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THE ORBITAL V-BAND LIGHT CURVE OF V4641 SAGITTARII

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V4641 Sgr was discovered by Goranskij (1978) during the outburst in June 1978 when it brightened up to $12\overset{m}{.}4$ B, about two magnitudes over the mean quiet level. At first, it was misidentified with GM Sgr in GCVS IV, and classified as a possible nova-like variable. Later it was shown that the star was an early A type binary with possible period of $0\overset{d}{.}7365$ (Goranskij, 1990). He measured the astrometric position, $18^h19^m21\overset{s}{.}7$, $-25°24'25''$ (converted to Eq. 2000.0), about $1\overset{''}{.}1$ from modern VLA radio interferometric one by Hjellming et al. (2000). The problem of identification was finally solved by Hazen et al. (2000).

In January, 1999 the star was found in X-rays (in't Zand et al., 1999), the source was called SAX J1819.3-2525. Later in September, 1999 the star underwent another outburst (Kato et al., 1999) detected in optical, radio, and X-rays. The star ejected relativistic jets, like known microquasars (Hjellming et al., 2000). Recently Orosz et al. (2000) have determined the spectroscopic orbital period of $2\overset{d}{.}8173 \pm 0\overset{d}{.}00013$ for V4641 Sgr.

I monitored V4641 Sgr with CCD SBIG ST-7 and ST-8 in V and R bands since 2000 July 24 to August 21 using the 38-cm telescope of Crimean Astrophysical Observatory and the 60-cm telescope of Sternberg Institute Crimean station. The star was observed only near sky meridian in V band because of its low declination. The comparison star was **e** (Goranskij, 1990), $V = 13\overset{m}{.}38$. Several frames were taken each night, mean values and mean square residuals were calculated. CCD observations are given in the Table 1, and signed there with 'ST-7' and 'ST-8'. Additionally I used my single photoelectric observation taken with the 1-m telescope of Mt. Sanglock Observatory on JD 2446708.108 (Goranskij, 1990), and few photoelectric observations taken with the 1-m telescope of Tien-Shan Observatory on JD 2449578 and 2449599. These observations were taken with single channel $UBVRI$ and $WBVR$ photometers, and signed with 'ptm' in Table 1.

The orbital period was justified using Moscow plate collection eye estimates (stored in the VSNET archive, vsnet-obs No. 26925), and the recent observations. New elements are the following:

$$\text{Min I} = 2451764.298 + 2\overset{d}{.}81728\ (\pm\ 1) \times E.$$

The value of orbital period is close to that by Orosz et al. (2000). The V band light curve is shown in Figure 1. It indicates strong ellipsoidal variation with the amplitude of about $0\overset{m}{.}30$. The primary minimum is deeper than the secondary by $0\overset{m}{.}10$. The light changes reflect only the tidal distortion of the A2 companion. My pre-outburst photoelectric observations were taken in the phases close to Min I and Min II. They have not shown any change in the relative depth of minima since that time.

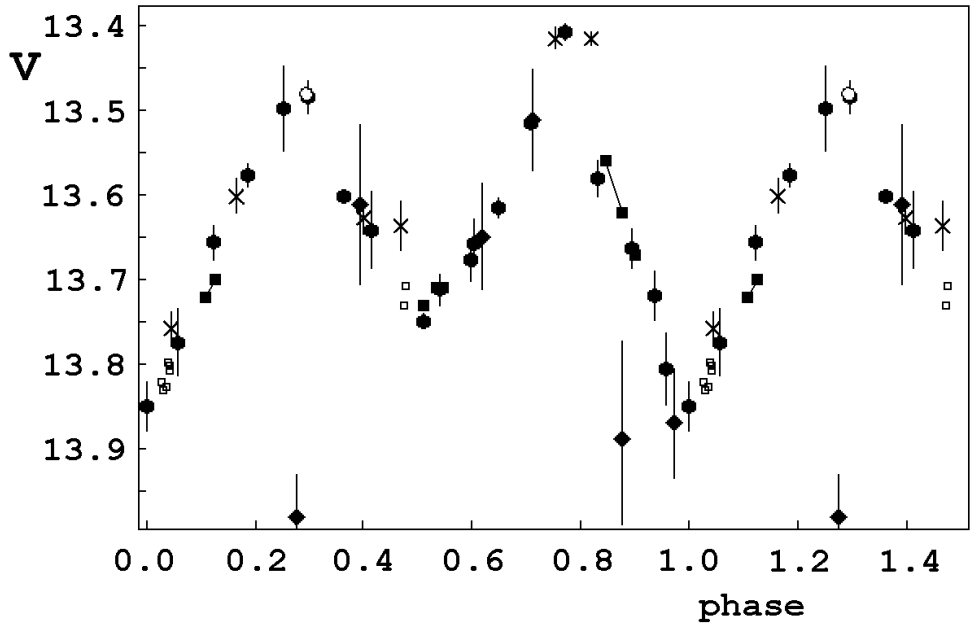

Figure 1. The light curve of V4641 Sgr in V band.
Symbol meaning is the following: filled circles are my observations with CCD ST-7, the crosses are those ones with CCD ST-8, open circle is a single photoelectric observation at Mt. Sanglock (Goranskij, 1990), open squares are my Tien-Shan photoelectric observations, filled squares are the observations by Marti et al. (2001), and filled rhombs are observations by Chaty et al. (2001). Vertical lines are mean square residuals

Table 1: Photoelectric and CCD observations of V4641 Sgr

JD_{hel} 24...	V	r.m.s.	Device	JD_{hel} 24...	V	r.m.s.	Device
46708.1080	13.480	0.020	ptm	51762.3172	13.484	0.020	ST-7
49578.1689	13.821	0.020	ptm	51763.3037	13.615	0.011	ST-7
49578.1756	13.831	0.020	ptm	51764.3018	13.850	0.029	ST-7
49578.1868	13.826	0.020	ptm	51765.3204	13.602	0.002	ST-7
49578.1975	13.797	0.020	ptm	51766.2965	13.515	0.007	ST-7
49578.2036	13.801	0.020	ptm	51767.2739	13.774	0.040	ST-7
49578.2092	13.807	0.020	ptm	51768.2801	13.641	0.046	ST-7
49599.1473	13.730	0.020	ptm	51769.2845	13.407	0.009	ST-7
49599.1518	13.707	0.020	ptm	51770.2791	13.656	0.020	ST-7
51750.3342	13.758	0.020	ST-8	51771.3671	13.749	0.009	ST-7
51751.3391	13.626	0.020	ST-8	51772.2725	13.580	0.021	ST-7
51752.3342	13.414	0.013	ST-8	51773.2765	13.576	0.014	ST-7
51754.3476	13.636	0.029	ST-8	51774.2711	13.712	0.019	ST-7
51755.3351	13.415	0.008	ST-8	51775.2692	13.663	0.023	ST-7
51756.3080	13.601	0.020	ST-8	51776.2800	13.497	0.050	ST-7
51760.3485	13.677	0.024	ST-7	51777.2645	13.657	0.028	ST-7
51761.2988	13.719	0.029	ST-7	51778.2600	13.806	0.042	ST-7

The published observations by other authors are also taken into account. The monitoring results by Marti et al. (2001) fit the light curve with $-0\overset{m}{.}25$ offset. It seems that this is a systematic error. Four of six observations by Chaty et al. (2001) fit the curve well without correction, but two of them surprisingly fall down out of the curve. The photometric amplitude of variations in the quiet state does not exceed $0\overset{m}{.}5$ what is less than the published photographic one of $1\overset{m}{.}2$ (Goranskij, 1990).

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