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Size and Shape of *Lucy* target: (11351) Leucus

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Abstract

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1. Introduction

The *Lucy* Discovery Mission will be the first mission to explore the Jupiter Trojan asteroids[2]. Launch is planned for October 2021 and then it's on to four targets in the L_4 cloud and one in L_5. Part of the mission goals include a direct mass determination from the flyby with the ultimate desire to get a bulk density. Imaging from *Lucy* will, in some cases, miss significant portions of the body due to a combination of flyby speed and the rotation period of the object.

The subject of this presentation is (11351) Leucus, one of the targets in L_4. Relatively little is known about Leucus so far but photometric observations have revealed an unusually long rotation period (446 hours) combined with a large (0.6 mag) lightcurve amplitude[1]. This work combines new stellar occultation data with old and new lightcurve photometry to determine the size, three-dimensional shape, and the rotation pole.

2. Occultations

The first successful occultation observation was made by M. J. Person and A. M. Olsen in 2017 (publication in process). They obtained two chords and initial information on size. The Olsen chord was quite long and by itself served to provide improve the predictions for three occultations in 2018. Two events in November 2018 were attempted by a large team of mobile observers using 40-cm telescope. The first event was visible from the Tucson/Phoenix, AZ region with a faint star (G=16). Though plagued by a faint star and high winds, several chords were collected in the predicted location. The second event was just 4 days later in the south Texas area. This star was considerably brighter and resulted in nine evenly-spaced high-SNR chords. These chords clearly show a non-elliptical profile indicating that Leucus is no simple tri-axial ellipsoid. Also evident is that the body does not have any sizeable companions. The lightcurve must essentially all come from a single body. A third event was observed from western Europe but due to poor weather conditions only a couple of chords where collected.

The timing of the occultations is such that the 2017 and second 2018 events were at minimum light while the first 2018 event was at maximum light. We will show the occultation results and the resulting shape and pole solutions derived from the new data.

Acknowledgements

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References

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