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

Number 4436

Konkoly Observatory
Budapest
28 January 1997

HU ISSN 0374 – 0676

TWO VARIABLE STARS IN AURIGA: THE NEW CLASSICAL CEPHEID NSV 01771 AND THE NEW ECLIPSING BINARY SYSTEM GSC 2906.0213

The variability of NSV 01771 (= CSV 006139 = VB 11 = GSC 2906.0279) was first announced by Horn-d'Arturo and Lacchini (1955). In the NSV catalogue (Kholopov, 1982), NSV 01771 is recorded as an RR Lyrae star with a photographic amplitude of 1.8 magnitudes. During the autumn of 1996, a variable star search carried out with the 0.4-m telescope at Mollet del Valles Observatory (Spain) revealed that this suspected variable had a period too long for an RR Lyrae star. To study more thoroughly its nature, it was monitored in the V band with the 0.6-m telescope at Esteve Duran Observatory (Spain) using a CCD camera. Observations were also performed with the 0.5-m telescope at L'Ametlla del Valles Observatory. NSV 01771 was observed for 21 nights from 7 October to 19 December 1996. GSC 2906.0069 was used as comparison star and GSC 2906.0213 as check star.

Photometric data shows that NSV 01771 is not an RR Lyrae star, but a classical Cepheid with a period close to 3.4 days which can be unambiguously identified with GSC 2906.0279, an object with an average photovisual magnitude (PAL-V1 filter) of 12.0 according to the Guide Star Catalogue. Its amplitude in the V band is of $0\overset{m}{.}93 \pm 0\overset{m}{.}02$. The phase curve (Figure 1) presents an asymmetry factor (M−m)/P=0.2. The following ephemeris was computed:

$$\text{Max.} = \text{HJD}\,2450416.64 + 3\overset{d}{.}4075 \times \text{E}$$
$$\pm 0.02 \pm 0.0015$$

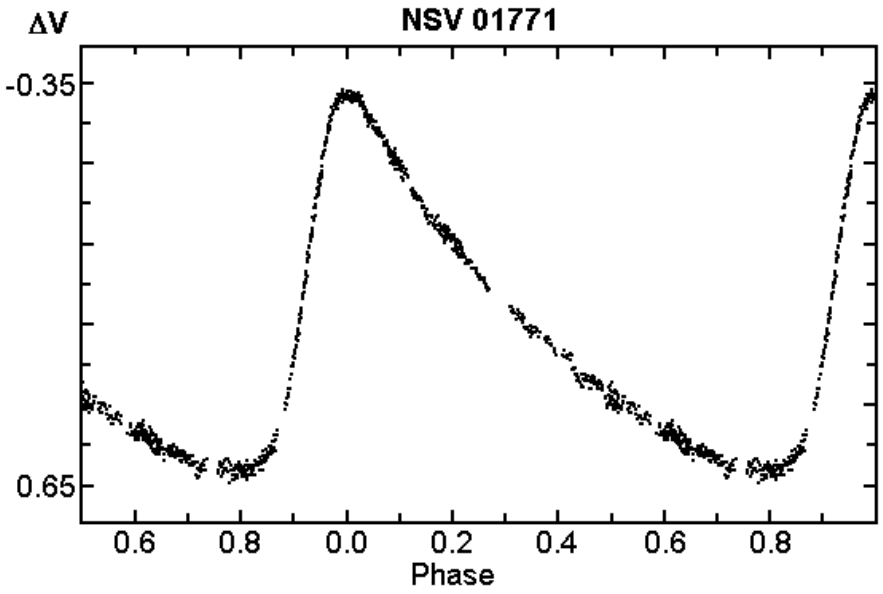

Figure 1

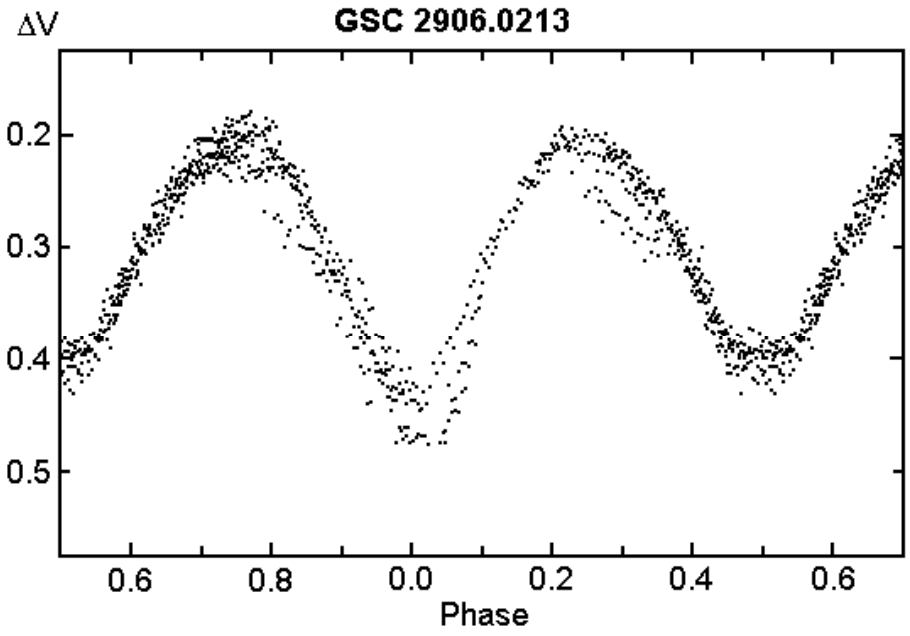

Figure 2

Brightness measurements obtained from archival plates would allow to improve the above given ephemeris and also study its light-curve in the past. In addition to this, spectroscopic and more photometric data would help to obtain additional relevant information about this new pulsating star.

CCD reductions yielded that the check star GSC 2906.0213, located about 43 arcseconds to the Southwest of NSV 01771 is also variable. According to the Guide Star Catalogue, its photovisual magnitude (PAL-V1 filter) is 12.7. This object is an eclipsing binary star with a period close to 0.9 days, and has an amplitude of $0\overset{m}{.}24 \pm 0\overset{m}{.}04$ at primary minimum and $0\overset{m}{.}19 \pm 0\overset{m}{.}02$ at secondary minimum in the V band. Phase curve (Figure 2) presents higher dispersion around primary minimum than around minimum II. Simultaneous observations performed with two different telescopes showed that this is due to cycle-to-cycle changes in the shape of the light-curve, probably as a consequence of some form of stellar activity. Although data scatter does not allow to compute the physical parameters of this binary system, a preliminary study suggests that the primary component is about 10 times as massive as the secondary one. Minimum I is a transit whereas minimum II is an occultation.

Due to the unstable shape of primary minimum, ephemeris to predict times of minima was derived for minimum II:

$$\begin{aligned} \text{Min. II} = \text{HJD}\,2450395.5073 &+ 0\overset{d}{.}91279 \times \text{E} \\ &\pm 0.0025 \pm 0.00020 \end{aligned}$$

A list of minimum II timings and O−C residuals for the above given ephemeris was also obtained after using the Kwee and van Woerden's (1956) method. These are given in Table 1.

Table 1

HJD	O−C
2450373.5962	−0.0041
2450374.5139	0.0008
2450395.5073	0.0000
2450416.4998	−0.0016
2450437.4940	−0.0016

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References:

Horn-d'Arturo, G., Lacchini, G.B., 1955, *Bologna Pubbl.*, **6**, No. 13
Kholopov, P.N., editor, 1982, New Catalogue of Suspected Variable Stars, Moscow
Kwee, K.K., van Woerden, H., 1956, *BAN*, **12**, 327