on the comparison star, the average colour indices are similar to those of DR82. However, we find a larger amplitude and slight variability outside eclipses. Some additional observations in R and I in the first and second night (phases .6 and .2) gave V-R = .055 and .041, V-I = .125 and .115 (each ± .005 estimated error) which also indicates slight variability.

The primary minima no. 1554 and 1557 - numbered according to HD 85 - were observed in some detail. Fig.3 gives plots of the individual 10-sec integrations.

The shape of the two minima was slightly different. The second minimum was brighter in V and B by $0^m.03$, in U by $0^m.05$. The difference appears to be restricted to the immediate neighbourhood of the minimum (Fig. 4), approaching zero at phase 0.02 and lasting somewhat longer in U than in V. The maximum difference occurred probably shortly after the minimum, at about phase 0.005 ± 0.005. Fig. 5 gives the colour indices B-V and U-B at minimum. There is no significant difference in the shape.

The primary minimum times were obtained by a polynomial fit (Breinhorst et al. 1973), the Kwee method (Kwee and van Woerden 1956) being inapplicable in both cases. Table II lists the minimum times. The minima occur, within the error tolerances, simultaneously in V and B, but slightly later in U. The actual period is $1^d.65843 \pm 0^d.00013$ which is in good agreement with the value of $1^d.65847$ expected by HD 85. The minimum times are also within the error tolerances of the prediction of HD 85.

In conclusion, we find long-term variability of a few percent in the light curve and the colour indices, as well as short-term variability for the primary minima. The minimum times are as expected.

We thank the SAAO for granting observing time and D. Laing, J. Menzies, J. Rahe and H. Drechsel for advice. The Austrian Fonds zur Förderung der wissenschaftlichen Forschung (project no. 5454) contributed to the costs.

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