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Science with the Asteroid Impact Mission

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The Asteroid Impact Mission (AIM) will monitor the binary asteroid Didymos before, during, and after the impact of the projectile sent by the Double Asteroid Redirection Test (DART)spacecraft. The primary goal of the mission is to demonstrate asteroid deflection with a kinetic impactor. However, important asteroid science will be achieved as a secondary objective.

AIM is the first space mission to study a binary asteroid. There are several hypotheses about how binaries form, and the comparison of the global properties (density, and surface amd interior structure) may allow to distinguish between those scenarios. For example, if the binary was formed by rotational fission of the primary, an oblate shape of the primary and a low density and tensile strength of the secondary are expected. Furthermore, observation of the DART impact will provide unique data on the reaction to small asteroids, with significant implications on the collisional evolution of the solar system and planetary rings. Landing of MASCOT-2 on the secondary will provide information about the physical surface properties of a very small asteroid, providing additional information about the evolution of those objects.

We will present an overview of the scientific studies foreseen with the AIM payload and their implications on the physics of small bodies in the solar system.