

LIGHTCURVE AND ROTATION PERIOD OF 358 APOLLONIA

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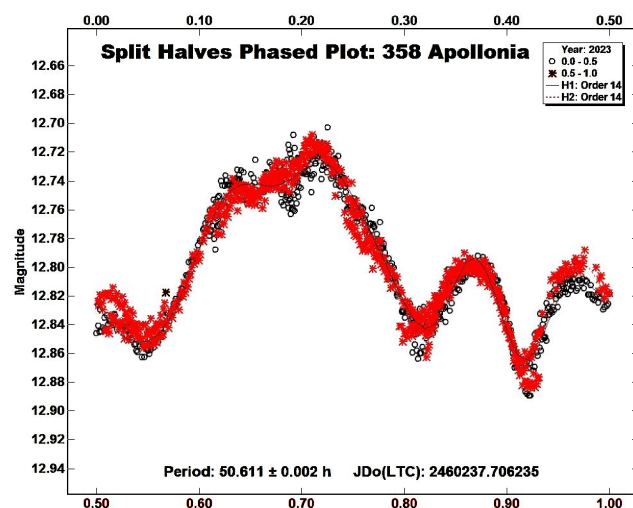
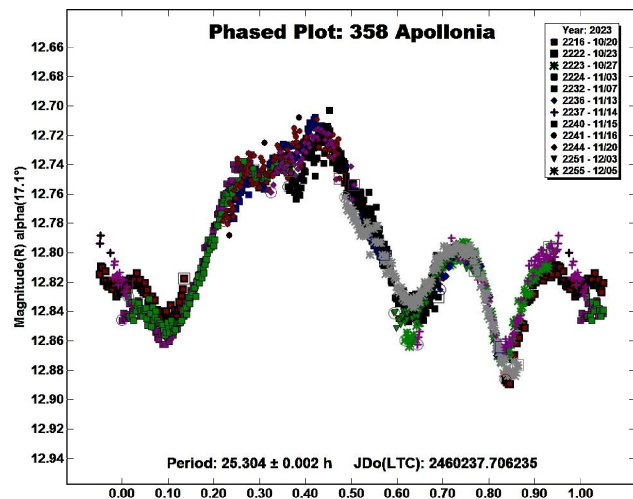
For 358 Apollonia we find a synodic rotation period of 25.304 ± 0.002 hours, amplitude 0.16 ± 0.02 magnitudes, and an irregular lightcurve for our observations near celestial longitude 65 degrees.

The observations by Pilcher to produce the results reported in this paper were made at the Organ Mesa Observatory with a Meade 35 cm LX200 GPS Schmidt-Cassegrain, SBIG STL-1001E CCD, 60 to 120 second exposures, unguided, clear filter. Observations by Delgado are with an 11-inch Celestron Schmidt-Cassegrain, Atik 4.14 EX CCD, 60 to 120 second exposures.

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. To reduce the number of data points on the lightcurves and make them easier to read, data points have been binned in sets of 3 with maximum time difference 5 minutes.

358 Apollonia. The Asteroid Lightcurve Database (Warner et al., 2009) lists two previous rotation period determinations. Buchheim (2009) published a synodic period of 50.6 hours, amplitude 0.12 magnitudes, with a symmetrical but nonuniform lightcurve that looks as if it could be phased to half of that period with a comparably good fit. Durech et al. (2020) published a sidereal period of 25.3108 hours.

New observations obtained on 12 nights 2023 Oct. 20 - Dec. 5 provide an excellent fit to an irregular lightcurve with synodic period 25.304 ± 0.002 hours and amplitude 0.16 ± 0.02 magnitudes. A split halves plot shows that the entire 50.611-hour double period was sampled and that the two halves are identical within observational error and reasonable lightcurve shape change between phase angles 17.1° and 3.0° . The double period is ruled out and a period of 25.304 hours may be considered secure. This period is consistent with Durech et al. (2020) and with Buchheim (2009) if his lightcurve data are rephased to 25.3 hours.



References

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Number	Name	yyyy/mm/dd	Phase	LPAB	BPAB	Period(h)	P.E	Amp	A.E.
358	Apollonia	2023/10/20-2023/12/05	*17.1 - 3.0	65.5	-4.3	25.304	0.002	0.16	0.02

Table I. Observing circumstances and results. The phase angle is given for the first and last date. Preceded by an asterisk indicates the phase angle reached a minimum during the period. LPAB and BPAB are the approximate phase angle bisector longitude and latitude at mid-date range (see Harris et al., 1984).

LIGHTCURVE ANALYSIS OF 1485 ISA

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We report on our observations and data analysis of the asteroid 1485 Isa, finding a period of 35.601 ± 0.020 hours, and an amplitude of 0.50 ± 0.03 magnitudes.

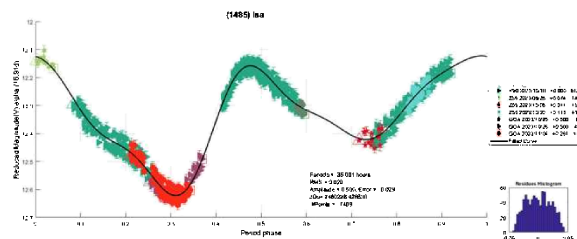
All observations reported here were unfiltered, except those that we took from Calar Alto Observatory, Almería, Spain (R-Cousins filter). The images were calibrated in the standard way (bias, darks and flats). Images were measured, and periods analysis were done using *FotoDif* (2021), *Tycho Traker* (2022), and *Periodos* (2020) packages. All data were light-time corrected. The results are summarized below.

Our studies on 1485 Isa began at the end of 2023 September and were extended into October and November. We used amateur telescopes of between 0.25-m to 0.30-m, and the 1.23-m telescope of the Calar Alto observatory, in Almería, thanks to the participation in a project of the Europlanet network, whose objective was to determine the period and lightcurve of this asteroid.

1485 Isa is an asteroid orbiting between Mars and Jupiter in the main portion of the asteroid belt. It orbits the sun every 1920 days (5.26 years), coming as close as 2.67 au and reaching as far as 3.39 AU from the sun. Isa is about 17.34 kilometers in diameter. Its absolute magnitude is 11.92, and 0.117 is its albedo. The asteroid was discovered on 1938 July 28, by Karl Wilhelm Reinmuth at Heidelberg. We found no previously reported rotation period, lightcurve, or 3-D model.

Due to its relatively small size, telescopes with a certain aperture (0.25-m and larger) along with good night skies with little light pollution and good seeing were necessary to monitor and study the asteroid. In addition to our own observations, we decided to submit an observing project to the Europlanet network to use the 1.23-m telescope of the Calar Alto observatory (Almería, Spain) on the nights of 2023 October 23 to 26.

In total, eleven reports were obtained from three different observatories between 2023 September 28 (phase angle 16.9° , elongation 125.5°) and November 6 (phase angle 5.5° , elongation 164.2°). We obtained 1409 points for our lightcurves. Most of our data were uploaded to ALCDEF and MPC sites. The analysis of the data obtained allowed us to deduce a rotation period of 35.601 ± 0.020 hours, and an amplitude of 0.50 ± 0.03 magnitudes.



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Number	Asteroid	20yy mm/dd	Phase	Period(h)	P.E.	Amp	A.E.
1485	Isa	23/09/28–23/11/06	16.9–05.5	35.601	0.020	0.500	0.029

Table I. Observing circumstances and results. Phase is the solar phase angle given at the start and end of the date range. If preceded by an asterisk, the phase angle reached an extrema during the period.