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**OBSERVATIONS OF A NEWLY DISCOVERED
SU UMa-TYPE STAR HV AURIGAE**

HV Aurigae was discovered to be a dwarf nova by Hoffmeister (1964) in Dec. 1963. He also found two outbursts on the Palomar charts occurred in March 1940 and March 1941 on the Palomar charts. After the discovery, the object has been little studied except the additional observations of two outbursts and a finding chart given by Bruch et al. (1987). The quiescent identification was made by Downes and Shara (1993).

Many of the outbursts of HV Aur have probably been overlooked because of its faintness, because the maximum visual magnitude in outburst is only about 15. However, an outburst was recently noticed by M. Iida (Variable Star Observers League in Japan) on Nov. 8, 1994, and announced a brightness variation which was regarded to be superhumps (M. Iida 1995, in preparation).

In order to confirm the superhumps and to determine the superhump period, we made observations on Nov. 11 and 13, 1994 using a CCD camera (Thomson, TH 7882CDA, 576×384 pixels with $23 \mu\text{m}$ square pixel size) attached to the Cassegrain focus of 0.6-m reflector (focal length=4.8m) at Ouda Station, Kyoto University (Ohtani et al.,1992). An interference filter was used which had been designed to reproduce the Johnson *V* band. The mode of 2×2 on-chip summation was employed. The observation lasted about six and eight hours on Nov. 11 and 13, respectively, occasionally interrupted by clouds. The exposure time was 120 sec with a read-out and saving dead time of 13 sec throughout observations.

We reduced the data using the personal-computer-based aperture photometry package developed by one of the authors (T.K.). This package automatically subtracts bias-flames, applies flat fielding and enables us to estimate the instrumental magnitudes. The aperture size was $8''$ in radius. The sky level was determined from pixels whose distance from the individual objects are between $16''$ to $30''$.

Figures 1 and 2 show short-term light curves of differential magnitude between HV Aur and a comparison star (Table 1). The zero point of the ordinate of figures corresponds to $V = 13.6$. The abscissa is Julian Day minus 2449660.

Table 1. The coordinates and magnitudes of the comparison and check stars taken from Guide Star Catalog (GSC).

	R. A.(J2000)	Dec.(J2000)	m_V
comparison	04 ^h 53 ^m 02 ^s .97	+38°18'10"0	13.6
check 1	04 ^h 53 ^m 00 ^s .06	+38°14'22"0	13.4
check 2	04 ^h 53 ^m 06 ^s .31	+38°13'50"9	14.3
check 3	04 ^h 53 ^m 13 ^s .20	+38°18'20"9	14.5

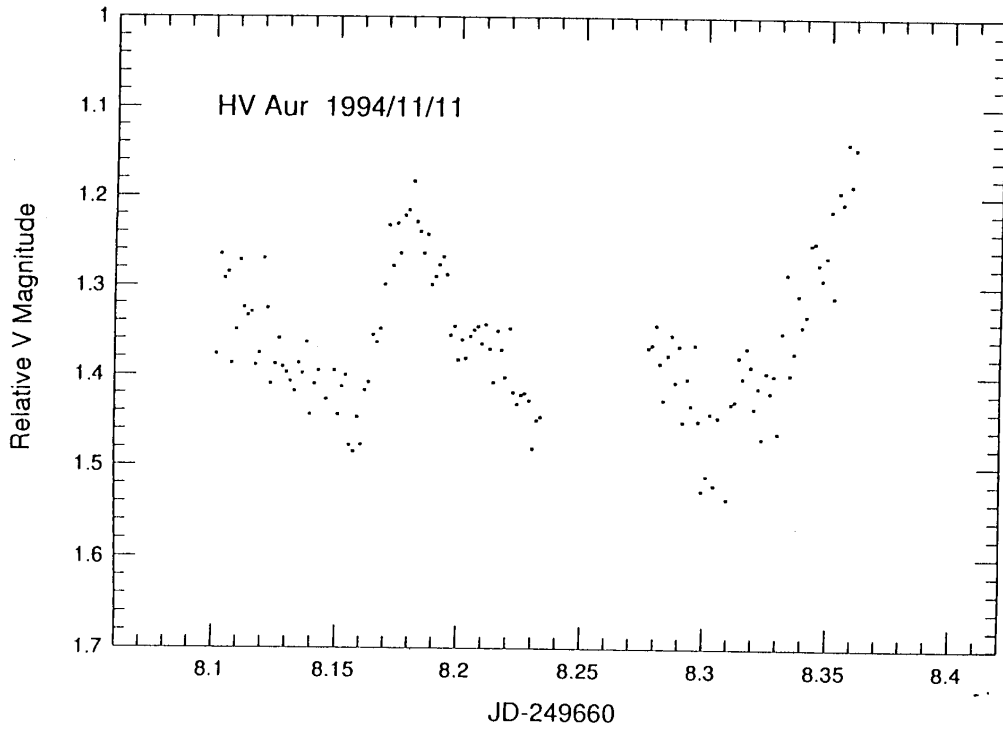


Figure 1: The short term light curve of HV Aur on Nov. 11 1994

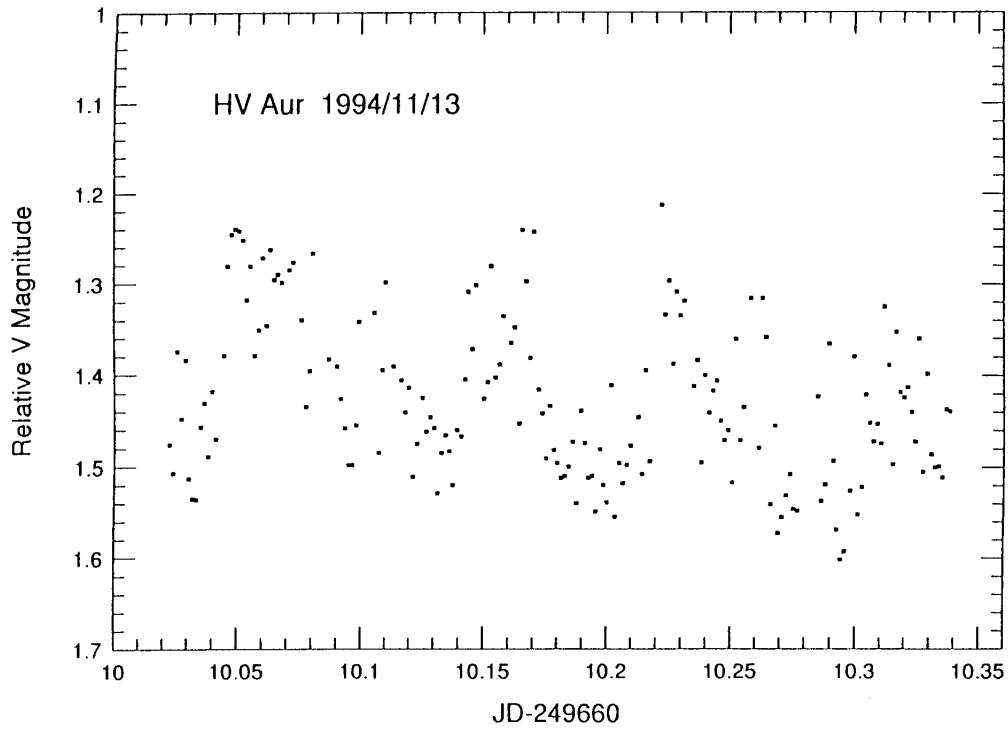


Figure 2: The short term light curve of HV Aur on Nov. 13 1994

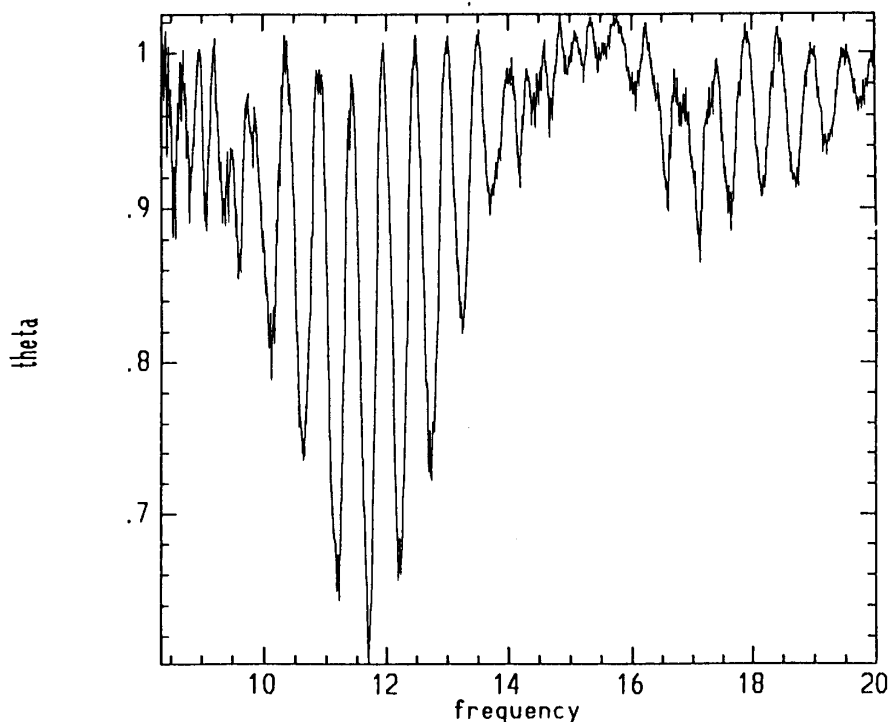


Figure 3: Theta diagram by PDM; the minimum point corresponds to 0.0855 day

Using three nearby check stars selected from GSC, we confirmed the constancy of the comparison star (Table 1) within 0^m02 , and the r.m.s. error for a single measurement of the differential magnitude is 0^m02 . Although the error is a little bit large because of clouds, the hump-like feature is considered to be real because its amplitude is about 0.2 mag, being much larger than the estimated error.

By analyzing the light curve using PDM (Stellingwerf 1978) program within IRAF package (IRAF is distributed by the National Optical Astronomy Observatories, U.S.A.), after removing the trend of linear decline, we obtained 0.0855 ± 0.0001 day as the best estimate of the period. Figure 3 shows the Θ diagram, whose abscissa is frequency (day^{-1}). We regarded the feature as superhumps, because the shape of the modulation, rather rapid rise and following gradual decline, is characteristic of a superhump of SU UMa-stars in superoutburst and only a superhump can explain such large amplitude modulation in a dwarf nova in outburst. We thus confirmed Iida's identification of HV Aur as a new member of SU UMa-type dwarf novae, and obtained a superhump period of 0.0855 day.

The decline rate is $0.035 \text{ mag day}^{-1}$, which is about one fourth of those typically observed in slow decline phase of usual SU UMa stars. More observation is necessary to reveal the nature of this peculiarity.

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