

Photometry and model of a Very Small NEA 2015 AZ43

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1. Introduction

Very Small Asteroids (VSAs) are objects with diameters $D < 150$ m. They often rotate with periods shorter than 2 h enabling us to study their internal structure by comparing the centrifugal force with the material forces holding them together. VSAs are sensitive to the YORP effect, which can change their spins and spin axes. For such reasons it is important to determine their shapes and spin axes. 2015 AZ43 is a Apollo asteroid with an effective diameter of about 60 m. From 6 to 23 Feb 2015 it swept a 120° long arc in the sky maintaining a decent brightness $V < 20$ mag, spanning solar phase angles from 48 to 90, and staying away from the Milky Way. This prompted us to get its lightcurves at different geometries to use them for spin and shape modelling.

2. Observations

We observed 2015 AZ43 with 7 telescopes (2.5-m NOT at La Palma, 1.0-m and 2.0-m LCOGT, 4.0-m Mayall at Kitt Peak, 0.7-m RBT at Winer Obs. AZ, 2.4-m at MRO, and 1.5-m Danish Telescope at La Silla) during 13 nights obtaining 26 lightcurves. We also added a lightcurve observed independently by Brian Warner [1]. A rotation period from the Mayall lightcurve was also reported in [2]. An example lightcurve is presented in Fig. 1.

3. Model

Relatively high phase angles allowed us to use the SAGE algorithm [3] to derive a family of non-convex shapes of 2015 AZ43. We are currently analysing them to see if a unique solution can be derived. At this moment, for the purpose of illustration, we present

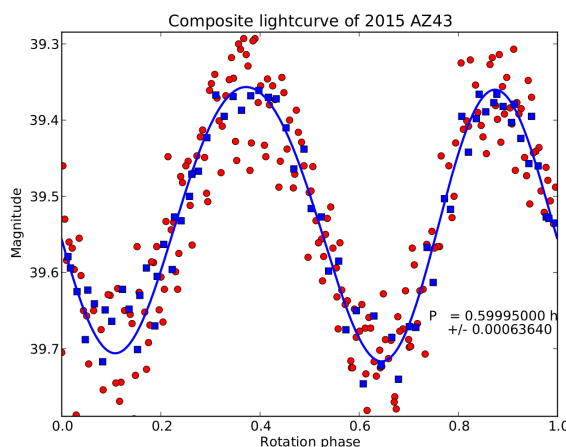


Figure 1: Example lightcurve obtained on Feb 11 simultaneously with the 0.7-m R. Baranowski Telescope in Arizona (red circles) and 1.0 LCOGT in Texas (blue squares). Zero phase JD=2457063.6246296.

a solution obtained with the sidereal period $P = 0.599868$ h and the spin axis $\lambda = 281^\circ$, $\beta = -35^\circ$ (Fig. 2).

Acknowledgments

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References

- [1] Warner, B (2015) MPB 42, 172

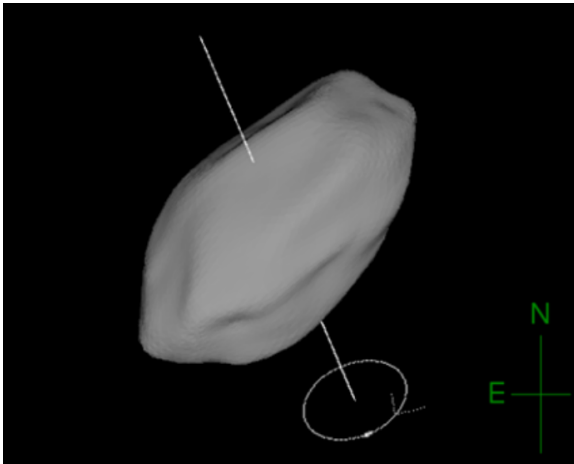


Figure 2: One of the solutions for a non-convex shape of 2015 AZ43. The model is viewed from an aspect angle of 132° .

[2] Thirouin, A et al. (2016) AJ 152, 163;

[3] [3] Bartczak et al. (2014) MNRAS 443, 1802;