EPSC Abstracts
Vol. 6, EPSC-DPS2011-351, 2011
EPSC-DPS Joint Meeting 2011

Preliminary Results from a Rotation Survey of Jovian Trojan Asteroids

L. M. French (1), **R. D. Stephens** (2), S. M. Lederer (3), L.H. Wasserman (4), D. Coley (2), D. A. Rohl (1), and D. La Rocca (1)
(1) Illinois Wesleyan University, USA, (2) GMARS, USA, (3) NASA-JSC, (4) Lowell Observatory / lfrench@iwu.edu, Fax: +001-309-5563864)

Abstract

Lightcurve results are presented for 16 Jupiter Trojan asteroids from observations obtained at Cerro Tololo Interamerican Observatory, GMARS Observatory, and Lowell Observatory from October 2009 to January 2011.

1. Introduction

The Jovian Trojan asteroids are among the most enigmatic objects in the Solar System. Because of their greater distance from the Sun and their low albedos, they have been less studied than main belt asteroids. We are conducting a survey of Trojan asteroid rotation properties and colors for testing models of the composition and the collisional history of the Trojan asteroids.

2. Observations

Observations at GMARS (Goat Mountain Astronomical Research Station, MPC G79) were made by Stephens and Coley with three telescopes. All were 0.35-m SCTs, two using a SBIG STL-1001E CCD Cameras and the other using a SBIG ST-9e CCD camera. All images were unbinned with no filter. Measurements were made using *MPO Canopus*, which employs differential aperture photometry to produce the raw data. Period analysis was done using *MPO Canopus*, which incorporates the Fourier analysis algorithm (FALC) developed by Harris (1989).

Observations at CTIO (Cerro Tololo Interamerican Observatory, MPC 807) were made with the CTIO 1.0-m or 0.9-m telescopes. All images taken at CTIO were unbinned; V and R filters were used. Data and period analysis was done using MPO Canopus.

Observations at Lowell Observatory (MPC 688) were made with the Perkins 1.8-m telescope or the 0.8-m telescope using primarily R filters with sufficient V observations for transforming to the standard system.

3. Figures

Two representative lightcurves, both obtained at GMARS, are presented here.

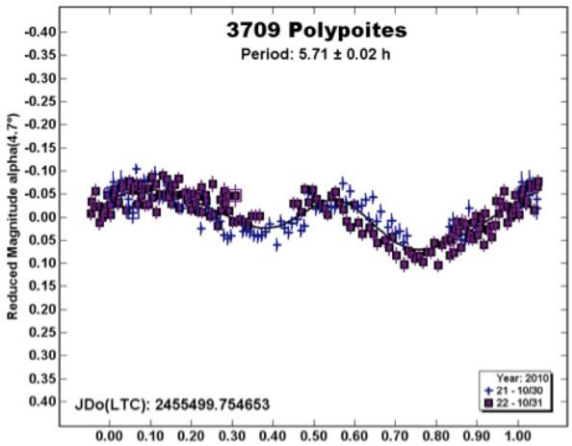

Figure 1: Lightcurve for 3709 Polypoites, D = 99 km (French et al. 2011). This result corrects a previously published period of 43 h (Molnar 2008).

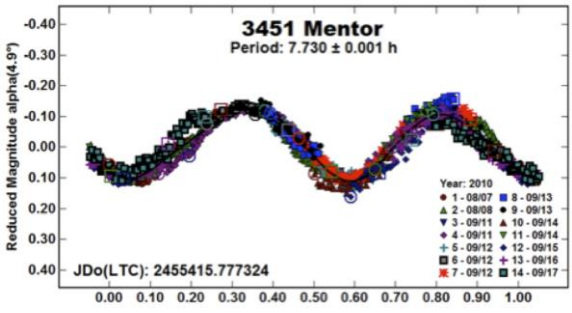

Figure 2: Lightcurve for 3451 Mentor, D = 134 km (French et al. 2011). Sauppe (2007) reported a period of 7.70 h. Duffard (2008) reported a period of 7.682 h. Melita (2010) reported a period of 7.68 h. Behrend

(2010) reported a period of 7.699 h. Phasing our data to these periods resulted in some nights not lining up by a quarter of the phase. The Sauppe period was obtained over three 3 nights spanning 4 days in 2007. The Behrend period is from a single night in August 2010 that does not appear to complete a full rotational period. We find the best result for P =7.730 ± 0.001 h.

4. Discussion and Conclusions

In a previous study, Molnar *et al.* (2008) found that Trojan asteroids had a longer rotation period, on average, than main belt asteroids of comparable size. We will compare our results with those of Molnar *et al.*, compare Trojan rotation properties with those of other small bodies, and consider possible implications for the history of the Trojan asteroids.

Acknowledgements

French, Lederer, Rohl, and Stephens were visiting astronomers at Cerro Tololo Interamerican Observatory, National Optical Astronomy Observatory, operated by the Association of Universities for Research in Astronomy, under contract with the National Science Foundation. The Cerro Tololo 0.9-m and 1.0-m telescopes are operated by the SMARTS Consortium. This research was supported by Cottrell College Science Award grants from the Research Corporation (French and Rohl; Lederer), support from the Lunar and Planetary Institute (Lederer), and support from the Faculty Development Fund of Illinois Wesleyan University (French and Stephens).

References

[1] Behrend, R., Observatoire de Geneve web site, *http://obswww.unige.ch/~behrend/page_cou.htm,* 2010.

[2] Duffard R., Melita, M., Ortiz, J., Licandro, J., et al. *ACM 2008*, 8187, 2008.

[3] French, L. M., Stephens, R. D., Lederer, S. M., Coley, D., and Rohl, D. A. *Minor Planet Bul.* 38-2, 2011.

[4] Melita, M.D., Duffard, R., Williams, I.P., Jones, D.C., et al. *Plan. Space Sci.* **58**, 1035-1039, 2010.

[5] Molnar, L. L.A., Haegert, M., and Hoogeboom, K. *Minor Planet Bul.* **35**, 82-84, 2008.

[6] Sauppe, J., Torno, S., Lemke-Oliver, R., and Ditteon, R. *Minor Planet Bul.* **34**, 119-122, 2007.