

# SPICAM on Mars Express: an overview of UV and Near IR Results over one martian year

**J.L. Bertaux (1)**, O. Korablev (2), E. Quemerais (1), S. Perrier (1), A. Fedorova (2), F. Montmessin (1), F. Leblanc (1), S. Lebonnois (4), P. Rannou (1), D. Fussen (3)

(1) Service d'Aéronomie du CNRS, BP 3, 91371, Verrières-le-Buisson, France.

(2) Space Research Institute (IKI), 84/32 Profsoyuznaya, 117810 Moscow, Russia

(3) Belgian Institute for Space Aeronomy, 3 av. Circulaire, B-1180 Brussels, Belgium.

(4) Laboratoire de Météorologie Dynamique, 4 place Jussieu, 75252 Paris Cedex 05, Paris, France.

SPICAM, a light-weight (4.8 kg) UV-IR dual spectrometer on board Mars Express orbiter, is dedicated primarily to the study of the atmosphere and ionosphere of Mars. A UV imaging spectrometer (118 - 320 nm, resolution 1.5 nm, intensified CCD) operates in nadir viewing, limb viewing and atmospheric vertical profiling by stellar and solar occultation. An IR spectrometer (1.0-1.7  $\mu\text{m}$ , resolution 0.5-1.2 nm, or  $\lambda/d\lambda=1300$ , mass 0.8 kg) is dedicated primarily to nadir measurements of H<sub>2</sub>O abundances, but detects also water ice and CO<sub>2</sub> ice both on perennial and seasonal caps. It is based on AOTF technology; and it is the first time that such a spectrometer is flying in deep space.

Night glow emissions from NO recombination and several aurora over crustal magnetic anomalies have been discovered. Several hundreds of atmospheric vertical profiles by UV star occultation were obtained. The main absorbers are CO<sub>2</sub> (below 200 nm) and aerosols/dust (above 200 nm). The atmospheric pressure and temperature are retrieved from 150 km down to 25-40 km, for the construction of an empirical model of the atmosphere. In 60 % of cases there is a detached layer of dust, or cloud.

The UV absorption of ozone is well identified in routine reflectance nadir viewing, and its vertical quantity is recovered along the orbital track, and compared to the water vapour distribution measured by SPICAM in the near Infra-red around 1.38  $\mu\text{m}$ . SPICAM has thus obtained for the first time from an orbiter simultaneous measurements of ozone and H<sub>2</sub>O, which are found to be somewhat anti-correlated as expected on the ground of chemistry consideration: catalytic destruction of ozone from OH and HO<sub>2</sub> radicals. We observed also the O<sub>2</sub> Airglow at 1.27  $\mu\text{m}$  in nadir and limb viewing produced by photo-dissociated ozone, and all UV limb dayglow emissions that were observed by Mariner spacecraft.

A summary of two years of martian observations will be presented, and also future prospects of cooperation with the UV imaging capabilities of MRO.