

LICENSING OPPORTUNITY: VARIABLE-FREQUENCY OPTICAL COMBS, HETERODYNE SENSOR, AND PROCESS FOR PERFORMING SPECTROSCOPY

DESCRIPTION

Problem

Traditional chemical detection tools are slow and bulky, often needing mechanical parts that wear out. They also struggle to measure many chemical signals at once.

Invention

This invention uses lasers and modulators to create special light waves called “optical frequency combs” that can scan multiple chemical features instantly. These combs detect chemicals by analyzing how light changes as it interacts with different substances. It’s fast, accurate, and doesn’t need moving parts like older systems. The result is a detailed chemical fingerprint of whatever is being tested.

BENEFITS

Potential Commercial Applications

- Environmental monitoring (e.g., detecting pollution or greenhouse gases)
- Medical diagnostics (e.g., breath analysis for disease detection)
- Industrial safety (e.g., leak detection in chemical plants)
- Food and drug testing (e.g., checking for contamination)
- Defense and security (e.g., detecting explosives or toxic agents)

Competitive Advantage

- Companies can save money by using a faster, more reliable system that doesn’t need frequent maintenance.
- The technology can be miniaturized for portable or remote use.
- It enables real-time monitoring, which reduces downtime and improves safety.
- Businesses can also offer premium services with higher accuracy and speed.
- Opens doors to new markets like wearable health tech or smart sensors.

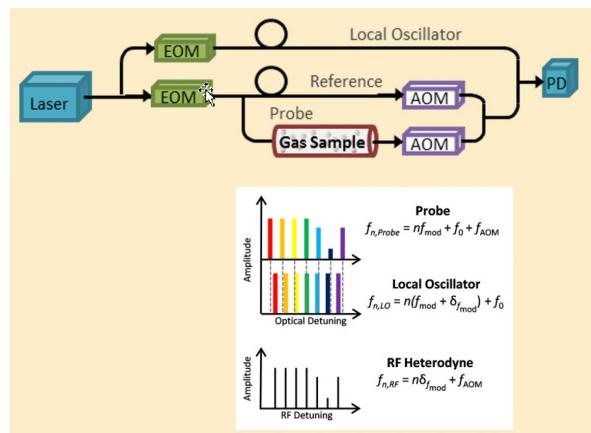


Diagram of the dual optical frequency comb spectrometer consisting of a single laser that is split into local oscillator, reference and probe legs to down-convert, interleave and normalize gas sample absorption signals.

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