

EXPERIENCE OF CCD-OBSERVATIONS OF ASTEROIDAL OCCULTATIONS WITH THE HELP OF METHOD OF TEMPORAL UNSQUEEZING THEIR IMAGES. F. I. Kravtsov and I. V. Lukyanyk, Astronomical Observatory of Kyiv Shevchenko National University, Observatorna str., 3, Kyiv, 04053, UKRAINE, iluk@observ.univ.kiev.ua

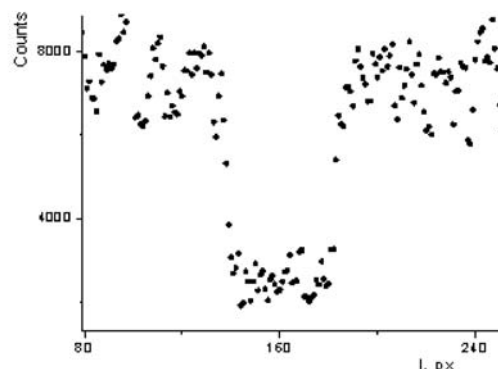
The asteroid occultations are rare and valuable astronomical phenomenon. Successful observations of such phenomenon allowed to define the sizes of asteroids and, hence, albedo their surfaces. About 400 similar events has registered by present time. Certainly, the sizes of asteroids are considered as main "product" of asteroid occultations. Of course it is better to use CCD which work in a television mode for this purpose. But observations of weak stars are inaccessible to registration in such mode. Using accumulation of a signal needs to register weak objects. However low time resolution excludes registration of the phenomena in this case.

The observations of the asteroid occultations were made in primary focus ($D=70\text{cm}$, $F=280\text{ cm}$) telescope AZT-8 which is located at observational station of Astronomical Observatory of the Kyiv Shevchenko National University in village Lisnyky ($30^{\circ}.5247\text{E}$ $50^{\circ}.2979\text{N}$). The images of objects were registered by CCD ST-8 XME. The CCD has been transferred UNESCO in 2005. The working field (chip) of the CCD $1600 \times 1200\text{ px}$, the linear sizes - $18 \times 13\text{ mm}$ (in primary focus the angular sizes $16' \times 12'$). GPS is used for time registration.

As a technique of the asteroid occultations observations the method of temporal unsqueezing their images was used. The essence of this method consists in the following. During observations the telescopetube is moved with constant angular speed concerning stars. Thus all objects in field of view will be stretched (displayed in the form of track (traces)). The length of trace is defined by speed of moving of object on CCD-chip and exposition time. The width of each trace is defined by magnitude of object and angular speed of moving of the telescopetube. Star and asteroid will be displayed as one track (width is defined by their total brightness) directly before of asteroid occultation. If the asteroid occultation takes place, the width of such trace will decrease to the size caused by brightness of asteroid. The length of break is defined by duration of asteroid occultation. Making incision along a trace (Fig.1), it is possible to define length of a chord of an asteroid along a line of occultation. Thus linear incision along a trace is simultaneously time resolution of the phenomenon.

Moving of a telescopetube concerning stars can be carried out in two ways: to switch off a clockwork of a telescope or to make use of correction movement of a telescope. Each of these ways has the advantages and disadvantages. We used both of methods for observing of the asteroid occultations during 2005 - 2008. In addition the observations of a field of stars with an asteroid before and after asteroid occultation used to define

the exact moment of the middle of asteroid occultation and distances between centers of star



and asteroid.

Fig. 1 - Photometrical incision along a trace for asteroid occultation November 4, 2006 (star - TYC 0587-00209-1U, asteroid - 76 Freia)

Images of a field of stars with an asteroid was done with short expositions in a mode of accumulation. Depending on brightness of an asteroid and a star, duration of an exposition got out within the limits from 0.1 sec to 20 sec. Before moment of start of asteroid occultation observations were spent so that CCD registered picture of temporal unsqueeze of the asteroid occultation.

Initial reductions were done with help of package ESO MIDAS. In the further processing own program complex was used. Measurement of a difference of coordinates Δx and Δy an asteroid concerning a star (between the average centers of images) were done in pixels. Accuracy (depend on quality of the image) changed within the limits of from 0.02 up to 0.3 px.

The moments and other parameters of asteroid occultations were calculated by D.Garalda's OCCULT Asteroidal Occultations program v.3.6.0.

In our reports we present practical experience of CCD-observations of asteroidal occultations with the help of method of temporal unsqueezing their images.