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# WY Tri: A NEW SU UMa-TYPE DWARF NOVA

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WY Tri is a UG-type cataclysmic variable (Downes et al. 1997) located at $\alpha = 02^{\rm h}25^{\rm m}00\overset{\rm s}{.}57$, $\delta = +32^\circ 59' 54\overset{''}{.}9$ (J2000.0), with a magnitude range of 13.8 – >17.0 $m_{pg}$. The object has been discovered by L. Meinunger (Meinunger 1986) in 1986 on plates of a field around $\beta$ Trianguli, taken with the 40/160 and 40/195-cm astrographs of Sonneberg Observatory. Meinunger recognised the UG type of variability and gave the object the preliminary designation S 10919. He also published a finding chart, and noted that the variable is visible at minimum light on Palomar Atlas charts as a blue object. A detailed finding chart is given in (Downes et al. 1997).

Five distinct outbursts of WY Tri are listed by Meinunger, the brightest one showing the variable at 13.8 $m_{pg}$, although the average maximum magnitude derived from his observations is 15.0 $m_{pg}$ only. Apart from this, very little seems to have been published about the outbursting characteristics of WY Tri. More recently, the object has received some attention from amateur variable star observers around the world.

The shortest likely interval between outbursts of WY Tri is about 381 days, but from the sparse observations it is impossible to conclude whether this is the true outburst cycle of the object, or just a multiple. More intensive monitoring of WY Tri will be required to derive the precise values of the outburst and superoutburst cycles. The outburst amplitude is over $3\overset{\rm m}{.}2$.

The December 2000 outburst of WY Tri was first reported by Jochen Pietz (Pietz 2000), who found the object around $15\overset{\rm m}{.}7$ on unfiltered CCD images taken on 2000, December 16.914 UT. For the first time, this outburst was monitored intensively by CCD photometry, the results of which are discussed below.

Upon notification of the outburst of WY Tri through VSNET (Pietz 2000), an observing campaign was launched at the Belgian node of the Center for Backyard Astrophysics (CBA). The CBA is a multi-longitude network of professional and amateur astronomers (Patterson 1998), who study periodic phenomena in cataclysmic variables. Target campaigns and results of the CBA are regularly reviewed on the CBA Web site (http://cba.phys.columbia.edu).

The CBA campaign on WY Tri occurred during very favourable conditions, with the variable being visible almost all night long. We accumulated 29.7 hours of coverage over 4 nights and obtained 1336 datapoints. Details are listed in Table 1. Time-resolved and differential (variable−comparison) CCD photometry of WY Tri was done at CBA Belgium

Table 1: Log of photometry

| UT Date | JD Start | Length (hr) | Points |
|---|---|---|---|
| 20-Dec-2000 | 2451899.3499 | 4.58 | 246 |
| 21-Dec-2000 | 2451900.2334 | 7.87 | 354 |
| 22-Dec-2000 | 2451901.2134 | 8.40 | 391 |
| 23-Dec-2000 | 2451902.1976 | 8.88 | 345 |

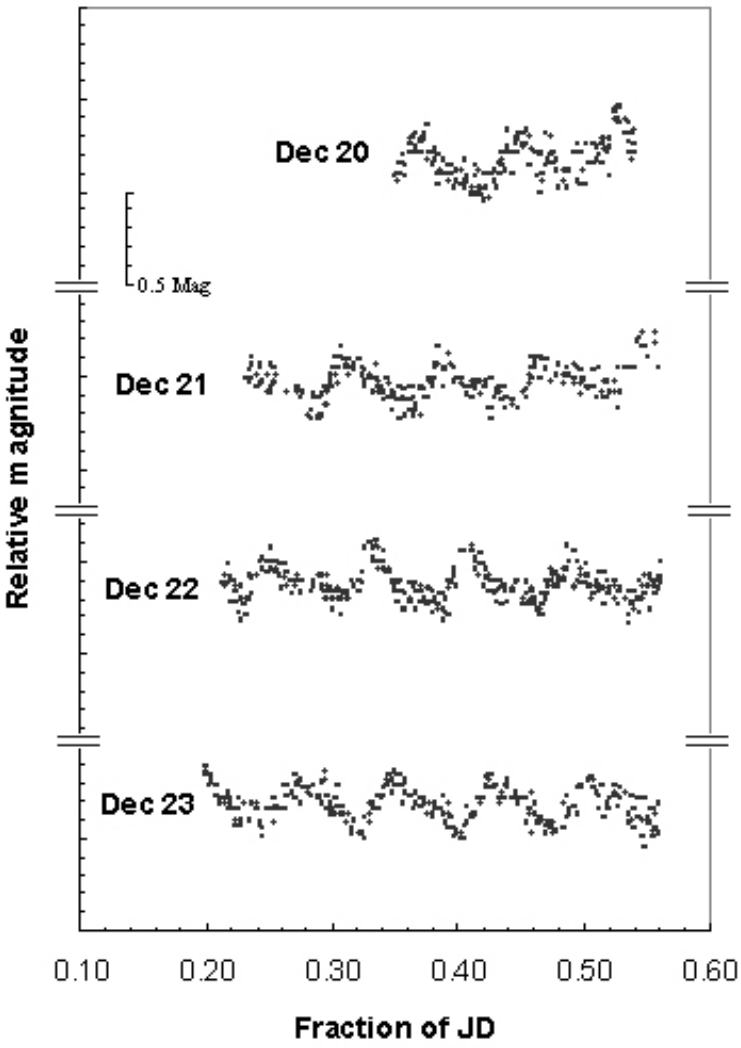


**Figure 1.** Light curve of WY Tri

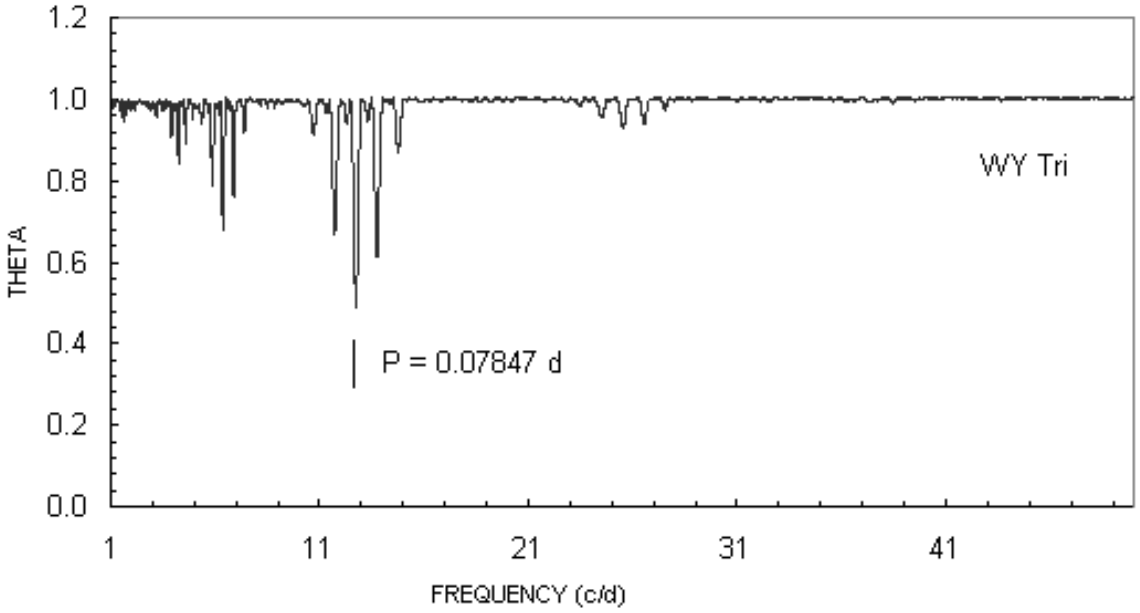


**Figure 2.** Period analysis of WY Tri

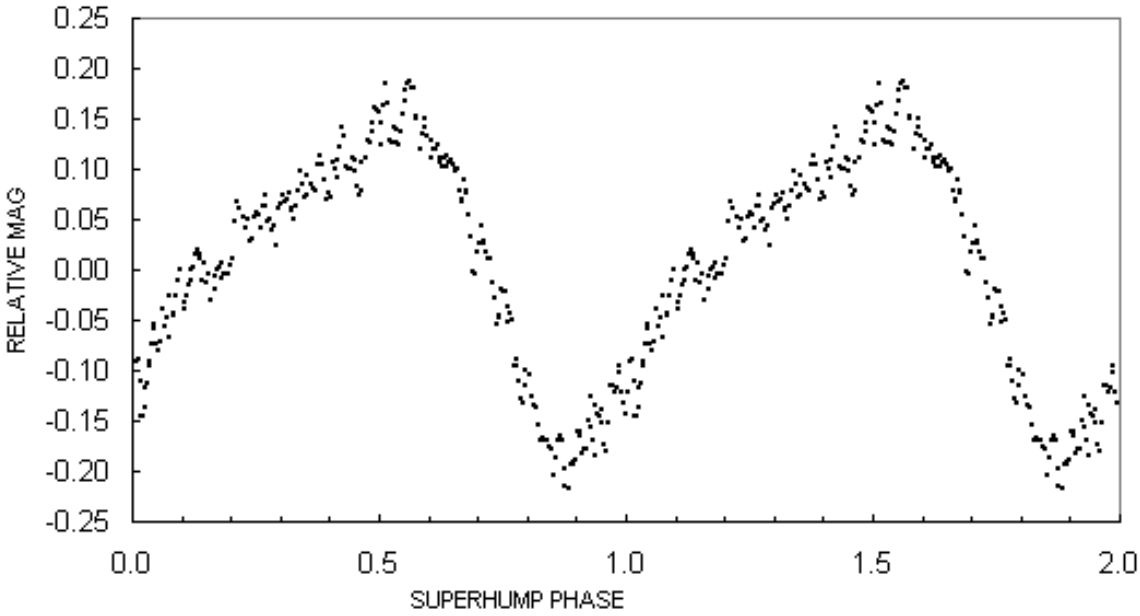


**Figure 3.** Averaged phase diagram of WY Tri

using a 0.35-m $f/6.3$ Schmidt-+Cassegrain telescope, mounted on an AstroTechniek FM-98 German equatorial mount, and equipped with a SBIG ST-7 CCD camera (Kodak KAF-0400 CCD for imaging and Texas Instruments TC211 CCD for guiding). For a complete description of the CBA Belgium Observatory equipment and software, see (Vanmunster et al. 2000a). During the 4 observing nights, we used GSC 2327 1839 ($11\overset{\mathrm{m}}{.}8$) as the comparison star, whose constancy was confirmed by other check stars.

Our December 20, 2000 observations revealed already fully grown superhumps with an amplitude of $0\overset{\mathrm{m}}{.}39$, and allowed the immediate classification of the object as a new SU UMa-type cataclysmic variable (Vanmunster 2000b). The initial stage of the outburst probably has been missed. Further observations at CBA Belgium were obtained over the next nights (Figure 1), allowing a more detailed analysis of the superhump period. After removing linear trends from the light curve, we performed a period analysis using the Phase Dispersion Minimization PDM method (Stellingwerf 1978). The resulting theta diagram is shown in Figure 2. The best superhump period is $0\overset{\mathrm{d}}{.}07847$ ($\pm\, 0\overset{\mathrm{d}}{.}00002$). The mean waveform of WY Tri is shown in Figure 3 (averaged data), and is a classical footprint of a common superhump profile. The superhump full amplitude was about $0\overset{\mathrm{m}}{.}39$.

The above superhump period value is in good agreement with results obtained at other observatories during the December 2000 outburst of WY Tri. In particular, data from Kyoto University, Japan and Copernicus Observatory, Czech Republic, yielded a superhump period of $0\overset{\mathrm{d}}{.}078483$ (Uemura 2000).

The December 2000 eruption light curve of WY Tri indicates a maximum magnitude of $15\overset{\mathrm{m}}{.}1$ (unfiltered CCD images), but since parts of the initial outburst phase likely have been missed, it is uncertain if this represents the true maximum magnitude value attained by the variable. The final fading of the object took place with an average decline rate of $0\overset{\mathrm{m}}{.}15$ per day, which is a typical value for dwarf novae in superoutburst.

We also examined the post-superoutburst behaviour of WY Tri, as some SU UMa-type dwarf novae are known to show rebrightenings during this stage. However, no evidence of such a rebrightening was found, both in our own CCD monitoring during two weeks following the steep decline, and in reports submitted to VSNET.

There is still an important amount of characteristics of WY Tri to be uncovered. Therefore, this object should receive all possible attention from both amateur and professional astronomers.

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