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OBSERVATIONS OF SUPERHUMPS IN FO ANDROMEDAE

FO And was discovered as a dwarf nova by Hoffmeister (1967). Subsequent survey of Sonneberg plates revealed a short outburst cycle length of 15–23 days, together with long outbursts which were suspected to be superoutbursts (Meinunger, 1984). This dwarf nova has since been monitored as a good candidate of an SU UMa-type dwarf nova.

The first detection of superhumps with a period of ~ 105 min was reported by Grauer and Bond (cf. Szkody et al., 1989), but the precise value of the period has not yet been published. We here report the results of CCD photometry obtained during a superoutburst in Aug. 1994.

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 90 and 120 s depending on the brightness of the object. The frames were first corrected for standard de-biasing and flat fielding, and were then processed by a personal-computer-based aperture photometry package developed by the author. The differential magnitudes of the variable were determined against a local standard star marked as C1 ($V=13.06$; Thorstensen et al., 1995) in Figure 1. The constancy of this comparison was checked against several stars in the same field. Total number of useful frames was 319.

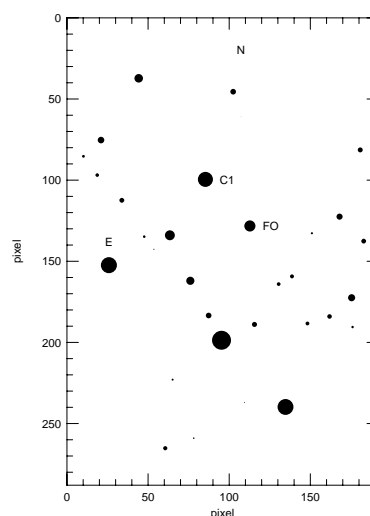


Figure 1. Finding chart of FO And drawn from a CCD image. North is up, and the field of view is about 10×7 arcmin. The primary comparison star (C1), and FO And (FO) are marked.

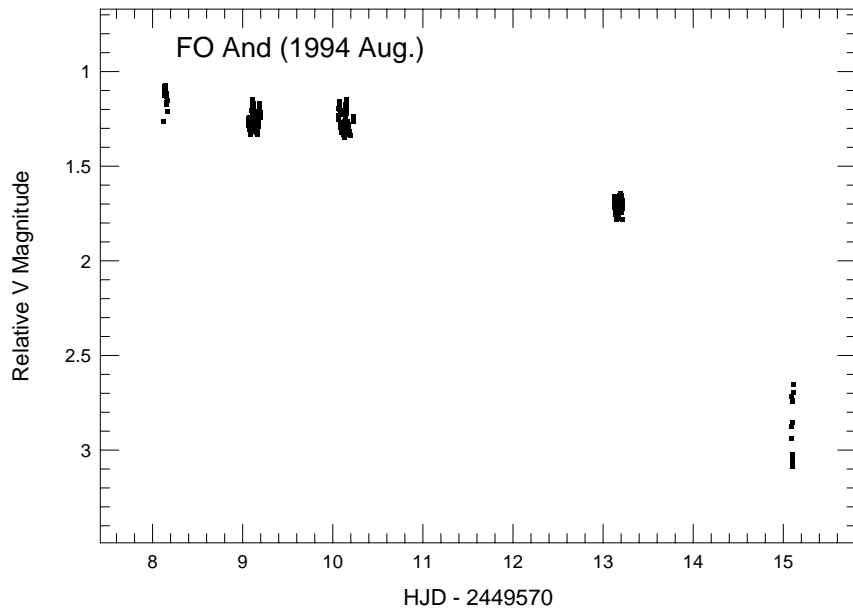


Figure 2. V -band light curve of FO And during a superoutburst in Aug. 1994. The zero point of the magnitude scale corresponds to $V=13.06$.

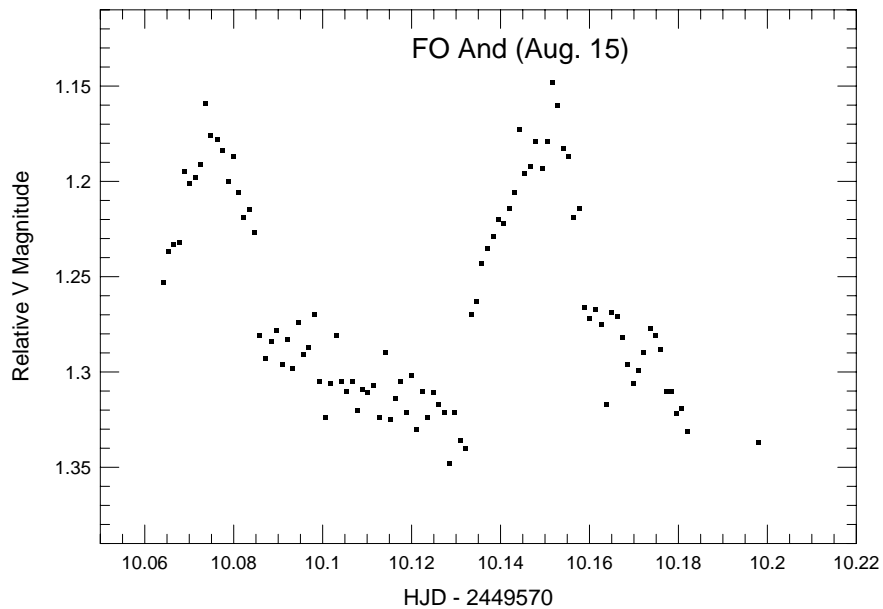


Figure 3. Enlarged light curve based on the Aug. 15 observation. Superhumps with an amplitude of 0.17 mag are clearly seen.

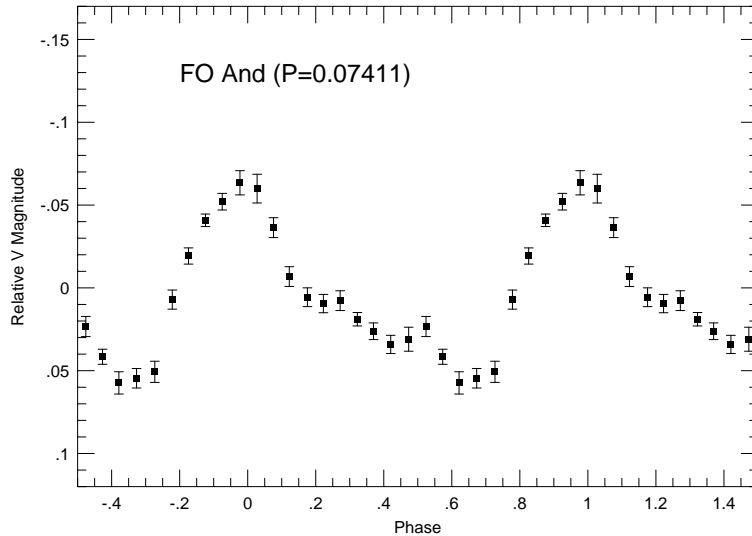


Figure 4. Folded superhump light curve of FO And. Each point represents 0.05 phase bin, and the vertical bar represents the standard error.

Figure 2 shows the overall light curve of FO And by our CCD photometry during the Aug. 1994 superoutburst. Since FO And was reported to be already in outburst on Aug. 10 (VSNET messages), we may conclude that the present outburst lasted at least 10 days. A representative light curve obtained on Aug. 15 (Figure 3) clearly shows superhumps with an amplitude of 0.17 mag. After heliocentric correction and removal of a linear trend of decline (0.097 mag was added to Aug. 15 data to correct a systematic deviation from the linear trend), a period analysis was applied to observations for the period of Aug. 13–18 using the Phase Dispersion Minimization (PDM) method (Stellingwerf, 1978). The resultant superhump period was 0.07411 ± 0.00005 day, which is about 1.5 % longer than that obtained by Grauer and Bond. A folded light curve (Figure 4) by this period clearly shows a profile of full-grown superhumps. FO And has thus become a member of SU UMa-type dwarf novae with well-determined superhump period.

Quite recently Thorstensen et al. (1995) report the orbital period of FO And as 0.07161 ± 0.00018 based on radial velocity study. By comparison with this period, we obtain the fractional superhump excess $((P_{\text{SH}} - P_{\text{orb}})/P_{\text{orb}})$ as 3.5 ± 0.3 %, which places FO And within usual distribution of fractional superhump excesses of SU UMa-type dwarf novae with similar orbital periods.

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