

thinkforward

The new **IFS 125HR** FT-IR spectrometer is the successor to the established worldwide reference for high resolution measurements from the Far-IR to the UV, the **IFS 120HR**.



IFS 125HR

- Outstanding resolution across the entire spectrum.
- Resolved linewidth of $< 0.001 \text{ cm}^{-1}$
- Broad spectral range: from 5 cm^{-1} in the far-IR to $>50,000 \text{ cm}^{-1}$ in UV
- Double-sided interferogram acquisition up to 50 cm OPD.
- Vacuum optics bench evacuable $< 0.02 \text{ Torr}$
- Easy detector and range change

The Bruker Optics **IFS 125HR** FT-IR spectrometer offers the highest resolution available over a wide wavelength range from 5 cm^{-1} in the Far-IR to $50,000 \text{ cm}^{-1}$ in the UV.

Each component of the new **IFS 125HR** is optimized to approach the theoretical limit of sensitivity. The scanner allows collection of data at very high resolution without beam folding. With the improved electronics, free running delta-sigma 24 bit ADC and Ethernet TCP/IP connectivity, the **IFS 125HR** provides the performance that any demanding application may need. Automatic detector-, beamsplitter- and accessory recognition assists the user in setting-up experiments. The spectrometer is completely controlled by the user-friendly OPUS software running on a Windows™ PC.

Studies of physical-chemical primary processes require very high spectral resolution to derive the true molecular quantum motion from the absorption spectra. In addition, high resolution FT-IR spectroscopy is ideal for investigating changes in stratospheric gas concentrations due to its sensitivity and selectivity. Some applications:

- Structure analysis of gaseous molecules at low pressure
- Low temperature measurements on solids
- Magneto-optical splitting on semiconductor material
- Emission of high temperature gasses
- Environmental atmosphere analysis



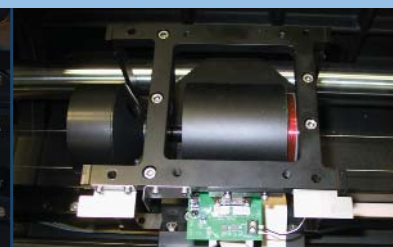
Longer bearing assemblies can be substituted to achieve higher resolution.



Up to 4 internal and 2 external detectors can be mounted on the **IFS 125HR**.



Ethernet connectivity transmits data from the spectrometer to the OPUS data station.



Hybrid scanner with high & low resolution scan mode provides exceptional velocity stability.



World's highest resolution commercial FT-IR at the ETH Zürich

IFS 125HR

The Interferometer

The permanently aligned interferometer has a 30° angle-of-incidence. The narrow angle-of-incidence makes more effective use of the beamsplitter in addition to reducing beam polarization effects. The beam is split to the fixed and moving cube-corner retroreflectors of the modified Michelson interferometer. The moving mirror is translated on a hybrid bearing whose design ensures beam integrity over the extremely long optical path difference, which can be greater than 9 meters.

The Source Compartment

The source compartment of the **IFS 125HR** can accommodate three water-cooled sources with computerized selection. In addition, there is a computer-selectable port for an ultra-violet source or external emission experiments. The source beam exits at a focus to the interferometer compartment.

The Sample Compartment

There are two large chambers with focused beams which accommodate a wide variety of sampling accessories including long path gas cells and cryostats. To enhance flexibility, each sample chamber can be equipped with an additional exit port. Flaps isolate the

sample compartment to preserve vacuum in the rest of the optics during sample change or accessory installation. At the sample position a 1:1 image of the input aperture is provided.

The Detector Compartment

The detector compartment can house up to four internal and two external detectors. All six detector positions are accessible by beams from either sample chamber and detector selection is under computer control. Up to four liquid nitrogen cooled or room temperature detectors with new DigiTect™ technology can be mounted internally. The external positions provide room for large liquid helium cooled detectors such as far-IR bolometers or special high sensitivity mid-IR detectors such as Si:B or Ge:Au.

For emission work a separate detector chamber may be mounted at the collimated beam exit port of the interferometer to maximize energy throughput in the NIR/VIS/UV range.

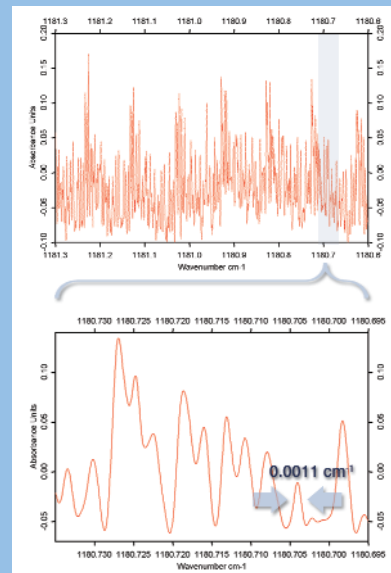
The system includes a closed-loop coolant system for the sources and a vacuum pump which evacuates the bench to a level of <0.02 Torr. Alternatively, the entire optics bench may be purged with dry, clean, air or nitrogen.

Stratospheric gas analysis



High resolution FT-IR spectroscopy is ideal for investigating changes in stratospheric gas concentrations due to its sensitivity and selectivity. The sun serves as the infrared source and the composite optical density due to all absorbers along the optical path to the spectrometer is measured at a given wavelength. Thus, if an absorption line is interference-free, the resulting spectrum can be used to obtain a total column density of all stratospheric and tropospheric absorbers of that species. Careful analysis of the lineshape even allows a concentration profile versus altitude to be obtained. Specifically configured IFS 120 series spectrometers have been in use for field emission measurements since the late 1980s, all around the world.

High Resolution Spectrum of CF₃I



Sample: CF₃I, 20cm cell, 0.3 mbar
Measurement time: 10 h
Noise: 0.005 Absorbance units.

CLASS 2 LASER PRODUCT, DO NOT STARE INTO BEAM

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