

NEO-SURFACE: Near Earth Objects - SURvey of Asteroids Close to the Earth

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Abstract

NEO-SURFACE (Near Earth Objects - SURvey of Asteroids Close to the Earth) is a survey we carry out in order to increase the present knowledge of the physical properties of NEOs. It includes V+NIR spectroscopy and photometry of i) the so-called Potentially Hazardous Asteroids (PHAs) which make threatening close approaches to the Earth, and ii) the suitable targets for future rendez-vous space missions.

1. Introduction

Near-Earth Objects (NEOs) form a continuously replenished population of asteroids and dead comets that cross the Earth's orbit while orbiting around the Sun. Our present knowledge of their physical properties is rather limited, especially for what concerns faint and newly discovered objects of which we have physical information for less than 10% of the population.

The most used technique to obtain physical characterizations of NEOs is the optical/NIR spectroscopy: by analyzing the object's spectral features it is possible to detect minerals and compounds (e.g. silicates, organics, products of aqueous alteration processes) present on its surface, to put constraints on the thermal evolution (maximum temperature reached, aqueous alteration vs. thermal metamorphism), as well as to establish possible links with objects belonging to other populations of small bodies (e.g. main belt asteroids, and comets) and with meteorites.

In order to increase the present knowledge of the physical properties of NEOs we are carrying out a survey called NEO-SURFACE: Near Earth Objects -

SURvey of Asteroids Close to the Earth (www.oa-roma.inaf.it/planet/NEOSurface.html).

2. Observations and Discussion

We perform V+NIR spectroscopy and photometry focusing our effort i) on objects with possible close approaches with the Earth, the so-called Potentially Hazardous Asteroids (PHAs) and ii) on NEOs easily accessible for future rendez-vous space missions.

For PHAs, the derived physical parameters are fundamental to estimate the response to non-gravitational forces (mainly to the Yarkovsky effect), model the future dynamical evolution, and assess the mitigation technologies to be used in case of impact with the Earth.

For NEOs suitable targets of a rendez-vous space mission, the knowledge of the physical properties is needed to guarantee both the technical feasibility and the high scientific return of the mission.

The obtained results will be presented and discussed.