Photometric Analysis of Shape-Model Generated Lightcurves of Selected Main Belt Asteroids

Myra Stone

The rotational properties of asteroids can be determined via light curve analysis, however, it is first necessary to know asteroid parameters such as the rotation axis position and the shape model. The *lightcurve inversion* method as outlined in Kaasalainen et al. (2001), provides a mechanism in which the observed light variations of an asteroid can provide a unique model of the convex shape representation, sidereal period spin parameters, and rotation axis position. Marciniak et al. (2012) take advantage of this *lightcurve inversion* method, apply it to new photometry of eight main belt asteroids (76 Freia, 127 Johanna, 355 Gabriella, 386 Siegena, 417 Suevia, 435 Ella, 505 Cava, and 699 Hela), and increase the sample of available asteroid spin and shape models.

Only 250 asteroids have known parameters mentioned above, and of those, only 170 have reliable determinations (Kryszczyńska 2013). Therefore, with the motivation to increase the number of asteroids with known spin states and shape parameters, Marciniak et al. (2012) present an interactive service for asteroid models (ISAM) which can be used for the direct comparison of photometric asteroid models to those obtained with different techniques. ISAM provides model plane-of-sky orientation displays of asteroids for different epochs and provides a tool which can track how complex lightcurves are produced by various asteroid shapes and orientations.

I intend to reconstruct photometric lightcurves over a range of epochs of select main belt asteroids with data obtained from the *Asteroid Photometric Catalogue* (APC). I also intend to obtain new photometric data with the use of UMD's observational facilities and construct new lightcurves. Taking advantage of ISAM, I will be able to analyze shape-model generated lightcurves and determine which model orientation can best reproduce the observed lightcurves.

REFERENCES

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