Abstracts

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The zoo of organics in 67P/Churyumov-Gerasimenko from ROSINA/Rosetta

Rosetta has been at comet Churyumov-Gerasimenko for almost 1 ½ years by now and the ten instruments on board the European Space mission Rosetta are very busy studying the comet nucleus and its coma. The two Swiss ROSINA mass spectrometers and the pressure sensors are exploring the volatile material in the coma over a wide range of heliocentric distances. In the talk I will present some of the highlights from ROSINA on board and discuss the first implications and conclusions on the origin of our solar system material.

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The nucleus and coma of 67P/Churyumov-Gerasimenko from VIRTIS/Rosetta

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The presentation will describe the major results obtained by the instrument VIRTIS (Visible, Infrared and Thermal Imaging Spectrometer), the dual channel spectrometer onboard Rosetta since the arrival at the comet 67P/Churyumov-Gerasimenko in August 2014. The two channels of the spectrometers are: VIRTIS-M, a hyperspectral imager covering a wide spectral range from 0.25 through 5μm, whose major objective is the composition and thermal properties of the nucleus. VIRTIS-H, (H for High-resolution), a punctual spectrometer with high spectral resolution ($\lambda/\Delta\lambda$=3000 @3μm) in the range 2-5 μm, mainly devoted to studies of the cometary coma.
The VIRTIS nucleus 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 μm), 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 μm range present across the entire illuminated surface, are compatible with opaque minerals associated with nonvolatile organic macromolecular materials: a complex mixture of compounds containing C-H and/or O-H chemical groups, with little contribution of N-H.
The VIRTIS instrument is also used to investigate the molecular composition of the coma of 67P/CG by observing resonant fluorescent excitation in the 2 to 5μm spectral region. The spectrum consists of emission bands superimposed on a background continuum. The strongest features are the bands of H_2O at 2.7 μm and the CO_2 band at 4.27 μm. The high spectral resolution of VIRTIS-H obtains a detailed description of the fluorescent bands, while the mapping capability of VIRTIS-M extends the coverage in the spatial dimension to map and monitor the abundance of water and carbon dioxide in space and time.