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### PHOTOMETRIC OBSERVATIONS OF MAIN-BELT ASTEROIDS 1637 SWINGS, 10498 BOBGENT, AND (25980) 2001 FK 53

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Photometric observations of asteroids 1637 Swings, 10498 Bobgent and (25980) 2001 FK 53 were acquired from Flarestar Observatory (MPC171) and Znith Observatory in 2017. The observations were made during a favourable apparition for each asteroid.

In between the months of July to November 2017, photometric observations of three main-belt asteroids were carried out from two observatories located in Malta (Europe). Observations of 1637 Swings and asteroid (25980) 2001 FK53 were obtained from Flarestar Observatory (MPC171). Observations of 10498 Bobgent were obtained from Znith Observatory through a 0.20-m *f*/10 Schmidt-Cassegrain (SCT) equipped with a Moravian G2-1600 CCD camera. Flarestar Observatory utilized a Moravian G2-1600 camera at 1x1 binning mode with a resultant pixel scale of 0.99" per pixel while Znith operated at a pixel scale of 0.17" per pixel using the same binning mode. All cameras were operated at sensor temperature of -15°C and images were dark subtracted and flat-fielded.

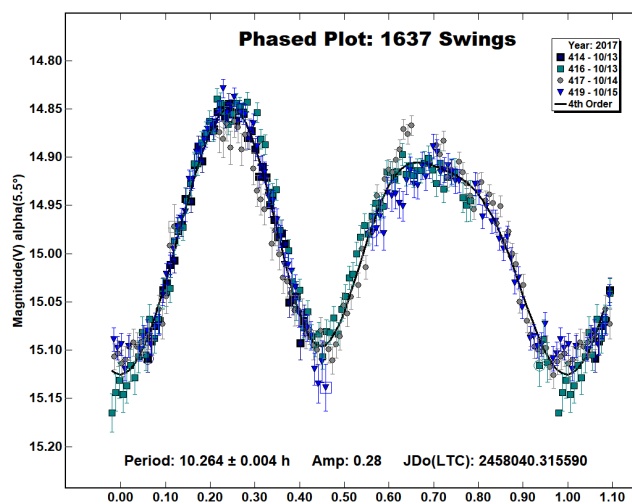
Both telescopes and cameras were controlled remotely from a nearby location via *Sequence Generator Pro* (Binary Star Software). Photometric reduction, lightcurve construction and analyses were derived through *MPO Canopus* software (Warner, 2017). Differential aperture photometry was utilized and photometric measurements were derived through the use of MPO Canopus, Comparison Star Selector (CSS) that utilized comparison stars of near-solar color. All measurements were taken

from the MPOSC3 Catalog that is based on the 2MASS catalog (<http://www.ipac.caltech.edu/2mass>) with magnitudes converted from J-K to BVRI (Warner, 2007).

The three asteroids for this research have been selected through the CALL website as maintained by Warner (2016).

1637 Swings is a main-belt asteroid that was discovered on 1936 August 28 by Hunaerts, J. at the at the Royal Observatory of Belgium in Uccle, Belgium. This asteroid was named after the Belgian astronomer Pol Swings (1906–1983). 1637 Swings orbits the sun with a semi-major axis of 2.935 AU, eccentricity 0.0444, and period of 5.38 years (JPL, 2017). The JPL Small-Bodies Database Browser (JPL, 2017) lists the diameter as 53.0 km  $\pm$  0.4 km based on an absolute magnitude  $H = 10.4$ .

1637 Swings was observed from Flarestar Observatory on 4 nights starting on the night of 2017 October 12/13 at 00:10 UT and ending on the night of 2017 October 15/16. Our results yielded a synodic period of  $20.998 \pm 0.001$ h and amplitude of  $0.62 \pm 0.02$  mag. The Lightcurve Database did not contain any references of the synodic period of this asteroid.



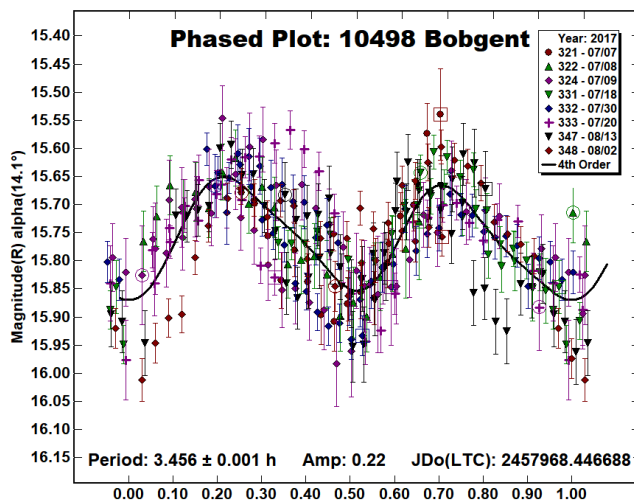
10498 Bobgent is a main-belt asteroid that was discovered on 1986 September 11 by E. Bowell at the Anderson Mesa Station of the Lowell Observatory. Also known as 1986 RG3, this asteroid was named in honour of Robert Gent (b. 1947), an enthusiastic amateur astronomer and International Dark-Sky Association

Number	Name	yyyy/mm/dd	Pts	Phase	L <sub>PAB</sub>	B <sub>PAB</sub>	Period(h)	P.E.	Amp	A.E.	Group
1637	Swings	2017 03/18-04/13	335	5.8, 4.4	034	3.1	10.264	0.004	0.28	0.02	MB-O
10498	Bobgent	2017 07/07-08/02	306	14.5, 8.5	301	9.4	3.456	0.001	0.22	0.05	MB-I
25980	2001 FK53	2017 09/23-10/10	166	9.8, 2.5	013	-3.3	2.760	0.001	0.10	0.03	MB-I

Table 1. Observing circumstances and results. Pts is the number of data points. The phase angle is given for the first and last date. L<sub>PAB</sub> and B<sub>PAB</sub> are the approximate phase angle bisector longitude and latitude at mid-date range (see Harris *et al.*, 1984). Grp is the asteroid family/group (Warner *et al.*, 2009).

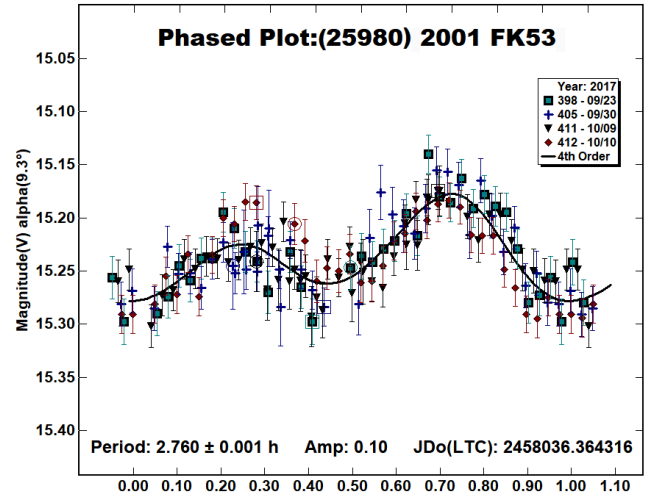
volunteer (Schmadel & Schmadel, 1992). The asteroid orbits the sun with a semi-major axis of 2.286 AU, eccentricity 0.259, and period of 3.46 years (JPL, 2017). The JPL Small-Bodies Database Browser lists the diameter of 10498 Bobgent as 2.7 km  $\pm$  0.8 km based on an absolute magnitude H = 14.6.

Observations were conducted from Znith Observatory and were carried out on 7 nights from 2017 July 7 to August 2. Results indicate a synodic period of  $3.456 \pm 0.001$  h and amplitude of  $0.22 \pm 0.05$  mag.



(25980) 2001 FK53 is a main-belt asteroid that was discovered on 2001 March 18 by LINEAR at Socorro. Provisionally designated as 2001 FK53, this asteroid has an absolute magnitude (H) of 13.7 and orbits the sun with a semi-major axis of 2.424 AU, eccentricity 0.2676, and period of 3.77 years (JPL, 2017).

Observations were conducted from Flarestar Observatory on 4 nights from 2017 September 23 to October 10. The derived lightcurve indicates a synodic period of  $2.760 \pm 0.001$  h and amplitude of  $0.10 \pm 0.03$  mag. No previous entries in the LCDB database were found for this asteroid.



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We would like to thank Brian Warner his work in the development of *MPO Canopus* and for his efforts in maintaining the CALL website. This research has made use of the JPL's Small-Body Database.

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