

**CCD PHOTOMETRY OF THE
1999 FEBRUARY OUTBURST OF CI Gem**

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CI Gem is a variable star discovered by Hoffmeister (1943, 1947). He proposed the nova-like or dwarf nova-type classification based on the single outburst. Duerbeck (1987) proposed the possible quiescent counterpart, and suggested the dwarf nova nature based on the small outburst amplitude. Wenzel (1990) examined Sonneberg plates and found three additional outbursts between 1963 and 1986. From the existence of long and short outbursts, Wenzel (1990) suggested the SU UMa-type classification.

An additional outburst of CI Gem was detected by P. Schmeer (1999) on an unfiltered CCD image taken on 1999 February 18.185 UT (the discussion on the outburst detection is also given in Schmeer and Duerbeck (1999)). He reported the object as magnitude 15–16. Schmeer (1999) reported the incorrect quiescent identification by Duerbeck (1987), the precise coordinates are given by Schmeer and Duerbeck (1999). Schmeer (1999) reported nothing down to magnitude 21 was visible on the POSS blue print at this location.

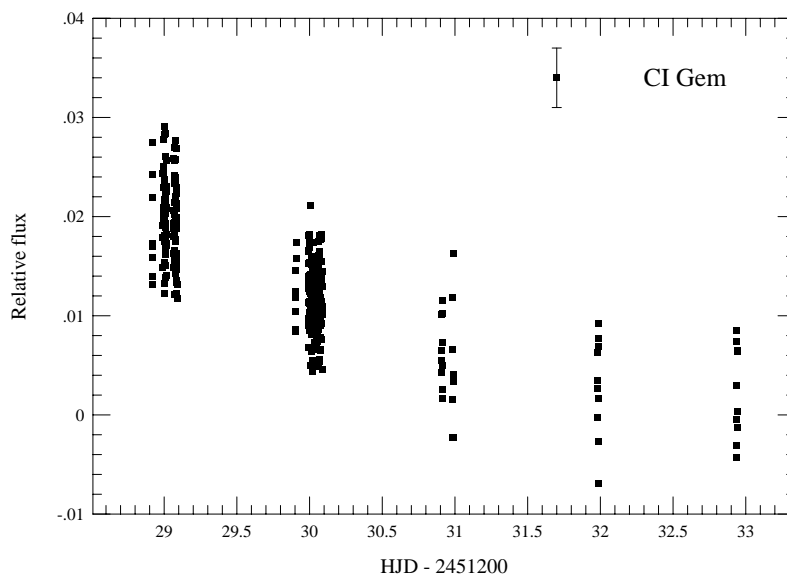


Figure 1. Overall light curve of CI Gem

Table 1: Nightly averaged magnitudes of CI Gem

mid-HJD ^a	mag ^b	error ^c	N ^d
51229.035	4.279	0.020	129
51230.032	4.829	0.019	231
51230.944	5.597	0.217	18
51231.984	6.381	0.618	10
51232.939	6.592	0.695	10

^a HJD – 2400000

^b Magnitude relative to GSC 1340.657

^c Standard error of nightly average

^d Number of frames

The observations were done on five nights between February 19 and 23, using an unfiltered ST-7 camera attached to the Meade 25-cm Schmidt-Cassegrain telescope. The exposure time was 30 s. The images were dark-subtracted, flat-fielded, and analyzed using the JavaTM-based PSF photometry package developed by the author (TK). The location of the PSF center was adjusted using Schmeer's astrometry. The flux of the variable was measured relative to GSC 1340.657 (USNO *r*-magnitude 11.5), whose constancy was confirmed by comparison with GSC 1340.1349 (USNO *r*-magnitude 11.9).

Figure 1 illustrates the overall light curve of the present observation. The fluxes are given relative to GSC 1340.657. Table 1 summarizes the nightly averaged magnitudes.

As seen in Table 1 and Figure 1, CI Gem was already fading rather rapidly. By adopting the USNO *r*-magnitude of the comparison, CI Gem was estimated to be ~ 15.8 on February 19 and ~ 18.1 on February 23. The last part of the light curve, however, may have been affected by the nearby star. The average decline rate (0.55 mag d^{-1}) of the initial part of the observation precludes the superoutburst. However, the decline rate seems to be a little slower than those of normal outbursts of SU UMa stars (usually exceeding 1 mag d^{-1}). Period analysis of February 19 and 20 observations, spanning 4.1 and 4.5 hr respectively (occasionally interrupted by gaps), could not yield positive periodicities between 0.05 and 0.15 d to a limit of 0.1 mag. Although this negative result does not preclude a normal outburst of an SU UMa star, the present observation seems to suggest a longer orbital period system, possibly an SS Cyg-type dwarf nova.

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References:

- Duerbeck, H. W., 1987, *Space Sci. Rev.*, **45**, 58
Hoffmeister, C., 1943, *Astron. Nachr.*, **274**, 37
Hoffmeister, C., 1947, *Veröff. Sternwarte Sonneberg*, **1**, 107
Schmeer, P., 1999, *VSNET alert circulation*, No.2640 (also available from
<http://www.kusastro.kyoto-u.ac.jp/vsnet/Mail/vsnet-alert/msg02640.html>).
Schmeer, P., Duerbeck, H. W., 1999, *IBVS*, No.4758
Wenzel, W., 1990, *IBVS*, No.3440