ROTATION PERIOD DETERMINATIONS FOR 80 SAPPHO, 145 ADEONA, 217 EUDORA, 274 PHILAGORIA, 567 ELEUTHERIA, AND 826 HENRIKA

Frederick Pilcher
4438 Organ Mesa Loop
Las Cruces, NM 88011-8403 USA

(Received: 12 June)

Synodic rotation periods and amplitudes have been found for: 80 Sappho 14.025 ± 0.001 h, 0.14 ± 0.02 mag; 145 Adeona 15.071 ± 0.001 h, 0.15 ± 0.02 mag; 217 Eudora 25.470 ± 0.05 h, 0.08 ± 0.02 mag; 274 Philagoria 17.938 ± 0.001 h, 0.44 ± 0.03 mag; 567 Eleutheria 7.718 ± 0.001 h, 0.34 ± 0.02 mag; 826 Henrika 5.9846 ± 0.0001 h, 0.25 ± 0.02 mag.

All of these observations have been made at the Organ Mesa Observatory. Equipment consists of a 35 cm Meade LS200 GPS S-C, SBIG STL-1001E CCD, unguided, R filter for 80 Sappho and clear filter for all other targets, 60 s exposures, differential photometry only. Image measurement and data analysis are with *MPO Canopus*. In the lightcurves the large number of data points acquired for each target have been binned into sets of three with a maximum time difference of 5 minutes between plotted points.

80 Sappho. Harris et al. (2009) list a period 14.030 hours, reliability 3, based on several investigations. New lightcurves were obtained to contribute to spin/shape modeling. Observations on 4 nights 2010 Apr. 26 – May 9 show a period 14.025 ± 0.001 hours, amplitude 0.14 ± 0.02 magnitudes.

145 Adeona. The small amplitude and irregular shape of the lightcurve has caused three previous studies to obtain three different periods: Debehogne et al. (1982), 20.6 hours; and Burchi et al. (1985), 8.1 hours, both from very sparse data sets. Stephens (2009), from a much denser data set, finds 15.086 hours. New observations on 10 nights 2010 Apr. 5 – June 1 show a period 15.071 ± 0.001 hours, amplitude 0.15 ± 0.02 magnitudes with a lightcurve having 4 very unequal minima in each rotational cycle. The period is in good agreement with Stephens (2009). His lightcurve had amplitude 0.05 magnitudes near longitude 70 degrees which is evidently much closer to rotational pole than 220 degrees near which the new observations were made. A careful inspection of the data of Debehogne et al. (1982) and Burchi et al. (1985) shows that they are compatible with a period near 15.07 hours. Hence a period near 15.07 hours can now be considered well established.

217 Eudora. Lagerkvist et al. (1998) on the basis of a very fragmentary lightcurve containing a minimum but no maximum reported a possible period of 12.54 hours, amplitude >= 0.16 magnitudes. Buchheim et al. (2007) obtained a period of 25.253 hours, amplitude 0.24 magnitudes with 75% phase coverage on their published lightcurve. A new investigation on 8 nights 2010 Feb. 24-Apr. 14 did not achieve secure reliability because of a combination of faint magnitude around 15, low amplitude 0.08 ± 0.02 magnitudes, and near commensurability with Earth rotation period. All local minima on the period spectrum between 10 and 70 hours were investigated. The best visual fit, and one with lowest residual, is for 25.470 hours, but others may not be completely ruled out. The actual error is likely to be closer to 0.05 hours, or even larger, than to the formal error of 0.005 hours. The data of Lagerkvist et al. (1998) are also compatible with twice his period. A period slightly greater than 25 hours with pole much closer to longitude 170 degrees near which the new observations were made than to 240 degrees of the Buchheim et al. (2007) observations supports moderately well all currently available data.

274 Philagoria. Behrend (2010) lists a period of 17.96 hours. New observations on 6 nights 2010 Feb. 26 – Apr. 10 confirm this value by showing a period 17.938 ± 0.001 hours, amplitude 0.44 ± 0.03 magnitudes.

567 Eleutheria. Gil-Hutton and Canada (2003) list a period of 12.673 hours. New observations on 5 nights 2010 Apr. 9 – May 5 show a period 7.718 ± 0.001 hours, amplitude 0.34 ± 0.02 magnitudes.

826 Henrika. Harris et al. (2009) list no previous observations. New observations on 6 nights 2010 Mar. 26 – May 4 show a period 5.9846 ± 0.0001 hours, amplitude 0.25 ± 0.02 magnitudes.

References

Behrend, R., Observatoire de Geneve web site: (2010). http://obswww.unige.ch/~behrend/page_cou.html.

Burchi, R., D'Ambrosio, V., Tempersi, P., and Lanciano, N. (1985). "Rotational properties of asteroids 2, 12, 80, 145 and 354" *Astron. Astrophys. Suppl Ser.* **60**, 9-15.

Buchheim, R. K., Roy, R., and Behrend, R. (2007). "Lightcurves for 122 Gerda, 217 Eudora, 631 Philippina, 670 Ottegebe, and 972 Cohnia," *Minor Planet Bull.* **34**, 13-14.

Debehogne, H., Lagerkvist, C.-I., and Zappala, V. (1982). "Physical Studies of asteroids VIII. Photoelectric photometry of the asteroids 42, 48, 93, 105, 145, and 245." *Astron. Astrophys. Suppl. Ser.* **50**, 277-281.

Gil-Hutton, R. and Canada, M. (2003). "Photometry of Fourteen Main Belt Asteroids," *Revista Mexica de Astronomica y Astrofisica* **39**, 69-76.

Harris, A. W., Pravec, P., and Warner, B. D. (2009). "Asteroid Lightcurve Data File: Apr. 8, 2009," http://www.MinorPlanetObserver.com/astlc/default.htm.

Lagerkvist, C.-I., Bel'skaya, I., Erikson, A., Shevchenko, V., Mottola, S., Chiorny, V., Magnusson, P., Nathues, A., and Piironen, J., (1998). "Physical Studies of Asteroids XXXIII. The Spin-rate of M-type Asteroids," *Astron. Astrophys. Suppl. Ser.* **131**, 55-62.

Stephens, R. D. (2009). "Asteroids Observed from GMARS and Santana Observatories," *Minor Planet Bull.* **36**, 59-62.