

**PERIOD DETERMINATION FOR 414 LIRIOPE**

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Lightcurve analysis for 414 Liriope was performed from observations obtained during its 2011 opposition. The synodic rotation period was found to be  $7.353 \pm 0.002$  h and the lightcurve amplitude was  $0.13 \pm 0.05$  mag.

As of late 2011 August, only 5 of the first 500 numbered asteroids appeared to have no previously reported rotation periods. This implied a modest improvement (just one asteroid less) compared to the situation prevailing one year before (Alvarez, 2011). One of those elusive 5 asteroids, 414 Liriope, was chosen for observations from CALL web-site (Warner 2011) since it would be favorably placed for a few weeks during its 2011 opposition.

Unfiltered CCD photometric images of 414 Liriope were taken at Observatorio Los Algarrobos, Salto, Uruguay (MPC Code I38) from 2011 August 30 to September 07 using a 0.3-m Meade LX-200R working at  $\sim f/6.3$  with a focal reducer. The CCD imager was a QSI 516wsg NABG with a 1536 x 1024 array of 9-micron pixels. 2x2 binning was used, yielding an image scale of 1.9 arcseconds per pixel. Exposures were 60 s working at  $-10C$ , unguided (except for the last session, when a Lodestar camera and *PHD Guiding*

software were applied). All images were dark and flat field corrected and then measured using *MPO Canopus* (Bdw Publishing) v10.2.0.2 with a differential photometry technique. The data were light-time corrected. Period analysis was also done with *MPO Canopus*, which incorporates the Fourier analysis algorithm developed by Harris (Harris *et al.* 1989).

Nearly 1,900 data points were obtained during six sessions. Each session was longer than 5.5 h, giving a total of more than 33 h of observations. Over the span of observations, the phase angle varied from 2.9° to 4.5°. Analysis of the data found a rotation period for 414 Lirioppe of  $P = 7.353 \pm 0.002$  h along with a peak-to-peak amplitude of  $A = 0.13 \pm 0.05$  mag.

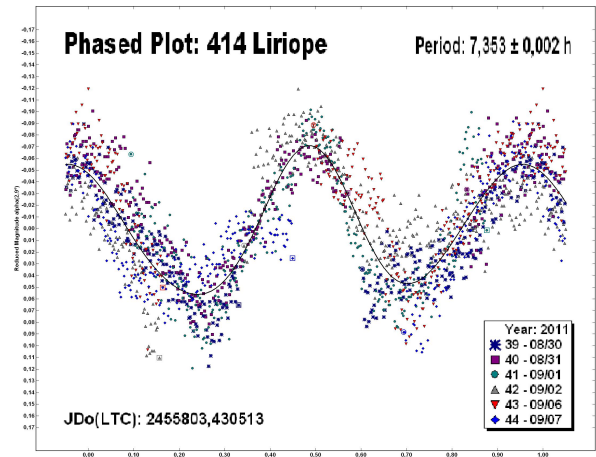
This leaves only four asteroids numbered below 500 for which no rotation parameters could be found. They are, in ascending order, 330 Adalberta, 398 Admete, 457 Alleghenia, and 473 Nolli. With respect to the following 500 asteroids (numbered from 501 to 1000) such status currently contains 37 cases, thus totaling 41 the number of the first 1000 numbered asteroids that still appear to have no previously reported rotation periods.

#### References

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### LIGHTCURVES FOR 2567 ELBA, 2573 HANNU OLAVI, 2731 CUCULA, 4930 REPHILTIM, 6952 NICCOLO, AND 7750 MCEWEN

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Lightcurve observations have yielded period determinations for the following asteroids: 2567 Elba,  $9.7794 \pm 0.0008$  h; 2573 Hannu Olavi,  $4.9326 \pm 0.0003$  h; 2731 Cucula,  $26.886 \pm 0.003$  h; 4930 Rephiltim,  $5.2423 \pm 0.0001$  h; 6952 Niccolo,  $12.532 \pm 0.001$  h; and 7750 McEwen,  $27.8182 \pm 0.0009$  h.

Photometric data for six asteroids were obtained at Barnes Ridge Observatory located in northern California, USA, using a 0.43-m PlaneWave f/6.8 corrected Dall-Kirkham astrograph and Apogee U9 camera. The camera was binned 2x2 with a resulting image scale of 1.26 arc-seconds per pixel. All image exposures were 210 seconds taken through a photometric C filter with the imager cooled to  $-25^{\circ}\text{C}$ . All images were obtained with *MaxIm DL V5* driven by *ACP V6* and analyzed using *MPO Canopus* v10.4 (Warner, 2011). All comparison stars and asteroid targets had an SNR at least 200.

2567 Elba. Data were collected from 2011 July 23 through August 04 resulting in 9 data sets totaling 443 data points. 2567 Elba was tracked through 29.58 revolutions. A period of  $9.7785 \pm 0.0007$  h was determined with a peak-to-peak amplitude of 0.25 mag.

2573 Hannu Olavi. Data were collected from 2011 May 4 through May 13 resulting in 4 data sets totaling 307 data points. 2573 Hannu Olavi was tracked through 44.87 revolutions. A period of  $4.9326 \pm 0.0003$  h was determined with a peak-to-peak amplitude of 0.35 mag.

2731 Cucula. Data were collected from 2011 August 5 through September 7 resulting in 17 data sets totaling 688 data points. 2731 Cucula was tracked through 29.51 revolutions. A period of  $26.886 \pm 0.003$  h was determined with a peak-to-peak amplitude of approximately 0.3 mag.

4930 Rephiltim. Data were collected from 2011 February 10 through April 11 resulting in 6 data sets totaling 436 data points. 4930 Rephiltim was tracked through 275.35 revolutions. A period of  $5.2423 \pm 0.0001$  h was determined with a peak-to-peak amplitude of 0.32 mag.

6952 Niccolo. Data were collected from 2011 July 1 through August 1 resulting in 14 data sets totaling 458 data points. 6952 Niccolo was tracked through 59.32 revolutions. A period of  $12.5326 \pm 0.0008$  h was determined with a peak-to-peak amplitude of approximately 1.0 mag.

7750 McEwen. Data were collected from 2011 August 30 through September 29 resulting in 18 data sets totaling 1085 data points. 7750 McEwen was tracked through 25.91 revolutions. A period of  $27.8182 \pm 0.0009$  h was determined with a peak-to-peak amplitude of 0.44 mag.

#### References

Warner, B.D. (2011). *MPO Canopus* software. <http://www.MinorPlanetObserver.com>