GSC 05178_01376: A NEW W UMa VARIABLE

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Name of the object:
GSC 05178_01376

Equatorial coordinates:	Equinox:
R.A.= $20^{\rm h}48^{\rm m}13^{\rm s}$ **DEC.**= $-01°29'26''$	J2000.0

Observatory and telescope:
Rolling Hills Observatory, 0.20-m Schmidt–Cassegrain telescope

Detector:	Cookbook 245 CCD (CB245)

Filter(s):	No, roughly R (CB245 camera)

Comparison star(s):	GSC 05178_01373
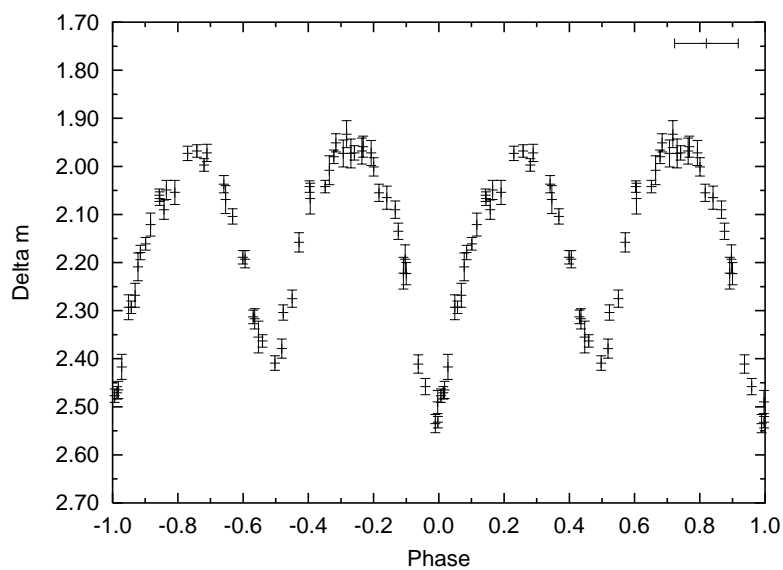
Figure 1. Phase diagram of GSC 05178_01376

Transformed to a standard system:	No

Availability of the data:
Upon request

Remarks:

The Mark III survey of The Amateur Sky Survey (TASS) has collected numerous measurements of stars along the equator using drift scan CCDs mounted behind 135-mm telephoto lenses (Richmond et al., 2000). Analysis of the data has produced a number of new variables (Gutzwiller, 1999). One of these, GSC 05178_01376, was observed by the author to verify the classification by Gutzwiller and to determine an ephemeris.

Data were obtained on five nights. Each "observation" was composed of four or five separate 10^s images. After dark images were subtracted and flats applied, aperture photometry using sextractor (Bertin and Arnouts, 1996) was used to generate star lists. The difference (Δm) between GSC 05178_01376 and the nearby star GSC 05178_01373 ($m_v = 9.30$) was calculated for each 10^s image. The data for all images comprising an "observation" were averaged and the standard deviation calculated. A heliocentric correction was applied to the data.

The TASS tenxcat database contains 59 I observations of GSC 05178_01376. The data were sorted to find the faintest measurements; these should correspond to observations that occurred at or very near a minimum. Five minima in the I-band TASS photometry were identified: TASS minima HJD $- 2450000 = 740.5650$; 967.8671; 1056.6230; 1059.6140; 1068.5880. Using these values in conjunction with the minima determined during the five nights of observation at Rolling Hills Observatory yields an improved ephemeris:

$$\text{Min. I} = \text{HJD } 2451463.5725 + 0\overset{\text{d}}{.}272218 \times E.$$
$$\pm 0.0004 \pm 0\overset{\text{d}}{.}000004$$

The quoted error was estimated by assuming that each of the TASS minima had a standard error of 5 minutes. A phase diagram is shown in Figure 1. The light curve is fairly symmetric, with the primary minimum being $0\overset{\text{m}}{.}10$ fainter than the secondary. The secondary eclipse occurs very close to phase 0.5.

Acknowledgements:

Michael Gutzwiller has searched through the TASS Mark III database to discover several dozen previously unknown variables. His work was instrumental in pointing the author to this new variable.

Tom Droege is the founder and main driving force behind the TASS organization. Without his efforts there would be no TASS.

References:

Bertin, E., Arnouts, S., 1996, *A&AS*, **117**, 393
Gutzwiller, M., 1999, "TASS Variables",
    http://home.fuse.net/deepsky/TASS_Variables.htm
Richmond, M. W., Droege, T. F., Gombert, G., Gutzwiller, M., Henden, A. A., Albertson,
    C., Beser, N., Molhant, N., Johnson, H., 2000, *PASP*, **112**, 397