

New results from ground-based observations of asteroid 21 Lutetia prior to the Rosetta fly-by

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Abstract

On its journey to comet 67P/Churyumov-Gerasimenko, the International Rosetta Mission (ESA) was planned to fly-by two asteroids: (2867) Steins and (21) Lutetia. (21) Lutetia was encountered on July 10th 2010. Although classified as an M-type asteroid due to its high albedo, its reflectance spectrum in the near and mid-infrared region, suggests a primitive composition, more typical of C-type asteroids. We have obtained uvbyRI photometric measurements covering the complete rotational period of the asteroid (about 8 hrs), as well as visible and near-infrared spectra in the range 0.4–2.5 μm . The spectroscopic data were taken at different rotational aspects to search for any significant inhomogeneities in asteroid's surface mineralogy. We used BUSCA at the 2.2 m telescope in Calar Alto Observatory (Almería, CSIC-MPG), and the 1 m telescope at Lulin Observatory (Taiwan, NCU) to do the photometry; visible spectra were obtained with CAFOS, at the 2.2 m telescope of Calar Alto, while near-infrared spectra were obtained using NICS at the 3.6 m TNG of “El Roque de los Muchachos” Observatory (La Palma). We present here the obtained values of lightcurve amplitudes, rotational period and phase coefficients, as well as results from a mineralogical analysis performed on the asteroid spectra. Lutetia was no longer be visible from Earth after May, so our data, taken during March and April, provide us with the most updated and recent information about Lutetia's surface properties prior to the fly-by. The information retrieved from this ground-based data will be part of a more complete analysis of the data acquired with the OSIRIS instrument on board the Rosetta spacecraft.