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CCD LIGHTCURVES FOR MAIN-BELT ASTEROIDS 423 DIOTIMA AND 925 ALPHONSINA

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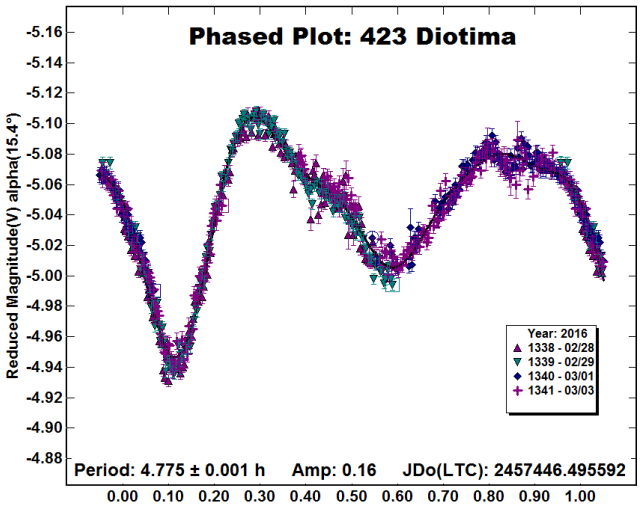
Fourier analysis of a new CCD-derived lightcurves found synodic periods for 423 Diotima (4.775 ±0.001 h) and 925 Alphonsina (7.879 ± 0.001 h).

The instrument used at UnderOak Observatory (UO) for this investigation was a 0.28-m SCT equipped with an SBIG ST-8XME thermoelectrically-cooled CCD camera. Image calibration/registration procedures employed at UO have been published elsewhere (Alton, 2013). Data reduction with *MPO Canopus* (Warner, 2015) used at least four non-varying comparison stars in the same FOV to generate lightcurves by differential aperture photometry. Data were light-time corrected but not reduced to standard magnitudes. Fourier analysis (Harris et al., 1989) yielded a period solution from the folded datasets and then independently verified with *Peranso* (Vannmunster 2006) using ANOVA (Schwarzenberg-Czerny, 1996). Phased lightcurve data are available upon request (*mail@underoakobservatory.com*).

423 Diotima. This is a relatively large (D = 209 ± 5 km) but somewhat dark (p_V = 0.0515) taxonomic type C main-belt asteroid that was discovered in 1896 by A. Charlois. Schober (1983) first proposed a synodic period of 8 ± 0.33 h and the possible existence of a satellite. Both of these eventually proved to be inaccurate.

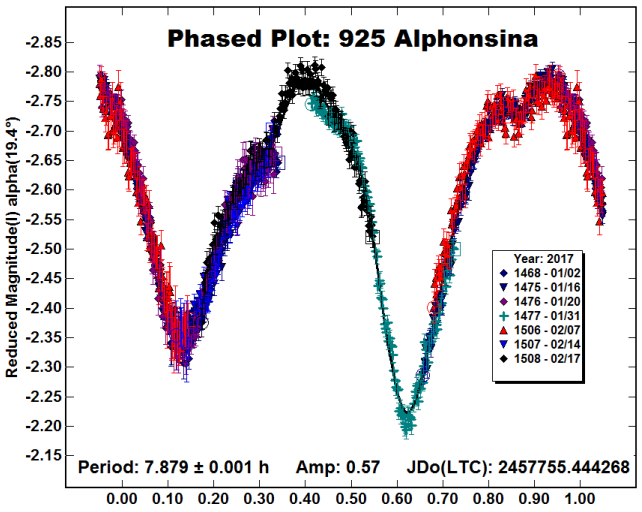


Further refinements to the now accepted synodic period (4.775 h) were reported by Zappala et al. (1985), Dotto et al. (1995), Dymock (2005), Fauerbach and Bennett (2005), and Chiorny et al. (2007). A shape model for 423 Diotima was published by Ďurech et al (2007). At UO, images (clear filter; 60 s) were taken over four nights from 2016 Feb 28 thru Mar 3.

Fourier analysis of the 619 lightcurve data points produced a best fit at 4.775 ± 0.001 h. The maximum peak-to-peak amplitude of 0.16 mag observed during the 2016 apparition was consistent with those reported in the Asteroid Lightcurve Database (LCDB; Warner et al., 2009).

925 Alphonsina was discovered in 1920 by J. Solà. It is a moderately sized (57.5 ± 0.4 km) type S asteroid with a somewhat inclined orbit (i = 21.1°). Harris and Young (1989) published the first lightcurve with a period solution of 7.880 ± 0.001 h. Additional studies by Hanuš and Ďurech (2010) and Hanuš et al (2011) established a *sidereal* period of 7.87754 ± 0.00005 h. This

asteroid has also been shape modeled using a combination of lightcurve inversion and occultation silhouettes (Durech et al, 2011). At UO, images (I_c filter; 60 s) were taken over seven nights from 2017 Jan 2 thru Feb 17.



Fourier analysis of the 1139 lightcurve data points produced a best fit at 7.879 ± 0.001 h. The maximum peak-to-peak amplitude of 0.57 mag observed during this most recent apparition was significantly higher than those of 0.11-0.31 mag reported in the Asteroid Lightcurve Database (Warner et al., 2009).

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