

Simplified lock-in detection for QEPAS trace gas sensing applications

Tomasz Starecki^{1,2 a)}, and Frank K. Tittel²

¹ *Institute of Electronic Systems, Warsaw University of Technology, Nowowiejska 15/19, 00-665 Warsaw, Poland*

² *Department of Electrical and Computer Engineering, Rice University, Houston, TX 77004, USA*

^{a)} *e-mail: tomasz@starecki.com*

Quartz-Enhanced Photoacoustic Spectroscopy (QEPAS) is a variant of photoacoustic (PA) detection utilizing a quartz tuning fork (TF) as a resonant acoustic transducer. In any kind of PA trace gas sensing applications the photoacoustic signal results from absorption of a modulated semiconductor laser radiation. The resulting PA signal frequency corresponds to the frequency of the laser modulation. The PA signal is usually measured by means of a lock-in amplifier. A concept of a simplified lock-in detector that can be used in QEPAS applications, resulting in substantial miniaturization and lowering power consumption of such a setup will be reported.