

Applications of spectroscopic techniques to trace gas sensing

F. Shen¹, D. Chen^{1,2}, H. Yi^{1,#}, T. Nguyen Ba¹, R. Maamary^{1,§}, P. Augustin¹, M. Fourmentin¹, D. Dewaele¹, F. Cazier¹, Cécile Coeur¹, E. Fertein¹, W. Chen^{1,*}

¹ *Université du Littoral Côte d'Opale, Dunkerque, France (* chen@univ-littoral.fr)*

now with NIST, Gaithersburg, Maryland, USA

§ now with l'Université de Reims, GSMA

² *Hefei University of Technology, Hefei, Anhui 230009, China*

In this talk, we will overview our recent progress in the developments of laser-based instruments dedicated to spectroscopic monitoring of key molecular trace gases of environmental interest. The newly developed photonic instruments will be presented which are based on modern infrared laser sources (external-cavity quantum cascade laser, distributed feedback quantum cascade laser and interband cascade laser) coupled to high-sensitivity spectroscopic measurement techniques (such as multipass absorption spectroscopy [1], quartz-enhanced photoacoustic spectroscopy [2], Faraday rotation spectroscopy [3] as well as laser heterodyne radiometry).

Typical applications in intensive field campaigns, in smog chamber and in laboratory investigation will be illustrated and discussed.

References

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- [3] W. Zhao, G. Wysocki, W. Chen, E. Fertein, D. Le Coq, D. Petitprez, W. Zhang, "Sensitive and Selective Detection of OH Free Radical using Faraday Rotation Spectroscopy at 2.8 μm ", *Opt. Express* **19** (2011) 2493-2501