

**A 530-590 GHZ SCHOTTKY HETERODYNE RECEIVER
FOR HIGH-RESOLUTION MOLECULAR SPECTROSCOPY
WITH LILLE'S FAST-SCAN FULLY SOLID-STATE DDS SPECTROMETER**

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Laboratory spectroscopy, especially at THz and mm-wave ranges require the advances in instrumentation techniques to provide high resolution of the recorded spectra with precise frequency measurement that facilitates the mathematical treatment.

We report the first implementation of a Schottky heterodyne receiver, operating at room temperature and covering the range between 530 and 590 GHz, for molecular laboratory spectroscopy. A 530-590 GHz non-cryogenic Schottky solid-state receiver [1] was designed at LERMA, Observatoire de Paris and fabricated in partnership with LPN- CNRS (Laboratoire de Photonique et de Nanostructures), and was initially developed for ESA Jupiter Icy Moons Explorer (JUICE), intended to observe Jupiter and its icy moon atmospheres. It is based on a sub-harmonic Schottky diode mixer, designed and fabricated at LERMA-LPN, pumped by a Local Oscillator (LO), consisting of a frequency Amplifier/Multiplier chain (AMC) from RPG (Radiometer Physics GmbH). The performance of the receiver was demonstrated by absorption spectroscopy of CH₃CH₂CN with Lille's fast-scan DDS spectrometer. A series of test measurements showed the receiver's good sensitivity, stability and frequency accuracy comparable to those of 4K QMC bolometers, thus making room-temperature Schottky receiver a competitive alternative to 4K QMC bolometers to laboratory spectroscopy applications. We will present the first results with such a combination of a compact room temperature Schottky heterodyne receiver and a fast-scan DDS spectrometer.

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[1] J. Treuttel, L. Gatilova, A. Maestrini et al., 2016, IEEE Trans. Terahertz Science and Tech., 6, 148-155.