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A NEWLY DISCOVERED ECLIPSING VARIABLE IN THE SW URSAE MAJORIS FIELD

A new eclipsing variable star has been discovered by the authors in the field of the dwarf nova SW UMa during an observational program to collect data on superhump phenomena. Details of the instrumentation and filters may be found in (DeYoung, Schmidt, and Gritz 1991). The I band filter was used for 1199 images, the R band filter was used for 66 images, and a V filter was used for 67 images. Observations were taken on eleven nights from Julian Date 2448705.53823 (March 24, 1992 UT) through 2448762.61821 (May 20, 1992 UT).

The DAOPHOT photometry package, (Stetson 1987), was used in synthetic aperture mode, giving magnitudes of all of the brightest stars in the CCD field. The new star was discovered on the first night by intercomparing all of the stars in the CCD field of view. A search of the *General Catalogue of Variable Stars* (1985), *The New Catalogue of Suspected Variable Stars* (1982), and the various *Information Bulletin on Variable Stars* issues published since 1980 revealed no object corresponding with the new variable. The method of Kwee and van Woerden (1956) was used to determine the heliocentric times of well observed minima (see Table 1). Using the three well-observed times of primary minima in a linear least squares fit gives the following preliminary ephemeris:

$$\text{JD Hel. Min. I} = \underset{\pm.0006}{2448706.7253} + \underset{\pm.000007}{0.358162} * E \qquad (1)$$

The following data were found in the *Space Telescope Guide Star Catalog* (CD ROM Version 1 issued on 1 June 1989) on the new eclipsing variable.

Right Ascension (2000.0)	Declination (2000.0)	m_v
$08^h\ 36^m\ 27.2^s$	$+53°\ 34'\ 40''$	12.4

The general shape of the light curve indicates a borderline semi-detached/contact type binary system. Preliminary fits to the light curve using the GDDSYN software (Hendry and Mochnacki 1992), and the May 1992 revision of the Wilson-Devinney method (Wilson and Devinney 1979) and (Wilson 1979, 1990, 1992) indicate an inclination of 56.5 degrees. The observed instrumental amplitude of primary minimum is 0.2 in the instrumental V, while 0.15 is indicated for the secondary minimum. Figure 1 shows the instrumental differential I-band magnitudes versus phase computed using Equation 1. Figure 2 is an I-band image finder chart for the new variable. Table 1 gives the times of both primary and secondary minima observed during this study reduced to Equation 1.

In the instrumental I band evidence for variation from cycle to cycle is indicated on the maximum occurring at phase 0.75. Secondary minimum is slightly skewed to approximately phase 0.513, or 0.0046 days late, and is caused by the shape changes in the obviously variable light following maximum. The amplitude in the instrumental I band is 0.18 magnitude for primary and 0.14 magnitude for the secondary minimum.

TABLE 1. Times of primary and secondary minima.

CYCLE	HJD	MEAN ERROR (DAYS)	O-C (CYCLES)	O-C (Days)
-0.5	2448706.5403	±0.0006	-0.0165	-0.0059
0.0	2448706.7259	±0.0005	+0.0017	+0.0006
11.0	2448710.6645	±0.0005	-0.0017	-0.0006
19.5	2448713.7062	±0.0009	-0.0092	-0.0033
156.0	2448762.5986	±0.0011	+0.0000	+0.0000

Min. I (HJD) = 2448706.7253 + 0.358162 * E

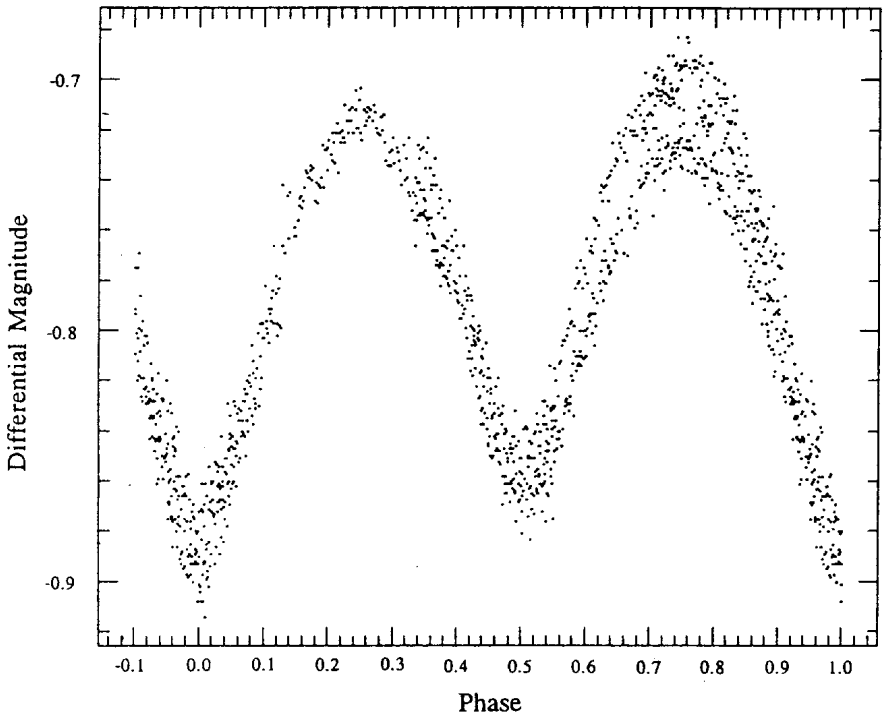

Figure 1. The instrumental I band light curve.

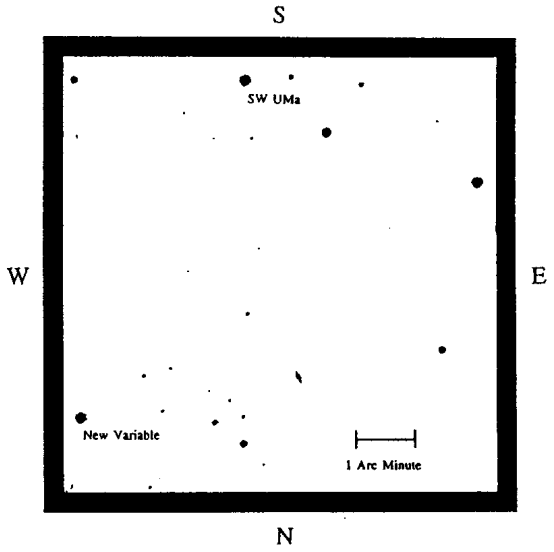

Figure 2. An I band finder chart.

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