

## PHOTONICS-BASED TERAHERTZ SOURCES FOR MOLECULAR SPECTROSCOPY

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Since twenty years photonics-based terahertz (THz) sources have made great progress. They are now usable for low- and high-resolution molecular spectroscopy in the 0.1-4 THz range ( $3\text{-}130\text{ cm}^{-1}$ ).

We will present the principles of near-infrared laser-based THz set-ups: time-domain spectroscopy (see figure showing ambient pressure  $\text{H}_2\text{O}$  lines) and frequency-domain photomixing. Then we will review the different types of high bandwidth semiconductor photodetectors used to convert laser beams into THz beams. Two families are mainly used: photoconductors and photodiodes. Advantages and drawbacks of each will be presented. The subject of THz antennas will be also discussed and a state of the art will be given including the devices developed at IEMN. Some example of molecular spectroscopy measurements using these devices at various frequencies and resolutions will be given. Finally new ways for photonics-based THz sources will be exposed.

