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THE DWARF NOVA SVS 2549, A SHORTPERIODIC ECLIPSING SYSTEM

The Soviet Variable Star (SVS) No.2549*) was discovered by Lipovetskij and Stepanyan (1981); in the quoted paper this is the star No.4. The star has an OB-spectrum with Balmer emissions in minimum light. The outburst of the star is seen in the Palomar Sky Survey charts. The position of the star with 1 " accuracy determined by us using two plates of the 40 cm astrograph is the following: $23^h20^m39^s.47$ + $18^\circ08'42''.0$, 1950.0. The chart of the variable star and comparison stars for photoelectric observations is given in Figure 1. The magnitudes and colour indices given below were measured with the UBVR photometer at the 6 meter reflector of the Special Observatory of the Soviet Academy of Sciences, the prime focus cage observer was S.I. Neizvestny.

	V	B–V	U–B	V–R
A	13.62	+0.53	+0.10	+0.45
B	13.80	+1.02	+1.04	–

The star was studied by a group of amateur variable star observers using the Moscow plate collection. 90 plates obtained at the Crimea 40 cm astrograph of the Sternberg Institute in the time interval JD 2444076-45695 (1979-83) were employed to estimate the star brightness. Six large outbursts of the star were detected by photographic data thus confirming its SS Cyg type. The outbursts are the following.

JD 24...	B	JD 24...	B
44085	12.0	45531 }	12.8
44199	12.6	45536 }	13.0
45258	13.0	45619	12.3
45337	13.9		

The interval between outbursts varies in the range from 79 to 114 days, the mean value is 95 days.

Strong light variability of minimum light amounting 2 magnitudes is detected. This variability turns out to be caused by orbital motion in a close binary system, and it is connected with the periodically repeating hump in the light

*) New GCVS designation is IP Pegasi.

curve the mean amplitude of which is 1^m, but sometimes raises to $1^m.5$. The photographic light curve shown in Figure 2 is plotted versus phases of the light elements we have determined:

$$\text{Hump Max}_{\odot} = 2445615.394 + 0^d.15820764 \cdot E$$
$$\pm 30$$

The mean light level changed abruptly sometime during JD 2444526-44820. Earlier observations are shown in Figure 2 by circles.

A dip in the light curve near the phase $0^p.19$ may be suspected to be an eclipse, the duration of which is less than the exposure time 45 minutes.

The star was observed at the 6 m reflector in the UBV system on 1984 July 27/28 during a high state with increased brightness. These observations confirmed the 95^d cycle, because exactly three cycles passed since the latest photographically observed outburst on JD 2445619. The observations were carried out since 23^h13^m till 0^h14^mUT. The brightness of the star dropped gradually during this time from 14.02 to 14.20 V, B-V = +0.34, U-B = -0.90, V-R = +0.87 (Figure 3). No hump was observed in the light curve. On JD 2445909.519 the brightness fell suddenly by 2^m in two minutes. Having not expected such behaviour of the star, we measured the comparison star to control sky and device conditions, and the eclipse minimum was missed. The ascending branch lasted 18 minutes. The star became redder during the light minimum and reached B-V=+0.8.

The photoelectric monitoring of the star in minimum brightness was carried out in August 1984 with the 1 meter reflector of the Tadjik Academy of Sciences Institute of Astrophysics on Mount Sanglock. The two sets of observations were obtained, the first one on August 20 since [illegible]$^h37^m56^s$ till $22^h19^m35^s$ UT and the second one on August 31 since [illegible] till [illegible] UT. The observations are plotted in Figure 4 versus the orbital phase.

The data show that out of eclipse the brightness varies from 15.0 to 16.0 B, no flickering is seen. The eclipse is total and strongly asymmetric. The partial eclipse duration is D = 42^m = $0^p.183$, that of the total eclipse is d = $5^m.5$= $0^p.024$, the totality brightness is 18.6B. The descending branch lasts for 14 minutes, the ascending one 22.5 minutes. The light increase and decrease are nonuniform, the steps and delays are seen. Twice a jump brightening by $0^m.15$ was observed before the first contact. Two moments of mid-totality are determined; JD 2445933.4094 and 45944.4833. The later one is less reliable because of the dawn.

The light curves in low (solid curve) and high states are compared in Figure 3.

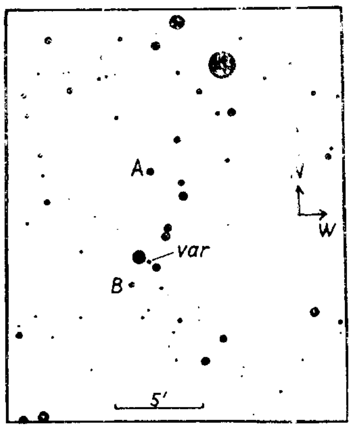

Figure 1: The identification chart of SVS 2549. The photo-electric standard stars are indicated.

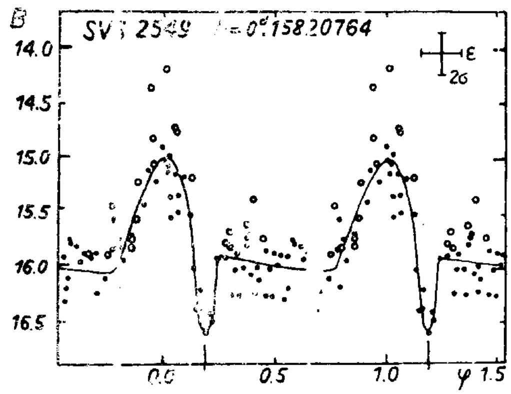

Figure 2: The photographic light curve of SVS 2549. The segments of cross are the accuracy of light estimates and the exposure duration in the scale of phase.

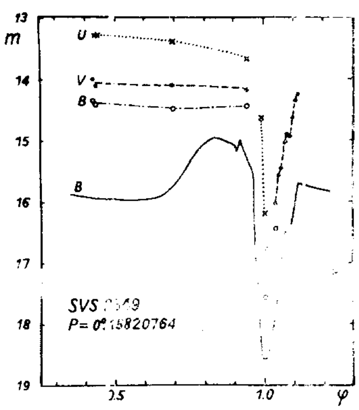

Figure 3:UBV observations of SVS 2549 at the 6 m telescope. The solid line is the light curve in the low state plotted for comparison. Zero phase is at JD 2445933.4094.

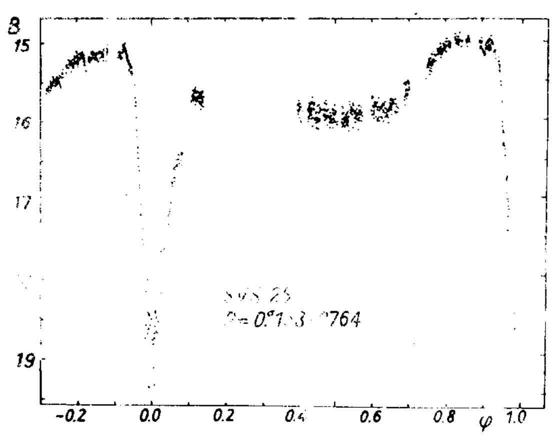

Figure 4 Photoelectric monitoring light curve obtained at the Mount Sanglock Observatory on 1984 August 20 and 31 and plotted versus orbital phase. Zero phase is at JD 2445933.4094.

The phase of sharp light decrease observed at the 6 m telescope coincides with that of mid-totality in the low state.

Our observations suggest that SVS 2549 is a dwarf eclipsing system with low luminosity components and edge-on accretion disc. That is why the fraction of the hot spot in the common light caused by interaction of gas stream and disc is very large. The deep eclipses during outburst in SVS 2549 resemble those in HT Cas. The system is useful to solve the problem of the nature of SS Cyg type star outbursts and should be studied in details.

Interesting results may be obtained by visual monitoring of outbursts by amateur astronomers. If the outburst cycle will stay stable, the star may flare up in the end of October 1984 and the end of January - the beginning of February 1985.

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