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Thermophysical Characterisation of Space Mission Target Asteroids: Itokawa, utetia, Steins

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We present thermophysical studies of 25143 Itokawa, the target of the Hayabusa sample return mission, and of 21 Lutetia and 2867 Steins, the Rosetta encounter asteroids. The investigations are based on thermal observations together with shape models from lightcurve inversion methods (e.g.,Kaasalainen shape models). The thermophysical model by Lagerros (A&A 1996,1997,1998) allows the combination of different pieces of information. As a result, a reliable size and albedo can be determined and the thermal properties of the surface regolith can be revealed. E.g., our Itokawa size prediction was within 2% of the in-situ size determination, much more accurate than pre-encounter predictions from radar measurements.

This project will support the planning and interpretation of the ROSETTA fly-by and encounter measurements. Moreover, the results (and also certain model aspects) can be tested and validated for future applications to other near-Earth asteroids where no dedicated mission is foreseen.