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PECULIAR OUTBURST BEHAVIOR OF GO Com

GO Com was discovered by Kowal (1977) as an eruptive object on a Palomar plate taken on 1977 July 1.213. The variable was confirmed to coincide with a suspected variable star CSV 1959 = SVS 382 (Belyavskij, 1933). On the other hand, Usher (1981) independently discovered a very blue star of $B=18.1$ during the survey of the north galactic pole region. This star (US 31) was identified with GO Com. The extreme color ($U-B = -1.5$) suggests an extreme nature of this object. Vogt and Bateson (1982) classified this variable as a WZ Sge-type dwarf nova because of its large outburst amplitude and low outburst frequency.

The object has been visually monitored by VSOLJ members since 1986, and the short outburst observed on May 30, 1989 ($m_v=13.2$) has been the only record in recent years (Vanmunster and Howell 1995) until Vanmunster (1995) detected another outburst on July 16, 1995. Although only single positive visual observation has been available on this outburst, the outburst seems to have been confirmed by our CCD observation on July 25 which caught the object at $V=16.6$. A negative visual observation (fainter than 13.6) by M. Moriyama (private communication) 1.5 day after Vanmunster's detection seems to indicate that this outburst is also short-living just as one observed in May, 1989.

14 days after this outburst, GO Com was unpredictably caught in outburst on July 30.8, 1995 at $m_v=13.3$ (L. Szentasko, VSNET message). This outburst was subsequently confirmed by our CCD observation. We then started systematic time-resolved photometry to cover this outburst. The observations were carried out using a CCD camera (Thomson TH 7882, 576×384 pixels) attached to the Cassegrain focus of the 60 cm reflector (focal length=4.8 m) at Ouda Station, Kyoto University (Ohtani et al., 1992).

To reduce the readout noise and dead time, an on-chip summation of 2×2 pixels to one pixel was adopted. An interference filter was used which had been designed to reproduce the Johnson V band. The exposure time was between 60 and 180 s. The frames were first corrected for standard de-biasing and flat fielding, and were then processed by a microcomputer-based PSF and aperture photometry package developed by one of the authors (T.K.). The differential magnitudes of the variable were determined against a local standard star ($12^h56^m36^s.64 +26^\circ31'42''.9$ (J2000.0), $V=12.8$). The position and magnitude were taken from the Guide Star Catalog). The constancy of this comparison was checked against several stars in the same field.

The resultant general light curve is given in Figure 1, which clearly shows the long-living (lasting at least 7 days) nature of the present outburst. Existence of these two types (short and long) of outbursts suggests the SU UMa-type nature of GO Com, as was first suspected by the possible detection of 95 min periodicity in quiescent light curve (Howell et al., 1990). The rate of decline (~ 0.1 mag/day) also seems to support that this outburst may be a superoutburst, probably first documented one in GO Com.

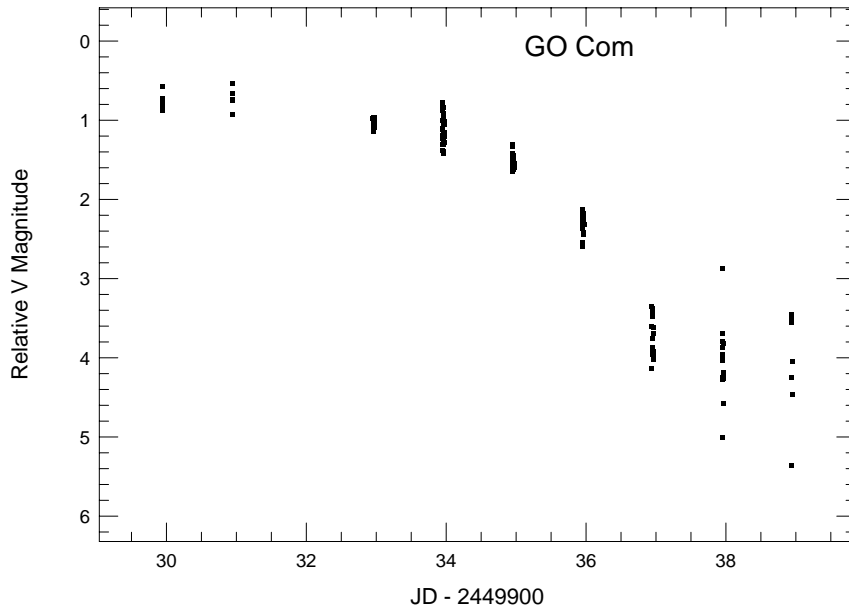


Figure 1. A general V -band light curve of GO Com constructed from all the CCD observations. The zero point corresponds to $V=12.8$. The outburst lasted at least 7 days showing a slow decline (~ 0.1 mag/day) followed by a rapid decline.

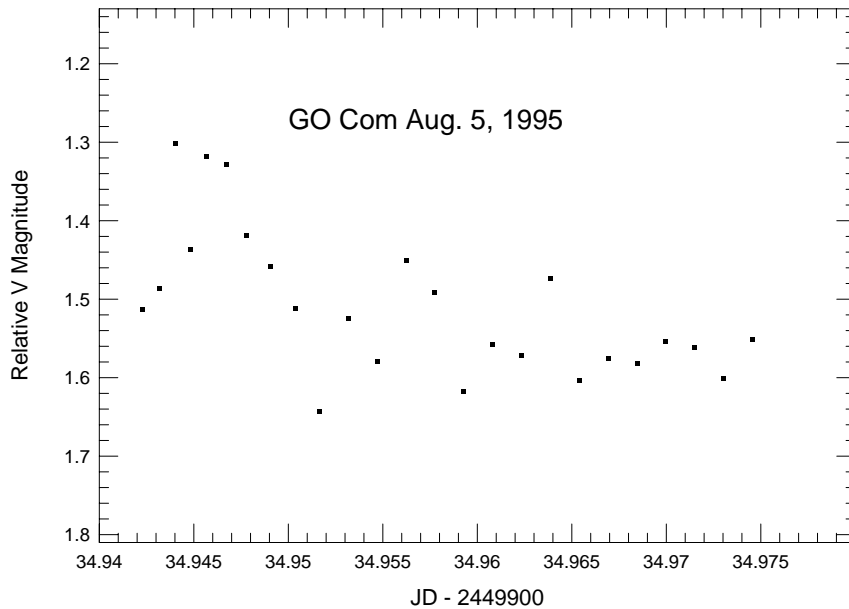


Figure 2. Time-resolved photometry of GO Com on Aug. 5. The light curve seems to indicate a hump feature with an amplitude of 0.2 mag at around Aug. 5.446 UT, which would be attributed to a superhump.

Due to unfavorable location in the sky, we can say little about existence of superhumps which are characteristics to SU UMa-type dwarf novae. The data on Aug. 5 (Figure 2) seems to indicate a hump feature with an amplitude of 0.2 mag at around Aug. 5.446 UT, which would be attributed to a superhump. The secure classification of this dwarf nova should await for further observations.

Although the classification of GO Com is still immature, we should point out the peculiar pattern of two consecutive outbursts. As stated earlier, the outbursts of GO Com have been very rare, likely one in few years. Hence the short interval (14 days) of these two outbursts is already a surprise. Although combinations of normal and super-outbursts are sometimes observed in SU UMa stars, they usually belong to either of the two patterns: (1) short outburst following a superoutburst, (2) short outburst just preceding a superoutburst. In the latter case, the interval of the short and superoutbursts are usually less than a few days. Such “precursor” type short outburst is currently understood as a trigger of a superoutburst in the scheme of thermal and tidal instabilities of the accretion disk to explain dwarf nova outbursts (Osaki 1989). Whether the current unique pattern of outbursts of GO Com can be explained in the same scheme would be an interesting problem. [Our latest observation indicates that GO Com is again in outburst on Aug. 13.44 at $V=15 - 15.5$. This post-outburst brightening can be fit by the pattern (1). It is again interesting that these two types of combinations of outbursts are consequently observed.]

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