

Outbursts of IPs and Related Systems

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Abstract. We observed the outbursts of the intermediate polar, DO Dra and the intermediate polar candidate, BZ UMa in 2004 January and 2004 February, respectively. The results of observations are presented, and the outburst behavior of IPs and related systems is discussed.

1. Introduction

Some IPs show outbursts (e.g. Hellier et al. 2000). TV Col and V1223 Sgr show very short and low-amplitude outbursts, which are thought to be mass-transfer outbursts. Outbursts of EX Hya are also thought to be mass-transfer events. On the other hand, outbursts of DO Dra and HT Cam are DN-like, which have amplitudes of 3-5 and durations of 3-5 d, and they are rather regular. They are explained by disk instabilities starting at the outside.

2. DO Dra

Figure 1 shows light curves of 5 outbursts during 1996 – 2004. All of them are short outbursts whose durations are shorter than a week. The object reached its outburst maximum rapidly, and declined to its quiescence gradually for ~ 5 days. The right panel of figure 1 is the light curve of the outburst in 2004 January, which shows that the duration of rising stage was within a day. The recurrent cycle of DO Dra is ~ 900 d (Simon 2000). Two outbursts in 2000 and 2001 occurred with shorter intervals of 300-400 d and their outburst profiles are similar to others. Between 1999 and 2001 outbursts, the quiescent brightness was slightly higher than between 2001 and 2004 outbursts. The short outburst cycle might be due to the slightly high mass transfer rate.

3. BZ UMa

Light curves of 8 outbursts during 1996 – 2004 are presented in figure 2. Their durations are shorter than 5 days. The right panel of figure 2 is the light curve of the outburst in 2004 February. The rising stage was not detected in this

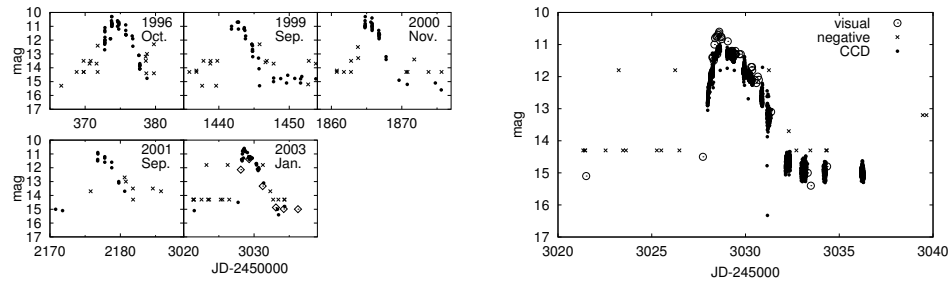


Figure 1. **Left:** Light curves of 5 outbursts during 1996 – 2004. Dots are CCD observations. Open circles and crosses show visual or photographic detections and negative observations, respectively. **Right:** Light curve during the 2004 January outburst.

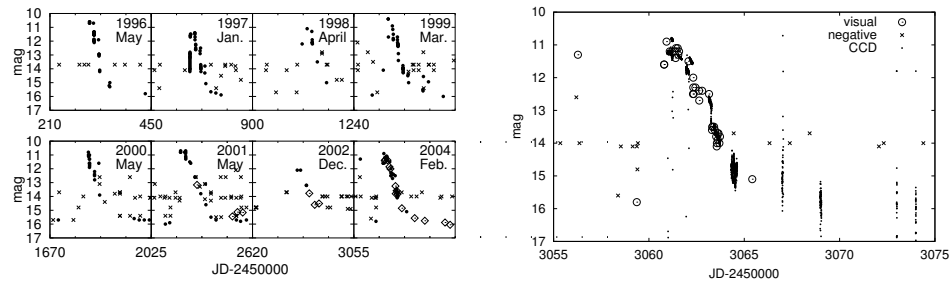


Figure 2. **Left:** Light curves of 8 outbursts during 1996 – 2004. Dots are CCD observations. Open circles and crosses show visual or photographic detections and negative observations, respectively. **Right:** Light curve during the 2004 February outburst.

outburst, but the object reached its outburst maximum from its quiescence within a day, and returned to quiescence 3 or 4 days after the maximum. The outburst behavior of BZ UMa is very close to that of HT Cam (Ishioka et al. 2002). But no superhump nor coherent spin period detected in the 2004 February outburst. To reveal the nature of this object, further observations are needed.

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References

- Hellier, C., Mason, K.O., Smale, A.P., Corbet, R.H.D., O'Donoghue, D., Barrett, P.E., & Warner, B. 1989, MNRAS, 238, 1107
 Ishioka, R., et al. 2002, PASJ, 54, 581
 Simon, V. 2000, A&A, 360, 627