SPECTROSCOPIC INVESTIGATION OF THE LARGE POTENTIALLY HAZARDOUS ASTEROID (52768) 1998OR2 WITHIN NEOROCKS EU PROJECT. M Lazzarin[1]; F. La Forgia[1]; A. Siviero[1]; E. Frattin[1]; P. Ochner[1]; P. Pravec[2]; M. Devogele[3]; P. Fatka[2]. [1]Dipartimento di Fisica e Astronomia, Padova University, Vicolo Osservatorio, 3, 35122 Padova, Italy. [2]Astronomical Institute, Academy of Sciences of the Czech Republic, Fricova 298, Ondrejov CZ-25165, Czech Republic. [3]Arecibo Observatory, Route 625 Bo. Esperanza, Arecibo 00612 Puerto Rico.

Introduction: With an estimated diameter of about 2200m (http://neo.ssa.esa.int/), and a MOID (minimum orbital intersection distance) of 0.0154 au (6 Lunar Distances LD), (52768) 1998 OR2 is one of the largest known Potentially Hazardous Asteroid. On 29 April 2020 at 09:56 UTC 1998 OR2 had a very close passage to Earth at a distance of 0.042 au (16 LD). Close approaches by large asteroids like 1998 OR2 are a quite rare event.

This asteroid has a highly eccentric orbit (e=0.57) with minor perturbations: this causes it to swap continuously. Moreover, it is classified as Amor or Apollo asteroid, depending on the orbital phase.

Within the NEOROCKS EU project ("The NEO Rapid Observation, Characterization and Key Simulations" - SU-SPACE-23-SEC-2019 from the Horizon 2020) - WP3-Task3.2 (Reflectance Spectroscopy) we observed 1998OR2 through the 120 cm "Galileo" telescope in Asiago using Boller & Chivens spectrograph instrument on 15 April 2020 when it was at 1.01 au heliocentric distance and 0.078 au distance from Earth.

1998 OR2, discovered on 24 July 1998 by NEAT program, is a fast rotator in the NEO population with a rotational period of 4.11 h [1]-[3] and shows a large crater-like concavity through radar images (naic.edu/~pradar/press/1998OR2.php) [4].

Due to its rapid rotation, we were able to monitor the reflectance spectroscopy of 1998 OR2 for one nearly complete rotation during the night of 15 April 2020. We acquired 11 spectra, one every 20 minutes, spanning from 19:22 to 23.26 UTC. This allowed to investigate the possible variegation of the object across its surface and potentially connected with its big crater.

It is unlikely that one of these large asteroids could impact the Earth over the next century, in fact also this asteroid poses no possibility of impact for at least the next 200 years, even if in its next close approach to Earth in 2079, it will pass by close, about four times the lunar distance. It is however extremely important to keep these objects monitored and to investigate their physical and compositional properties to implement mitigation techniques.

In this work, we will present optical spectroscopic characterization of 1998 OR2 and the comparison of the taxonomic classification resulting from these spectra with the Xk obtained by Binzel et al. [5]. Additionally we will investigate its possible surface variegation by determining the geometry and latitude/longitude coverage of our observations using the asteroid shape and pole orientation found by Devogele et al. [6].

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References: Use the brief numbered style common in many abstracts, e.g., [1], [2], etc. References should then appear in numerical order in the reference list, and should use the following abbreviated style:

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