

Modelling of the Nitric Oxide Emission Observed by SPICAV in Stellar Occultation Mode

E. Royer¹, F. Montmessin¹, J-L. Bertaux¹ and E. Marcq¹

¹LATMOS, 11 boulevard d'Alembert, 78280 Guyancourt, France

Ultraviolet (UV) nightglow data from the SPICAV instrument (SPectroscopy for the Investigation of the Characteristics of the Atmosphere of Venus) onboard the Venus Express spacecraft are presented here.

In its extended source mode, SPICAV has shown that the Venus nightglow in the UV contains essentially Lyman- α and Nitric Oxide (NO) emissions. In the stellar mode, when the slit of the spectrometer is removed, an emission is also observed at the limb in addition to the stellar spectrum. A forward model of this emission observed without the slit of the spectrometer allows us to characterize it as NO emission. Due to radiative recombination of N and O atoms produced on the dayside of Venus, and transported to the nightside, NO nightglow provides important constraints to the Solar-to-Anti Solar thermospheric circulation prevailing above 90 km.

The forward model presented here allows us to derive the altitude of the peak of emission of the NO layer, found at 113.5 ± 6 km, as well as its scale height, of 3.4 ± 1 km and its brightness. The latter is found to be very variable with emissions between 19 KR and 540 KR. In addition, the NO nightglow is sometimes very patchy, as we are able to observe two distinct emission zones in the field of view. This patchy aspect is reproduced by an inverse model of which we present the preliminary results here.

Finally, systematic extraction of this emission from stellar occultations extends the database of the NO emission already reported elsewhere using limb observations.