

Problems of determination of asteroid absolute magnitudes

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An absolute magnitude is one of the main characteristics of asteroids obtained from photometrical observations, which allows estimating asteroid size. Since observations of asteroids are carried out at phase angles that are different from zero, we need correctly to take into account the phase angle effects in asteroid brightness. Up to now the HG-function (Bowell et al., 1989, Asteroids II) is used for the extrapolation of asteroid brightness to zero phase angle, but it fits badly for high albedo and low albedo asteroids, especially the darkest ones. New HG₁G₂-function (Muinonen et al., 2010, Icarus 209, 542) has no these problems and can be used for these aims. The accuracy of the absolute magnitude determination using the HG₁G₂-function is checked for the case when asteroid magnitudes were measured only at the large phase angles. The on-line program (<https://wiki.helsinki.fi/display/PSR/HG1G2+tools>; Penttilä et al., 2016, PSS 123, 117) was used for determination of the absolute magnitudes. This problem is very important for newly discovered near-Earth asteroids. For the purpose, we used the available space mission data (NEAR, Rosetta, Dawn).

One more problem is related to the differences in values of asteroid absolute magnitudes obtained from different large survey projects (PAN-STARRS, Veres et al. 2015, Icarus 261, 34; PTF, Waszczak et al., 2015, AJ 155, 75; REx-program, Macau, China; etc.) and the MPC data. It can be connected with differences of photometrical systems. Comparison of the high quality magnitude-phase relations and data from these surveys for selected asteroids lets us to estimate and to take into account such photometrical differences.

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