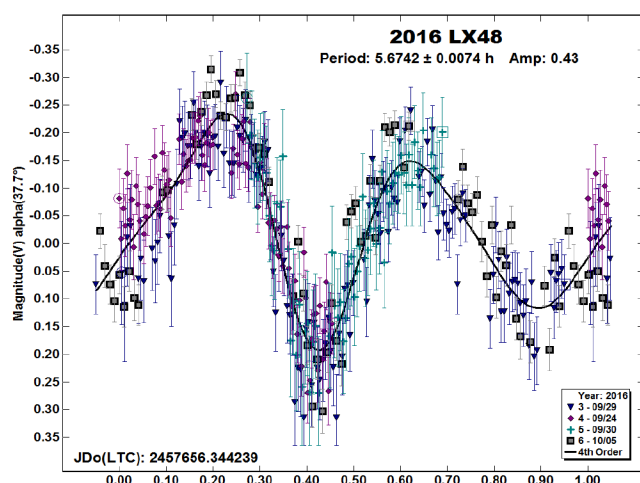




Our period of 5.6742 ± 0.0074 h, with amplitude of 0.43 mag, is in agreement with the one found by (Warner, 2017) and (Benishek, 2017), but disagrees with the period of 3.815 ± 0.001 h found by (Carbognani, 2017).

Date (2016)	UT	V	PA	Airmass
Sep 24	18:11–20:51	15.8	43.8	1.1–1.0
Sep 29	17:30–22:49	16.3	37.8	1.2–1.0
Sep 30	17:30–20:10	16.4	36.8	1.3–1.1
Oct 5/6	19:20–00:28	16.8	31.8	1.2–1.0

Table III. Detailed observation circumstances for 2016 LX48: the date, the UT at the start and at the end of the observing night, the apparent V magnitude, the phase angle and the air mass at the beginning and at the end of the observations.

Acknowledgements

This research is financed by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS–UEFISCDI, project number PN-II-RU-TE-2014-4-2199.

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LIGHTCURVE ANALYSIS FOR MINOR PLANET 703 NOEMI

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(Received: 2017 Feb 14)

CCD images were taken of asteroid 703 Noemi from 2016 November 16 to 2017 January 31 to determine its rotation period. The data analysis gives a complex light curve with a rotation period of 201.7 ± 0.7 hours.

The main-belt asteroid 703 Noemi was discovered by Johan Palisa on 1910 October 3 and is named for Baroness Valentine Noémi von Rothschild to celebrate her engagement to Baron Sigismund von Springer. Its orbital period is approximately 3.21 years. The absolute magnitude is $H = 12.5$, the geometric albedo is 0.368, and the estimated diameter is 7.25 km (JPL, 2017). A search in the asteroid lightcurve database (LCDB: Warner et al., 2009) did not provide any information about the rotation period for the asteroid. Consequently, we started an observational campaign aimed at estimating the period.

CCD photometric observations were carried out at three different amateur observatories, all of them located in the south of Italy, and by two remote telescope stations: iTelescope T7 (MPC I89; Nerpio, Spain) and iTelescope T21 (MPC H06; Mayhill, New Mexico, USA). Table I lists the telescope/CCD camera combinations used for the observations.

A total of 2197 images were collected in 43 observing sessions with exposure times ranging from 120 to 1080 s. All images were astrometrically aligned, dark, and flat-field corrected using *Maxim DL* and *Astrometrica*. *MPO Canopus* (Warner, 2016) was used to measure the magnitudes, perform Fourier analysis, and produce the final lightcurve. In particular, data were reduced in *MPO Canopus* using differential photometry. Night-to-night zero point calibration was accomplished by selecting up to five comparison stars with near-solar colors using the “comp star selector” feature. The MPOSC3 (Warner, 2007) star catalog was used for determining the comparison star magnitudes and the “StarBGone” routine within *MPO Canopus* was used to subtract stars that occasionally merged with the asteroid during the observations. *MPO Canopus* was also used for rotation period analysis. The software employs the FALC Fourier analysis algorithm developed by Harris (Harris et al., 1989).

The observations started at the middle of 2016 November. After accumulating 48 sessions that were completed at the end of 2017 January, it was very hard to obtain a solution using a short (from a few hours to tens of hours) period. The period analysis gave the best solution of 201.7 ± 0.7 hours with an amplitude of 0.78 ± 0.15 mag. The rotation period is associated with a lightcurve showing a

Site	Ap (m)	Type	f/	Camera	Array	Filter
Pontecagnano, Italy	0.24	SC	4.8	Moravian KAF1603 ME	1536x1024x9μ	Rc
Maiori-Erchie, Italy	0.20	N	4.0	StarlightX-Press ICX085AL	1300x1030x6.7μ	C
Somma Vesuviana, Italy	0.10	R	6.7	ATIK KAF-8300	3362x2537x5.4μ	C
Nerpio, Spain	0.43	DK	4.3	SBIG STL-11000M	4008x2672x9μ	Rc
Mayhill, USA	0.43	DK	6.8	FLI-PL6303E	3072x2048x9μ	Rc

Table I. List of telescope/camera combinations. SC:Schmidt-Cassegrain; N:Newtonian; R:Refractor; DK:Corrected Dall-Kirkham.

Number	Name	20yy/mm/dd	Pts	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E.	Amp	A.E.	Exp (s)
703	Noemi	16/11/16-17/01/31	2197	2.84-29.4	56	-2	201.7	0.7	0.78	0.15	120-1080

Table II. Observing circumstances and results. The phase angle is given for the first and last date. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude and latitude at mid-date range (see Harris *et al.*, 1984). Exp is exposure range, seconds.

complex behavior with different maxima and bumps (Fig. 1) possibly attributed to an irregular shape of the asteroid. However, tumbling might also explain the irregular behavior. From the data shown in Figure 1, it is clear that the lightcurve is only partially sampled. Table II gives the observing circumstances and results. We rate this result $U = 2$ (see Warner *et al.*, 2009). *This is not necessarily the value that will be assigned in the LCDB.*

New observations and additional data of 703 Noemi at future oppositions will be required in order to improve the current analysis and eventually confirm its very long rotation period. A sufficient number of sessions to include full coverage of at least two rotations based on the suspected period are needed to confirm that 703 Noemi belongs to the very slow rotators class of asteroids.

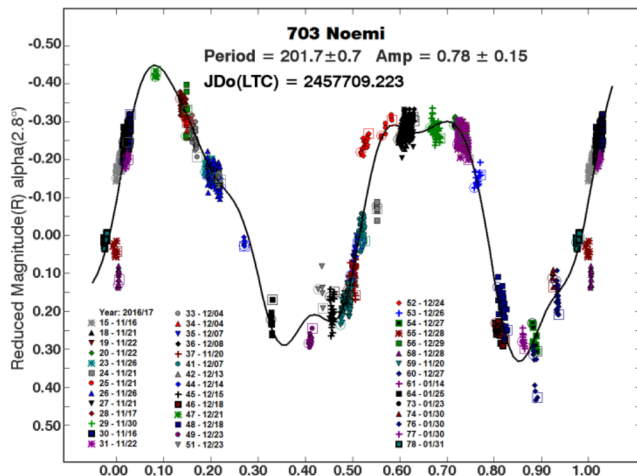


Fig.1. Lightcurve for asteroid 703 Noemi fit to a period of 201.7 ± 0.7 hours and with an amplitude of 0.78 ± 0.15 mag.

Acknowledgements

AN and AV are indebted to Brigida and Tatiana for their invaluable support.

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LIGHTCURVE ANALYSIS FOR TEN MAIN BELT ASTEROIDS

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(Received: 2017 March 5; Revised: 2017 May 29)

Photometric observations of ten main-belt asteroids, 2854 Rawson, 3113 Chizhevskij, 5318 Dientzenhofer, (5563) 1991 VZ1, 7143 Haramura, 10421 Dalmatin, (11386) 1998 TA18, (18429) 1994 AO1, (23496) 1991 VN3, and (31782) 1999 KM6 were made at the Eurac Observatory (MPC C62). Results of lightcurve analysis are presented.

CCD photometric observations of ten main-belt asteroids were made at the Eurac Observatory (MPC C62). Asteroids 2854 Rawson, 3113 Chizhevskij, 5318 Dientzenhofer, (5563) 1991 VZ1, 7143 Haramura, 10421 Dalmatin, (11386) 1998 TA18, and (23496) 1991 VN3, were observed in 2016 with filter V (except (23496) 1991 VN3 with filter R). The observations for (18429) 1994 AO1 and (31782) 1999 KM6, were made in 2017 with filter R.

All images were obtained with a 0.30-m reflector telescope reduced to $f/4.0$, a QHY9 CCD camera, and then calibrated with dark and flat-field frames. The computer clock was synchronized with an Internet time server before each session. Differential photometry and period analysis were done using *MPO Canopus* version 10.4.3.17 (Warner, 2014).

2854 Rawson This main-belt asteroid was reported as a lightcurve photometry opportunity for 2016 January on the MinorPlanet.info