DATABASES AND PROGRAMS FOR THE SPECTROSCOPY OF SOME GREENHOUSE GASES: CH_4, SF_6 AND CF_4

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Highly symmetrical molecules such as CH_4, CF_4 or SF_6 are known to be atmospheric pollutants and greenhouse gases. High-resolution spectroscopy in the infrared is particularly suitable for the monitoring of gas concentration and radiative transfer in the Earth's atmosphere. This technique requires prior extensive theoretical studies for the modeling of the spectra of such molecules (positions, intensities and shapes of absorption lines).

We have developed powerful tools for the analysis and the simulation of absorption spectra of highly symmetrical molecules. These tools have been implemented in the Spherical Top Data System (STDS)[a] and Highly-spherical Top Data System (HTDS)[b] software available at `http://www.u-bourgogne.fr/LPUB/shTDS.html`. They include a compilation of modeled data obtained during the last 20 years. An overview of our latest results in this domain will be presented[c].

We will especially focus on the recent advances concerning the high polyads of methane and the combination and hot bands of sulfur hexafluoride.

[a] Ch. Wenger and J.-P. Champion, *J. Quant. Spectrosc. Radiat. Transfer*, **59**, 471–480 (1998).

[b] Ch. Wenger V. Boudon, J.-P. Champion and G. Pierre, *J. Quant. Spectrosc. Radiat. Transfer*, **66**, 1-16 (2000).

[c] V. Boudon, J.-P. Champion, T. Gabard, G. Pierre, M. Loëte and Ch. Wenger, *Env. Chem. Lett.*, in press (2003).