

Nano-probe concept design for CAST's small-body exploration mission

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Abstract

The mission concept for small-body exploration proposed by China Academy of Space Technology (CAST) will realize multi-objective on the NEA sample collection and MBC investigation, returning one NEA in approximately 3 years, followed by a detailed investigation of MBC in the next 7 years. Though the main probe will be equipped with multiple scientific payloads for remote sensing, in-situ characterization and sample return, still Nano-probes are needed to get accurate gravity field and internal structure characterization for NEA target and long-term in-situ research for MBC target. In this presentation, CAST's small-body mission concept is briefly introduced, and what is missing is discussed if only the main-probe is served for the NEA and MBC target surgery. After that, one Nano-orbiter is proposed for the near-earth asteroid target and one Nano-lander is proposed for the main-belt comet target, the scientific goals of which are complementary to that of the instruments on the main-probe. The scientific objectives and possible payloads for the Nano-probes are given and the top requirements for Nano-probes are summarized in the end.