Seminarankündigung

Donnerstag, 7. November 2019
11:30 Uhr

WSI, Seminarraum S 101

"Quartz-enhanced photoacoustic spectroscopy: Basics, merits and real-world applications"

Optical gas sensors are excellent candidate as powerful tool for trace gas detection and monitoring in a large number of applications, such as environmental monitoring, industrial process control and petrochemical industry. Among most sensitive optical techniques, quartz-enhanced photoacoustic spectroscopy (QEPAS) is capable of extremely high detection sensitivities with a compact detection module. It exploits a quartz tuning fork (QTF) as a sharply resonant acoustic transducer to detect weak photoacoustic excitation and allowing the use of extremely small volumes [1]. QEPAS technique does not require an optical detector, it is wavelength independent, it is immune to environmental noise. These factors, together with and its proven reliability and ruggedness, represent the main distinct advantages with respect to other laser-based techniques for environmental monitoring and in situ detection.

Starting from the basic principles governing the QEPAS technique, I will review the main results achieved by exploiting custom QTFs for QEPAS sensing and describe how these achievements allowed QEPAS real-word applications and lead to the first commercialization of QEPAS modules [2].

[1] P. Patimisco, A. Sampaolo, L. Dong, F.K. Tittel, V. Spagnolo, "Recent advances in quartz enhanced photoacoustic sensing", Appl.Phys.Rev. 5, 011106 (2018)
[2] https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=11241

Vincenzo Spagnolo obtained the PhD in physics in 1994 from University of Bari. From 1997 to 1999, he worked as researcher of the National Institute of the Physics of Matter (INFM). Since 2004, he works at the Polytechnic of Bari, formerly as assistant, associate and in 2018 as full professor of Applied Physics. In 2019, he was appointed vice-Rector, deputy to the technology transfer of the Polytechnic of Bari. He has been visiting professor at Rice University in 2017 and is "Hundred Talent" professor at Shanxi University in Taiyuan (China). He is the director of the joint-research lab PolySense created by Technical University of Bari and THORLABS GmbH. His research interests include optoacoustic gas sensing and spectroscopic techniques for real-time device monitoring. His research activity is documented by more than 190 Scopus publications and two filed patents. He has given more than 50 invited/keynote presentations at international conferences and workshops. Prof. Spagnolo is program committee member of several SPIE and OSA conferences. He serves in EU-COST, Deutsche Forschungsgemeinschaft (DFG), Austrian Science Fund and Italian minister of Research as reviewer of photonics and optical sensing related projects. He is editor of Sensors (MPDI), Applied Science (MPDI) and Journal of Sensors (Hindawi). Prof. Spagnolo is fellow member of SPIE and senior member of the OSA.

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