

## LIGHTCURVE OBSERVATIONS OF 1614 GOLDSCHMIDT

Johan Warell  
Lindby Observatory (K60)  
Lindby 229, SE-274 93 Skurup, Sweden  
johan.warell@gmail.com

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Photometric observations of the main belt asteroid 1614 Goldschmidt were obtained on four nights in March 2014. The lightcurve shows only small variations in amplitude, approximately 0.10 mag, and a best-fit rotation period of  $7.74 \pm 0.02$  h. The period determination is uncertain and more observations of higher photometric precision are needed to verify the result.

Minor planet 1614 Goldschmidt was discovered by Alfred Schmitt at Uccle Observatory, Belgium, on April 18, 1952. It is a main belt asteroid in an orbit with semimajor axis 3.00 AU, eccentricity 0.07, inclination  $14.1^\circ$  and period 5.19 years. The diameter has been determined to about 46 km from IRAS measurements, the absolute magnitude is  $H=10.7$  and the geometric albedo 0.043 (JPL Small Body Database Browser 2014).

Observations were made on five nights between March 11 and April 5, 2014, at Lindby Observatory (K60) in southernmost Sweden. Data were obtained with a 0.25-m f/10 Schmidt-Cassegrain (SCT) operating at f/4.6, a Starlight Xpress SXV-H9 CCD camera and a clear imaging filter. The pixel scale was 2.3 arcsec and individual exposure times 45 seconds. Goldschmidt culminated at an altitude of  $39^\circ$ .

Images were calibrated with bias, flats and darks. Photometric reduction to the R filter band was made with the MPO Canopus software using the MPOSC3 star catalog and the Photometry Magnitude Method (Warner 2014).

In the analysis, 394 observations were used, reduced to  $4.7^\circ$  phase angle. A search of the MPC Asteroid Lightcurve data file (MPC 2014), LCDB (Warner et al. 2009) and CALL did not find any previously reported light curve observations of this object.

The period spectrum of the observations is quite flat with no pronounced RMS minimum, but many small fluctuations. The best fit period for the range of 2-20.5 h is found at  $7.74 \pm 0.02$  h (Figure 1). The resulting phased light curve is slowly undulating with two indistinct maxima and minima and an amplitude of  $0.10 \pm 0.02$  mag (Figure 2). In the case of the next best solution, 11.64 h, the observations do not cover the full period length and the fit is partially unconstrained. Observations with higher photometric precision seem necessary to resolve if this is the correct period or if another, perhaps longer, rotation period is hiding in the data.

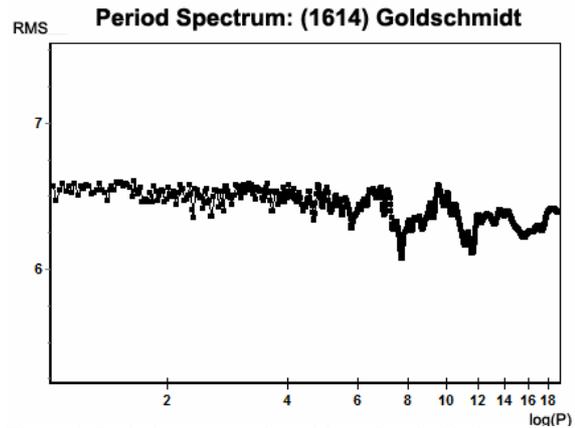


Figure 1. Period spectrum (logarithm of period in hours vs. RMS) for 1614 Goldschmidt.

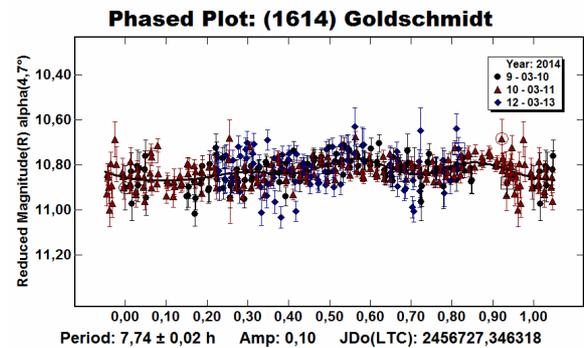


Fig. 2. Phased plot for 1614 Goldschmidt with 4th order fit, obtained from observations on 2014 March 10 (black circles), 11 (red up triangles) and 13 (blue diamonds) at Lindby, based on a best fit rotation period of 7.74 h. Zero phase occurred at JD 2456727.3463 (light time corrected).

## References

- CALL (2014), Collaborative Asteroid Lightcurve Link, <http://www.minorplanet.info/call/>
- JPL Small Body Database Browser (2014). <http://ssd.jpl.nasa.gov/sbdb.cgi>
- MPC (2014), Asteroid Lightcurve Data File accessed 2014 Sep. 24, <http://www.minorplanetcenter.net/iau/lists/Lightcurvedat.html>
- Warner, B.D. et al. (2009). The asteroid lightcurve database, Icarus 202, 134-146. LCDB on-line database accessed 2014 July 22. [http://minorplanetcenter.net/light\\_curve](http://minorplanetcenter.net/light_curve)
- Warner, B.D. (2014). MPO Software, MPO Canopus version 10.4.4.0. Bdw Publishing, <http://minorplanetobserver.com/>