ASTEROID PHOTOMETRY AND LIGHTCURVE

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Observatorio Astronómico El Gato Gris (MPC I19) - Tanti (Córdoba-Argentina)

Observatorio Cruz del Sur (MPC I39) - San Justo (Buenos Aires-Argentina)

Observatorio de Sencelles (MPC K14) - Sencelles (Mallorca-Islas Baleares-España)

Osservatorio Astronomico "La Macchina del Tempo" (MPC M24) - Ardore Marina (Reggio Calabria-Italia)

Observatorio Los Cabezones (MPC X12) - Santa Rosa (La Pampa-Argentina)

Observatorio Galileo Galilei (MPC X31) - Oro Verde (Entre Ríos-Argentina)

Observatorio Antares (MPC X39) - Pilar (Buenos Aires-Argentina)

Observatorio Río Cofio (MPC Z03) - Robledo de Chavela (Madrid-España)

Observatorio AstroPilar (GORA APB) - Pilar (Buenos Aires-Argentina)

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Synodic rotation periods and amplitudes are reported for: 786 Bredichina, 795 Fini, 892 Seeligeria, 1343 Nicole, 2717 Tellervo, 3224 Irkutsk.

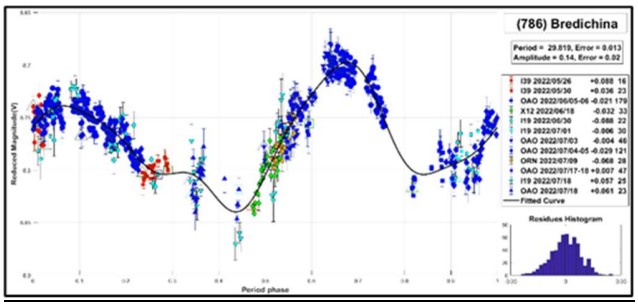
The presented periods and amplitudes of asteroid light curves are the product of collaborative work by GORA (Grupo de Observadores de Rotaciones de Asteroides) group. In all the studies we have applied relative photometry assigning V magnitudes to the calibration stars.

The image acquisition was performed without filters and with exposure times of a few minutes. All images used were corrected using dark frames and, in some cases, bias and flat-field were also used. Photometry measurements were performed using *FotoDif* software and for the analysis, we employed *Periodos* software (Mazzone, 2012).

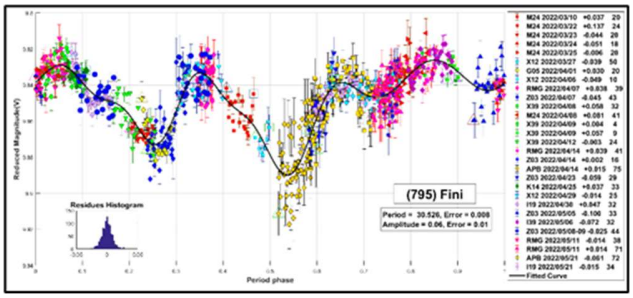
Below, we present the results for each asteroid under study. The light curve figures contain the following information: the estimated period and period error and the estimated amplitude and amplitude error. In the reference boxes, the columns represent, respectively, the marker, observatory MPC code, or - failing that - the GORA internal code, session date, session offset, and several data points.

Targets were selected based on the following criteria: 1) those asteroids with magnitudes accessible to the equipment of all participants, 2) those with favorable observation conditions from Argentina or Spain and Italy, *i.e.*, with negative or positive declinations δ, respectively, and 3) objects with few periods reported in the literature and/or with light curve Database (LCDB) (Warner et al., 2009) quality codes (U) of less than 3.

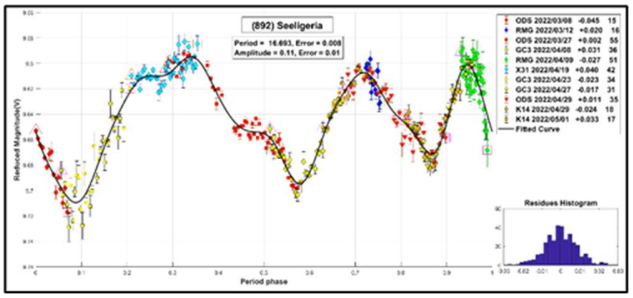
786 Bredichina. This C-type asteroid, was discovered in 1914 by Kaiser Heidelberg. Several periods were measured for this asteroid with the following results: P = 18.61 ± 0.02 h (Gil-Hutton and Cañada, 2003), P = 27.88 h (Behrend, 2010web), and P = 29.434 ± 0.001 h (Garceràn et al., 2015). We have determined a period of 29.819 ± 0.013 h, consistent with the one proposed by Garceràn et al.



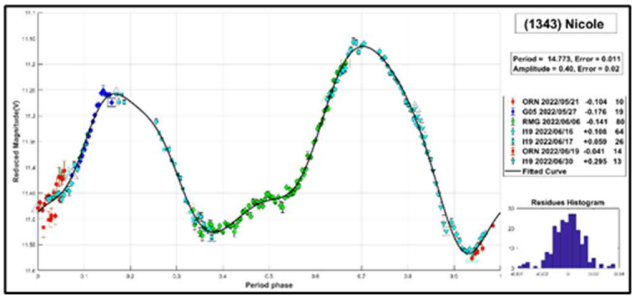
795 Fini. This asteroid was discovered in 1914 by Johann Palisa. The two more recent periods published in the literature correspond to P = 4.65 h with Δm = 0.02 mag (Pravec et al., 2012) and P = 26.9714 ± 0.0557 h with Δm = 0.06 mag (Waszczak et al., 2015). The results we obtained, P = 30.526 ± 0.008 h with Δm = 0.06 ± 0.01 mag, are consistent with the longer period proposed by Waszczak et al.



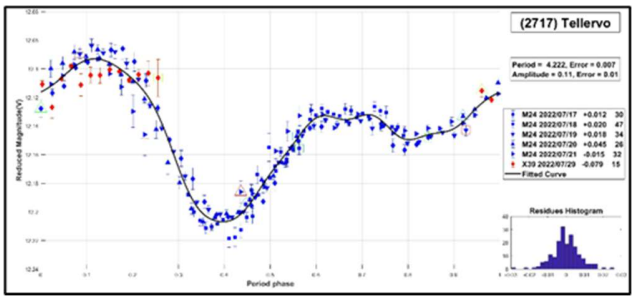
892 Seeligeria. This asteroid was discovered in 1918 by Maximilian Franz Wolf. We found two different periods reported in the literature: P = 41.40 ± 0.02 h with Δm = 0.15 ± 0.02 mag (Behrend, 2007web) and P = 15.78 ± 0.04 with Δm = 0.2 mag (Shipley et al., 2008). Our period P=16.693 ± 0.008 with Δm = 0.11± 0.01 mag well agrees with the one measured by Shipley et al.



1343 Nicole. This asteroid was discovered in 1935 by Louis Boyer. We measured a period of 14.773 ± 0.011 h with Δm = 0.40 ± 0.02 mag. These results well agree with those reported by Waszczak et al. (2015), P = 14.7781 ± 0.0151 h with Δm = 0.42 mag and Aznar et al., (2016), P = 14.76 ± 0.01 h with Δm = 0.38 ± 0.02 mag. As a further contribution, our light curve provides almost full coverage of the rotational phase.



2717 Tellervo. This asteroid was discovered in 1940 by Liisi Oterma. We found in the literature two rather different periods calculated for this object: P = 8.428 ± 0.003 h with Δm = 0.40 ± 0.03 mag (Tomassini et al., 2013), and P = 4.213 h with Δm = 0.40 ± 0.03 mag (Scardella et al., 2016). The results we obtained are P = 4.222± 0.007 h and Δm = 0.11 ± 0.01 mag. Our period well agrees with the one measured by Scardella et al.



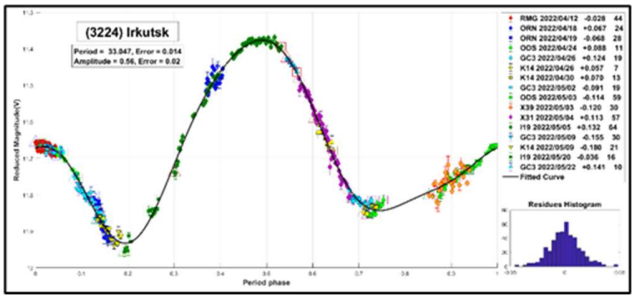
3224 Irkutsk. It was discovered in 1977 by Nikolái Chernyj. In the literature, we found only one period reported for this asteroid: P = 33.1404 ± 0.0630 h with Δm = 0.51 mag (Waszczak et al., 2015). Our study supports the aforementioned period and yielded the following data: P = 33.047 ± 0.014 h with Δm = 0.56 ± 0.02 mag.

Number	Name	yy/ mm/dd- yy/ mm/dd	Phase	L_{PAB}	B_{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
786	Bredichina	22/05/26-22/07/19	*12.8,08.3	276	-2	29.819	0.013	0.14	0.02	MB-O
795	Fini	22/03/10-22/05/22	*13.7,18.0	199	-2	30.526	0.008	0.06	0.01	MB-O
892	Seeligeria	22/03/08-22/05/01	*8.3,11.1	189	7	16.693	0.008	0.11	0.01	MB-O
1343	Nicole	22/05/21-22/06/30	*7.5,13,0	253	-5	14.773	0.011	0.40	0.02	MB-I
2717	Tellervo	22/07/17-22/07/29	12.0,04,9	310	3	4.222	0.007	0.11	0.01	MB-I
3224	Irkutsk	22/04/02-22/05/22	*7.2,16.4	206	-2	33.047	0.014	0.56	0.02	MB-O

Table I. Observing circumstances and results. The phase angle is given for the first and last date. If preceded by an asterisk, the phase angle reached an extremum during the period. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude/latitude at mid-date range (see Harris et al., 1984). Grp is the asteroid family/group (Warner et al., 2009). MB-O: main-belt outer; MB-I: main-belt inner.

Observatory	Telescope	Camera
G05 Obs.Astr.Giordano Bruno	SCT (D=203mm; f=6.3)	CCD Atik 420 m
I19 Obs.Astr.El Gato Gris	SCT (D=355mm; f=10.6)	CCD SBIG STF-8300M
I39 Obs.Astr.Cruz del Sur	Newtonian (D=254mm; f=4.7)	CMOS QHY 174M
K14 Obs.Astr.de Sencelles	Newtonian (D=250mm; f=4.0)	CCD SBIG ST-7XME
M24 Oss.Astr.La Macchina del Tempo	RCT (D250mm; f=8.0)	CMOS ZWO ASI 1600MM
X12 Obs.Astr.Los Cabezones	Newtonian (D=200mm; f=5.0)	CMOS QHY 174M
X31 Obs.Astr.Galileo Galilei	RCT ap (D=405mm; f=8.0)	CCD SBIG STF-8300M
X39 Obs.Astr.Antares	Newtonian (D=250mm; f=4.72)	CCD QHY9 Mono
Z03 Obs.Astr.Río Cofio	SCT (D=254mm; f=6.3)	CCD SBIG ST-8XME
APB Obs.Astr.AstroPilar	Refractor (D=150mm; f=7.0)	CCD ZWO ASI 183
GC3 Specola Giuseppe Pustorino 3	RCT (D=400mm; f=5.7)	CCD Atik 383L+Mono
OAO Obs.Astr.Aficionado Omega	Newtonian (D=150mm; f=5.0)	CMOS QHY 174M
ODS Obs.Astr.de Damián Scotta 1	Newtonian (D=300mm; f=4.0)	CMOS QHY 174M
ORN Obs.Astr.de Ricardo Nolte	Newtonian (D=200mm; f=5.0)	CMOS POA Neptune-M
RMG Obs.Astr.de Raúl Melia	Newtonian (D=254mm; f=4.7)	CMOS QHY 174M

Table II. List of observatories and equipment.



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