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***Editor's Note:** This manuscript was received on February 20, one of the earliest reported lightcurve results for 2012 DA14. Unfortunately due to an error by the Editor, this article was omitted from the processing for MPB 40-3. The Editor offers his apology for the delay in publishing these results.

LIGHTCURVE PHOTOMETRY, H-G PARAMETERS AND ESTIMATED DIAMETER FOR 1412 LAGRULA

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Photometric observations of main-belt asteroid 1412 Lagraula were made over ten nights during 2013 March and April, with filtered system. The resulting synodic period is 5.9176 ± 0.0001 h with an amplitude of 0.28 ± 0.05 mag. The color index $V-R = 0.37 \pm 0.05$ mag. The measured absolute visual magnitude, $H_V = 11.81 \pm 0.04$ mag. and the slope parameter, $G = 0.135 \pm 0.049$, are consistent with a low albedo object, e.g., type C. The diameter is estimated to be $D = 23 \pm 3$ km.

The main-belt asteroid 1412 Lagraula was reported as a lightcurve photometry opportunity, for 2013 March, in Minor Planet Call http://www.minorplanet.info/PHP/call_OppLCDBQuery.php. All the observations were carried out from C62 Eurac Observatory in Bolzano (Italy), during ten observing nights, using a 0.30m reflector telescope, reduced to f/4.0 and a QHY9 CCD camera. Before each session, the observers synchronized the computer's clock with atomic clock time, via Internet NTP servers. Differential photometry and period analysis was done using *MPO Canopus* (Warner, 2012). The derived synodic period was $P = 5.9176 \pm 0.0001$ h (Fig.1) with a amplitude of $A = 0.28 \pm 0.05$ mag.

All filtered images (V Johnson, R Cousins) were calibrated with dark and flat-field frames. The V and R band frames were acquired in sequence changing alternatively the filters (VR VR VR). This

allowed us to find the color index of $V-R = 0.37 \pm 0.05$ mag (mean of 40 values). This value is typical of a C-type asteroid (Shevchenko and Lupishko, 1998). Assuming C-type, the geometric albedo is $P_V = 0.06 \pm 0.02$ (Shevchenko and Lupishko, 1998). The absolute magnitude (H) and slope parameter (G) were found using the H-G Calculator function of MPO Canopus. Seven values obtained pre- and post-opposition of the asteroid, using the maximum values of the lightcurve. We obtained $H_V = 11.810 \pm 0.040$ mag. and the slope parameter $G = 0.135 \pm 0.049$ (Fig. 2).

From this, we can estimate a diameter of $D = 23 \pm 3$ km using the expression (Pravec and Harris, 2007):

$$D_{(km)} = (1329/\sqrt{P_V})10^{-0.2H_V}$$

References

Minor Planet Call <http://www.minorplanet.info/PHP>

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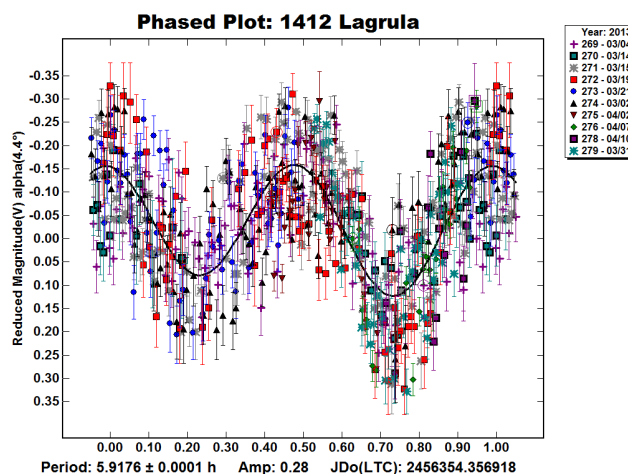


Figure 1. The lightcurve of 1412 Lagraula with a period of 5.9176 ± 0.0001 h and an amplitude of 0.28 ± 0.05 mag.

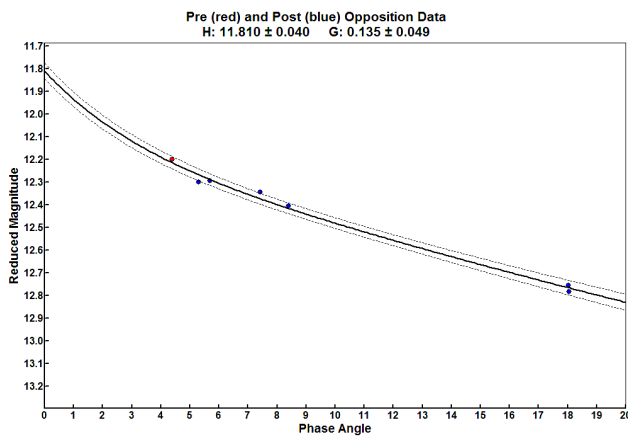


Figure 2. Visual reduced magnitude vs. phase angle for $H_V = 11.810 \pm 0.040$ mag. and the slope parameter, $G = 0.135 \pm 0.049$