# LICENSING OPPORTUNITY: SINGLE-DETECTOR DOUBLE-PATH INTENSITY-MODULATION SPECTROMETER

## DESCRIPTION

### Problem

Conventional approaches using a two-beam two-detector configuration can eliminate the fluctuation contribution from the light source and environment. However, using an additional infrared detector accompanies an unwanted thermal noise increase from multiple detectors and preamplifiers.

### Invention

This invention is an optical method that can minimize the noise due to system fluctuations and maximize the signal-to-noise ratio by modulating the analyte beam and the reference beam and detecting the alternating intensity difference by a signal light detector. This invention is based on a double-beam configuration but keeps a single detector so that it can reduce the laser fluctuation contribution without increasing the detection system noise.

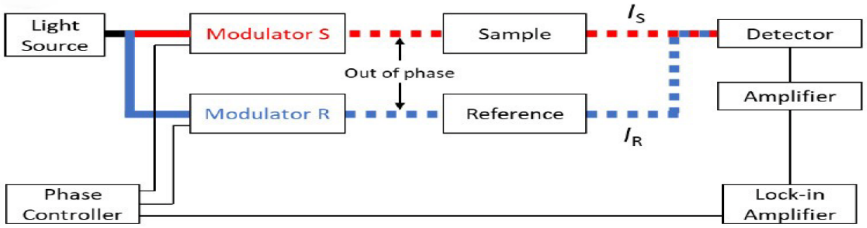
## BENEFITS

### Commercial Application

This invention improves the signal-to-noise of double-path by an order of magnitude without additional optical components for the invention. In fact, it reduces the number of bulky infrared detectors from two to one. The invention requires additional electronics for pulse generation and signal processing, which do not require additional footprint and may be provided by the existing electronics.

### Competitive Advantage

This invention keeps a double-path configuration but uses only a single detector so that it can reduce the laser fluctuation contribution without increasing the detection system noise. This invention will minimize the noise from the laser and other system fluctuations, maximize the sensitivity of absorbance measurement,and, thus, lower the detection limit of analytes.




Schematic of double-beam modulation spectrometry using a single detector.

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