KHARKIV ASTEROID MAGNITUDE-PHASE RELATION DATABASE. V. G. Shevchenko[1,2], I. N. Belskaya[1,2], D. F. Lupishko[1], Yu. N. Krugly[1], I. G. Slyusarev[1,2], V. G. Chiorny[1], O. I. Mikhalchenko[1,2], A. N. Dovgopol[1,2], I. A. Tereschenko[1], F. P. Velichko[1], [1]Astronomical Institute of V. N. Karazin Kharkiv National University, Sumska Str. 35, Kharkiv 61058, Ukraine, [2]Department of Astronomy and Space Informatics of V. N. Karazin Kharkiv National University, Svobody sq. 4, Kharkiv 61022, Ukraine shevchenko@astron.kharkov.ua

Introduction: One of the main characteristics of an asteroid, obtained from observations, is its magnitude-phase dependence. The magnitude-phase dependence allows one to determine the absolute magnitude of the asteroid and the value of the phase integral. It also contains information about the surface structure, the size and the refractive index of particles and the mechanisms of light scattering in the regolith layer. The long-term program aimed at observing the magnitude-phase dependences is performed at the Institute of Astronomy of V. N. Karazin Kharkiv National University. The main our goal is to obtain high quality data both in the linear part and in the region of the opposition effect (OE) down to extremely small phase angles of less than one degree in order to investigate the differences in the phase effects of brightness for asteroids of different taxonomic types.

Results of observations: The observations of magnitude-phase dependence of asteroid 17 Thetis performed in 1977 jointly with Astrophysical Institute (Tajikistan) can be considered as the beginning of this program [1]. By that time, Scaltriti & Zappala [2] had analyzed the opposition effect for only 26 asteroids of different compositional types and had concluded that the amplitude of the OE was practically the same for all asteroid types and equals 0.3 mag. It should be noted that most of these asteroids belonged to moderate-albedo objects (there were only three asteroids with low albedo and one asteroid with high albedo), and only for five asteroids the brightness was measured at extremely small phase angles <1º.

Further observations over forty years at our Institute have made it possible to significantly increase the amount of high quality data on the magnitude-phase dependences of asteroids of various compositional types (see, for example, [3-13]). In total, the magnitude-phase relations were obtained for about 85 asteroids and for 20 asteroids the data were obtained in *BVR* spectral bands, for about 60 asteroids the magnitude-phase relations were measured down to extremely small phase angles <1º. It was found that the low albedo asteroids of P and D types do not show opposition brightening and have linear magnitude-phase dependence down to subdegree phase angles [11, 12]. At present, the magnitude-phase dependences for all main asteroid compositional types have been obtained. As the result of the realization of our program, the Database «Kharkiv Asteroid Magnitude-Phase Relations» was created. The first release of this database was placed in NASA Planetary Data System and available at *http://sbn.psi.edu/pds/resource/magphase.html* [14].

The analysis of our data on magnitude-phase relations and other data (see, for example, [15, 16]) has shown that the amplitude of the OE is different for high, moderate and low albedo asteroids and the linear coefficient highly correlates with the albedo [17-20]. Maximal amplitude of the OE occurs for moderate albedo asteroids. The low albedo asteroids display the smallest amplitudes of OE. In addition, the correlation of the OE amplitude of low albedo asteroids with their color index U-B was found. The OE amplitude tends to increase with the increasing of the spectral slope in the UV part of spectrum.

Conclusion: During realization of the long-term program performed at the Institute of Astronomy of V. N. Karazin Kharkiv National University, the high quality magnitude-phase dependences have been obtained for about 85 asteroids of different taxonomic types and the significant differences in the behavior of the opposition effect of asteroids were detected. Main data set has been included in the Database «Kharkiv Asteroid Magnitude-Phase Relations» available at NASA Planetary Data System. These high quality magnitude-phase dependences have successfully been used also for testing the different theoretical phase functions [21, 22].

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