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OUTBURST PHOTOMETRY OF TmzV36

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TmzV36 is a variable star discovered by Takamizawa (1998). The J2000.0 coordinates are $09^{\text{h}}16^{\text{m}}50^{\text{s}}.7$, $+28^{\circ}49'42''$. Takamizawa (1998) reported only two positive detections on 1994 November 29–30. He also reported that the star is visible at mag 18 on DSS 1. Since Takamizawa's record suggested an outburst of a dwarf nova-type variable, the object has been monitored since 1998 by VSNET (<http://www.kusastro.kyoto-u.ac.jp/vsnet/>) members. No further outburst had been reported until Schmeer's detection on 1999 November 17.528 UT, at unfiltered CCD magnitude of 14.7 (Schmeer 1999). The rapid rise reported by Schmeer (1999), together with the subsequent evolution of the event, confirmed the suggested dwarf nova-type classification. The lack of further outbursts until 2001 April supports the low frequency of outbursts in TmzV36. We started time-resolved CCD photometry upon this alert, only 1^d.3 after Schmeer's detection.

The CCD observations were done using an unfiltered ST-7 camera attached to the Meade 25-cm Schmidt–Cassegrain telescope. The exposure time was 30 s. A total of 621 useful frames were obtained. The images were dark-subtracted, flat-fielded, and analyzed using the JavaTM-based PSF photometry package developed by one of the authors (TK). The flux of the object was determined relative to GSC 1957.358 (GSC magnitude 12.65), whose constancy during the run was confirmed by comparison with anonymous fainter stars. Barycentric corrections to the observed times were applied before the following analysis. The log of observations together with nightly average magnitudes is given in Table 1. The light curve drawn from these data is presented in Figure 1.

As seen in Figure 1 and Table 1, TmzV36 rapidly faded following the outburst maximum. The maximum rate of decline was 1.0 mag d^{-1} , which is comparable to those of normal outbursts of SU UMa-type dwarf novae. However, some of short-period SS Cyg-type dwarf novae also show similar rapid declines. The exact classification of the dwarf nova subtype awaits further observations. The object returned to quiescence within 7 days of the outburst detection. The measured amplitude of the outburst from this observation was $3^{\text{m}}.0$. Since Takamizawa's detection in 1994 was 1^{m} brighter than the present outburst, there may be two types of outbursts, possibly suggesting the SU UMa-type nature. Figure 2 shows the enlarged light curve of the first three nights of the outburst. Only rapid fading was observed, and no definitely periodic modulations attributable to superhumps were detected.

Table 1: Nightly averaged magnitudes of TmzV36

start ^a	end ^a	mean mag ^b	error ^c	N^d
51501.341	51501.349	2.970	0.044	12
51502.141	51502.245	3.519	0.020	201
51503.173	51503.340	4.512	0.029	264
51504.108	51504.150	5.480	0.318	80
51508.349	51508.365	6.258	0.946	23
51509.358	51509.370	5.881	0.264	17
51512.227	51512.230	5.780	0.492	10
51513.222	51513.225	5.866	0.984	8
51516.333	51516.337	6.425	0.949	6

^a BJD - 2400000

^b Magnitude relative to GSC 1957.358

^c Standard error of nightly average

^d Number of frames

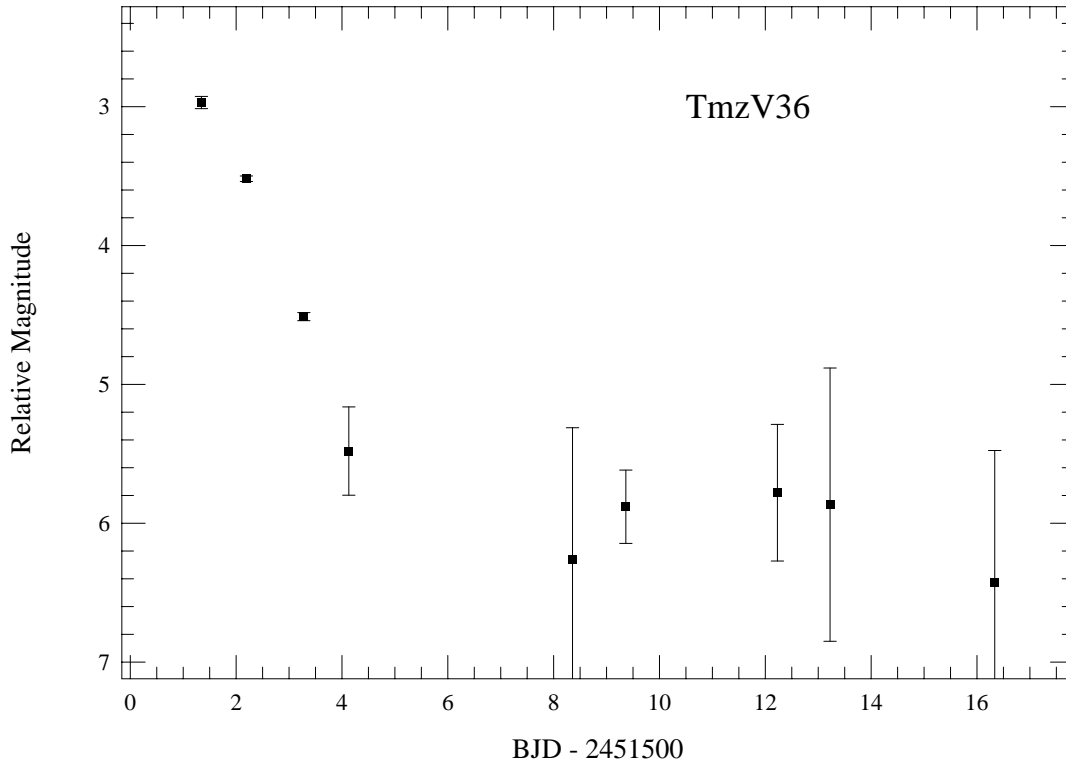


Figure 1. Light curve of TmzV36

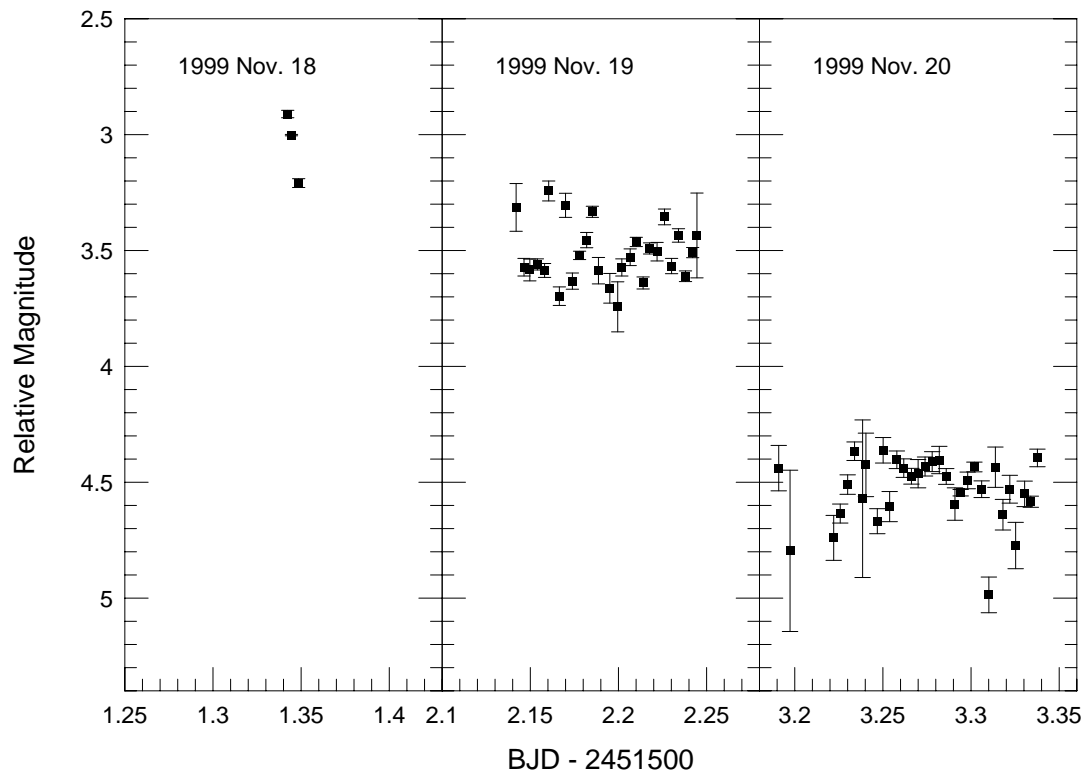


Figure 2. Enlarged light curve of TmzV36. Each point represents averages and errors of 0.004-d bins

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References:

- Schmeer, P., 1999, *VSNET alert circulation*, No. 3718 (available from <http://www.kusastro.kyoto-u.ac.jp/vsnet/Mail/alert3000/msg00718.html>)
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