

# Detection of Gases and Gas Mixtures by Correlation Spectroscopy

By

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## Abstract:

The reliable detection and monitoring of gases and gas mixtures is known to play a crucial role in many real-world environmental and industrial applications. It is of considerable importance to utilise techniques that are not susceptible to poisoning, are specific to a target gas in a mixture, are unaffected by contaminants, and can be adapted for in-process monitoring. Ever-more stringent requirements in this field dictate a need for ongoing research in this area.

As many common gases exhibit their fundamental optical absorption in the infra-red and visible regions, novel optical absorption methods for the detection of gases and gas mixtures have application in a variety of real-world situations. Of these, correlation spectroscopy<sup>1,2</sup> is an established non-dispersive technique that is attractive in offering appreciable sensitivity and discrimination for gas detection<sup>3,4</sup>, with the potential for real-time measurement of different gas species within a mixture using a single sensing instrument.

We present new results for the detection of O<sub>2</sub>, CO, and CO<sub>2</sub> gases using a method of real-time correlation spectroscopy involving the modulation of the absorption spectrum of a reference gas sample relative to that of the gas to be measured. We believe it is the first time O<sub>2</sub> has been sensed in this manner and the use of low-cost sources and detectors suggests attractive commercial potential for this device.

## References:

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