

Application of Radar Sounders to the Exploration of Small Bodies

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Recent radar sounding results from MARSIS has demonstrated the ability of radar sounders to reveal the hidden subsurface of planets. We believe the same techniques can be applied to image the interior of comets and some of the asteroids. We present a set of recent results from radar sounding of Phobos and explore ideas to use the radar sounding techniques to the investigation of small bodies. We will present the benefits and technical challenges of implementing a Radio Reflection Tomography (RRT) mission. The rationale for imaging the interiors of these bodies includes both scientific and practical arguments. The small bodies in our Solar System are of scientific interest because of the information they convey regarding the early conditions and processes which led to the solar system and planets. The interior structures provides information related to the manner in which these objects were built and evolved and to the conditions in the early solar system. Practical arguments for exploring the interiors of asteroids and comets are related to the potential for mining these bodies and for impact risk mitigation. Knowledge of the interior structure is required to determine the best strategies to use for impact risk mitigation.

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