N_2 COLLISIONAL BROADENING OF METHANE IN THE THZ REGION MEASURED AT THE SOLEIL SYNCHROTRON

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Recently, we recorded the THz centrifugal distortion-induced spectrum of methane using synchrotron radiation at the SOLEIL facility. Intensities of pure rotation lines of CH_4 were precisely measured, from which the induced dipole moment of this weak spectrum, of great interest for planetology, was accurately inferred.[a] This study should in particular help to measure methane concentrations in Titan's atmosphere.[b]

Here, we continue the work by presenting spectra of CH_4/N_2 mixtures, again recorded with a 150 m optical path in a White cell and a Bruker IFS 125 HR FTIR spectrometer at the AILES beamline of SOLEIL. More precisely, the spectra were recorded with 5 % of CH_4 in N_2 at various total pressures (*ca.* 100, 200, 400, 600 and 800 mbar). These spectra will allow to measure collisional broadening and shift coefficients, as well as line-mixing parameters, with N_2 as a perturber (like in Titan's atmosphere).

[a] V. Boudon, O. Pirali, P. Roy, J.-B. Brubach, L. Manceron and J. Vander Auwera, *J. Quant. Spectrosc. Radiat. Transfer*, in press (2010)

[b] A. Coustenis, R. K. Achterberg, B. J. Conrath *et al.*, *Icarus* **189**, 35–62 (2007).