SPICAV/SOIR: a suite of three spectometers to study the global structure and composition of the Venus atmosphere

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The first results of SPICAV/SOIR around Venus will be presented. SPICAV (**SP**ectroscopy for the **I**nvestigation of the **C**haracteristics of the **A**tmosphere of **V**enus) is a suite of three spectrometers in the UV and IR range with a total mass of 12.3 kg on board Venus Express orbiter, dedicated to the study of the atmosphere of Venus from ground level to the outermost hydrogen corona at more than 40,000 km.

A UV spectrometer (118 - 320 nm, resolution 1.5 nm) is dedicated to nadir viewing, limb viewing and vertical profiling by stellar and solar occultation. In nadir orientation, SPICAV UV analyzes the albedo spectrum (solar light scattered back from the clouds) to retrieve SO_2, and the distribution of the UV-blue absorber (of still unknown origin) on the day side with implications for cloud structure, and atmospheric dynamics. On the night side, γ and δ bands of NO are studied, as well as emissions produced by electron precipitations. In the stellar occultation mode the UV sensor will measure the vertical profiles of CO_2, temperature, SO_2, SO, clouds and aerosols. UV dayglow of the upper atmosphere allows studies of the ionosphere through the emissions of CO, CO^+, and CO_2^+, and its direct interaction with the solar wind. It studies the H corona, with its two different scale heights, and escape mechanisms. The SPICAV VIS-IR sensor (0.7-1.7 $\mu\mu$m, resolution 0.5-1.2 nm) employs a pioneering technology: acousto-optical tunable filter (AOTF). In solar occultation mode this channel permits to study the vertical structure of H_2O, CO_2, and aerosols.

The SOIR spectrometer is a new **S**olar **O**ccultation **IR** spectrometer in the rangeλ=2.2-4.3 μm, with a spectral resolution $\lambda v \Delta\lambda$ >15,000, the highest on board Venus Express (VEX). This new concept includes a combination of an echelle grating and an AOTF crystal to sort out one order at a time. The main objective is to measure HDO and H_2O in solar occultation, in order to characterize the escape of D atoms from the upper atmosphere and give more insight about the evolution of water on Venus. It will also study isotopes of CO_2, minor species, and provides a sensitive search for new species in the upper atmosphere of Venus.