GSC 2805–00766 is a new W UMa variable

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Abstract

Multi-night CCD observations of the previously unknown variable GSC 02805–00766 reveal its nature as a contact binary. We present its light elements and light curve.

The star GSC 2805–00766 (coordinates for equinox 2000.0: $\alpha = 00^h43^m29\!\!.\!\!^s7$, $\delta = +42°13'54''$) is in the field of CC And and was found to vary by I. Rozakis during CCD observations in autumn 2005. It was monitored by S. Kleidis in autumn/winter 2006 and autumn 2007 for fifteen nights.

A 30 cm SCT telescope, ST-7 XMEI CCD camera and Schuler photometric V and I_c filters were used. The data set of 28th December 2006 was taken through a clear filter. Five primary minima in 2006 and one secondary minimum in 2007 were recorded and are presented in the Table. All images were flat-fielded, bias and dark frames were subtracted according to standard procedures. We used the calibration and photometry software AIP4WIN V1.25 (Berry and Burnell, 2003). Times of minima and period calculated using Peranso period analysis software (Vanmunster, 2006) and software written by Robert Nelson (Nelson, 2007). The data are available electronically.

The comparison stars used were Comp1 = GSC 2805–00633 (adopted magnitude $V = 12.9$ from the GSC catalogue), Comp2 = GSC 2805–01419 and Comp3 = GSC 2805–00807. Unfortunately, all three are about two magnitudes brighter than the variable, limiting the precision of the observations. The average nightly standard deviation for the check stars was $0\!\!.\!\!^m02$–$0\!\!.\!\!^m03$ in V and $0\!\!.\!\!^m012$–$0\!\!.\!\!^m017$ in I_c. The light curves and electronic tables of observations contain differential magnitudes Δm(Var−GSC 2805.00663).
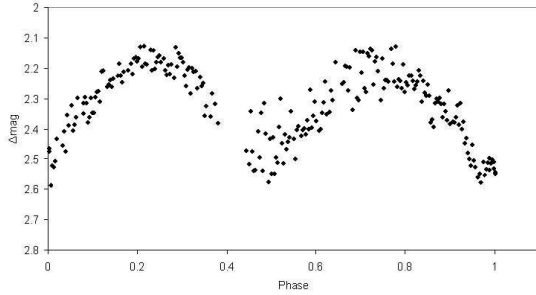
Table. Times of Minimum Light

| JD Hel. 2450000+	Min	O−C (days)	E	Filter
3980.51609	I	−0.00966	−31	V
3995.49103	I	0	0	V
4008.53186	I	0.00655	27	V
4024.45861	I	0.00252	60	V
4098.30620	I	−0.01079	213	Clear
4350.56045	II	0.00606	735.5	I_c

The weighted average of period values was $0\overset{d}{.}48276$ and further refined through O–C diagram to $0\overset{d}{.}48275$. The ephemeris is:

$$\mathrm{HJD_{MinI}} = 2453995.49103 + 0\overset{d}{.}48275 \times E.$$
$$\pm 9 \qquad \pm 14$$

**Figure 1.** The phased I_c light curve of GSC 2805–00766.
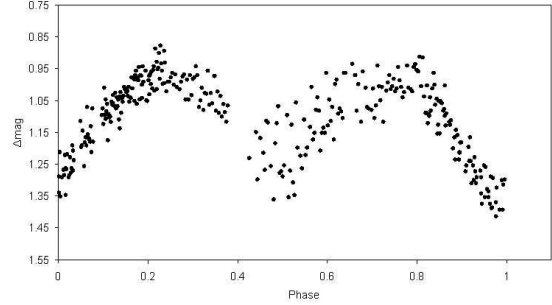
Figure 2. The phased V light curve of GSC 2805–0766

To measure the star's calibrated magnitudes, we arranged a short B, V observing run on 16th October, 2007. The magnitude of the variable at phase 0.458 was estimated as $V = 14.39 \pm 0.06$ ($B-V = 0.51 \pm 0.06$), as measured with respect of two standard Landolt fields using PhotoRed software (B.D. Warner, `http://www.minorplanetobserver.com/`) for reductions. The amplitude is about $0\overset{m}{.}3$ in V and $0\overset{m}{.}35$ in I_c filters. The phased light curves in both filters are given in Fig. 1 and Fig. 2, they are typical for W UMa systems. The almost equal depths of primary and secondary minima suggest close temperatures, however due to the faintness of the new variable and the absence of spectroscopic data, it is impossible to calculate an accurate light curve solution at this time. The finder chart for the new variable, along with comparison stars used, can be found in Fig. 3.

References:

Berry, R., Burnell, J., 2005, Handbook of Astronomical Image Processing, Willmann-Bell
Vanmunster, T., 2006, `http://www.peranso.com`
Nelson R.H., 2007, `http://members.shaw.ca/bob.nelson/software1.htm`
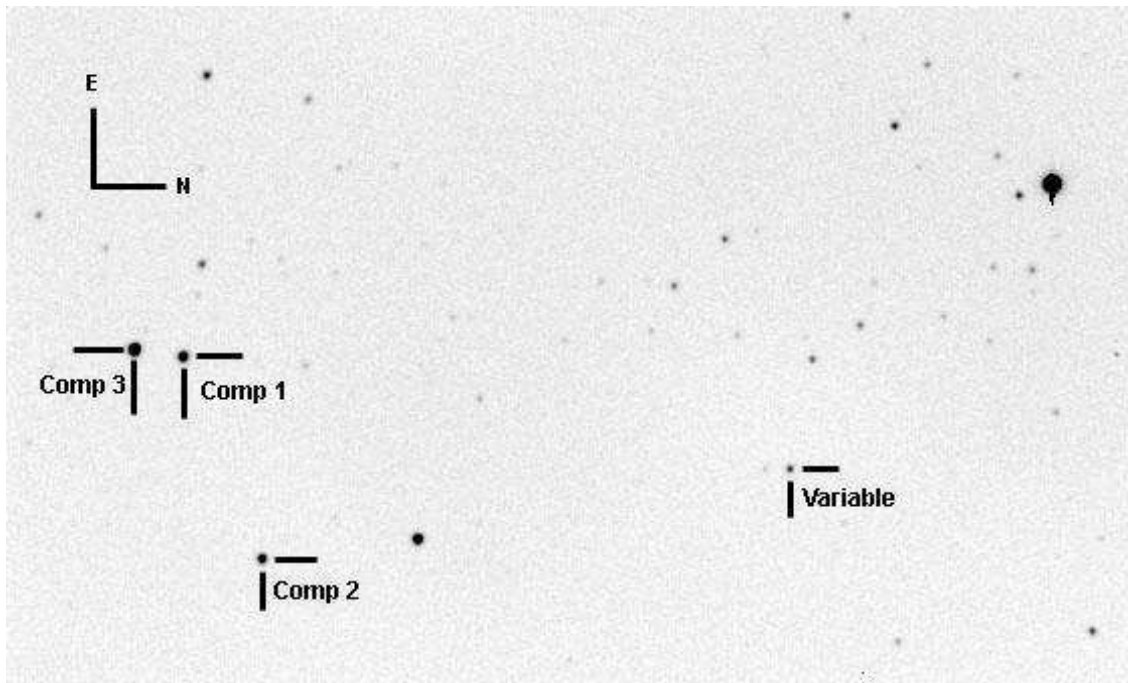
Figure 3. Finder chart of GSC 2805–00766