

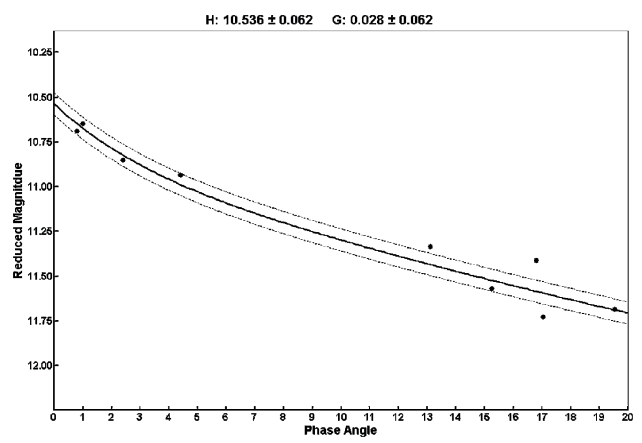


Figure 5. 946 Poesia H-G Parameters using 73.5 h period for finding the mean magnitude.

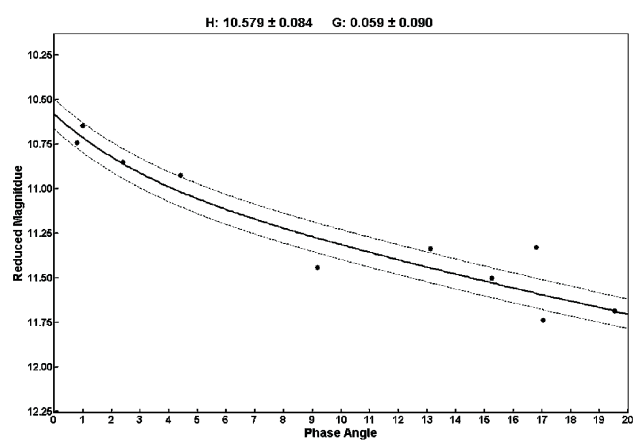


Figure 6. 946 Poesia H-G parameters using 102.9 h period for finding the mean magnitude.

Acknowledgements

The author extends thanks to Brian Warner for the highly useful software tools *Canopus* and *PhotoRed*. Thanks also to Brian for the “gentle push” towards the study of *H-G* Parameters and assistance in sorting out the ambiguous long period of 946 Poesia. Appreciation is also extended to the Society for Astronomical Sciences (SAS) for allowing use of this material as presented at the 2009 Symposium.

References

- Bdw Publishing (2008). MPO Software, Canopus version 9.5.0.3. <http://minorplanetobserver.com/>
- Bus, S.J. and Binzel, R.P. (2002). “Phase II of the Small Main-Belt Asteroid Spectroscopic Survey: The Observations”. *Icarus* **158**, 106-145.
- MPCORB, Orbital Database, Minor Planet Center, <http://www.cfa.harvard.edu/iau/MPCORB.html>
- Pravec, P. and Harris, A.W. (2007). “Binary Asteroid Population 1. Angular Momentum Content”. *Icarus* **190**, 250-259.

Warner, B.D. (2009). “Notes from the Acting Editor”. *The Minor Planet Bulletin* **36**, 1.

Warner, B.D., Harris, A.W., Pravec, P., Durech, J., and Benner, L.A.M. (2009a). “Lightcurve Photometry Opportunities: January - March 2009”. *The Minor Planet Bulletin* **36**, 31-34.

Warner, B.D., Harris, A.W., and Pravec, P. (2009a). “The asteroid lightcurve database”. *Icarus* **202**, 134-146.

Vander Haagen, Gary A. (2009) “What is Next in Asteroid Photometry?” In *Proceedings for the 28th Annual Conference of the Society for Astronomical Sciences* (B.D. Warner, J.L. Foote, D. Kenyon, D. Mais, eds.) pp. 85-90. Society for Astronomical Sciences, Rancho Cucamonga, CA.

Wisniewski, W.Z., Michalowski, T.M., and Harris, A.W. (1997). “Photometric Observations of 125 Asteroids.” *Icarus* **126**, 395-449.

ON THE PERIOD OF 1506 XOSA

George Stecher, Lyle Ford, and Natalie Bianchi
Department of Physics and Astronomy
University of Wisconsin-Eau Claire
Eau Claire, WI 54702-4004 USA
gstecher@uwec.edu

Brian D. Warner
Palmer Divide Observatory/Space Science Institute
Colorado Springs, CO USA

Larry Robinson
Sunflower Observatory, Olathe, KS USA

(Received: 2009 Jun 1)

Observations from the 2005 opposition of 1506 Xosa combined with re-analyzed data from the 2001 apparition were used to examine the period of 1506 Xosa. The combined data indicate possible periods of 5.9 h and 6.6 h.

The Eau Claire group made R band and I band photometric measurements of 1506 Xosa on 2005 June 16 and 17 using the 0.6-m “Air Force” Telescope located at Hobbs Observatory near Fall Creek, Wisconsin. 60-second exposures were taken with a Photometrics Star I Camera. Images were dark-subtracted and flat-fielded. Instrumental magnitudes were found using *MPO Canopus* version 9.3.1.0 (Warner, 2007a). The asteroid passed near three stars on the night of 16 June, so *Canopus*’ StarBGone star removal algorithm was used to eliminate their signals. Images of standard stars from the LONEOS catalog were used to find transforms and first order extinction coefficients, although not all the stars used were Landolt standards. Transforms and first order extinction coefficients were determined using the modified Hardie method as described in Warner (2006). The transforms and extinction coefficient calculations were made by spreadsheet because the unusual color index, R-I, is not supported by the MPO software. The Eau Claire data show possible periods of approximately 4.0 h, 5.9 h (Figure 1), and 6.6 h (Figure 2), with 4.0 h and 5.9 h giving the best fits.

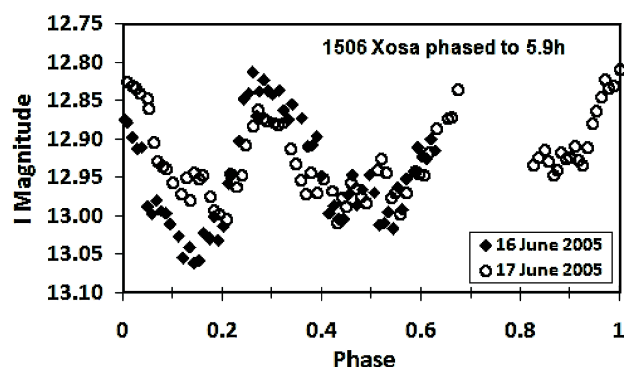


Figure 1. Data for 1506 from 2005 phased to a period of 5.9 h.

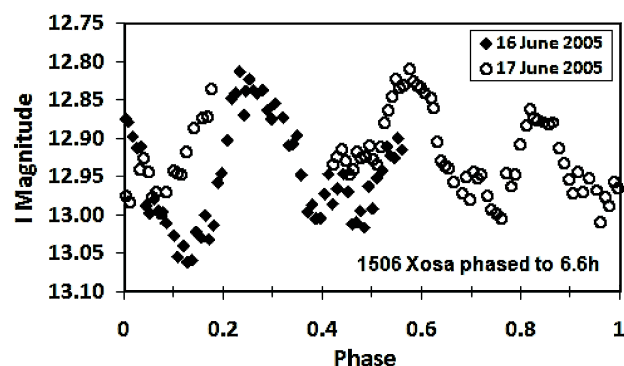


Figure 2. Data for 1506 from 2005 phased to a period of 6.6 h.

Warner re-measured the original 2001 images using the latest version of *MPO Canopus*. Those images were taken mostly by Robinson using a 0.30-m SCT and SBIG ST-9E CCD camera and 60-second exposures. The asteroid was embedded within crowded star fields and so the StarBGone feature of *Canopus* was used to keep as many data points as possible. Night-to-night calibrations were made by using 2MASS to BVRI magnitudes (see Warner, 2007b). Figure 3 shows a best-fit plot of the 2001 data phased to a period of 6.618 ± 0.002 h. Figure 4 shows a period spectrum covering the possible periods mentioned in this paper. From this, the alternate periods of 4.0 h and 5.9 h found by the Eau Claire group are not as likely if one presumes a bimodal curve. However given the low amplitude of the lightcurves at both apparitions, it's possible that a bimodal curve is not a valid assumption even though the phase angle was $<15^\circ$ in both cases. It can also be noted that the phase angle bisector longitudes differed by only 35° between the two apparitions and so the viewing aspect was not significantly different. The final conclusion seems to be that neither data set firmly establishes a period and that observations, preferably with significantly different viewing aspects, be carried out in the future.

The Eau Claire group's data can be obtained from <http://www.uwec.edu/physics/asteroid/>.

Acknowledgements

The Eau Claire group thanks the Theodore Dunham Fund for Astrophysics and the University of Wisconsin-Eau Claire Office of Research and Sponsored Programs for financial support.

Funding at the Palmer Divide Observatory for the re-analysis of the 2001 data was provided by NASA grant NNX 09AB48G and by National Science Foundation grant AST-0607505.

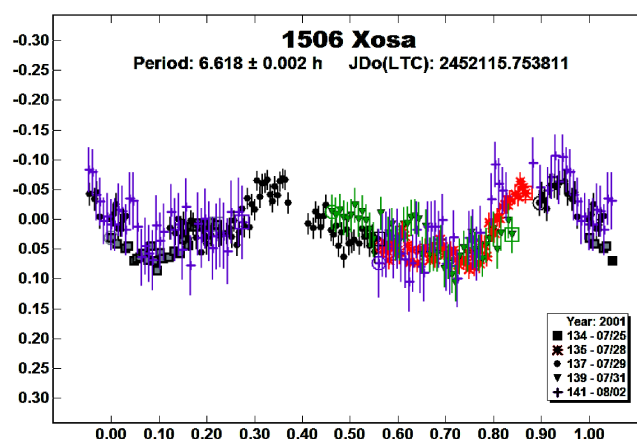


Figure 3. Data for 1506 Xosa from 2001 phased to 6.618 ± 0.002 h.

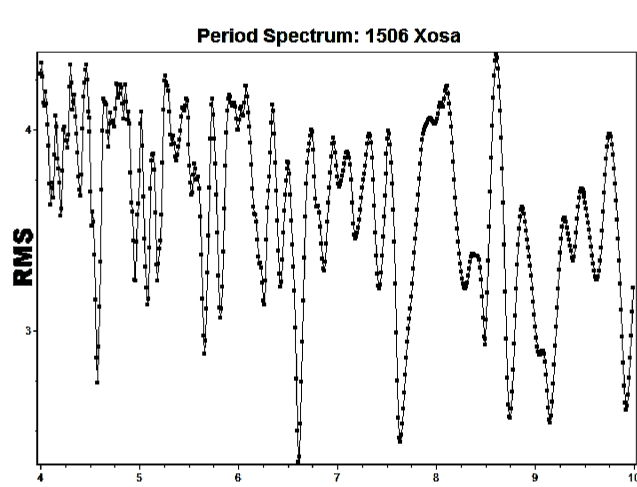


Figure 4. Period spectrum for 1506 Xosa using only 2001 data. The X-axis is the period, in hours, while the Y-axis is the RMS fit.

References

- Robinson, L.E. and Warner, B.D. (2002). "A Collaborative Work on Three Asteroid Lightcurves: 506 Marion, 585 Bilkis, 1506 Xosa", *Minor Planet Bulletin* **29**, 6–7.
- Warner, B.D. (2006). *A Practical Guide to Lightcurve Photometry and Analysis*. Springer, New York, NY.
- Warner, B.D. (2007a). MPO Software, Canopus version 9.3.1.0, Bdw Publishing, <http://www.minorplanetobserver.com/>
- Warner, B.D. (2007b). "Initial Results of a Dedicated H-G Project." *Minor Planet Bulletin* **34**, 113-119.