COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Number 5316

Konkoly Observatory
Budapest
4 October 2002

HU ISSN 0374 – 0676

FT Cam: AN ANALOGOUS OBJECT TO IR Com

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FT Cam (=Antipin Var64) is a dwarf nova discovered by Antipin (1999). The object was photometrically studied by Kato et al. (2001) during the 2000 February outburst. Kato et al. (2001) revealed a rather monotonous decline at a rate of 0.82 mag d^{-1}, without a signature of superhumps. From these observations and the past record, Kato et al. (2001) suggested that FT Cam may be an SS Cyg-type star, but there remained a possibility that we have only observed normal outbursts of an SU UMa-type star.

Recently, Thorstensen and Fenton (2002) reported the detection of a spectroscopic orbital period ($P_{\rm orb}$) of 0.07492(8) d. Such a short period (below the period gap of cataclysmic variables) would naturally suggest an SU UMa-type classification (Warner 1995)[1]. However, the apparent lack of long outbursts (superoutbursts) in the photometric record of FT Cam, which qualify an object to be an SU UMa-type star, has raised a new problem (Thorstensen and Fenton 2002). Both Kato et al. (2001) and Thorstensen and Fenton (2002) remarked that only short outbursts have been observed, and no superoutburst-like long outbursts have been yet recorded. This conclusion has been confirmed with the observations reported to VSNET (`http://www.kusastro.kyoto-u.ac.jp/vsnet/`) up to 2002 September. Since the object has been monitored more than 4 yr (with occasional gaps; there remains a small possibility that some superoutburst occurred in an unfortunate gap), the apparent lack of superoutbursts is unusual, since the longest expected supercycle length for SU UMa-type dwarf novae is $\sim$1000 d, unless there is a special mechanism, such as that which seems to be working in WZ Sge-type stars (Ichikawa and Osaki 1994). Only three short outbursts (1998 September, 2000 February, 2002 February) have been recorded during this period.

Among the possible "special mechanisms" to suppress dwarf nova-type outbursts, Kato et al. (2001) have suggested that FT Cam may be an intermediate polar (IP), whose magnetic field can suppress dwarf nova-type outbursts (Angelini and Verbunt 1989). However, time-resolved photometry by Thorstensen and Fenton (2002) did not reveal the presence of coherent pulse, which is expected to be present in an IP. The weakness of HeII emission line (Thorstensen and Fenton 2002) also prefers the non-magnetic (non-IP) nature.

[1]There are a few known dwarf novae below the period gap, which have not been yet demonstrated to be SU UMa-type stars in spite of sufficient observations. IR Com, as we will discuss later, is such an example.

Table 1. Comparison of X-ray Properties of FT Cam and IR Com[a]

Object	Count rate	HR1	HR2	V
FT Cam	0.050	1.00	0.47	17.5
IR Com	0.061	1.00	0.44	17.0

[a] The X-ray data are taken from Voges et al. (1999).

We alternatively propose that FT Cam is an analog of IR Com, another peculiar dwarf nova with a short orbital period ($P = 0.08704$ d) and infrequent outbursts (Kato et al. 2002 and references therein). The number of recorded outbursts of IR Com between 1997 and 2002 is only three, and no long outbursts (superoutbursts) have been yet conclusively detected. All of these features are common to FT Cam.

We also note that the X-ray properties of FT Cam is extremely close to those of IR Com (Table 1). In particular, the remarkable agreement in hardness ratios and flux ratios (X-ray count rate/optical flux) is striking. In view of these properties, as well as remarkably similar outburst properties, FT Cam and IR Com make almost a "twin" among short-$P_{\rm orb}$ dwarf novae. Up to now, HT Cas has been proposed to have analogous properties with IR Com (Kato et al. 2002). Since both IR Com and HT Cas are eclipsing systems, the presence of a non-eclipser FT Cam provides us new opportunities in studying these unusual systems at different binary inclinations. Since HT Cas is known to very infrequently show superoutbursts (e.g. Zhang et al. 1986; no superoutburst has been recorded since 1985), we still have chance to eventually see a superoutburst of FT Cam. Future confirmation of such a superoutburst will provide an observational test for proposed mechanisms of suppressing outbursts in some unusual short-$P_{\rm orb}$ dwarf novae (e.g. Lasota et al. 1995).

We are grateful to all observers who reported vital observations to VSNET. This work is partly supported by a grant-in aid (13640239) from the Japanese Ministry of Education, Culture, Sports, Science and Technology.

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