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Title	The Surface Composition and Thermal Properties of the Organic-Rich Surface of Comet 67P/Churyumov-Gerasimenko : VIRTIS/Rosetta Results (Invited)
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solutions. With the newly derived vertical profile of relaxation time, simulations converge and produce realistic temperature and wind in Jupiter's stratosphere.

4. PS02-D2-PM1-324-004 (PS02-A016)

Hydrogen Cyanide in the Stratosphere of Titan

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We have carried out observations of transitions of HCN in the stratosphere of Titan with the Herschel Space Observatory (Rengel et al. 2014), the Atacama Pathfinder Experiment and the IRAM 30m millimeter radio telescope. Using a line-by-line radiative transfer code and the least-squares fitting technique we have analyzed the observations, determined HCN abundances and an inter-comparison analysis. Beyond the intrinsic interest, these ground-based observations proven their usefulness in supporting spacecraft observations of Solar System bodies, in particular, of Titan's atmosphere.

Rengel, M., Sawaga, H., Hartogh, P. et al. 2014, A&A 561, A4

5. PS02-D2-PM1-324-005 (PS02-A004)

First Detection of 63 Micron Oxygen Line in the Thermosphere of Mars with GREAT Instrument

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Atomic oxygen is the key element in several processes governing the energy and mass flow in the upper atmosphere of Mars, and its uncertainty strongly impacts both, the outcomes of global circulation modeling as well as interpretation of remotely sensed satellite data. Despite the recognized need for accurate knowledge of atomic O abundances in the upper atmosphere, only few dedicated measurements are available. In this presentation we describe the new opportunities for planetary spectroscopic observations in the far infrared wavelengths provided by the GREAT instrument on board the Stratospheric Observatory for Infrared Astronomy (SOFIA). SOFIA features a 2.5 dish, and the heterodyne spectrometry available with GREAT provides 44 kHz resolution of 9.5 GHz bandwidth with high S/N ratio, high enough to resolve Doppler broadened lines and detect Doppler shifts of 0.1 km/s. Here we report on detection of Martian O(3 P) 63 μ m line measured on May 14, 2014 from which we estimate Mars thermospheric column density of atomic O, and averaged wind speed in the region 100-150 km. This detection is a promising introduction in to the future possibility of a systematic monitoring of atomic O in the atmosphere of Mars from the ground.

6. PS02-D2-PM1-324-006 (PS02-A011)

Chemistry of Atmospheric Compositions in MLT Region Observed by SMILES

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The Superconducting Submillimeter-Wave Limb-Emission Sounder (SMILES) is an atmospheric observation instrument that is used to observe submillimeter waves emitted from minor atmospheric constituents, with unprecedented sensitivity. SMILES was the first global environment observation instrument in the Japanese Experiment Module onboard the International Space Station (ISS), and succeed to detect minor atmospheric compositions, such as HCl, HO₂, HOCl, and Ozone, in Mesospheric Lower Thermospheric region. We will present Hydrogen and Chlorine chemistry in MLT region. This mission is a joint project of the National Institute of Information and Communications Technology (NICT) and the Japan Aerospace Exploration Agency.

PS02 - Microwave and Infrared Remote Sensing of Solar System Objects

Tuesday, August 04, 2015 | 324 | 16:00-18:00

1. PS02-D2-PM2-324-007 (PS02-A012)

The Surface Composition and Thermal Properties of the Organic-Rich Surface of Comet 67P/Churyumov-Gerasimenko : VIRTIS/Rosetta Results

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The paper will describe the major results obtained by the instrument VIRTIS (Visible, Infrared and Thermal Imaging Spectrometer), the dual channel spectrometer onboard Rosetta, on the surface composition and thermal properties of the nucleus of comet 67P/Churyumov-Gerasimenko.

VIRTIS is a dual channel spectrometer; VIRTIS-M (M for Mapper) is a hyper spectral imager covering a wide spectral range from 0.25 through 5 μ m. VIRTIS-M uses a slit and a scan mirror to generate images with spatial resolution of 250 μ m over a FOV of 3.7°. The second channel is VIRTIS-H (H for High-resolution), a point spectrometer with high spectral resolution ($\lambda/\Delta\lambda=3000$ @3 μ m) in the range 2-5 μ m.

The nucleus observations are performed in a wide range of conditions with spatial resolution varying from the initial 500m down to 2.5m. The surface temperature has been determined since the first distant observations when the nucleus filled one single VIRTIS-M pixel. On the mid of July 2014 from a distance of 15000km the mean surface temperature has been measured as 205±5K. This pointed to a surface structure largely covered by a porous crust, mainly devoid of water ice. Maximum temperature determined so far are as high as 230K on the subsolar point.

The VIRTIS composition analysis has showed evidence of carbon-bearing compounds on the nucleus of the comet 67P/Churyumov-Gerasimenko. The very low reflectance of the nucleus (normal albedo of 0.060 ± 0.003 at 0.55 μ m), the spectral slopes in Vis and IR ranges (5-25 and 1.5-5 % kÅ^{-1}) and the broad absorption feature in the 2.9-3.6 μ m range present across the entire illuminated surface, are compatible with opaque minerals associated with nonvolatile organic macromolecular materials: a complex mixture of various types of C-H and/or O-H chemical groups, with little contribution of N-H.

Authors acknowledge the support from national funding agencies.

2. PS02-D2-PM2-324-008 (PS02-A009)