

observers within the Binary Asteroid Survey (Pravec et al., 2006) were contacted to provide additional data.

After several more nights, the combined data set began to show mutual events due to occultations and eclipses within a binary system and analysis could start on finding the rotation period of the primary and orbital period of the satellite. Even after subtracting those two periods from the data, we still found strong indications of yet another period. The two most likely explanations were the rotation of the satellite, meaning that it was not tidally locked to its orbital period, or there was a third body in the system. We saw no additional mutual events, but that could be attributed to unfavorable system geometry and/or viewing aspect or that the orbital period of the tertiary was so long that our short observing windows did not allow seeing events. At this point we cannot rule out either possibility for the additional period.

Table I summarizes our findings, which are based on a subset of the data from 2009 March 4 – April 1. The data on Feb 28 and Mar 1 do not show any events and, while the period matches what we report here, the shape of the lightcurve was significantly different, which may have indicated that the primary's lightcurve was rapidly evolving. We urge follow-up observations of this system in order to refine these findings and to confirm the cause of the secondary period.

Acknowledgements

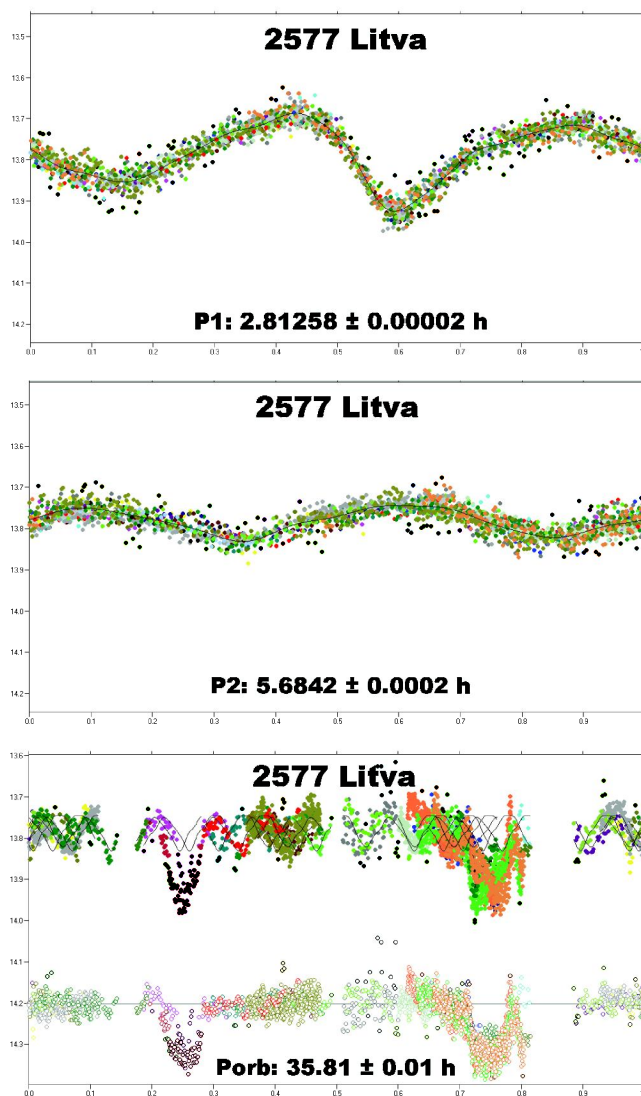
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2755 Litva Results		
P1 (synodic)	2.81258	± 0.00002 h
P2 (synodic)	5.6842	± 0.0002
P(orb)	35.81	± 0.01
A1	0.24	± 0.02 mag
A2	0.09	± 0.01
A(events)	0.14	± 0.01 mag
Ds/Dp (lower limit)	0.34	± 0.02

Table I. Summary of results for 2577 Litva.



ANALYSIS OF THE LIGHTCURVE OF 6179 BRETT

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We report on our collaboration to determine the lightcurve parameters for the Phocaea member asteroid, 6179 Brett. Our analysis found a synodic period of 9.403 ± 0.001 h and an amplitude of 0.67 ± 0.02 mag.

Both authors started to observe the Phocaea member asteroid, 6179 Brett, in 2009 April as part of the Photometric Survey for Asynchronous Binary Asteroids (Pravec, 2009). We combined our efforts to overcome weather and to extend runs on a given night.

This allowed us to find a solution sooner than might otherwise be possible for a single station. Warner used 0.35-m Schmidt-Cassegrain (SCT) with FLI-1001E CCD camera working at a scale of ~ 1.2 arcsec/pixel. Exposures were guided, unfiltered, and 240 s. Pray used a 0.5-m f/4 Newtonian reflector and SBIG ST-10XME camera, yielding a scale of ~ 2.0 arcsec/pixel. Exposures were

130 s, unfiltered, and unguided. We both used *MPO Canopus* to perform differential photometry on the reduced images. All data were light-time corrected. The merged data set was then used for period analysis, again in *Canopus*, which employs the FALC Fourier analysis algorithm by Harris (1989). The resulting lightcurve, shown below, has a synodic period of 9.403 ± 0.001 h and amplitude of 0.67 ± 0.02 mag.

Given the large amplitude and period, it was very unlikely that the asteroid was an asynchronous binary and so it was tempting to stop work once the period could be established. However, in order to maintain the integrity of the Survey, Pravec urged additional observations until the entire curve had been covered at least twice. This is an important point: in order to assure that biases in the asteroid lightcurve database (Warner et al., 2009) are kept to minimum, an asteroid's lightcurve should be completed as much as possible, whether in a survey or not. This includes staying with targets that don't present a quick and/or easy solution.

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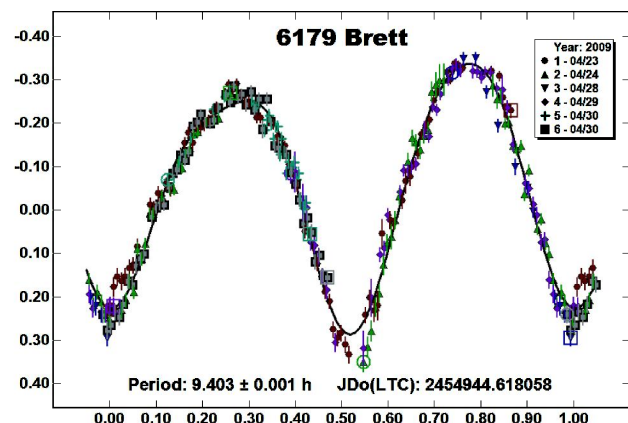


Figure 1. Lightcurve for 6179 Brett. The solid line is a fourth-order Fourier fit of the data.

PERIOD DETERMINATION OF 780 ARMENIA: AN INTER-LONGITUDE COLLABORATION

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We report the result of a collaborative effort to determine the lightcurve parameters for the main-belt asteroid 780 Armenia from two widely-separated geographic longitudes. The synodic rotation period and amplitude were found to be 19.891 ± 0.002 h and 0.18 ± 0.03 mag, respectively.

780 Armenia is a main-belt asteroid discovered in 1914 by G. N. Neujmin at Simeis. The only previously reported parameters were those by Behrend (2009) with a period (P) of ~ 13 h and amplitude (A) of ~ 0.1 mag. The asteroid was also listed as a potential observing target on the CALL website for 2009 April-June (Warner and Harris, 2009) and marked with an uncertainty flag of $U = 1$, which indicates preliminary and very likely incorrect parameters. Assuming that the period might be much longer than previously reported, the authors agreed to undertake a joint observational effort to determine a secure set of parameters. The observations started on 2009 May 2, when the apparent magnitude of the target was 14.1, and continued until June 2. Pilcher at Organ Mesa Observatory used a Meade 0.35-m LX200 GPS f/11 Schmidt-Cassegrain (SCT) and SBIG STL-1001E CCD. Benishek at Belgrade Observatory used a Meade 0.4-m LX200 GPS f/10 SCT and Apogee AP47p CCD. All observations were unfiltered. Instrumental magnitudes were found and used for period analysis with *MPO Canopus* software.

Even after the first observing runs it was clear that the period was considerably longer than 13 h. Initially, it was difficult to resolve the ambiguity between a bimodal solution with $P \sim 20$ h and a more favorable RMS error versus a trimodal solution with $P = 29.86$ h that was still very likely. However, a deep narrow

