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**NEO Characterization**

# VISIBLE SPECTROSCOPIC SURVEY OF POTENTIALLY HAZARDOUS ASTEROIDS FROM THE ASIAGO OBSERVATORY IN THE FRAMEWORK OF THE NEOROCKS PROJECT

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## ABSTRACT

We present an update of our ongoing spectroscopic survey of Near Earth Objects (NEOs), performed with the Asiago Telescopes. The program is part of the EU-funded NEO Rapid Observation, Characterization and Key Simulations (NEOROCKS) project, focused on the acquisition and analysis of data on new discovered small size objects.
The importance of NEOs is widely recognized as they can help to investigate the origin and evolution of the Solar System, in particular also the origin of life and water on Earth, they are possible future mining resources, but they are also possible threatening objects to our planet. This is particularly true for the Potentially Hazardous Asteroids, a subgroup of NEOs characterized by orbits that can make close approaches to the Earth and large enough to cause significant regional damage in the event of an impact.
So, it is particularly important and urgent to know in detail their dynamical, physical, and compositional properties in order also to have more information to establish mitigation strategies.
Our observations are performed with the 1.22m Galileo Telescope equipped with a Boller & Chivens and the 1.80m Copernico Telescope equipped with AFOSC (Asiago Faint Object Spectrograph and Camera), located at the Asiago Observatory, Italy, covering a spectral range between 0.4 - 1 micron. The observation of PHAs is particularly challenging because of their typical faintness and their high rate of velocity.
Nevertheless, since the beginning of the project, January 2020, we have observed about 70 NEOs of which about 28 PHAs. Some of them are newly discovered, with a size range from 30 m to about 900m. Most of them have an unknown taxonomic classification or not a clear one yet. We perform the taxonomic classification through

a comparison with spectral types from Bus-Binzel Taxonomy (2002) and with laboratory meteorites spectra from Relab database. Up to now we have found different types of asteroids, spanning from carbonaceous C to silicate S, and also some rare types as O or B. Some objects (eg, 1988 OR2 and Didymos) have been observed during their rotational periods, allowing the study of their surface variegation. In particular we are performing a systematic follow up of the PHA Didymos since the impact of the DART spacecraft on 26$^{th}$ September 2022 on its moon Dimorphos, with spectroscopic observations started in October 2022 as soon as the object was observable in the north hemisphere and that we will carry on until it remains visible, spring 2023. We will present the results of the observational campaign obtained so far.

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