

Introduction to Bruker



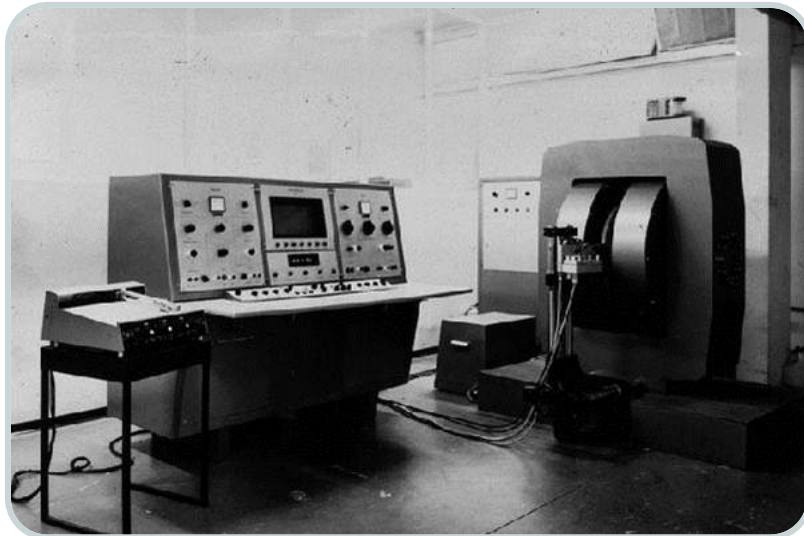
David Marston
Division Manager AU/NZ
Bruker Optics



History



- **1960** - BRUKER Physik AG was founded in Karlsruhe (Germany) by Prof. Günther Laukien with Nuclear Magnetic Resonance products



1967- HFX-90 spectrometer with a 90 MHz iron magnet (the world's first fully transistorized NMR-spectrometer)



Global Company with Diversified Markets



- 2018 Annual Revenues: **US\$1.896 Billion**
- Global market leadership in many segments
- Worldwide sales and service network with over 6500 employees



Bruker Corporation Groups and Divisions (NASDAQ: BRKR)



Bruker BioSpin Group



Magnetic Resonance Spectroscopy (MRS)



Preclinical Imaging (PCI)



Applied, Industrial and Clinical (AIC)

Bruker CALID Group



Mass spectrometry (Daltonics)



Infrared & Raman spectroscopy (Optics)



CBRNE (Detection)

CALID = Chemical, Applied Markets, Life Science, In-Vitro Diagnostics, Detection

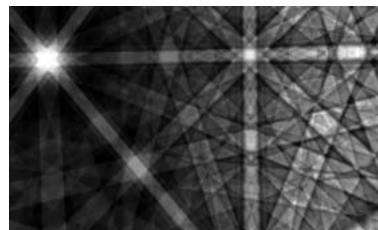
Bruker NANO Group



Bruker Nano Surface



X-ray analysis



Bruker Nano Analytics

Bruker EST (BEST)



Supercon wire and devices

BEST: Bruker Energy and Supercon Technologies

The best Solution for Analytical Tasks



Magnetic Resonance

- Nuclear magnetic resonance
- Electron paramagnetic resonance
- Magnetic resonance imaging

X-ray

- X-ray Fluorescence
- X-ray Diffraction & Crystallography

Elemental Analysis

- Spark OES
- Combustion (CS/ONH) Analyzers
- Handheld XRF

Molecular Spectroscopy

- Infrared Spectroscopy (FT-IR)
- Near Infrared Spectroscopy (FT-NIR)
- Raman Spectroscopy

Mass Spectrometry & Separations

- LC/MS
- FTMS
- MALDI-TOF (/TOF)
- ICP-MS

Microanalysis

- Scanning probe microscopes
- Atomic Force Microscopy
- Tribology

Bruker Optics – one Division of Bruker Corporation



- **Employees:**
660 worldwide, 330 in Germany
- **Revenue:** US\$ 190M
- **Ettlingen (Germany) facility:**
 - R&D of hardware and software
 - Production of all systems
 - Endtest (FAT) department
 - Worldwide support for application, sales and service

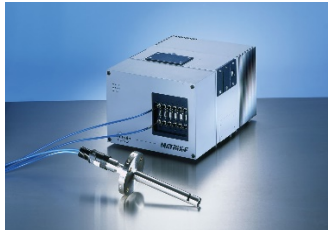
Bruker Optics Worldwide Sales & Support



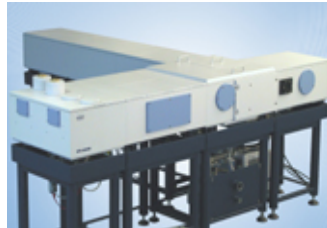
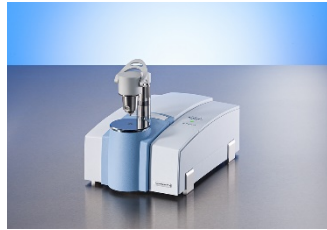
Bruker Optics Spectrometers



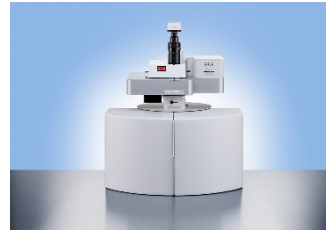
FT-NIR



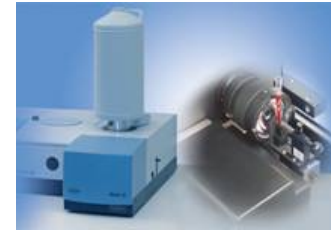
FT-IR



Microscopes



Raman



FTIR – the extremes



Alpha

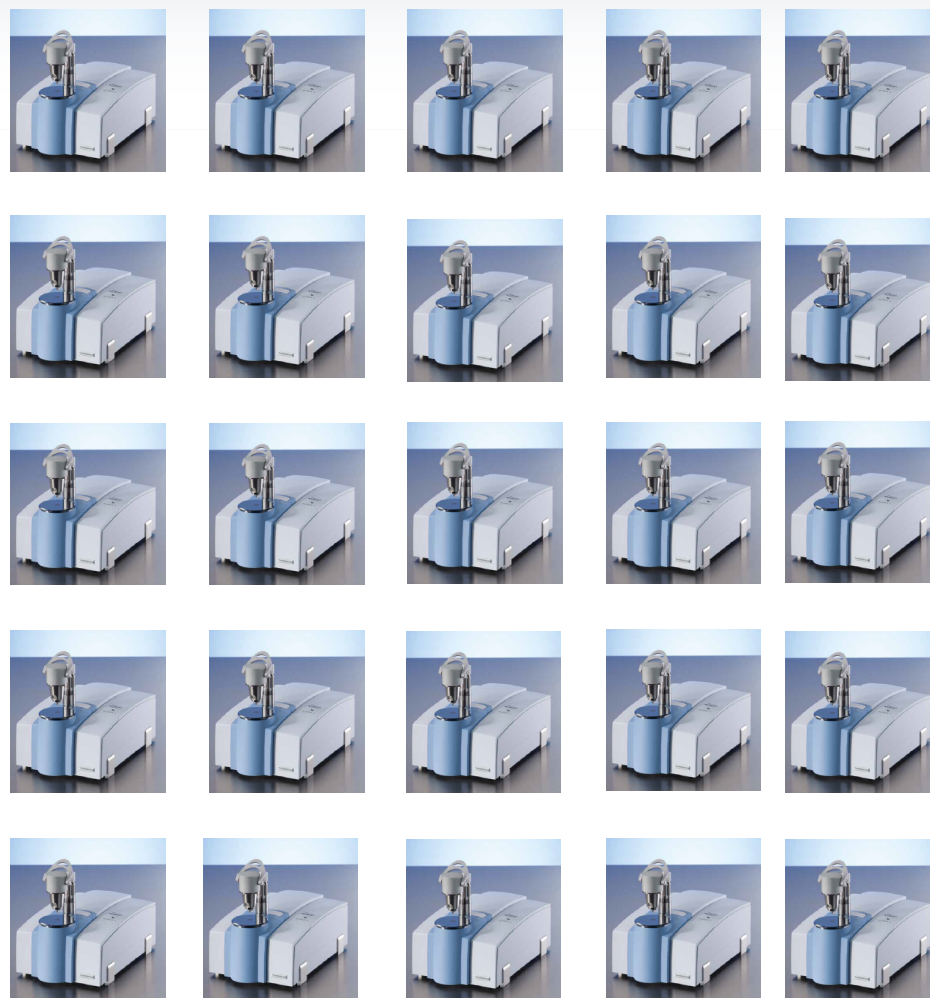
- Compact FTIR
- MIR only
- Modular sampling options
- QC, QA, teaching
- Qualification, Quantification
- Mobility options



IFS125

- Highest resolution FTIR
- UV to THz
- Atmospheric research
- Solid state research

IFS125 – an important product line



IFS125 - an important product line



IFS 125 Installation base:

- 88 units installed
- 25 countries
- 50:50 split between atmospheric and research

Typically annual activity:

- 2-3 new installations
- 1-2 upgrades of 120's (around 20 to date)

No plans to discontinue the IFS125

Systems will be supported >10 years after discontinuation
(oldest system is >30 years old)



Atmospheric Research

- Stratospheric trace gas analysis
- Absolute line strength and band shape of atmospheric gases
- Radiative transfer through the atmosphere

Physical Chemistry

- Ro-vibrational spectroscopy
- Determination of molecular dynamics
- Structural analysis of small molecules
- Spectroscopy of molecular crystals at low temperatures
- Matrix isolation studies

Solid State Physics

- Single crystal impurities at low temperature
- Magneto optical splitting
- Terahertz (THz) high resolution

IFS125 – non-atmospheric examples Simon Fraser University - semiconductor



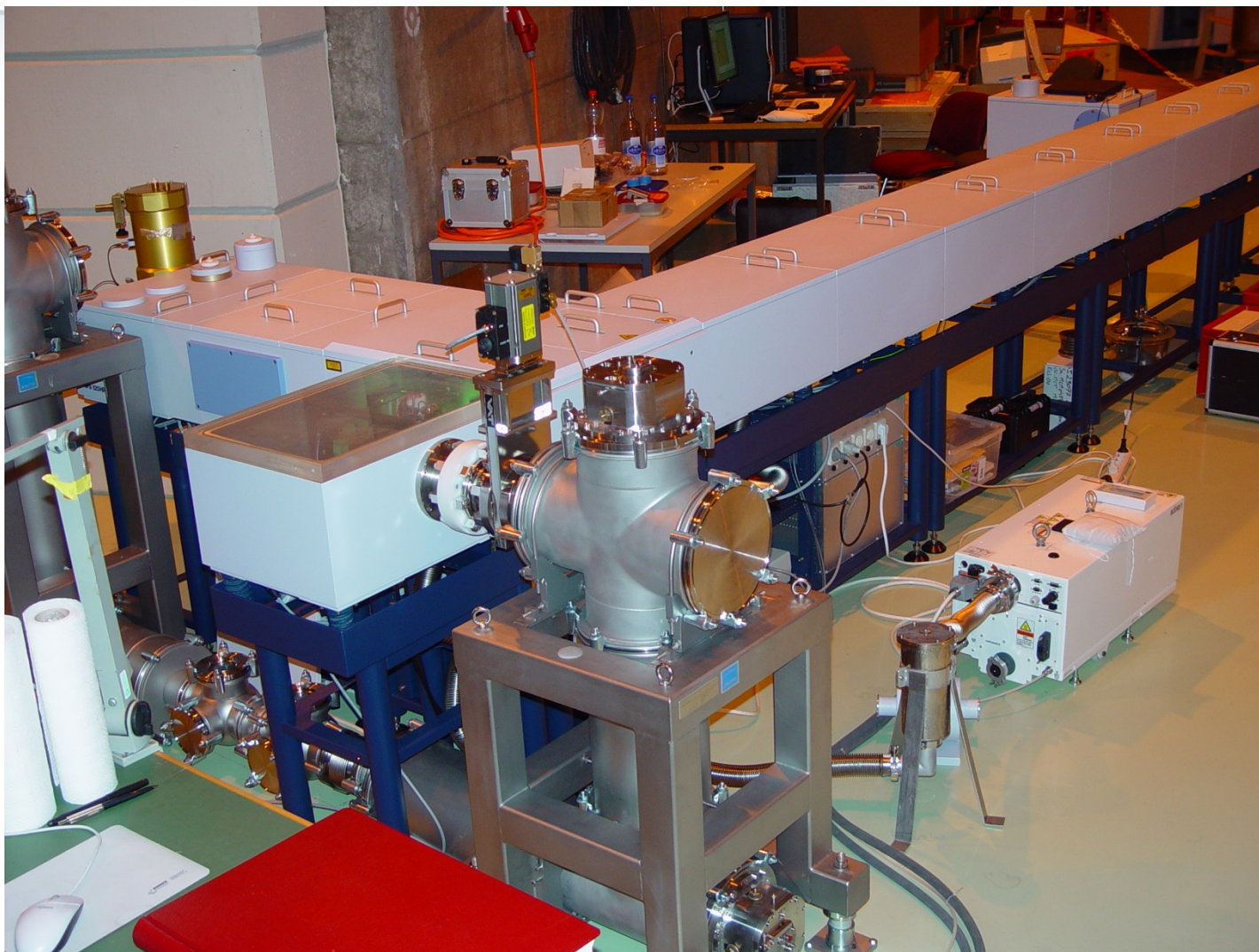
IFS125 – non-atmospheric examples Swiss Light Source



IFS125 – non-atmospheric examples Canadian Light Source – VT long path gas cell



IFS125 – non-atmospheric examples Swiss Light Source – 11 chambers (11.5m)!

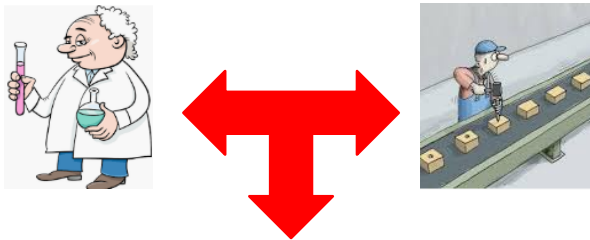


IFS125 from a local (AU/NZ) Perspective



Old days

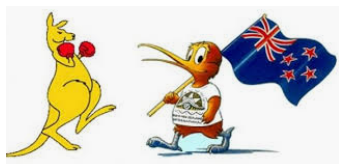
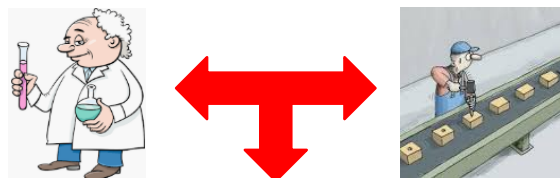
- Discussions between factory and customer
- Little / no involvement of local entity
- Sales, logistics etc conducted from Germany



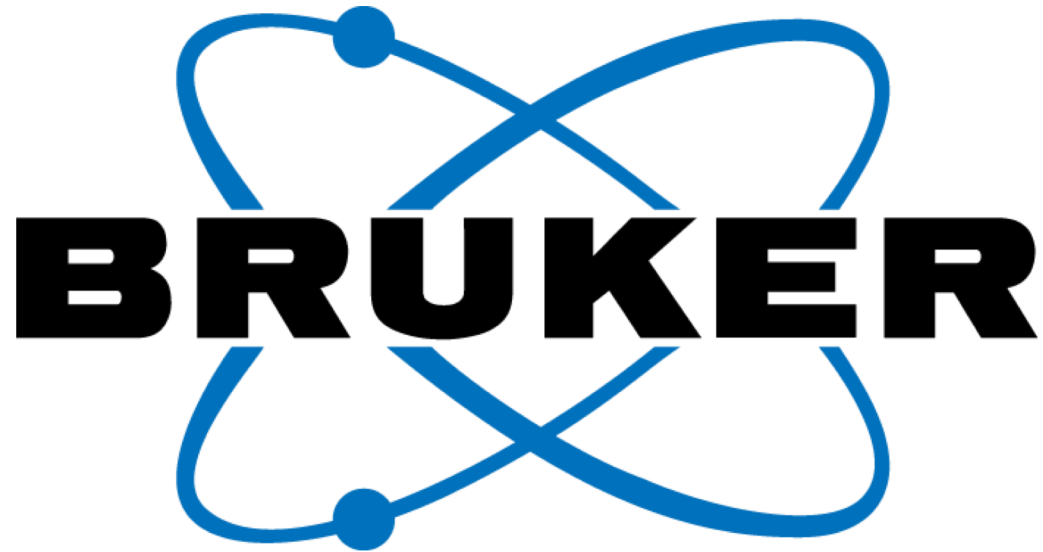
More recently

- No “cross-border” selling (except OEM)
- Discussions between factory &/or local entity and customer
- Final configurations approved by factory
- Local entity conducts transaction (quotes, invoicing, shipping, delivery, importation etc)
- Factory coordinates installation / service with all parties

Benefits of local entity involvement with IFS125



- Quotations: use local rules & regulations
- Invoicing / payments handled locally
- Local entity experienced at logistics
- Stock: provide (some) parts and consumables locally
- Carry out some service work locally
- Access other experts in the factory (shipping, orders, logistics, production, service, management etc) if Gregor is away
- A local ear you can speak / yell in your own time zone



Innovation with Integrity