Photometry of small main-belt asteroids in 2010-2013: Search for possible binary candidates

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This work presents the results of CCD photometry of six small main-belt asteroids — (7089) 1992 FX_1, (7355) Bottke, (9425) Marconcini, (10188) Yasuoyoneda, (17170) Vsevustinov, and (29168) 1990 KJ — obtained during 25 nights in 2010–2013. The objects were selected in the frame of the BinAstPhotSurvey project [1,2] based of the following criteria: rotation period unknown, semimajor axis $a < 2.5$ au, absolute magnitude $H > 12$ mag and expected errors of photometric measurement < 0.03 mag.

CCD photometry was made at the 0.7-m telescope of the Institute of Astronomy, Kharkiv National University, using a CCD camera IMG 47-10. The method of CCD observations and data reduction was described in [3,4]. The observations were obtained in the R and V bands of the standard Johnson-Cousins photometric system. The accuracy of the measurement of the color indices V-R and the estimates of the absolute magnitudes is not worse than 0.02–0.03 mag.

Our observations are presented as composite lightcurves. As a result, rotation periods of asteroids (7089) 1992 FX_1, (7355) Bottke, (9425) Marconcini, (10188) Yasuoyoneda, (17170) Vsevustinov and (29168) 1990 KJ were found for the first time. All these asteroids are fast-rotating objects with the rotation periods in the range from 2.583 to 3.375 hours. Their lightcurve amplitudes are in the range of 0.08–0.21 mag.

Thus, all of the observed asteroids may be binary candidates since their rotation properties are found to be close to the average characteristics in the near-Earth-asteroid binary population [1,5]. Further observations are needed to check whether they are really binary objects. The remaining cases will be regarded as single asteroids.

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