

COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Number 4908

Konkoly Observatory
Budapest
6 June 2000

HU ISSN 0374 – 0676

GSC 01887-01240 : A NEW ECLIPSING BINARY

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In this note, we report that GSC 01887-01240 ($RA_{2000} = 06^h26^m23^s.89$, $DEC_{2000} = +27^\circ56'44''.2$, $V = 10^m75$, $B - V = 0^m35$) is a new eclipsing binary. The star was originally observed as a check star for one of our observing program stars, AH Aur (BD +28°1116, HD 256902). A finding chart for the newly discovered variable star is shown in Figure 1.

GSC 01887-01240 has been observed on eight nights between January and March, 2000 with a 61-cm reflector at the Sobaeksan Optical Astronomy Observatory in Korea. A PM512 CCD imaging System of Photometric Instruments cooled with liquid nitrogen and a standard *BVR* filter set were used. Two stars near GSC 01887-01240 served as comparison ($RA_{2000} = 06^h26^m32^s.60$, $DEC_{2000} = +27^\circ56'43''.0$) and check ($RA_{2000} = 06^h27^m21^s.38$, $DEC_{2000} = +27^\circ30'11''.5$, $V = 9^m92$, $B - V = 0^m81$) stars, respectively (see Figure 1). Our CCD observations for those stars were pre-processed according to the method given by Park (1993). Nightly extinction coefficients were computed from the comparison – star measurements and the differential magnitudes in each color in terms of Δm (variable – comparison, check – comparison) were reduced in the instrumental system. From the check – star measurements the standard errors of our observations in three colors were calculated to be 0^m017 in *B*, 0^m009 in *V*, and 0^m020 in *R*, respectively.

The *BVR* light curves of GSC 01887-01240 and check stars versus Julian dates are presented in Figure 2. From the figure, one finds that the light of GSC 01887-01240 in three colors changes considerably on Jan. 26 and Mar. 24, 2000. One also finds that the pattern of the light variations indicates that the star is an eclipsing binary. From our observations two times of minimum light were obtained for the new variable in each color with the method of Kwee & van Woerden (1956) which are listed in Table 1.

Using Scargle's (1982) method we performed a period search and found a tentative ephemeris as:

$$\text{Min. I} = \text{JD Hel } 2451570.2363 + 1^d4280 \times E. \quad (1)$$

The *BVR* light curves of GSC 01887-01240 constructed by using Eq. (1) are presented in Figure 3. The light curves in Figure 3 show the star to be an Algol-type eclipsing binary. The depths of primary eclipse are 0^m32 in *B*, 0^m32 in *V*, and 0^m33 in *R*, respectively. It is noticed that there is a discontinuity in each light curve from 0^p2 to 0^p3 , which is obvious especially in *V*-band light curve. One also finds that the light at the beginning of ingress branch of secondary eclipse is higher than following Min II. At this moment it is difficult

to discern that these peculiarities are caused by the intrinsic stellar activity in the system or by incorrect determination of the period.

Future photometric as well as spectroscopic observations are urgently needed to reveal the properties of the light variability of GSC 01887-01240.

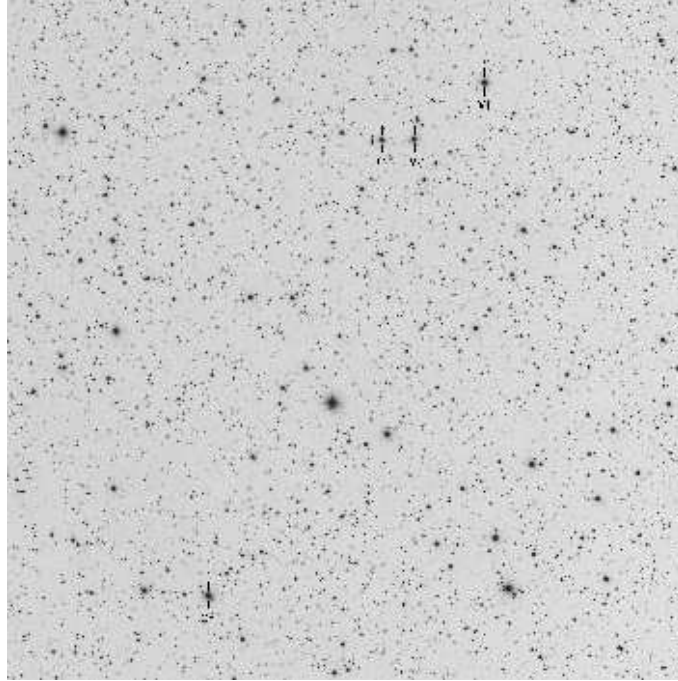


Figure 1. A finding chart for GSC 01887-01240 (V2), V1 = AH Aur, C = comparison star and Ch = check star (HD257287). The scale of the chart is $40' \times 40'$. North is up, east to the left.

Table 1: Times of minimum brightness of GSC 01887-01240.

Minimum Times	σ	Type	Filter	Weighted Mean	σ
2451570.2365	0.0013	I	<i>B</i>	2451570.2363	0.0011
2451570.2374	0.0011	I	<i>V</i>		
2451570.2351	0.0010	I	<i>R</i>		
2451628.0777	0.0020	II	<i>B</i>	2451628.0708	0.0015
2451628.0705	0.0015	II	<i>V</i>		
2451628.0662	0.0014	II	<i>R</i>		

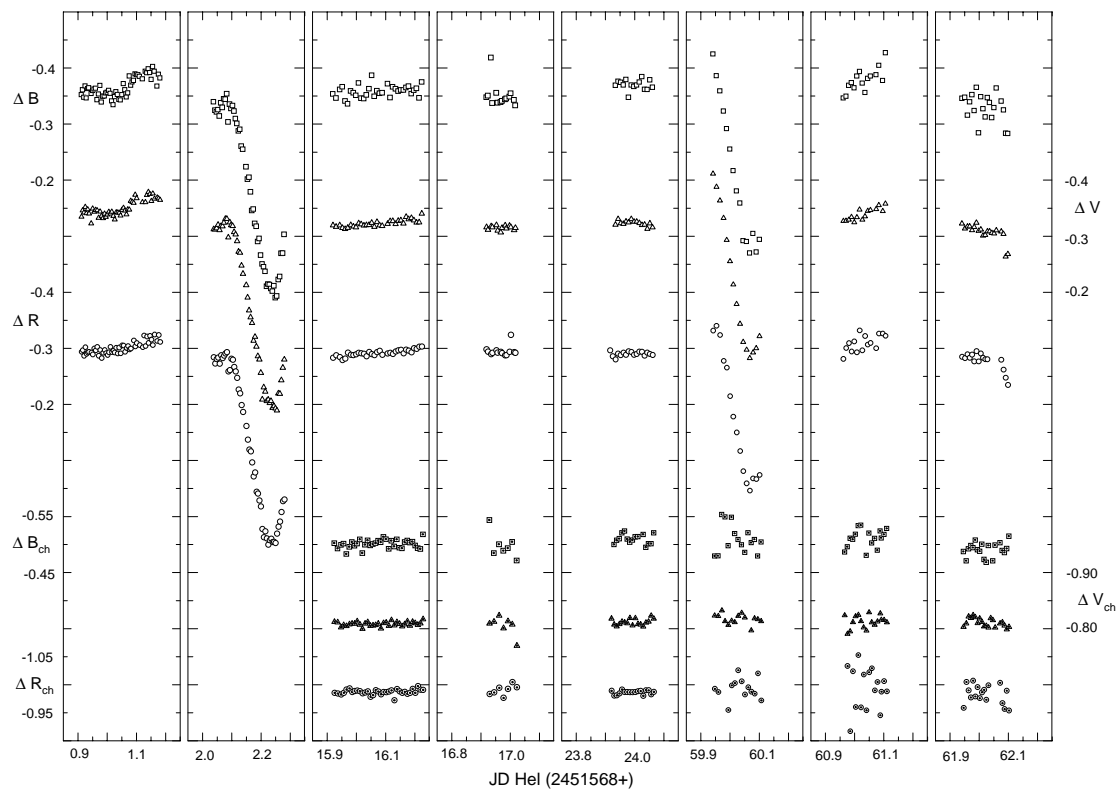


Figure 2. The *BVR* light curves of GSC 01887-01240 and the check star (HD257287).

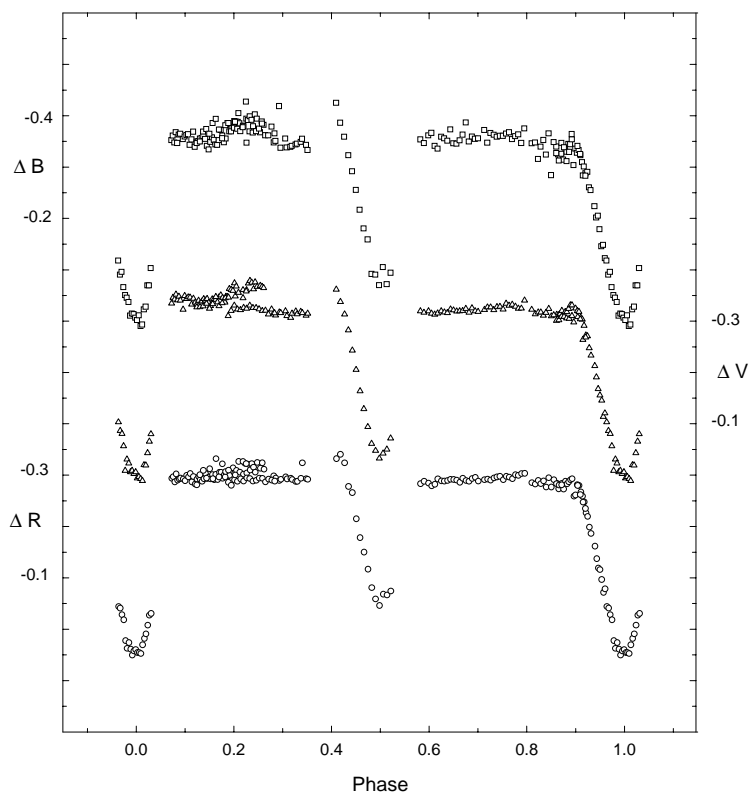


Figure 3. The *BVR* phase curves of GSC 01887-01240.

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