

# IRis-F1

## High-speed infrared spectrometer

### Are state-of-the-art spectrometers limiting you?

Are you studying non-repeatable processes or do you require higher time resolution than your FT-IR can deliver? Are your FT-IR measurements taking too long to complete? Are you getting insufficient signal quality at high resolutions?

Spectroscopy of reaction kinetics, protein-folding, photocatalysis or high-throughput applications e.g. in pharmaceutical research and industrial enzyme development require high speed measurement. Today's state-of-the-art instruments are not fast enough for some of those. Are your applications limited by instrumentation as well?

### IRis-F1: fast, high resolution spectroscopy.

The IRis-F1 offers an unmatched combination of speed, brightness and multi-color measurements.

Our quantum cascade laser frequency comb spectrometer is the first turn-key frequency comb spectroscopy system. As opposed to conventional single-wavelength laser systems, the IRis-F1 allows for the simultaneous measurement of the whole laser spectrum without requiring tuning of the source, so high spectral and temporal resolution are obtained in a single-shot measurement.



A time resolution of microseconds, combined with multi-color output and high spectral resolution offers new possibilities in various applications such as time-resolved bio-molecular spectroscopy, photocatalysis and high throughput environments. Another advantage is the high brightness of the laser source, allowing for thicker samples and accordingly simpler sample preparation.

### APPLICATIONS

- Time-resolved spectroscopy
- Chemical kinetics
- Photocatalysis
- High throughput IR-analysis
- Analysis of chemical composition of gaseous, liquid and solid samples with high spectral resolution

### BENEFITS

- High speed (1  $\mu$ s)
- High brightness (laser source)
- Multi-color

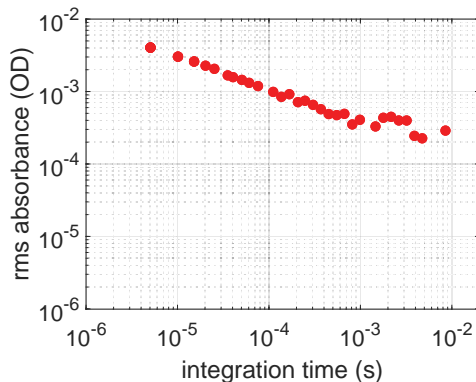
### CONFIGURATIONS

- High amplitude sensitivity: Both lasers penetrate the sample, leading to maximum absorption sensitivity
- Phase sensitivity: Lasers are combined after the sample, enabling phase sensitive measurements
- High resolution: User access to sweep the combs for high resolution applications

## SYSTEM SPECIFICATIONS

Time resolution	< 1 $\mu$ s
Signal-to noise ratio	> 100 @ 1 $\mu$ s integration time
	> 1000 @ 100 $\mu$ s integration time
	> 1000 @ 10 sec integration time
Light source	Exchangable quantum cascade laser frequency comb sources.
	Laser exchange may require exchange of additional system components.
Spectral coverage	typically 60 $\text{cm}^{-1}$ per exchangable laser source
Center wavelengths	2000 $\text{cm}^{-1}$ (5 $\mu\text{m}$ ) – 1000 $\text{cm}^{-1}$ (10 $\mu\text{m}$ ) available now
	2200 $\text{cm}^{-1}$ (4.5 $\mu\text{m}$ ) – 2000 $\text{cm}^{-1}$ (5 $\mu\text{m}$ ) under development
Spectral resolution	< 10 MHz (0.0003 $\text{cm}^{-1}$ )
Spectral sampling	0.165 $\text{cm}^{-1}$ – 0.5 $\text{cm}^{-1}$
User interface	Transmission and absorbance spectrum display
	Data export in open format
Power consumption	110 – 230 VAC, 700 W typical including electronics

## ALLAN DEVIATION OF A SINGLE SPECTRAL ELEMENT



Allan deviation as function of integration time. Only a single spectral element (data point in the spectrum) is considered. Even better results can be achieved on broad absorption features extending over multiple data points.

