



The search for asteroid 21 Lutetia's bound companions with the two cameras OSIRIS instrument during the Rosetta flyby

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Abstract

On July 10th, 2010, the European Space Agency's comet mission Rosetta flew-by the largest main belt asteroid visited so far by a spacecraft: 21Lutetia.

One of the major scientific objectives of the mission's two camera instrument OSIRIS [1] is the search for any gravitationally bound companion to Lutetia.

While adaptive optics ground-based observations found no evidence of a satellite larger than 1 km [2], OSIRIS conjugates the advantages of an in-situ exploration with a high resolving power to detect small companions.

The detection and study of small satellites and their orbits can provide precious information on the total mass of the system, and eventually, on the primary object if the satellites are small. Moreover, once the volume of Lutetia is derived from the images, this mass can give an estimate of the internal density of the asteroid, giving hints on its composition.

The data analysis can give clues to the dynamical evolution of the asteroids in general, helping us understanding the collisional environment in which they formed and therefore determining the role of collisions in shaping our solar system.

In this context we performed an analysis of the OSIRIS flyby images aimed at the detection of Lutetia's bound companions and the determination of their orbits.

Here we present the preliminary results of our work.

References

- [1] Keller, H. U., et al., : OSIRIS The Scientific Camera System Onboard Rosetta, Space Science Reviews, 128, 433-506, 2007.
- [2] Conrad, A. R., et al., : Observations of Rosetta Target (21) Lutetia with Keck and Gemini Adaptive Optics, American Geophysical Union, Fall Meeting 2009, abstract P43D-1463,2009