# ROTATION PERIOD DETERMINATION FOR ASTEROID 5355 AKIHIRO

Alessandro Marchini, Riccardo Papini
Astronomical Observatory, University of Siena (K54)
Via Roma 56, 53100 - Siena, ITALY
marchini@unisi.it

(Received: 2023 July 3)

Photometric observations of the main-belt asteroid 5355 Akihiro were conducted to determine its synodic rotation period. We found $P$ = 2.983 ± 0.002 h, $A$ = 0.13 ± 0.04 mag as the most likely bimodal solution.

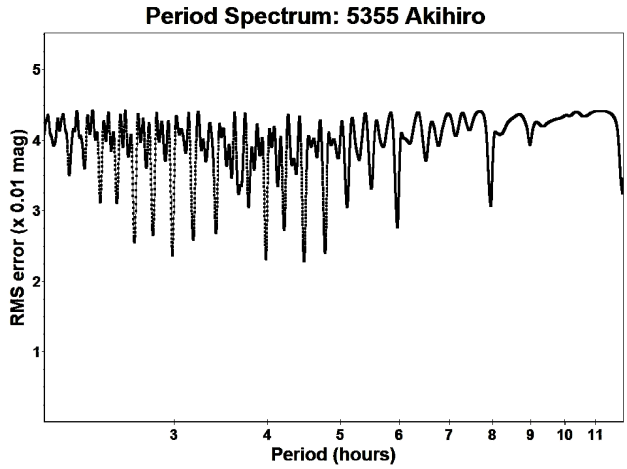
CCD photometric observations of the main-belt asteroid 5355 Akihiro were carried out in May 2023 at the Astronomical Observatory of the University of Siena (K54). We used a 0.30-m *f*/5.6 Maksutov-Cassegrain telescope, SBIG STL-6303E NABG CCD camera, and clear filter; the pixel scale was 2.30 arcsec when binned at 2×2 pixels and all exposures were 300 seconds.

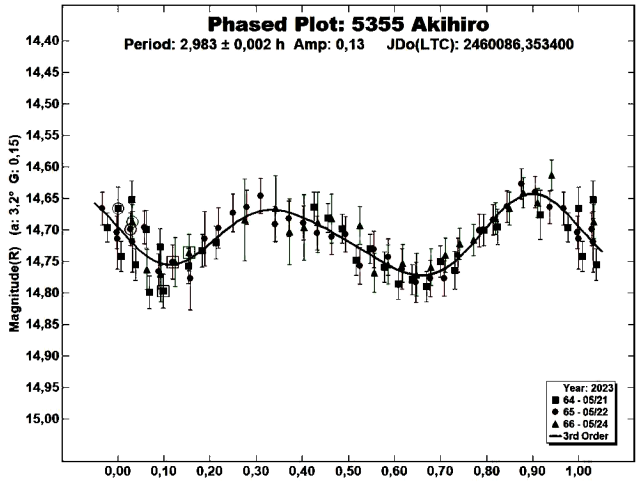
Data processing and analysis were done with *MPO Canopus* (Warner, 2018). All images were calibrated with dark and flat-field frames and the instrumental magnitudes converted to R magnitudes using solar-colored field stars from a version of the CMC-15 catalogue distributed with *MPO Canopus*. Table I shows the observing circumstances and results.

A search through the asteroid lightcurve database (LCDB; Warner et al., 2009) indicates that our result may be the first reported lightcurve observations and results for this asteroid.

5355 Akihiro (1991 CA) was discovered on 1991 February 3 by S. Ueda and H. Kaneda at Kushiro and named in honor of Akihiro Ueda, son of the first discoverer. It is an inner main-belt asteroid with a semi-major axis of 2.311 AU, eccentricity 0.168, inclination 0.745°, and an orbital period of 3.51 years. Its absolute magnitude is $H$ = 13.20 (JPL, 2023). The WISE/NEOWISE satellite infrared radiometry survey (Masiero et al., 2011) found a diameter $D$ = 5.750 ± 0.211 km using an absolute magnitude $H$ = 12.9.

Observations were conducted over three nights and collected 85 data points. The period analysis suggests a rotational period of $P$ = 2.983 ± 0.002 h with an amplitude $A$ = 0.13 ± 0.04 mag as the most likely bimodal solution.




## References

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| Number | Name | 2023/mm/dd | Phase | $L_{PAB}$ | $B_{PAB}$ | Period(h) | P.E. | Amp | A.E. | Grp |
|---|---|---|---|---|---|---|---|---|---|---|
| 5355 | Akihiro | 05/21-05/24 | 3.1,4.9 | 236 | 1 | 2.983 | 0.002 | 0.13 | 0.04 | MB-i |

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).

# A NEW LIGHTCURVE OF 357 NININA

Frederick Pilcher
Organ Mesa Observatory (G50)
4438 Organ Mesa Loop
Las Cruces, NM 88011 USA
fpilcher35@gmail.com

Lorenzo Franco
Balzaretto Observatory (A81), Rome, ITALY

Alessandro Marchini, Riccardo Papini
Astronomical Observatory, University of Siena (K54)
Via Roma 56, 53100 - Siena, ITALY

Giulio Scarfi
Iota Scorpii Observatory (K78), La Spezia, ITALY

Marco Iozzi
HOB Astronomical Observatory (L63)
Capraia Fiorentina, ITALY

Nello Ruocco
Osservatorio Astronomico Nastro Verde (C82)
Sorrento, ITALY

Paolo Bacci, Martina Maestripieri
GAMP - San Marcello Pistoiese (104), Pistoia, ITALY

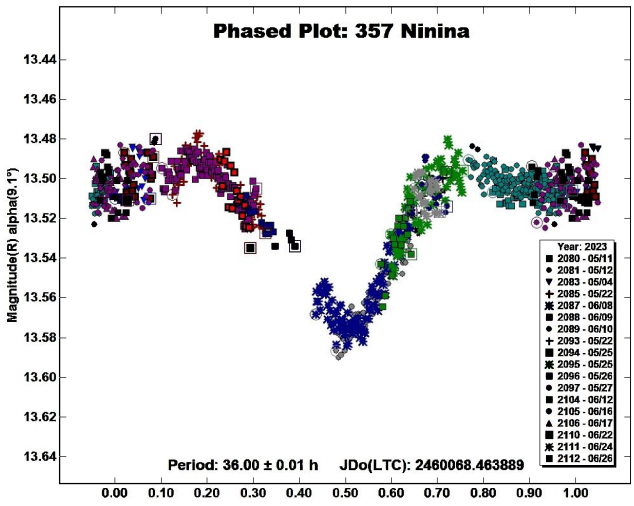
Nico Montigiani, Massimiliano Mannucci
Osservatorio Astronomico Margherita Hack (A57)
Florence, ITALY

(Received: 2023 July 11)

An international collaboration of observers from North America and Europe presents a lightcurve of the Earth commensurate asteroid 357 Ninina that shows a synodic rotation period 36.00 ± 0.01 hours, amplitude 0.08 ± 0.01 magnitudes with a single deep minimum in an otherwise nearly flat lightcurve.

Five previously published values of the rotation period of 357 Ninina, as presented in Warner et al. (2009), are all within 0.1 hours of the accepted best value of 35.983 hours. A new lightcurve was desired at a celestial longitude different from all those at which the previous observations were made to facilitate a lightcurve inversion study. With a rotation period almost exactly 1.5 Earth days, it is not possible to sample the entire lightcurve near a single opposition at a single observatory location. Therefore, the several authors of this paper, from both North America and Europe, agreed to collaborate. Their equipment is listed in Table I. Photometric image measurement and lightcurve construction were with *MPO Canopus* software with calibration star magnitudes for solar colored stars from the CMC15 catalog reduced to the Cousins R band. Zero-point adjustments of a few × 0.01 magnitude were made for best fit. To reduce the number of points on the lightcurves and make them easier to read, data points have been binned in sets of 3 with a maximum time difference of 5 minutes.

Eighteen sessions 2023 May 4 - June 26 can be fitted to a lightcurve with period 36.00 +/- 0.01 hours, amplitude 0.08 +/- 0.01 magnitudes, with one deep minimum in each rotational cycle. The period is consistent with previously published periods. The monomodal lightcurve shape and small amplitude are encountered for many asteroids at near polar aspect. These new data will be useful for future LI modeling.




| Observatory (MPC code) | Telescope | CCD | Filter |
|---|---|---|---|
| Organ Mesa Observatory (G50) | 0.35-m SCT f/10 | SBIG STL-1001E | C |
| Astronomical Observatory, University of Siena (K54) | 0.30-m MCT f/5.6 | SBIG STL-6303e(bin 2x2) | Rc |
| Iota Scorpii(K78) | 0.40-m RCT f/8 | SBIG STXL-6303e (bin 2x2) | Rc |
| HOB Astronomical Observatory (L63) | 0.20-m SCT f/6.0 | ATIK 383L+ | C |
| Osservatorio Astronomico Nastro Verde (C82) | 0.35-m SCT f/6.3 | SBIG ST10XME (bin 2x2) | C |
| GAMP (104) | 0.60-m NRT f/4 | Apogee Alta | Rc |
| Osservatorio Astronomico Margherita Hack (A57) | 0.35-m SCT f/8.3 | SBIG ST10XME (bin 2x2) | Rc |

Table I. Observing Instrumentations. MCT: Maksutov-Cassegrain, NRT: Newtonian Reflector, RCT: Ritchey-Chretien, SCT: Schmidt-Cassegrain.