

N₂ 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 CH₄ 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 CH₄/N₂ 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 CH₄ in N₂ 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 N₂ as a perturber (like in Titan's atmosphere).

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

^bA. Coustenis, R. K. Achterberg, B. J. Conrath *et al.*, *Icarus* **189**, 35–62 (2007).