

**Analysis from Stellar Occultation and Lightcurve Observation of 582 Olympia**

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**Introduction:**

Our aim is to estimate the three-dimensional shape of an asteroid. Since only a limited number of asteroids can be observed by spacecraft, we tried to find the shape of an asteroid which are millions of kilometers away from Earth. We conducted two observations: stellar occultation and lightcurve of an asteroid. Our group has observed lightcurves and occultations of several asteroid. Among them, as for 582 Olympia, we obtained both occultation and lightcurve data.

**Observation 1: Stellar Occultation**

Occultation is a phenomena when the light from TYC5743003321 is blocked by an intervening body from the observer. By observing this at multiple ground-points, we can estimate the cross-section of the asteroid. But there is a problem with this way of observing; the fewer the observation points, the lower the accuracy. We observed on October 15<sup>th</sup> at *Heartpia Anpachi* in Gifu Prefecture. Cross-section is used when guessing the shape.

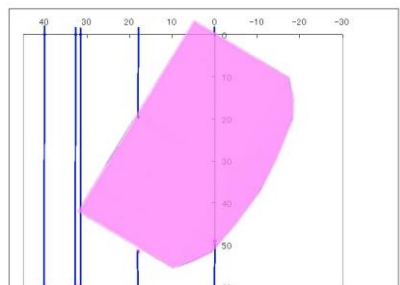


Fig.1 Shape of the cross section

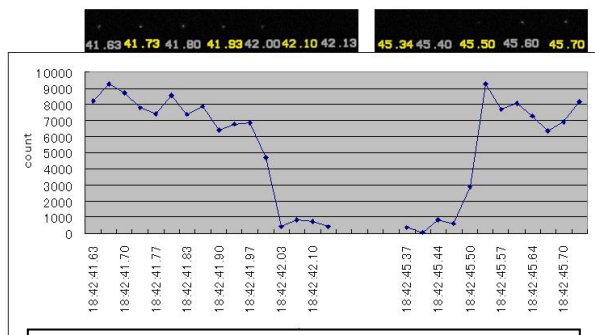


Fig.2 Raw data of occultation of TYC5743003321 by Olympia on Oct.15

**Observation 2: Lightcurve**

The second experiment is to detect the light-curve through photometric observation. From lightcurve observation, we can estimate the rotation rate as well as the shape(especially elongation) of an asteroid. We observed on November 6<sup>th</sup> · December 8<sup>th</sup> at *Heartpia Anpachi*.

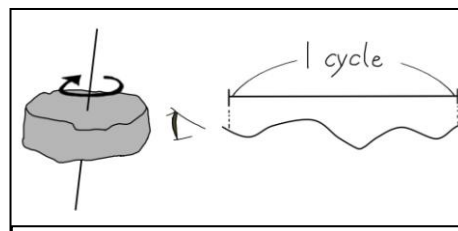


Fig.3 How to detect light-curves

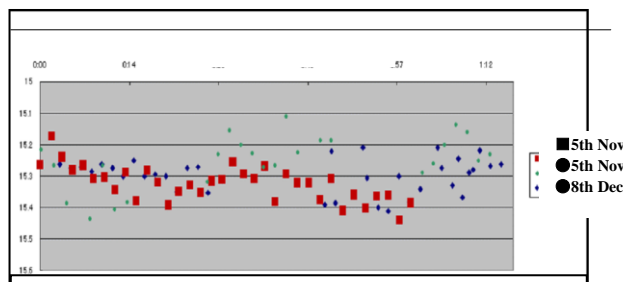


Fig.4 Result from the photometric observation

**Conclusion:**

The data shown here were taken in 2009. We are now planning next series of observation. Also we will make a more accurate 3D model of the target asteroid. By doing the photometric observation of the laboratory model of the asteroid, we can see if our estimates are correct. Since the accuracy of calculating the cross-section depends on the amount of observation points, we will cooperate with other observers, especially with highschool students all over Japan to increase the amount of observation points.

**References:**

- Mailing list “JOIN(Japan Occultation Information Network)”
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 Forecasts for the occultation-Minor Planets  
<http://www.toybox.gr.jp/mp366/>
- Mr. Preston-  
 Forecasts for the occultation phenomena  
<http://sendaiuchukan.jp/>