COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 2397

Konkoly Observatory
Budapest
5 September 1983
*HU ISSN 0374-0676*

# V436 CEN REVISITED

The superhump phenomenon seen during supermaxima of the SU UMa stars (Vogt 1974, Warner 1975) continues to attract interest but lacks a convincing explanation. One potentially useful clue to the mechanism underlying the superhumps is the slight but statistically significant decrease in their period during an outburst. Haefner *et al.* (1979) show that the superhumps in the well-studied VW Hyi outburst of December 1974 can be represented by elements containing the terms $0\overset{d}{.}07712E - 2.85 \times 10^{-6}E^2$ (where E is the number of cycles elapsed since the beginning of the outburst). Similarly, in TU Men, Stolz and Schoembs (1981) observed superhumps with elements $0\overset{d}{.}12625 - 6.1 \times 10^{-6}E^2$ and the writer has found elements $0\overset{d}{.}07749 - 6.5 \times 10^{-6}E^2$ for the December 1982 supermaximum of Z Cha.

In contrast, Semeniuk (1980) found a slightly increasing superhump period for the May 1978 supermaximum of V436 Cen. This anomaly suggested a second look at the interpretation of Semeniuk's data with the benefit of the greater amount of information now available for supermaxima of VW Hyi (Haefner *et al.* 1979, Vogt 1983). Semeniuk's observations consist of a short run on 7 May 1978, when V436 Cen was on a pre-maximum plateau, runs during the period 8-13 May when V436 Cen was in full outburst (gradually declining by a magnitude), and runs on 17 and 18 May when V436 Cen was within $\sim$0.5 mag of its quiescent brightness.

The observations of VW Hyi show (Vogt 1983) that the end of an outburst, when VW Hyi is within 0.5 mag of its quiescent brightness, "late superhumps" develop which have a period similar to that of the superhumps during the bright phases of the outburst, but which are displaced by 0.5P in phase with respect to the latter. This suggests that the 17 and 18 May superhumps observed by Semeniuk may in fact have been late superhumps, and that by including them (with their $180^{\circ}$ phase shift) into the solution, the superhump elements have been distorted.

That this is apparently the case is seen in Table I, where the light elements $T_{max} = 2443637.4990 + 0^{d}.063785E - 9.6 \times 10^{-7}E^{2}$, obtained from a least squares fit, are compared with the observed times of superhump maxima or, for the 17 and 18 May data, the times of superhump maxima less $\frac{1}{2} \times 0^{d}.0638$:

TABLE 1

| JDH 244 3600+ | | | | JDH 2443600+ | | | |
|---|---|---|---|---|---|---|---|
| *Observed* | *Calculated* | *E* | *O–C* | *Observed* | *Calculated* | *E* | *O–C* |
| 37.5010 | 37.4990 | 0 | +0.0020 | 39.6660 | 39.6664 | 34 | -0.0004 |
| .5597 | .5628 | 1 | -0.0030 | 40.621 | 40.6219 | 49 | -0.001 |
| .6270 | .6266 | 2 | +0.0004 | 41.513 | 41.5133 | 63 | 0.000 |
| .6847 | .6903 | 3 | -0.0056 | .576 | .5770 | 64 | -0.001 |
| 38.5218 | 38.5192 | 16 | +0.0026 | 42.6608 | 42.6589 | 81 | +0.0019 |
| .5850 | .5830 | 17 | +0.0020 | 46.534 | 46.5365 | 142 | -0.002 |
| .6480 | .6467 | 18 | +0.0013 | .599 | 46.6000 | 143 | -0.001 |
| .7132 | .7105 | 19 | +0.0027 | 47.5527 | 47.5524 | 158 | +0.0004 |
| 39.5390 | 39.5390 | 32 | 0.0000 | .6170 | .6158 | 159 | +0.0012 |
| .6043 | .6027 | 33 | +0.0016 | .6837 | .6793 | 160 | +0.0044 |

The rms of the deviations in Table 1 is $0^{d}.0020$, which is less than half the rms of the linear fit given by Semeniuk. In both cases we have omitted the single hump observed on 7 May, which deviates from the ephemeris by $0^{d}.0127$ and is more likely to be an enhanced orbital hump than a superhump: such enhanced orbital humps are observed in VW Hyi when a normal outburst immediately precedes a supermaximum (Vogt 1933).

In summary, our new interpretation of Semeniuk's observations provide (i) evidence that V436 Cen does not differ from the other SU UMa stars in having an apparently decreasing superhump period during the superoutburst, and (ii) the first evidence for late superhumps occurring in a system other than VW Hyi.

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