

THE ROTATIONAL PERIOD OF 176 IDUNA

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The rotational period for 176 Iduna is found to be 11.289 ± 0.006 hours with a lightcurve amplitude of 0.35 magnitudes.

Minor planet 176 Iduna was discovered in 1877 by C.H.F. Peters. It is a G-type asteroid with an estimated diameter of 125 km (Asteroids II database).

Photometric observations of 176 Iduna were carried out at the Ole Romer Observatory, University of Aarhus, with a 50-cm Cassegrain telescope equipped with a 1024x1024 CCD. The asteroid was observed in an R filter during the three nights 5-6, 10-11 and 24-25 October 1996. The first two nights were of fine quality, the last one was poor. The ephemerides were calculated from data given in EMP (Batrakov, 1995).

For the analysis presented here, we reduced a total of 114 CCD frames. Aperture photometry was performed on the CCD frames for the asteroid and comparison stars in the field, and from this the relative magnitude for the asteroid was obtained. The lightcurve displayed two minima on the first night and one on the second. This situation made it possible to distinguish between the minima and correlate the minimum on the second night. This correlation made a period determination possible. The third night's lightcurve served as a confirmation and improvement on the overall lightcurve.

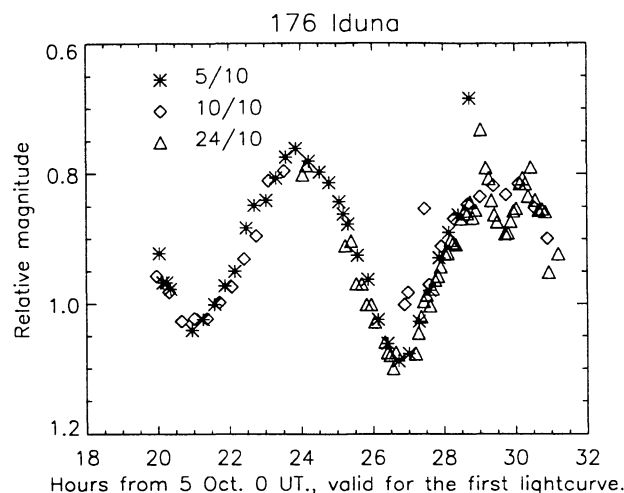


Figure 1. Composite lightcurve for minor planet 176 Iduna. No light time corrections have been applied.

We found the best fit value of the rotational period to be 11.289 ± 0.006 hours, where the composite lightcurve is shown in Figure 1. The amplitude of the lightcurve is 0.35 magnitudes. On the lightcurves there is some dispersion in the measurements, most likely due to clouds or the disturbance from daybreak.

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References

Batrakov, Yu. V., 1995, *Ephemerides of minor planets for 1996*.

ASTEROID PHOTOMETRY OPPORTUNITIES MAY-JULY

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The table below lists asteroids that come to opposition during the months of May through July that represent useful targets for photoelectric or CCD photometry observations. Observations are typically needed because the asteroid has either an unknown or ambiguous rotational period. The table gives (in order of opposition dates) the asteroid number and name, opposition date, opposition V magnitude, the rotational period (in hours), the estimated lightcurve amplitude (in magnitudes), and the designation PER if observations are needed to determine the rotational period. AMB implies that previous period determinations have given ambiguous results and these alternate periods are listed in the table. RAD indicates the asteroid is a planned radar target, and MOD denotes an asteroid at a critical longitude for shape and pole modeling. Question marks are used to denote uncertain or unknown values.

Now that many amateur and other small observatories have CCD capabilities, much fainter targets are accessible to them. Therefore, we have included a selection of fainter targets, down to opposition magnitude 15. Our emphasis among these fainter targets is to reach to the smallest size bodies possible within that magnitude limit. Thus the objects listed tend to be inner-belt asteroids, or even Mars or Earth-crossing objects, at unusually favorable oppositions. To achieve this, we filter the list of all oppositions to include those objects with H (absolute) magnitude >14.0 (roughly <5 km in diameter), but opposition V magnitude <15.0 , and then further eliminate any objects for which adequate observations have already been made. Our criteria for the brighter objects remains the same: opposition V magnitude <12.0 and that the period is unknown, very uncertain, or ambiguously determined. We have dropped low phase angle as a criterion for inclusion, as it seems no one has responded to past listings suggesting phase relation observations.

In the current table, we call attention to 3671 Dionysus (1984 KD), which may have the shortest rotation period known (2 hours). In its discovery apparition, the period was ambiguously determined, as 2.4 hours, or maybe only 2.0 hours. It is very important to resolve this ambiguity, since a period of 2.0 hours would indicate that the asteroid is in a state of tension from centrifugal force, and therefore a monolithic body, rather than a "rubble pile" of loose pieces. The date given in the table is the time of closest approach to the Earth, 0.11 AU. However it is almost as bright and more favorably placed for observation a month earlier, from about May 30 to June 10.