

ASTEROID LIGHTCURVE ANALYSIS AT RICKY OBSERVATORY

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(Received: 2009 Apr 15)

Lightcurves for six asteroids were obtained at Ricky Observatory from 2007 October through 2008 January: 802 Epyxa, 1666 Van Gent, 2320 Blarney, 2358 Bahner, 2509 Chukotka, 3416 Dorrit.

Observations of the 6 asteroids were carried out at Bennefeld's Observatory (MPC H46), which is equipped with a 0.35m Meade LX200 GPS telescope operating at f/6.3 coupled to a SBIG ST7-XME CCD camera, resulting in a resolution of ~ 1.7 arcsec/pixel (binned 2×2). Unfiltered exposure times varied between 30-60 s.

The asteroids under observation were selected from the list of asteroid lightcurve photometry opportunities which is posted on the Collaborative Asteroid Lightcurve Link (CALL) website (Warner, 2007a). The students measured the photometric properties of the images using Brian Warner's *MPO Canopus*, which employs differential aperture photometry to produce the raw data (Warner, 2007b). Period analysis of the raw data was done using *Canopus*, which incorporates the Fourier analysis algorithm developed by Harris (Harris et al., 1989). As well as reporting the synodic rotational period, amplitude, and phase angle of the asteroids, every attempt was made to expand on the knowledge base of the asteroids by, where appropriate, reporting the minimum axial ratio a/b of an elliptical asteroid and the Phase Angle Bisector longitude and latitude, PAB_L and PAB_B , respectively.

802 Epyxa. This main-belt asteroid was sampled 434 times over 3 nights to achieve a synodic rotation period of 4.389 ± 0.001 h. The absolute value of the peak-to-peak magnitude differential (Δm) of 0.58 mag implies an axial ratio (a/b) of 1.70, assuming an equatorial viewing aspect. The period agrees with Warner (2009).

1666 van Gent. The main-belt asteroid was sampled 156 times over 2 nights to yield a synodic rotation period of 4.166 ± 0.003 h. The absolute value of the peak-to-peak magnitude differential (Δm) of 0.50 mag implies an axial ratio (a/b) of 1.58. No other

lightcurves for this asteroid are known to exist.

2320 Blarney. The main-belt asteroid was sampled 154 times over a single night to yield a synodic rotation period of 5.097 ± 0.001 h. The absolute value of the peak-to-peak magnitude differential is 0.44 mag, implying an axial ratio (a/b) of 1.50. No other lightcurves for this asteroid are known to exist.

2358 Bahner. This main-belt asteroid was sampled 226 times over a 4 night period to yield a synodic rotation period of 14.194 ± 0.002 h. Due to an incomplete data set, the axial ratio was not computed. Behrend (2009) reports a provisional period of 10.848 ± 0.003 h and Owings (2009) a period of 10.855 h. We did test our data against the shorter period but found a lower RMS fit for the longer period. Given the lack of consecutive nights and the incomplete coverage of the curve in our data set, we admit that our solution may not correct and so present it here more for the purpose of putting our data on record.

2509 Chukotka. This main-belt asteroid was sampled 431 times over a 4 night period to yield a synodic rotation period of 3.19 ± 0.01 h. Due to the poor SNR and the inconclusive nature of the lightcurve, no attempt was made to calculate the axial ratio. No other lightcurves for this asteroid are known to exist.

3416 Dorrit. This Mars-crossing asteroid was sampled 247 times over a 2 night period to yield a synodic rotation period of 2.714 ± 0.003 h. The absolute value of the peak-to-peak magnitude differential is 0.38 mag, implying an axial ratio (a/b) of 1.42. No other lightcurves for this asteroid are known to exist.

Acknowledgements

The students would like to thank the entire staff at Imagine Renaissance Academy (Wallace Campus) including Mrs. Debbie Jones-Fowler, Head of Schools, Mr. Geoffrey Alderman, Assistant Director, and Mr. Greg McGhee, Activities Director, for striving to provide us with a project-based learning environment second to none. Thanks also go out to Mr. Brian D. Warner for his input in the preparation of this paper and finally to Mr. Bennefeld our Physics and Astronomy teacher.

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# Name	Date Range (mm/dd)	Data Pts	Phase	PAB _L	PAB _B	Per (h)	PE	Amp	AE
802 Epyxa	11/15-18/2008	434	6.05	104.4	7.6	4.389	0.002	0.58	0.02
1666 van Gent	12/31/2008-01/01/2009	156	18.57	66.3	0.5	4.166	0.003	0.50	0.03
2320 Blarney	01/01/2009	154	1.66	103.2	-3.9	5.097	0.001	0.44	0.02
2358 Bahner	10/26-11/25/2008	226	13.50	12.9	6.8	14.194	0.001	0.44	0.01
2509 Chukotka	09/29-10/29/2008	431	14.3	358.2	1.4	3.19	0.01	0.16	0.03
3416 Dorrit	11/19-11/20/2008	247	19.03	31.9	12.1	2.714	0.003	0.38	0.03

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