

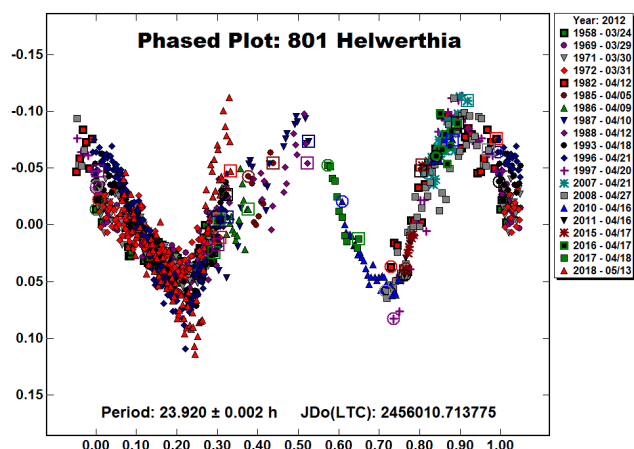


Figure 6. Lightcurve of 801 Helwerthia based on observations 2012 Mar. 24 - May 13 phased to the preferred period of 23.920 hours.

LIGHTCURVE FOR 2074 SHOEMAKER

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Analysis of CCD photometric observations of the Hungaria asteroid 2074 Shoemaker in 2012 showed a low amplitude lightcurve of 0.08 mag. No definitive period could be found, with those of 2.8, 2.5, and 2.4 hours having nearly equal probability. No evidence was found of a satellite, which was suspected based on data from a previous apparition.

The Hungaria asteroid 2074 Shoemaker was observed by Stephens (2004) in late 2003. At the time, a period of 57.02 h and amplitude of 0.45 mag was reported. The images were remeasured and the new data analyzed a few years later (Warner *et al.*, 2009). That analysis indicated a period of 2.5328 h with the possibility of a satellite with a period of, not so coincidentally, of 55.5 h. However, the evidence was far from conclusive. The asteroid was observed again in 2010 (Warner, 2011), where a period of 2.5338 h, amplitude 0.12 mag was found but no indications of tell-tale “mutual events” that could be attributed to a satellite.

In 2012, the authors again observed the asteroid with the hopes of confirming the 2.5 h period and to look for signs of a satellite. The observations at PDO were made using a 0.35-m Schmidt-Cassegrain (SCT) using an SBIG STL-1001E CCD camera. The observations at CS3 used a 0.35-m SCT and STL-1001E as well. All images were unfiltered. The data were put onto an internal standard system using R magnitudes derived from the 2MASS catalog (Skrutskie *et al.*, 2006; see Warner, 2007; Stephens, 2008). Circumstances allowed only short runs for each observing session, about 4 hours or less.

Analysis of the relatively sparse data set, less than 100 observations, found a low amplitude lightcurve, $A \sim 0.08$ mag. It was not possible to find a definitive period. The data best fit a period of 2.820 h. However, almost equally good fits could be found at 2.449 h and 2.523 h, the latter not far removed from the previous results. The phase angle bisector longitudes for the 2005 and 2012 apparitions differed by about 200 degrees, and so not much difference in the lightcurves would be expected. The 2010 apparition, $L_{PAB} = 312^\circ$, was sufficiently different and, as expected if the asteroid was sufficiently elongated, the amplitude was larger. This indicates that the pole longitude might be around 20° (or 200°).

No indications were seen of mutual events from a satellite. Observations at the next apparition (2013 January, $V \sim 16.3$, Dec -38° , $L_{PAB} \sim 132^\circ$) are encouraged.

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