Exploration of Near-Earth Asteroids (4)
Exploration of Near-Earth Asteroids (1) (1)

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THE ESA HERA MISSION : PLANETARY DEFENSE AND FIRST RENDEZVOUS WITH A BINARY ASTEROID

Abstract

The Hera mission has been approved for development and launch in the new ESA Space Safety Programme by the ESA Council at Ministerial Level, Space19+, in November 2019. Hera will contribute to the first deflection test of an asteroid, in the framework of the international NASA- and ESA supported Asteroid Impact and Deflection Assessment (AIDA) collaboration. The main purpose of AIDA is to support international collaboration in planetary defense activities and to support the demonstration and validation of the technology needed to deflect a hazardous asteroid by means of a kinetic impactor, to improve our understanding of the impact process and the momentum transfer to the target asteroid. The AIDA collaboration will use data obtained by the NASA Double Asteroid Redirection Test (DART) mission, which will impact the secondary of the binary asteroid Didymos and observe the change in its spin period around the primary from ground-based observatories, and by the ESA Hera mission, which will fully characterize the target asteroid (including for the first time, its internal structure), image the crater made by DART and determine the momentum transfer efficiency determination. Hera will provide unique information on many current issues in asteroid science. From small asteroid internal and surface structures, through rubble-pile evolution, impact cratering physics, to the long-term effects of space weathering in the inner Solar System, Hera will have a major impact on many fields. Additionally, those studies using Hera data will in turn affect our understanding of the asteroid population as a whole. The scientific legacy of the Hera mission will extend far beyond the core aims of planetary defense.