

ROTATION PERIODS FOR 2707 UEFERJI AND (23552) 1994 NB

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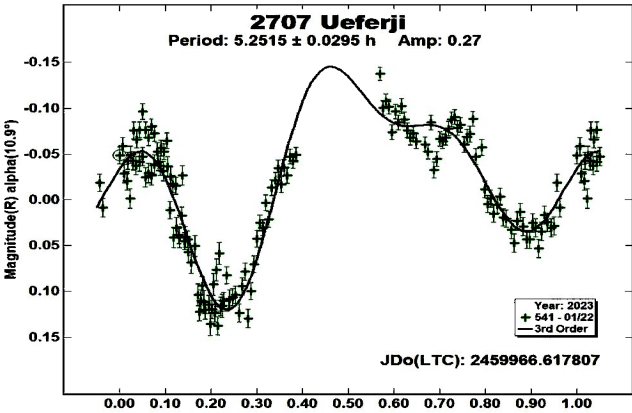
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We present photometric optical lightcurves and derived rotation periods for a sample of two asteroids: 2707 Ueferji ($P = 5.2515 \pm 0.0295$ h) and (23552) 1994 NB (3.628 ± 0.001 h). Observations were carried out at the Observatorio Astronómico Carl Sagan (OACS) of the Universidad de Sonora in Hermosillo, México.

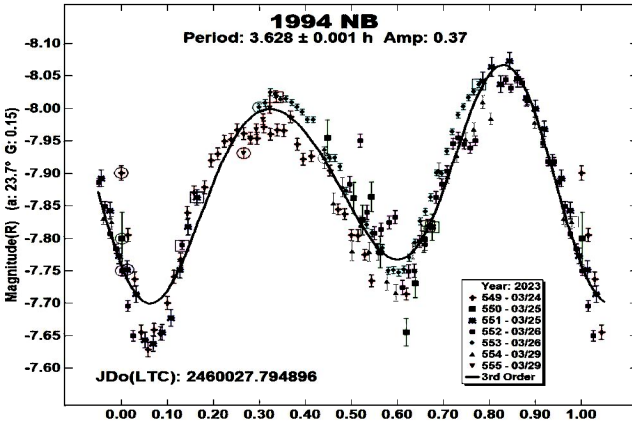
As part of our permanent campaign of asteroid observation at the Carl Sagan Astronomical Observatory, we obtained photometric data for two main belt asteroids (2707 Ueferji and 1994 NB). Asteroid observation provides an excellent opportunity to prepare students in observational techniques and data reduction as well as obtaining results such as lightcurves and rotation periods, and a way to fully take advantage of nearby astronomical facilities. This campaign was aimed to accomplish the above-mentioned objectives.

The equipment used at the OACS was a $512 \times 512 \times 20$ μm SBIG ST-9 CCD camera mounted on a Meade LX-200GPS 0.41-m $f/10$ telescope. Images yielding a final plate scale of 1.03 arcsec/pix and an effective 9×9 arcmin FOV. Data reduction was made with *IRAF* or *MaximDL* following standard procedures to correct for bias, dark current and flat-field effects. Photometry and lightcurve analysis were made using *MPO Canopus* (V.10.8.6.15, Warner, 2023) software package, which allowed us to obtain the synodic period for each object.

2707 Ueferji (1981 QS3) was discovered in 1981 August 28 by H. Debehogne at La Silla Observatory (Schmadel, 2003) and was originally named 1981 QS3. Ueferji is a main-belt asteroid and has a size of 25 km, absolute magnitude $H=11.84$ and albedo of 0.082. We observed Ueferji during the night of January 22 for 6.5 h. A period of $P = 5.2515 \pm 0.0295$ h was obtained with a lightcurve amplitude of $A = 0.27$ mag using a 3rd order fit. These values are similar to the one reported on the LCDB (REV. 2023-February) by Warner et al. (2009) of $P=5.286$ h. Both results come from less than complete lightcurves. Further observation of this object was impossible due to weather.



(23552) 1994 NB. Discovered by E.F. Helin, at Palomar Observatory on 1994 Sep 3 (Schmadel, 2003). This asteroid has an absolute magnitude $H=13.7$. We observed 1994 NB during 4 nights in 2023 May. A period of $P = 3.628 \pm 0.001$ h was obtained with a 3rd order fit and with a lightcurve amplitude of $A = 0.37$ mag. A similar result $P = 3.63$ h was reported in the LCDB (REV. 2023-February) by Warner et al. (2009).



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Number	Name	yyyy mm/dd	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
2707	Ueferji	2023 01/22	10.8	93.5	1	5.2515	0.0295	0.27	0.05	MB
23552	1994 NB	2023 03/24-03/29	23.7, 23.9	191.9	33	3.628	0.001	0.37	0.09	MB

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 extrema 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).

ASTEROID PHOTOMETRY OF SEVEN ASTEROIDS

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Synodic rotation periods and amplitudes are reported for:
 957 Camelia, 1030 Vitja, 1135 Colchis,
 1903 Adzhimushkaj, (97034) 1999 UK7 A and B
 components, (97514) 2000 DL1, and (199145)
 2005 YY128.

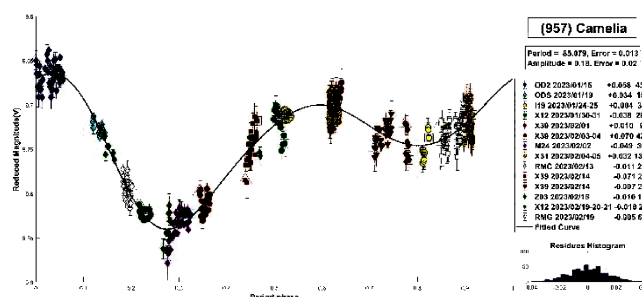
The periods and amplitudes of asteroid lightcurves presented in this paper are the product of collaborative work by the GORA (Grupo de Observadores de Rotaciones de Asteroides) group. In all the studies, we have applied relative photometry assigning V magnitudes to the calibration stars.

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 corrections 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 studied. The lightcurve 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, i.e., with negative or positive declinations δ , respectively, and 3) objects with few periods reported in the literature and/or with Lightcurve Database (LCDB) (Warner et al., 2009) quality codes (U) of less than 3.

957 *Camelia*. It is a main-belt asteroid. It was discovered in 1921 by K. Reinmuth. Two authors measured a short period for this asteroid: $P = 5.391 \pm 0.02$ h (Warner, 2001) and $P = 8.894 \pm 0.004$ h (Behrend, 2020web). On the other hand, Polakis (2022a) published a longer period of 85.05 ± 0.11 h. The results we obtained are $P = 85.079 \pm 0.013$ h and $\Delta m = 0.18 \pm 0.02$ mag. Our period well agrees with the one measured by Polakis. The diagram published by Polakis has the virtue of having extended light curves of many hours each. The light curve presented in this paper has the advantage of showing several light curves with linked nights.



1030 Vitja. It is a main-belt asteroid. It was discovered in 1924 by V. Albitzkgig. The three most recent periods published in the literature correspond to $P = 6.332 \pm 0.001$ h (Ferrero, 2014), $P = 6.336378 \pm 0.000002$ h (Đurech et al., 2019), and $P = 6.346 \pm 0.008$ h (Polakis, 2022b). We have determined a period of 6.334 ± 0.007 h, which is consistent with those previous results. Notably, we present full coverage lightcurve in this work, in contrast to those previously published.