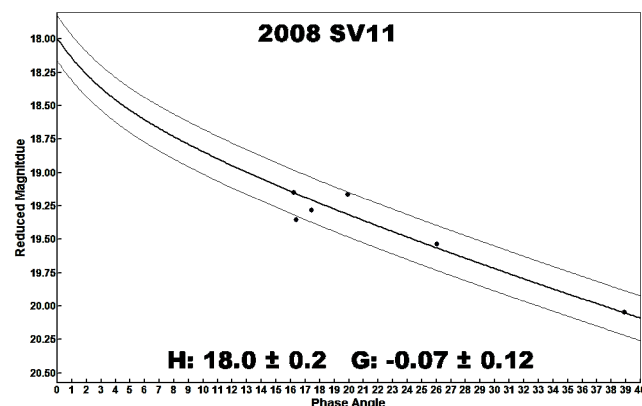
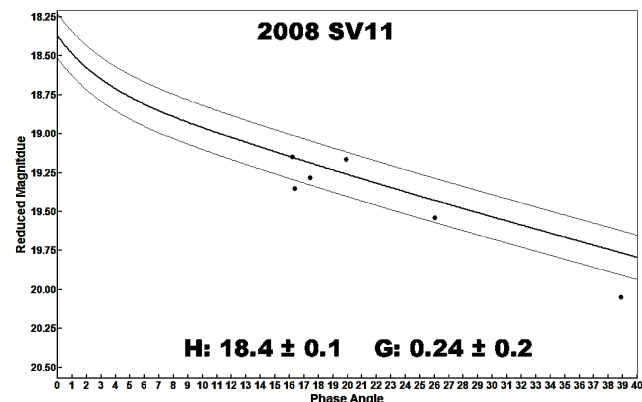
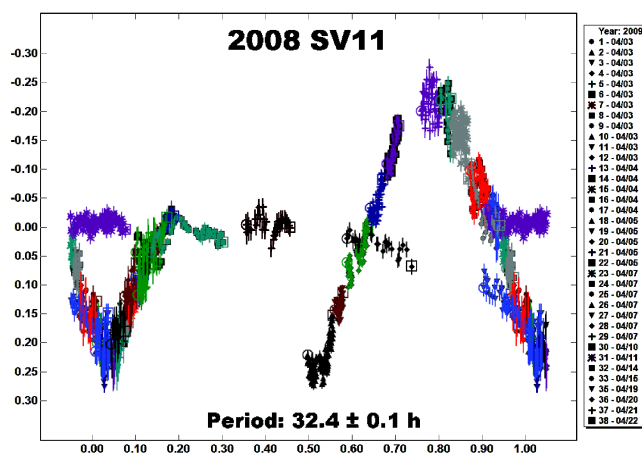
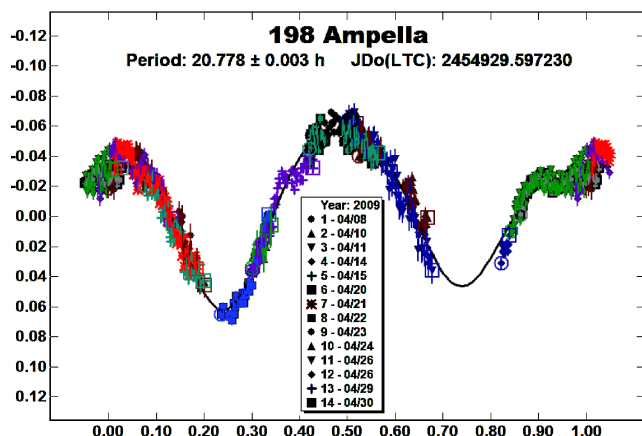




2577 LITVA: A HUNGARIA BINARY

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Observations of the Hungaria asteroid 2577 Litva in 2009 late February to early April show that the asteroid is a binary. The primary period (synodic) is 2.81258 ± 0.00002 h and the orbital period (synodic) is 35.81 ± 0.01 h. The depth of mutual events (occultations and eclipses) indicate a size ratio of D_s/D_p (lower limit) = 0.34 ± 0.02 . A secondary period of 5.6842 ± 0.0002 h was also found. This is due either to the rotation of the satellite that is not tidally locked with the orbital period or a third body.

Initial observations of the Hungaria asteroid 2577 Litva were made by Warner at the Palmer Divide Observatory (PDO) in late 2009 February as part of an ongoing study of that group/family of asteroids. Wisniewski et al. (1997) worked the asteroid in 1988 and found a period of 5.618 h with an amplitude of 0.36 mag. Stephens (2004) reported a period of 2.82 h and amplitude of 0.30 mag while Behrend (2009) reported a period of 2.81 h and amplitude of 0.14 mag. When the initial data from the 2009 PDO campaign were analyzed, there were unusual aspects with one interpretation being a second period within the data. At this point,

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

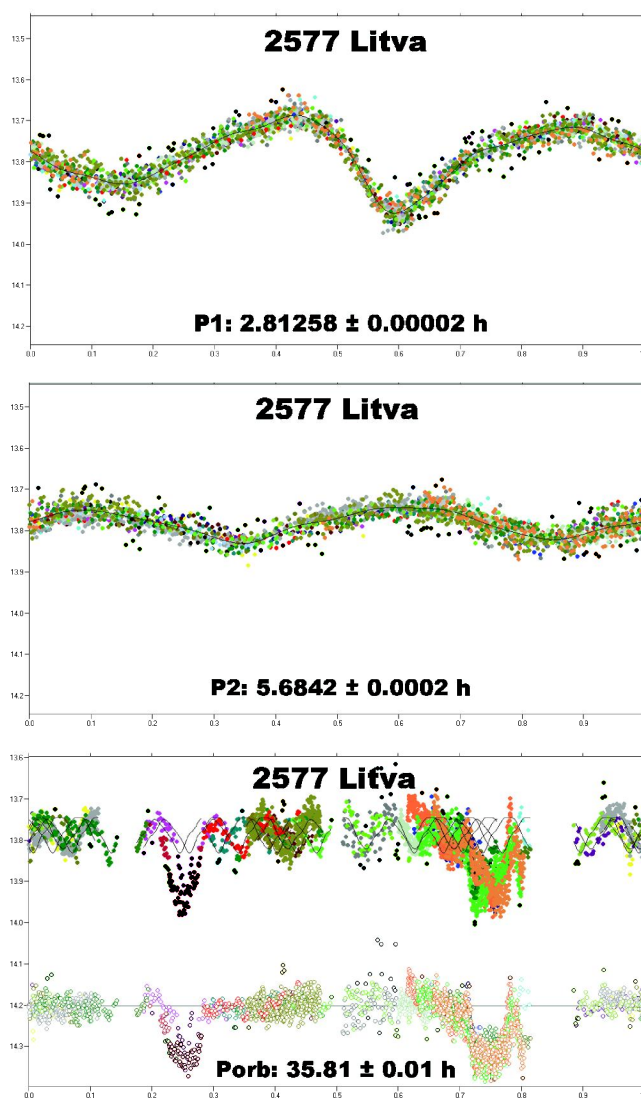
Funding for observations at the Palmer Divide Observatory is provided by NASA grant NNX 09AB48G, National Science Foundation grant AST-0607505, and by a Gene Shoemaker NEO Grant from the Planetary Society. The work at Ondřejov was supported by the Grant Agency of the Czech Republic, Grant 205/09/1107. The work at Carbuncle Hill Observatory was supported by a Gene Shoemaker NEO Grant from the Planetary Society.

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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.