**DIODE-LASER SPECTROSCPY: TEMPERATURE DEPENDENCE OF THE CO2-BROADENING COEFFICIENTS IN THE 4 BAND OF METHANE**

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The study of planetary atmospheres is a hot topic and spectroscopy is a powerful tool to gain insight and new understanding of these atmospheres. Instruments on board various spacecrafts sound these atmospheres in different wavelength ranges, from the UV to the IR, under various geometry, solar or stellar occultation, limb and nadir to obtain detailed information on composition and even on dynamics. To retrieve physical properties, atmospheric spectra must be analyzed with accurate spectroscopic line parameters. In particular, broadening coefficients associated to their adequate line profile are of high importance [1].

The NOMAD instrument [2] on-board ExoMars mission, has been especially designed to observe CH4. The determination of the densities of methane relies on the knowledge of accurate and adapted spectroscopic data, requiring, in particular for Mars, CO2-broadening coefficients of high quality. Only one previous study about the CO2-broadening coefficients has been performed, by our team, in the 4 vibrational band at room temperature [3].

Using a tunable diode-laser spectrometer [4] equipped with a low or a high temperature absorption cell, we have measured CO2-broadening coefficients of absorption lines in the  fundamental band of methane. These coefficients have been determined by fitting three theoretical line profiles (Voigt, Rautian, Galatry) on the experimental line profiles. The measurements performed over a large range of temperatures (200 to 650 K) have permitted to deduce the temperature dependence of these collisional broadening coefficients. The experimental set-up and first results will be presented and discussed.

a Post-doctoral researcher with F.R.S.-FNRS (Belgium)

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