# GSC 4487-00399 is a New W UMa Variable

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Star Name:	GSC 4487-003	399,	
<b>Coordinates (J2000):</b> 23 48 36.30, +71 28 49.0			
Variability type:	EW;	Limits, System:	13.2 - 13.8 ( V);
Period:	0.49624(3) d;	Epoch:	JD 2455121.200(2)

#### **Remarks:**

During observations of GSC 4487-00347, a new eclipsing binary star with an eccentric orbit (Otero et al. 2006), we discovered variability of GSC 4487-00399. Our observations were carried out at the Tien Shan Astronomical Observatory (altitude 2750 m) using a Ritchey-Chretien-360 f/4 telescope with an ST-402 CCD detector. The telescope was made by V.B. Sekirov. A total of 934 images with 60 s exposures in the V band, obtained on the good nights of October 16, 17 and November 19, 2009, have been analysed. We used a routine of reductions for dark current during exposure to avoid dependence on temperature. The comparison star and two check stars were: GSC 4487-00523 (V = 11.1), GSC 4487-00329 (V = 11.4), GSC 4487-00195 (V = 11.76). No variations of the comparison star or check stars were detected during our observations with the accuracy of  $\sigma = 0.006$  m. The photometric reductions made use of the Minipack code (Hroch 1998).

To search for periodicity, we used the software package by Breger (1990), in which Fourier analysis is applied to find the periods and the least-squares method is used to find parameters of the detected brightness variations. Fig. 1a displays the spectral window. The power spectrum for our observations is presented in Fig. 1b; we see that it exhibits a peak at the frequency  $\omega = 4.030 \text{ d}^{-1}$  (P = 0.24812 d). From our analysis of the variability, we can assume that the true frequency is twice lower than this one. We suggest that the star is a close-binary EW-type variable with the ephemeris:

#### MinI = HJD 2455121.200(2) + 0.49624(3)\*E.

Fig. 1c shows the phase diagram (brightness versus phase of the period found). The phased light curve is typical of W UMa systems. The almost equal depths of the primary and secondary minima suggest close temperatures. However, the lack of spectroscopic data or of photometry in other bands makes it impossible to obtain an accurate light curve solution yet.

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### **References:**

Breger, M., 1990, Comm. in Asteroseismology, 20, 1

Hroch, F., 1998, Proceedings of the 29th Conference on Variable Star Research, Brno, Czech Republic; eds.: Dušek, J. and Zejda, M., p. 30

Otero, S.A., Wils, P., Hoogeveen, G., and Dubovsky, P.A., 2006, IBVS, No. 5681

## Light Curve



The spectral window (1a), the power spectrum (1b), and the phase diagram (1c) of the variable star GSC 4487-00399. **Finding Chart** 



The finding chart for the variable star GSC 4487-00399. **Data Source** 1. <u>gsc0448700399.txt</u>