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QEPAS-New developments in quartz enhanced photo-acoustic gas sensing

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The detection and quantification of trace gas concentrations are of considerable importance for a number of applications, such as environmental monitoring, industrial process control analysis, combustion processes, detection of toxic and flammable gases, as well as explosives. One of the most robust and sensitive trace-gas optical detection techniques is the quartz enhanced photo-acoustic spectroscopy (QEPAS). QEPAS is an alternative approach to photoacoustic detection of trace gas, utilizing a quartz tuning fork (QTF) as a sharply resonant acoustic transducer to detect weak photoacoustic excitation with a compact and relatively low-cost absorption detection module. I will report an overview of the latest developments in QEPAS trace-gas sensor technology employing quantum cascade laser sources, such as the realization of mid-IR fiber coupled sensor systems, QEPAS sensors operating in the THz spectral range and intracavity-QEPAS sensors, realized by coupling to a QTF in a build-up optical cavity. Results on the design and realization of new QTFs with different geometries, providing significant enhancements of optoacoustic generation efficiency, will be also reported.

Biography

Vincenzo Spagnolo received his PhD in Physics from University of Bari. He works as Assistant Professor of Physics at the Technical University of Bari. He has been a visiting researcher at the Rice University (TX). His current research interests include quantum cascade lasers, spectroscopic techniques for Real-time device monitoring, fiber optics, Opto-acoustic gas sensing. He is author of 2 patents and has published more than 70 journal papers. He has given more than 30 invited presentations and co-authored over 100 presentations in the international conferences and workshops.

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