NEW ANALYSIS OF THE ν_3 AND ν_4 BANDS OF HNO_3 BY HIGH RESOLUTION FOURIER-TRANSFORM INFRARED SPECTRA IN THE 7.6 μm REGION: LINE POSITIONS AND LINE INTENSITIES

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Nitric acid (HNO_3) plays an important role in the Earth's atmosphere as a reservoir molecule of NO_x species. This molecule has a strong infrared signature at 7.6 μm which is one of the most commonly used for the infrared retrieval of HNO_3 in the atmosphere together with the 11 μm one. It is therefore essential to have the best possible spectral parameters in this spectral region. The goal of this work was to get better line positions and intensities for the ν_4 and ν_3 interacting cold bands located at 1303.071 and 1326.182 cm^{-1} respectively as compared to those obtained few years ago [a,b]: in fact, only the total band intensity was re-sclaled during the recent update in the HITRAN database [c], [d] HNO_3 line list at 7.6 μm region. For this purpose a large set of new high resolution FTS spectra recorded in Giessen and in Denver were analysed. For the line positions and line intensities calculation, the theoretical model accounts for the vibration-resonances which link the energy levels of the 4^1 and 3^1 bright vibrational states together with those of several dark interacting states (9^3 for example, among others). Very preliminary results will be presented.

[a] A. Perrin, O. Lado-Bordowski, and A.Valentin, Mol. Physics. 67, 249 (1989)

[b] A. Perrin, J.-M. Flaud, C.Camy-Peyret, V. Jaouen, R. Farrenq, G. Guelachvili, Q. Kou, F. Le-Roy, M..Morillon-Chapey, J. Orphal, M. Badaoui, J.-Y. Mandin, and V.Dana, J. Mol. Spectrosc. 160, 524 (1993)

[c] http://cfa-www.harvard.edu/hitran/

[d] J.-M. Flaud, G. Brizzi, M. Carlotti, A. Perrin, and M. Ridolfi, Atmos.Chem.Phys.6, 5037-5048 (2006)