Procedures, challenges, and expectations of the astrometry of asteroids with Gaia

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Observation of asteroids by Gaia is an important opportunity to get a large amount of homogeneous physical data about those bodies. Gaia has been designed as an astrometric space mission mainly for the investigation of the structure of the Milky Way. The data reduction of asteroid detections cannot be based on the same concepts implemented for fixed stars but it requires an ad-hoc approach. Each Main Belt asteroid will be observed by Gaia on average about 70 times during its nominal operation lifetime, but each time in a completely different position on the sky, unlike fixed stars. Their motion and angular extension, for asteroids larger than 30 km, introduce some peculiarities in the signals of asteroids that need not be taken into account for stars. Here we describe the kind of signals provided by Gaia for asteroids and the details of the procedure of their analysis. Related problems and expected accuracy in centroiding and magnitude determination are discussed.