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Authors	MIGLIORINI, Alessandra; Barbieri, M.; PICCIONI, GIUSEPPE; Barbieri, C.; ALTIERI, FRANCESCA
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Oxygen investigation in the Galilean satellites using AFOSC

A. Migliorini¹, M. Barbieri², G. Piccioni¹, C. Barbieri², F. Altieri¹

¹ IAPS-INAF, via del Fosso del Cavaliere, 100, 00133, Rome, Italy

² University of Padova

Spectroscopy in the visible range of the Galilean satellites is a suitable way to investigate the surface properties of these objects. In recent years, several species, like O₂, O₃, and SO₂, have been detected on the surfaces of these satellites, which were thought to be completely covered only by water ice. The recent detection of the O₂ absorption bands in the Ganymede trailing face (Spencer et al. 1995) led to laboratory experiments in order to constrain the O₂ phases trapped in the water ice surface (Vidal et al. 1997).

The same features were observed also on Europa and Callisto surfaces (Spencer and Calvin, 2002), although a better investigation of their properties and their variability with time is still not fully addressed.

We proposed ground-based observations with the AFOSC instrument on the 1.8-m telescope in Asiago, to investigate the Galilean satellites' surface properties, focusing both on the leading and trailing faces of the satellites. We used the Volume Phase Holographic grism covering the spectral range 400-1000 nm, with a spectral resolution of about 5000.

In this work, we show results of the observations acquired in November 2014, focusing on the leading faces of the satellites. Data were treated using standard methods of data reduction. Further observations with the same setup, scheduled for February 2015 to observe the trailing face of the Galilean satellites, will complement the program. These observations are in preparation to the future science we will be able to perform with the MAJIS spectrometer on the European JUICE mission.

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