

## Period Solution for "Unsolved Variable" HD 139388

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<b>Star Name:</b>	TYC 4415-1629-1, PPM 8943, SAO 8275, BD +71 0735		
<b>Coordinates (J2000):</b>	15 32 57.48, +70 42 15.8		
<b>Variability type:</b>	EA;	<b>Limits, System:</b> 9.16 - 9.44 V;	<b>Spectrum:</b> A2
<b>Period:</b>	16.2570 d;	<b>Epoch:</b>	JD 2456423.231 (MinI), 2456415.818 (MinII)

### Remarks:

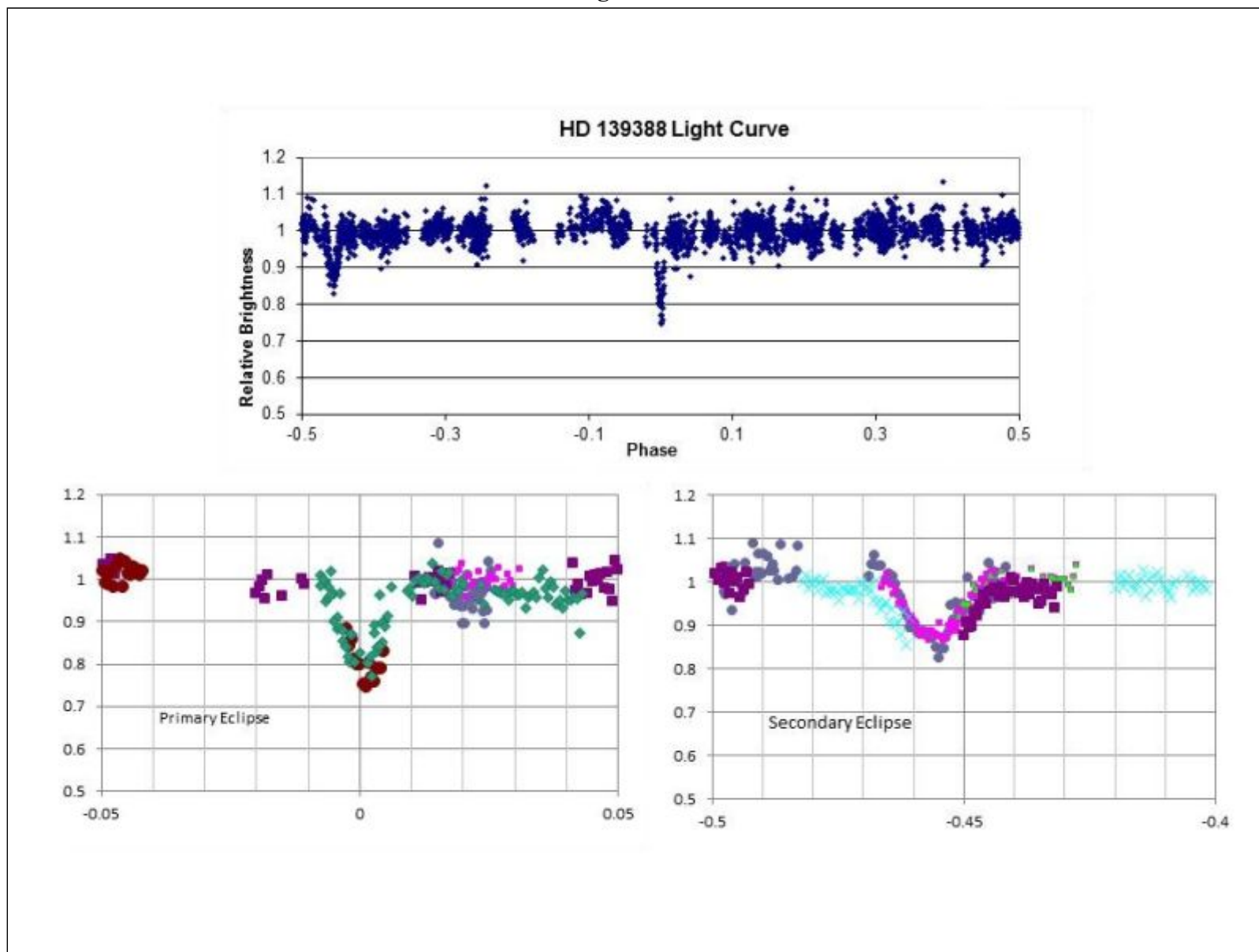
There were two different systems used to acquire the data (a): A TheImagingSource DMK 41BU02 Astronomy camera on an unfiltered 110mm focal length  $f/2.5$  lens, mounted on a Meade ETX-60 operating in Alt/Az mode and (b) : A TheImagingSource DMK 41AU02.AS Astronomy Camera on an unfiltered 50mm focal length  $f/2$  lens mounted on a Meade ETX-90 operating in Equatorial Mode. Neither configuration used the Meade optical system for data acquisition. System (a) was used in 2010, (b) was used in 2011 and 2013. Four-second exposures were used, with each exposure also used for automatically guiding the telescope. The guiding/acquisition software, written by the author, aggregated the pixels  $2 \times 2$  for the (a) configuration before writing the files to disk; in the (b) configuration there was no binning and the software co-added 8 frames before writing the resulting file to disk. Subsequent processing consisted of photometry of the target and reference star(s) on each frame and an averaging of the signal ratios on 200 frames (2010) or 24 frames (2011 and 2013). The errors listed in the data file are 1 sigma estimates based on the rms variation of the measurements going into the average, on a bin-by-bin basis. This software was also written by the author.

The resulting FOVs of the two systems were (a):  $3^\circ.10 \times 2^\circ.33$ , and (b):  $4^\circ.25 \times 3^\circ.20$ . Due to the different fields of view and mounting configurations, different reference stars were used for normalization during the different years. In 2010 HD 140342 was used; in 2011 HD 140342 + HD 138301 were used, and in 2013 HD 136727 + HD 141987 were used. In all cases, the reference star(s) were in the FOV simultaneously with the target star. All brightness measurements, presented in the table, are the ratio of the target and reference stars, normalized to the long-term average of that value.

The primary eclipse duration is  $\sim 4.7$  hours, with a depth of 0.28 mag. The secondary eclipse occurs at a phase of 0.544 (or -0.456), has a duration of  $\sim 7.8$  hours and a depth of 0.18 mag. There is a suggestion of a flat-bottomed long eclipse especially in the data taken on May 3, 2013 (JD 2456415,

magenta points in lower right magnified plot).

### Light Curve

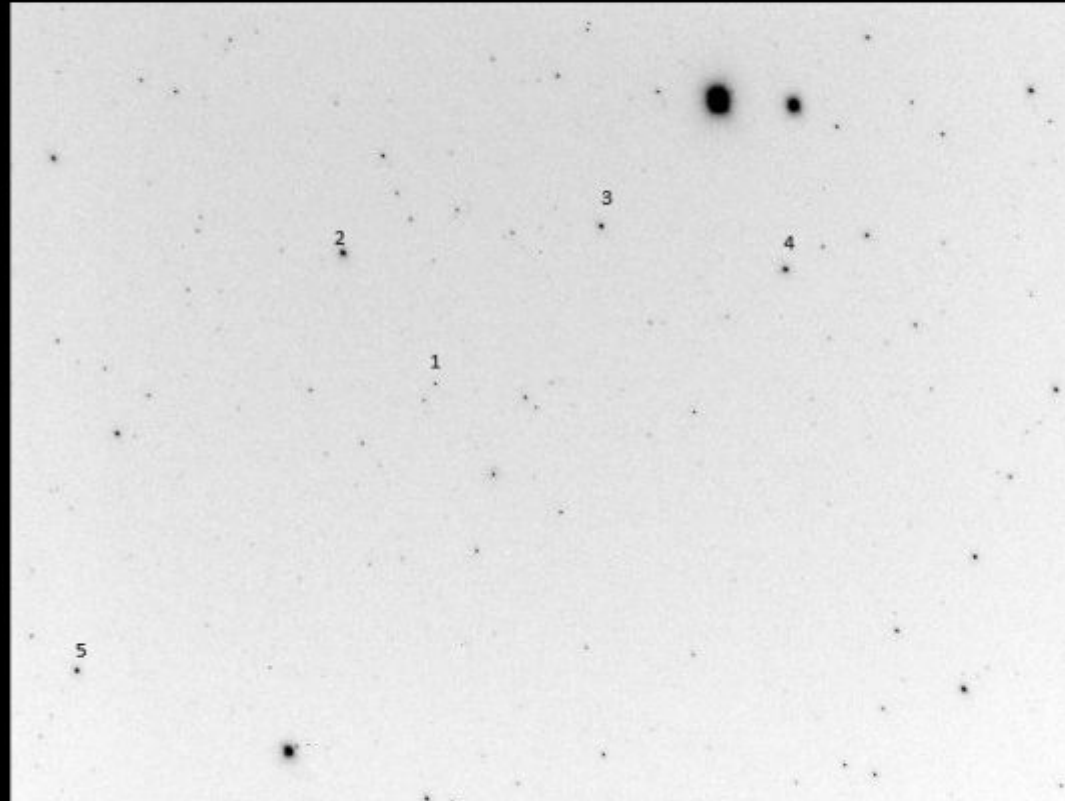


Complete light curve plus magnified view of the eclipses

## Finding Chart

### Finder chart

- 1: HD 139388
- 2: HD 140342
- 3: HD 138301
- 4: HD 136727
- 5: HD 141987



### Data Source

1. [hd139388photometry.txt](#)