

## PROGRESS AROUND THE HIGH RESOLUTION HETERODYNE SPECTROMETER OF THE AILES BEAMLIN

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Our consortium<sup>a</sup> is currently developing a new spectrometer on the AILES beamline of the SOLEIL synchrotron facility to achieve sub-MHz resolution in the THz and far-IR regions. This spectrometer is based on heterodyne mixing of the far-IR synchrotron radiation with various local oscillators (LOs). In past years, we used a frequency multiplication chain to provide LO frequencies which enabled both a deep characterization of the spectral composition of the synchrotron emission<sup>b</sup> and the recording of its first Doppler limited absorption lines (of D<sub>2</sub>O)<sup>c</sup>. We recently improved our set-up and measured absorption lines using a far-IR molecular laser pumped by a 10 μm QCL as the LO. The principle of the spectrometer, together with the first experimental results, will be presented in the talk.

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<sup>b</sup>Tammaro, S., Pirali, O., Roy, P., Lampin, J.F., Ducournau, G., Cuisset, A., Hindle, F., Mouret, G. "High density terahertz frequency comb produced by coherent synchrotron radiation" *Nature Communications*, 6, 7733 (2015)

<sup>c</sup>talk WI02, ISMS 2018