

LIGHTCURVE ANALYSIS OF 788 HOHENSTEINA

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A collaborative effort from two widely-separated geographical longitudes resulted in three nights of long, continuous observations of 788 Hohensteina. The 14-hour, non-overlapping lightcurve allowed us to constrain the synodic period of the asteroid to 37.176 ± 0.004 h with an amplitude of 0.18 ± 0.03 mag.

Kingsgrove Observatory used a 0.25-m Schmidt-Cassegrain telescope operating at f/5.2 combined with an ST-402ME SBIG CCD camera at 1x1 binning, which gave a pixel scale of 1.40 arc seconds/pixel. All images were unfiltered and 60 s. *MPO Canopus* v.9.4.0.1 software was used for period analysis, which incorporates the Fourier algorithm developed by Harris (1989). Egan Observatory used 0.40-m Ritchey-Chretien telescope operating at f/5.6 on a Paramount ME mount coupled with an Apogee AP7ap back-illuminated camera. This produced a pixel resolution of 2.2 arc seconds/pixel.

788 Hohensteina, a 103-km C-class main-belt asteroid, was listed on the CALL website (Warner 2008) for further improvement in its known synodic period, the quality of which was listed as $U = 1+$ at the time (Harris and Warner 2008). Previous photometry by Behrend (2008) showed that the period was either 18.435 h or 28.85 h based on two short-duration lightcurves obtained by single observers.

A call for collaborative work was posted on the CALL website after initial data by Oey indicated a difficult, low-amplitude, and slow-rotating asteroid. Fauerbach responded and agreed to assist. From the five nights collected by Fauerbach and 18 nights collected by Oey, there were three nights, May 7, 10, and 14, that each formed a nearly continuous 14-hour lightcurve segment. The segments were not overlapping, being separated by about 2.5 hours. No attempt was made to standardize the zero point of the differential magnitudes. Instead, the data were aligned visually such that tail of the first segment made a reasonable fit with the head of the second segment. This method was deemed sufficiently reliable due to the low amplitude and long period nature of the object. All the data taken initially indicated that the lightcurve amplitude did not exceed 0.10 mag. With no collaboration, this alone could have led the authors to believe that the lightcurve period was approximately that reported by Behrend. However, the session on May 14 showed that the minimum amplitude should be 0.18 mag or more. Based on that assumption, the zero points were adjusted such that data on May 14 represented one minimum and the data from May 7 and 10 represented the second minimum, all the while keeping the overall amplitude at about 0.18 mag. Once the best fit period was obtained by inspection of the period spectrum, the remaining sessions were gradually added to the

lightcurve with the net result being the lightcurve presented here, phased to a synodic period of 37.176 ± 0.004 h.

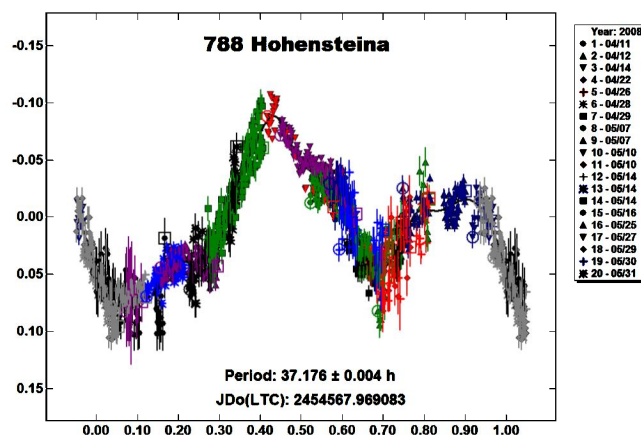
There was also an indication of Non-principal axis rotation (NPA or “tumbling”) as suggested by Alan Harris (private communications). Further observations are needed to confirm that possibility.

Acknowledgement

We would like to thank Brian Warner for his effort in helping to decipher the possible period presented from the available data.

References

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Sessions	Observer	Phase	LPAB	BPAB
1-7	Oey	9.2-5.5	219	12
9, 11, 14, 15, 18, 19, 20	Oey	6.3-13.1	220	13
8, 10, 12, 13, 16, 17	Marks, Fauerbach	6.5-12.5	220	13

ASTEROID LIGHTCURVE ANALYSIS AT THE OAKLEY SOUTHERN SKY OBSERVATORY: 2008 MARCH

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Photometric data for 17 asteroids were collected over ten nights of observing during 2008 February and March at the Oakley Southern Sky Observatory. The asteroids were: 170 Maria, 266 Aline, 426 Hippo, 441 Bathilde, 619 Triberga, 701 Oriola, 840 Zenobia, 1175 Margo, 1232 Cortusa, 1297 Quadea, 1309 Hyperborea, 1355 Magoeba, 1505 Koranna, 2120 Tyumenia, 2606 Odessa, 3428 Roberts, and 4254 Kamel.

Seventeen asteroids were observed from the Oakley Southern Sky Observatory on the nights of 2008 February 29 and March 1–6, 9, 10, and 12. From the data, we were able to find lightcurves for eight asteroids. Out of those eight, three were previously unrecorded results, three were reasonably close to previously published periods, and two disagreed with previously published periods.

For the ten nights of observing, a 20-inch Ritchey-Chretien optical tube assembly mounted on a Paramount ME was used with a Santa Barbara Instrument Group STL-1001E CCD camera and clear filter. The image scale was 1.2 arcseconds per pixel. Exposure times varied between two and four minutes. Calibration of the images was done using master twilight flats, darks, and bias frames. All calibration frames were created using *CCDSOFT*. *MPO Canopus* was used to measure the processed images. Selection of asteroids was based on their sky position about one hour after sunset. Asteroids without previously published lightcurves were given higher priority than asteroids with known periods, but asteroids with uncertain periods were also selected with the hopes that we would be able to improve previous results.

As far as we are aware, these are the first reported observations for the period of the following asteroids: 1505 Koranna, 2606 Odessa, and 3428 Roberts. No repeatable pattern was found for the following asteroids: 170 Maria, 266 Aline, 426 Hippo, 441 Bathilde, 701 Oriola, 840 Zenobia, 1232 Cortusa, 1355 Magoeba, and 4254 Kamel. Our data for these asteroids was so noisy we do not feel comfortable even reporting amplitudes. Results from the asteroids with good lightcurves are listed in the table below.

Number	Name	Dates mm/dd 2008	Data Points	Period (h)	Period Error (h)	Amp (mag)	Amp Error (mag)
619	Triberga	03/06, 10, 12	87	29.37	0.06	0.35	0.04
1175	Margo	02/29, 03/01–04	176	11.99	0.03	0.3	0.06
1297	Quadea	03/05, 06, 09	74	6.259	0.005	0.35	0.05
1309	Hyperborea	03/05, 06, 10, 12	108	13.88	0.02	0.45	0.05
1505	Koranna	02/29, 03/01–04	179	4.451	0.001	0.6	0.04
2120	Tyumenia	03/05, 06, 09	76	17.47	0.07	0.45	0.08
2606	Odessa	02/29, 03/01–04	170	8.244	0.002	0.8	0.1
3428	Roberts	02/29, 03/01–04	162	3.278	0.001	0.6	0.06

Comments have been included if they are necessary.

619 Triberga. Our data are consistent with the period of 29.412 ± 0.003 h found by and Pray (1987).

1175 Margo. Our data disagree with the period 6.0138 ± 0.0002 h deemed most likely by Behrend (2008) but support the period of 12.028 that was listed as another possibility.

1297 Quadea. Our data agree with the period of 6.267 ± 0.001 h found by Behrend (2008).

1309 Hyperborea. Our data give a period that is close to that of 13.95 ± 0.02 h found by Apostolovska et al. (2004).

2120 Tyumenia. Our data are not consistent with the period of 2.769 ± 0.0005 h found by Warner (2005).

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