DIFFERENTIAL OPTICAL DISPERSION SPECTROSCOPY FOR COMPARATIVE MOLECULAR QUANTIFICATION

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A new spectroscopic technique that is based on molecular dispersion spectroscopy[a] and enables new capabilities in chemical detection as compared to well-established laser absorption spectroscopy will be discussed in this paper. Differential optical dispersion spectroscopy (DODiS) enables simultaneous measurement and comparison of two gas samples. This is performed through simultaneous detection of molecular absorption that is additive and molecular dispersion that provides differential information about the samples. Therefore DODiS performs true optical addition/subtraction of absorption/dispersion spectra, which is a unique property not available with any conventional absorption-based techniques. The DODiS measurement principle and proof-of-concept experiments involving comparative measurements with a well-known reference gas mixture utilized as a real-time system calibration, as well as mitigation of unwanted spectral interference from other molecules achieved through DODiS optical subtraction will be presented.

[a] G. Wysocki and D. Weidmann, *Opt. Express* **18**, 26123 (2010).