

**PHOTOELECTRIC MEASUREMENTS OF THE BRIGHTNESS OF 52 EUROPA.** F. A. Tupieva. Institute of Astrophysics, Tajik Academy of Sciences, Bukhoro Str. 22, Dushanbe, 734042, Tajikistan, fanisa.tupieva@gmail.com

In July-September 1980 the photoelectric measurements of the brightness of 52 Europa were carried out with the 70-cm reflector of the Gissar Observatory of Tajikistan at *UBV* standard spectral bands. The observations were made during 24 nights at the interval of the phase angle from  $0^\circ.2$  to  $16^\circ$ .

Lightcurve was composed with rotation period  $5^h.631$  ([1]). The obtained composite lightcurve has the amplitude 0.15 mag., levels of minimum are equal, levels of maximum differ by 0.05 mag. The phase functions of brightness and color indices  $U - B$  and  $B - V$  were determined. The average colors  $B - V = 0.696 \pm 0.004$  mag.,  $U - B = 0.398 \pm 0.010$  mag. The changes of  $B - V$ ,  $U - B$  with phase angle did not reveal.

52 Europa has the linear phase function of brightness with phase coefficient  $\beta = 0.043 \pm 0.003$  mag./deg. for angles  $\alpha > 7^\circ.5$  and  $\beta = 0.058 \pm 0.002$  mag./deg. for angles  $\alpha < 7^\circ.5$ . Brightness of asteroid at  $\alpha = 0^\circ$  is equal to  $6.32 \pm 0.03$  mag.

$H, G$  – approximation of the observed data gives  $H = 6.23 \pm 0.02$  mag.,  $G = 0.16 \pm 0.03$ . This approximation badly corresponds to data.

On the phase curve of Europa the increase of brightness by 0.10 mag. for  $V$  band and 0.15 mag. for  $U$  band was obtained at the phase angle  $8^\circ.7$ . The same effect was observed for Saturn's rings at the phase angle  $4^\circ$  ([2]) and also for the asteroid 19 Fortuna in the region of phase angles  $6-8^\circ$  ([3]). It may be explained by rainbow effect, i.e. scattering of light by large spherical particles ([2]).

The corrected brightness of asteroid,  $V(I, \alpha)$  and linear functions (touch-straight for  $\alpha < 7^\circ$ , continuous-straight for  $\alpha > 7^\circ$ ) and  $H, G$  – function (curve) are given in Fig.

**References:** [1] Michalowski T. et al. (2004) *A&A*, 416, 353-372 [2] Gretski A. (1976) *Vestnik Kharkov. University*, 137, 21-31 [3] Lupishko D. et al. (1981) *Astron. Vestnik* 15, 25-31.

