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Spectroscopic observations of the Uranus' satellite Miranda in Near-IR

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Abstract

We present new Near-IR spectra of the Uranus' icy satellite Miranda. This body is probably the most remarkable of all satellites of Uranus, displaying series of surface features such as faults, craters and large-scale upwelling, remnant of a geologically very active past. The observations were performed first at the Palomar Observatory with the PHARO instrument (Palomar High Angular Resolution Observer) and then at the Mauna Kea Observatory with SpeX instrument based on the IRTF (Infra-Red Telescope Facility). Water ice is clearly visible in K-band (large 2.0 μm absorption band) and crystalline water ice (at 1.65 μm) seems to cover the most part of the satellite's surface. We focused the study in H band on the 1.42-1.72 μm range at observations dates corresponding to the leading and trailing hemispheres of Miranda. Contrary to the other outer Uranus' moons (Grundy et al. 2006), we did not found any significative differences between both hemispheres in this spectral range. We also studied the possible presence of volatiles like ammonia hydrate and do not exclude the possible presence of a tiny 2.22 μm band yet observed by Bauer et al. 2002. No significant features of carbon dioxide were identified on any spectra. We performed spectral models, based on bi-hemispherical reflectance theory (Hapke 1993) in order to obtain more details on the chemical compounds possibly present on the surface of this Uranian satellite.

References

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