BUILDING A DATABASE FOR QCL PUMPED FAR-IR LASERS

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Our collaborative team is developing new experimental set-ups based on heterodyne mixing of synchrotron radiation (extracted by the AILES beamline of SOLEIL) with various Local Oscillators (LOs). In the sub-millimeter and THz regions (defined as 0.1–1 THz), LOs from electronic techniques are easy to implement through the use of multiplication chains. However, it is more challenging to produce fixed LOs in the far-IR domain (1–6 THz). The recent development of a new generation of molecular lasers pumped by 10 μm QCLs[a] allows us to generate many more far-IR frequencies than the previous approach which used CO_2 lasers as a pump source. The difficulty in this technique stems from selecting the proper far-IR transitions that both involve rotational states susceptible to lase and that are accessible with our 10 μm QCL source. We will present our program making use of HITRAN, JPL, CDMS, and ExoMol databases to produce lists of far-IR lasing frequencies.

[a] Pagies et al., APL Photonics 1 (2016)