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PHOTOELECTRIC LIGHT CURVES OF HU AURIGAE

The twelfth magnitude variable star HU Aur was first discovered at the Bamberg Observatory as BV 83 (Geyer et al. 1955), and subsequently observed by Filatov (1960) and Strohmeier et al. (1962). However, no photoelectric light curves have been reported so far. In the fourth edition of GCVS (Kholopov et al. 1985), the system is classified as EB/KE. The ephemeris for the primary minimum has been given by Strohmeier et al. (1962) as

$$\text{Min I} = \text{HJD } 2426707.370 + 1^{\text{d}}.408010 \text{ E.} \quad (1)$$

In 1989-1991 we performed photoelectric observations of the system with the 91-cm reflector at the Dodaira Station of the National Astronomical Observatory of Japan. The equipment employed is a multi-channel polarimetric photometer, whose detailed description is given by Kikuchi (1988). The nearby C1 and C2 (BD+34°897) stars in Figure 1 were chosen as the comparison stars.

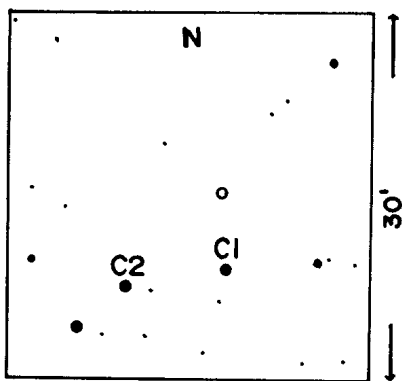


Figure 1. Finding chart of HU Aur. The variable HU Aur is represented by the open circle. The comparison stars are designated as C1 and C2.

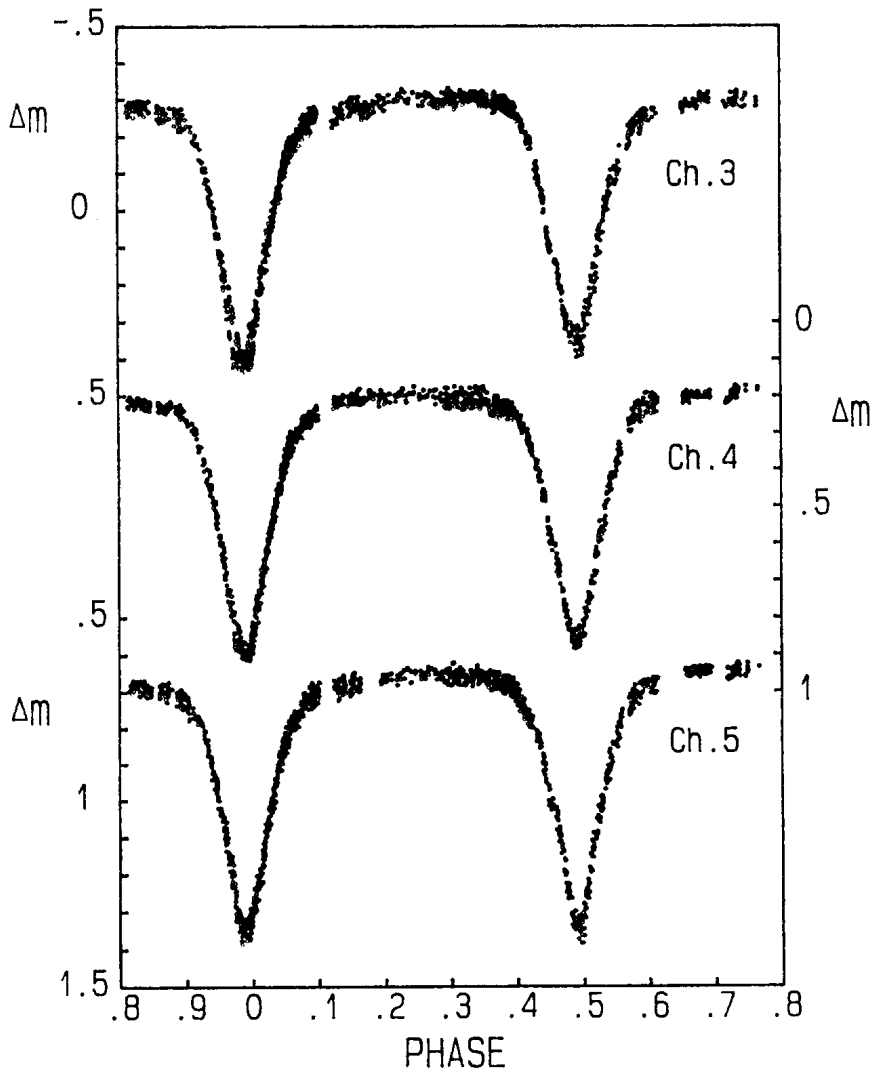


Figure 2. Light curves of HU Aur. The effective wavelengths of the channels 3, 4 and 5 are 460, 535 and 650 nm, respectively.

We have calculated the differential magnitudes of HU Aur with respect to C1, taking into account the differential magnitudes of C2 relative to C1. The light curves are shown in Figure 2 for some channels, where the orbital phases are calculated from the above ephemeris. As is seen in Figure 2, the depths of both minima are almost the same, as predicted by Strohmeier et al. (1962): the shape of the light curves are not EB-type. The colour of the system reveals that HU Aur is not so an early-type system. We have roughly estimated the spectral type of HU Aur to be middle to late F (at light maxima), comparing the colour of HU Aur with the colours of some standard stars taken with the same photometric system.

We caught primary minima twice in our observations, one on October 9 and the other on December 20 in 1989. The times of mid-eclipse have been estimated to be HJD 2447809.1997 (for October 9) and HJD 2447881.0090 (for December 20). According to the ephemeris (1), these yield the O-C values of $-0^d.0162$ ($E = 14987$) and $-0^d.0154$ ($E = 15038$), respectively.

Because the ephemeris (1) has been derived based on photographic observations, we recalculated the ephemeris including our photoelectric primary minima. Assigning weight 1 to photographic observations and 10 to photoelectric ones, we have obtained the following ephemeris,

$$\text{Min I} = \text{HJD } 2447809.199 \pm 6 + 1^d.4080103 \pm 8 \text{ E.} \quad (2)$$

In deriving this, we did not use the data for secondary minima, because it has been reported that these minima occurred slightly out of the mid-phase $0^P.5$ (Strohmeier et al. 1962). The O-C values of the observed primary minima are calculated from the new ephemeris (2) and listed in Table I.

The new orbital period is essentially the same as the old one. This indicates that there has been no period change since the observations by Strohmeier et al. (1962) and the system is probably a detached one, though there seem some indications of proximity effect in the light curves. Therefore, the classification KE in GCVS is surely not an appropriate one.

Table I
The O-C values of primary minima

Observed minima	E	O-C	Source
HJD 242 6707.332	-14987	-0.017	Strohmeier et al.
.353	-14987	+0.004	S
6987.567	-14788	+0.024	S
7397.358	-14497	+0.084	S
7449.379	-14460	+0.009	S
9168.526	-13239	-0.025	S
9175.527	-13234	-0.064	S
243 3157.410	-10406	-0.034	Filatov
3181.460	-10389	+0.080	F
3916.336	-9867	-0.026	F
5503.191	-8740	+0.002	F
5510.189	-8735	-0.040	F
5548.169	-8708	-0.077	F
6756.126	-7978	+0.033	F
6853.476	-7781	+0.005	F
7705.341	-7176	+0.024	Strohmeier et al.
244 7809.1997	0	+0.0006	Present work
7881.0090	51	+0.0014	Present work

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REFERENCES

- Filatov, G.S. 1960, *Astron. Tsirk.*, No.215, 20.
Geyer, E., Kippenhahn, R. & Strohmeier, W. 1955, *Kleine Veröff. Remeis-Sternw. Bamberg*, No.11.
Kikuchi S. 1988, *Tokyo Astron. Bull.*, 2nd ser., No.281.
Kholopov, P.N. et al. 1985, *General Catalogue of Variable Stars*, 4th ed., Vol.I (Nauka, Moscow).
Strohmeier, W., Knigge, R. & Ott, H. 1962, *Veröff. Remeis-Sternw. Bamberg*, 5, No.13.