RADIATIVE TRANSFER OF THE OXYGEN 130 NM TRIPLET IN THE ATMOSPHERE OF MARS AND VENUS.

M. Barthelemy[1] G. Gronoff[1], J. Lilensten[1], C. Simon[2] .
[1]Laboratoire de Planetologie de Grenoble; UJF-CNRS (mathieu.barthelemy@obs.ujf-grenoble.fr),
[2] Belgian Institute for Space Aeronomy (BISA) .

The problem of the atomic oxygen concentration in the terrestrial planets atmospheres is crucial to understand the upper atmospheric mechanisms. This had never been directly measured for Mars and Venus. The oxygen 130 nm triplet is optically thick in those atmospheres and is resonant with the sun. The instruments SPICAV and SPICAM are able to measure the intensity of this triplet. Due to these points, it is important to calculate accurately the intensity of this triplet in such planetary atmospheres.
However recent radiative transfer simulations showed that overlapping between lines in a planetary atmosphere could modified strongly the intensity and line shape of optically thick lines [1],[2]. In the atmosphere of Mars and Venus an overlapping between the O 130 nm triplet and lines of the CO fourth positive band has never been taken into account.
We present new calculation of this oxygen 130 nm triplet intensity and line profile taking into account the overlapping problem with a partial redistribution. Due to the structure of the triplet, we had to develop a new expression of the RII redistribution function.
The radiative transfer equation is solved through a Feautrier technique.
We found that the effects of the CO lines modified strongly the O 130nm line intensity and profile. These effects depend strongly of the geometry of the line of sight.
We show that it is essential to take this problem into account in both the Martian and Venusians cases and that this could be a very useful way to get accurate information on both the CO and the O states in these atmospheres.

References:

[1] Barthelemy et al. (2004) A&A, 423, 391.
[2] Barthelelmy et al. (2005), A&A, 437, 329.