

Gaia: performances and expected results for solar system dynamics

P. Tanga (1), A. Cellino (2), F. Mignard (1)

(1) Departement Cassiopée, Observatoire de la Côte d'Azur, France (tanga@obs-nice.fr), (2) INAF/Osservatorio Astronomico di Torino, Italy (cellino@to.astro.it)

The Gaia mission will produce a huge amount of extremely accurate astrometric and photometric measurements of all kinds of celestial objects, including also a very large sample of Solar System objects. For this reason, the expected performances of Gaia instruments when observing extended and moving objects need a careful assessment. In particular, a deep refinement of our understanding of the collisional evolution and the internal properties of minor bodies is expected to be produced by Gaia. Simulations indicate that it will be possible to determine the masses of a good sample of asteroids, to constrain post-newtonian relativity parameters and, probably, to measure non-gravitational effects such as the Yarkovsky force. A ~ 2 orders of magnitude improvement over orbital elements for minor bodies can also be predicted. The full exploitation of the photometric and astrometric accuracy of Gaia observations of solar system objects requires the development of procedures specifically aimed at extracting from the data the whole body of physical information achievable, including masses, sizes, shapes, spin properties, presence of satellites. Such procedures are currently being developed and tested.