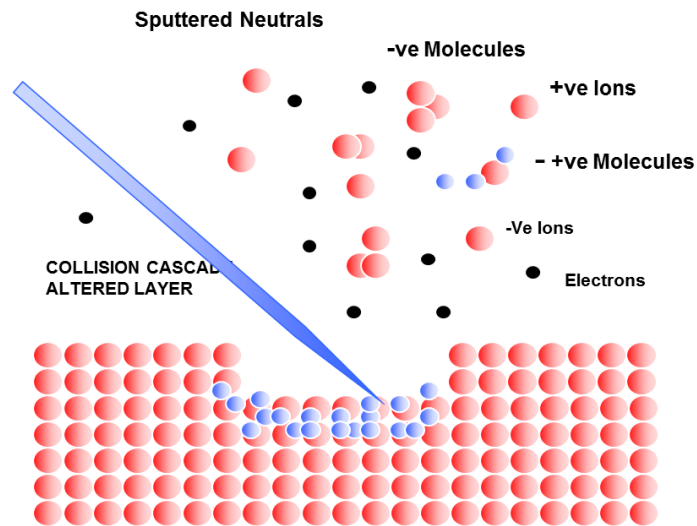


# Hidden Compact SIMS

## Mass Spectrometry in solid material



# Compact SIMS Overview

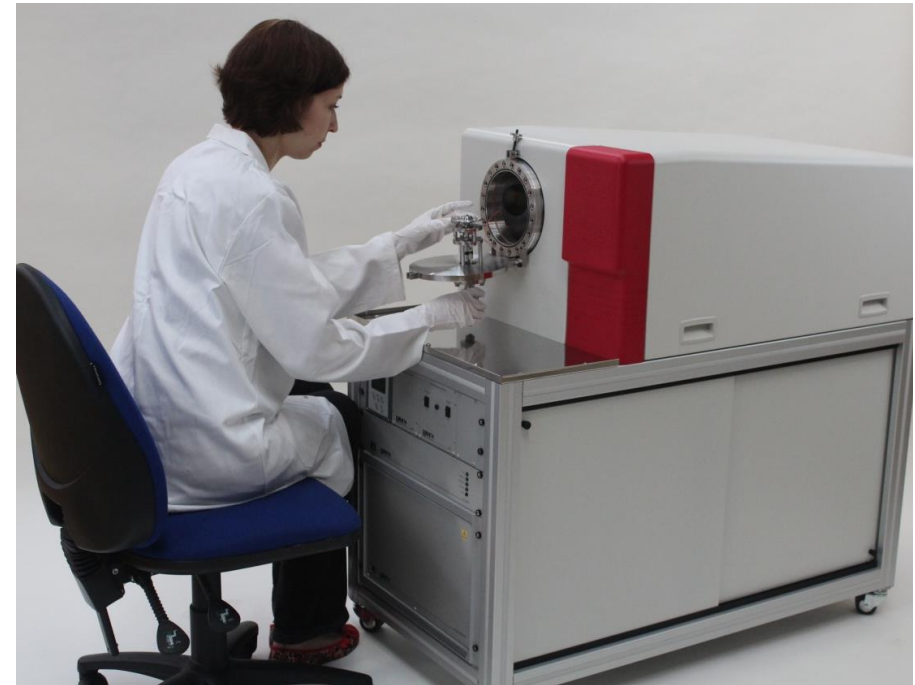
The Hiden Compact SIMS tool is designed for fast and easy characterisation of layer structures, surface contamination and impurities with sensitive detection of positive ions being assisted by the oxygen primary ion beam and provides isotopic sensitivity across the entire periodic table.

The ion gun geometry is set to provide for ideal nanometre depth resolution and near surface analysis.



## Features

- Small footprint
- Easy “user friendly” layout
- Requires only single phase electrical power (under 10A 220Vac)
- Wheeled trolley design
- Positive SIMS and SNMS
- Depth Profiling
- 3D characterisation and imaging
- Mass spectra
- Isotopic analysis



# Applications

- Thin films
- Surface coatings
- Semiconductors
- Catalysis
- Magnetic media
- Pharmaceuticals
- Corrosion studies
- Nanotechnology



# Specifications

## Primary ions

Energy/current: 1 to 5 keV / up to 400nA

Gases: Oxygen for high sensitivity

Spot size: under 50 $\mu$ m (imaging)  
80  $\mu$ m depth profiling

## Sensitivity

Boron in Silicon (SIMS): 2ppm ( $10^{17}$  atoms cm<sup>-3</sup>)

## Vacuum

Pump down to operation 10 minutes  
with inert gas vent

Ultimate ----- <5x10E-8mbar

Weight --- 215kg



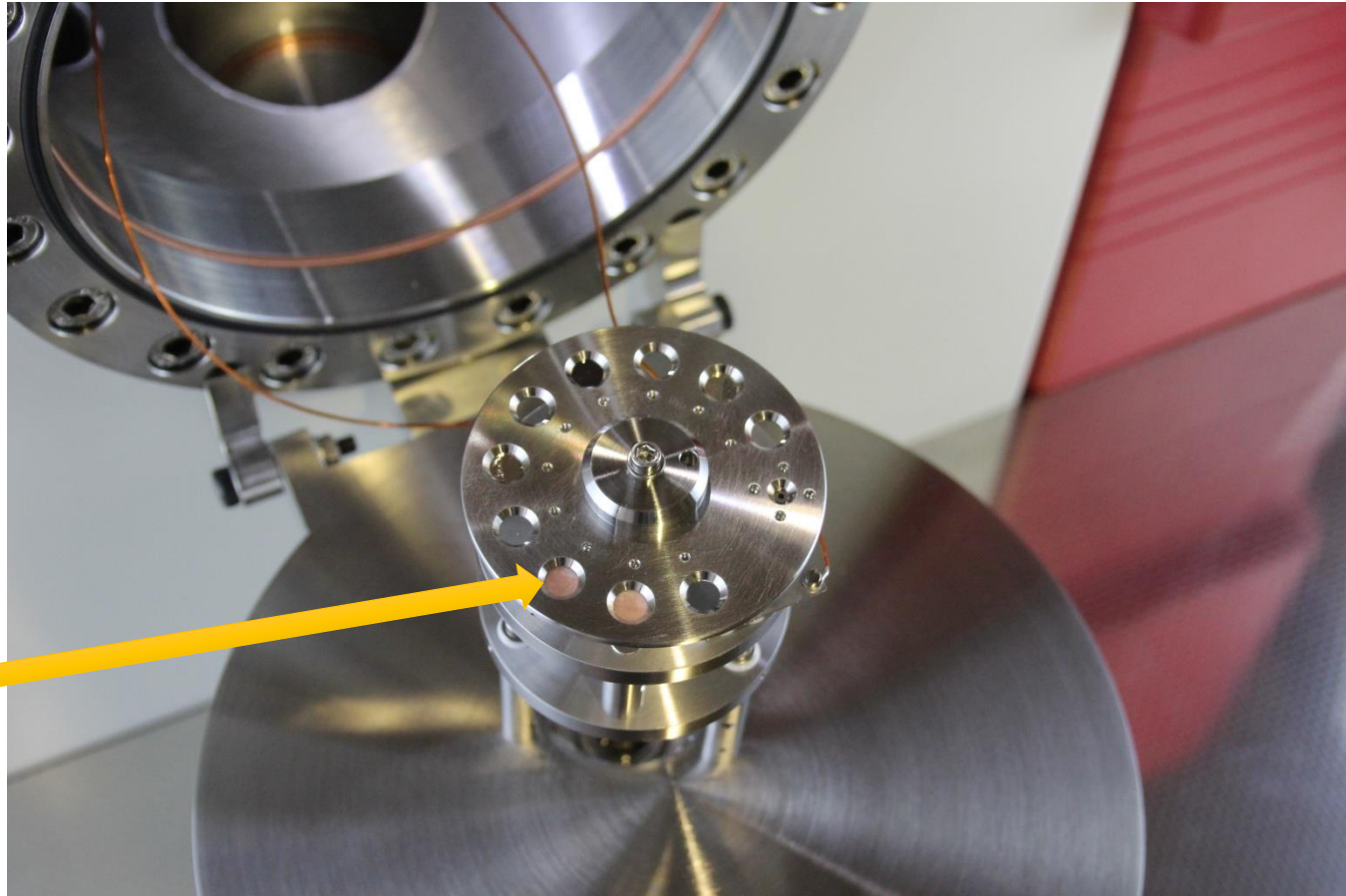


# Sample loading

A rotary carousel enables 10 samples to be simultaneously loaded for measurement into the dry-pumped vacuum chamber.

Custom carousels are easily changed and custom carousels can be manufactured for specific sample applications.

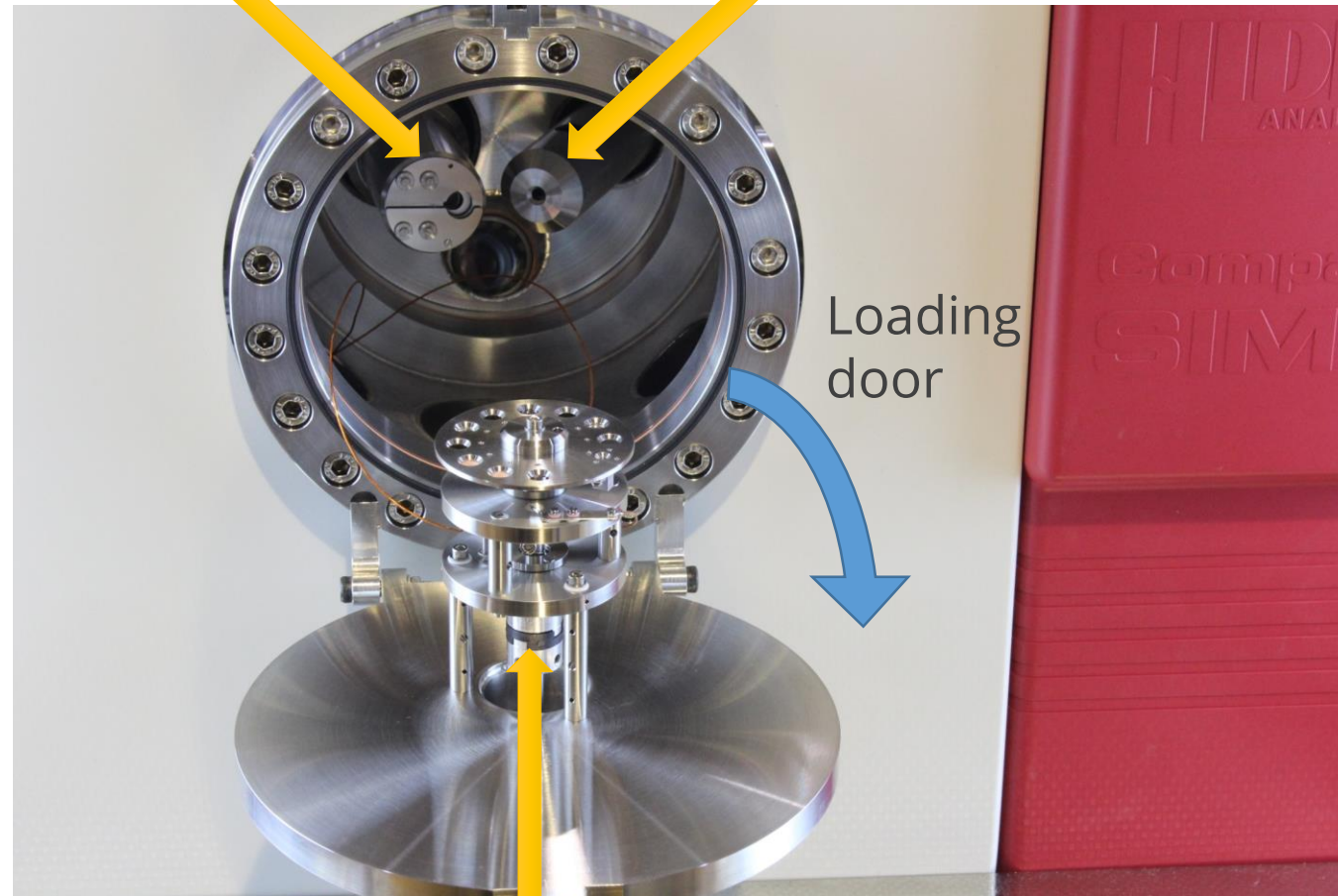
8mm diameter



# Quadrupole Mass Spectrometers for Advanced Science

MAXIM-600P SIMS detector

IG20 gas ion gun

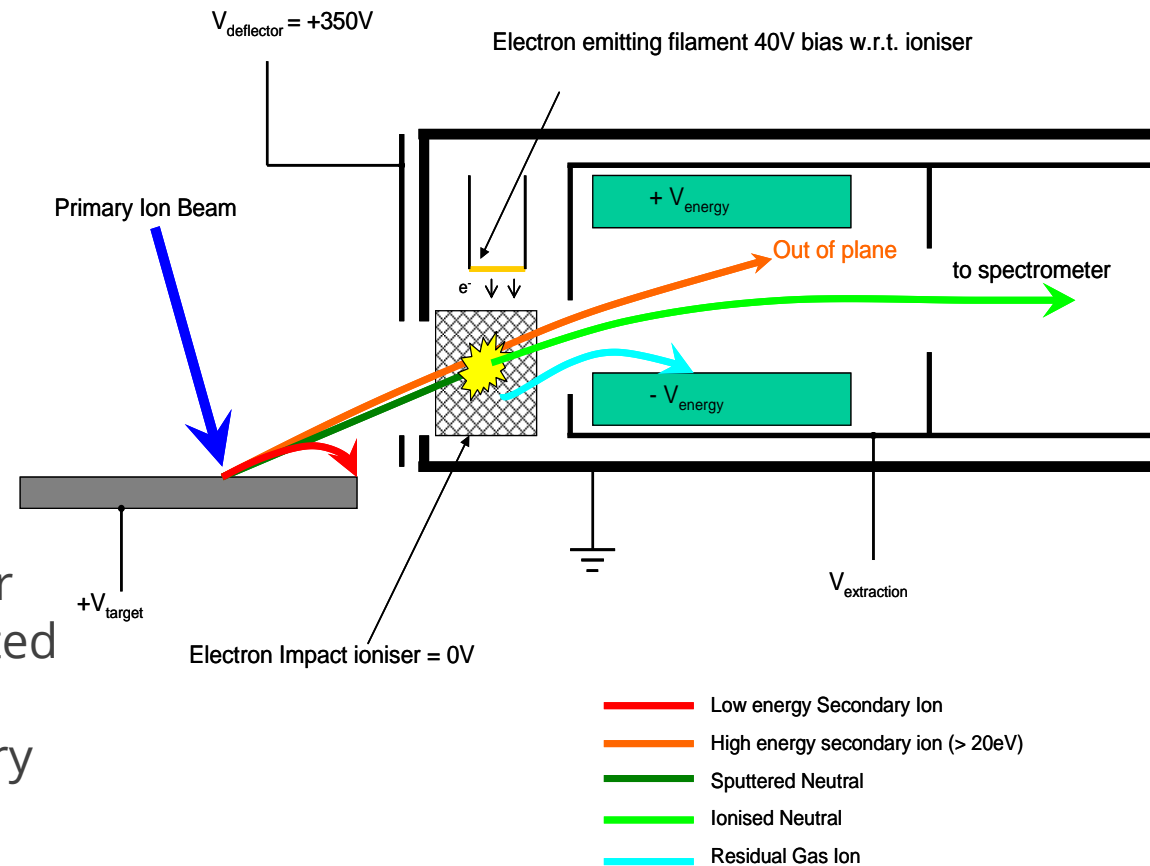


Loading door

Rotary carousel

**SNMS** facility that is useful for quantification of high concentration elements, such as alloys.

The MAXIM SIMS/SNMS spectrometer has an electron impact ion source fitted close to its entrance. An external deflector plate removes the secondary ions (which generally constitute less than 1% of the sputtered flux) and allows the neutrals to enter the ioniser. Once ionised, the neutrals follow the same path that SIMS ions would have taken.



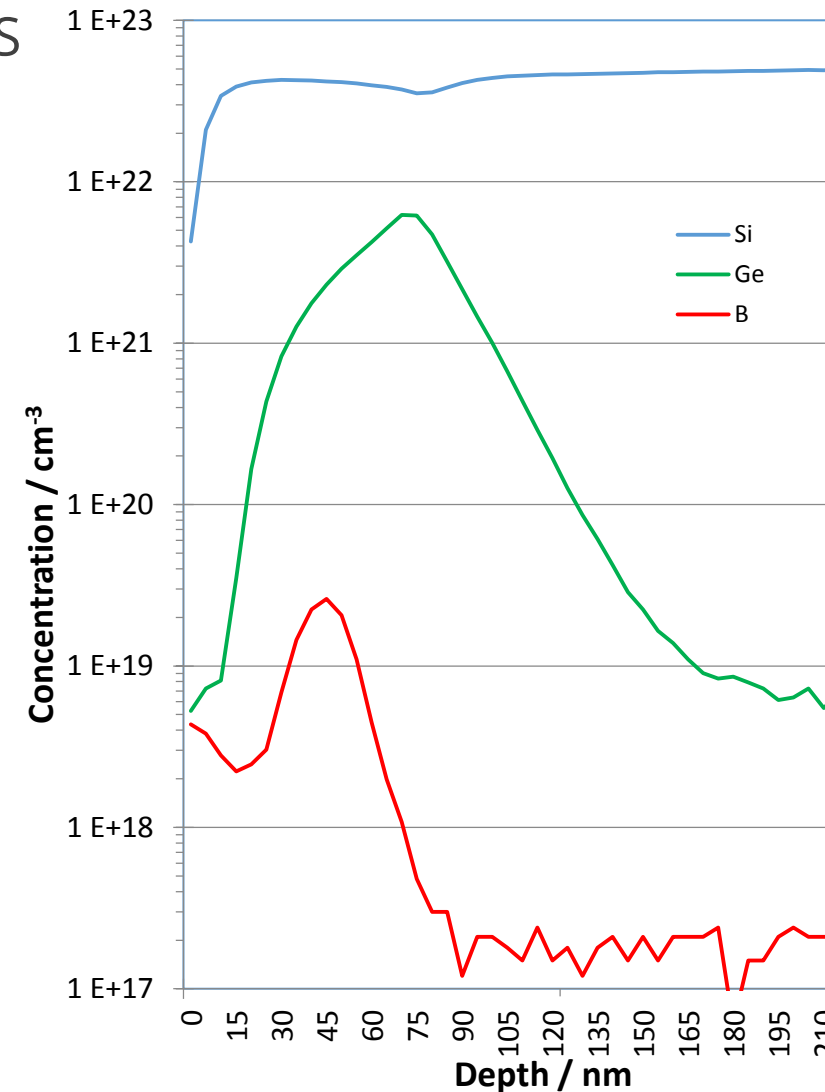


## Depth Profile from Compact SIMS

SiGe with Boron Doping

Primary ions 5keV O<sub>2</sub><sup>+</sup>

Positive secondary ions



# Ion Gun Control

PC controlled

Settings can be saved and recalled

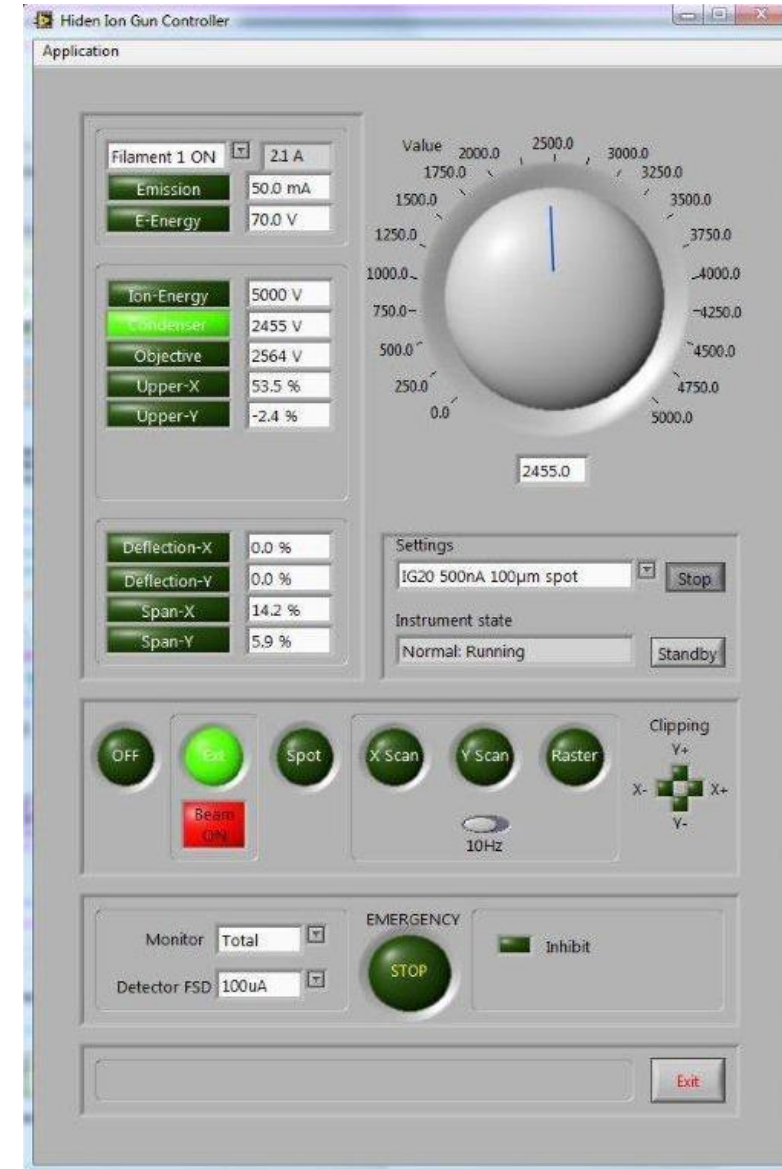
Automatic ion source warm up / cool down

EHT ramp rate control

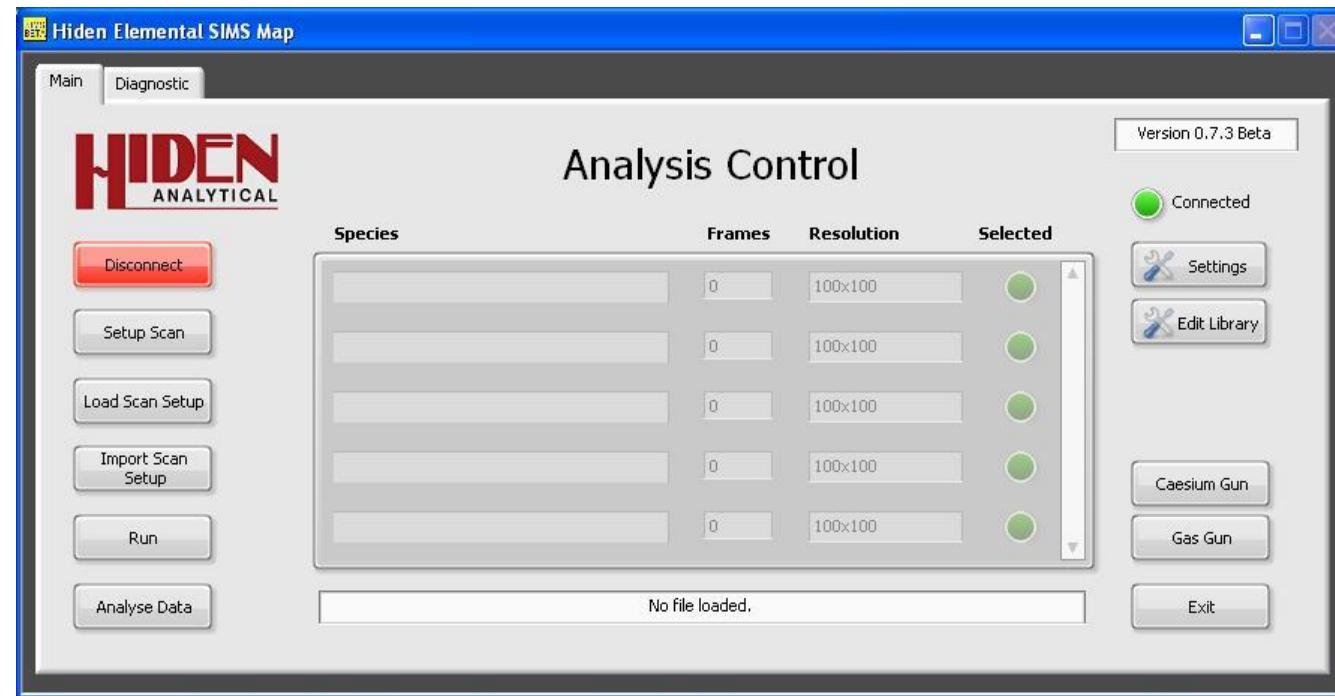
Gun diagnostics

Connect via TCP/IP, USB or serial

Upgradeable software and firmware



# Hidden SIMS Mapper Software



Control of the overall experiment and connection to the mass spectrometer

# Quadrupole Mass Spectrometers for Advanced Science

Periodic Table Species Selection

Available Isotopes	Exact Mass	Abundance
28Si	27.98	92.23
29Si	28.98	4.67
30Si	29.97	3.10

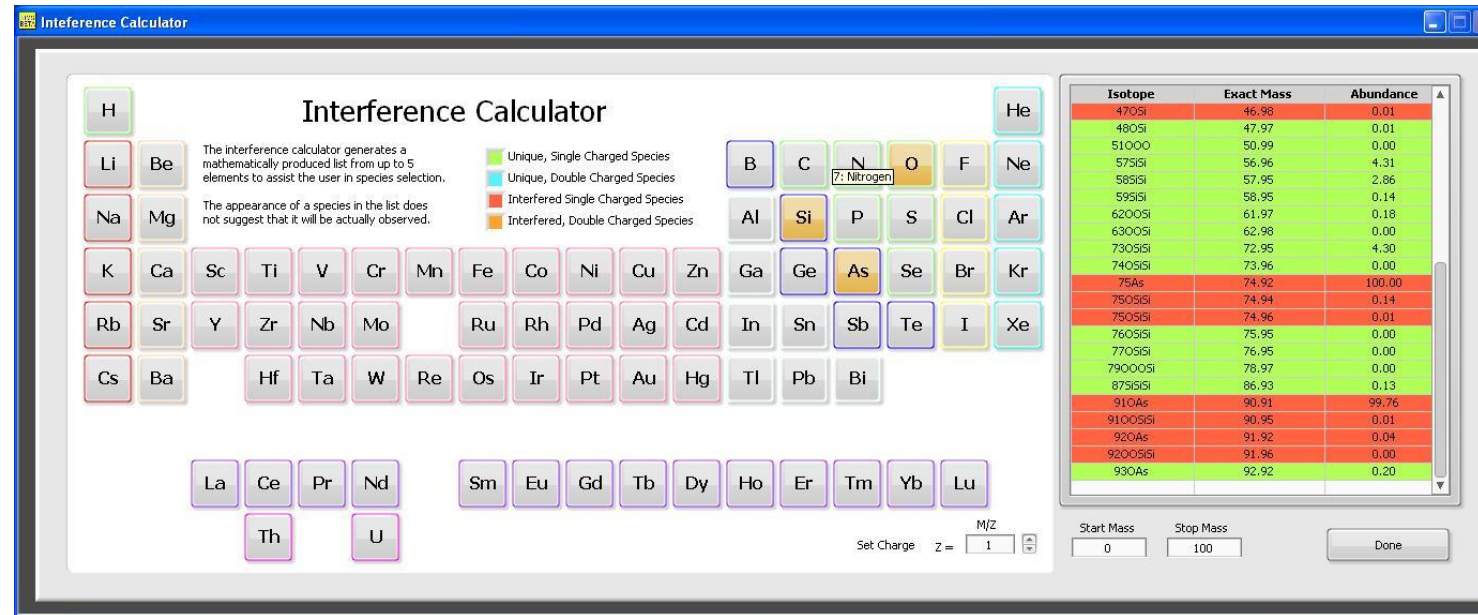
Atomic Mass: 30 Chosen Species: Si Exact Mass: 29.97 Abundance (%): 3.10

Interference Calculator Save to Custom List Custom List Editor

Cancel Done

Mass for analysis is chosen from a periodic table and can include molecules and multiply charged species. Experienced users can also input data directly.

# Quadrupole Mass Spectrometers for Advanced Science



An integral interference calculator identifies possible mass interferences and suggests relative signal intensities



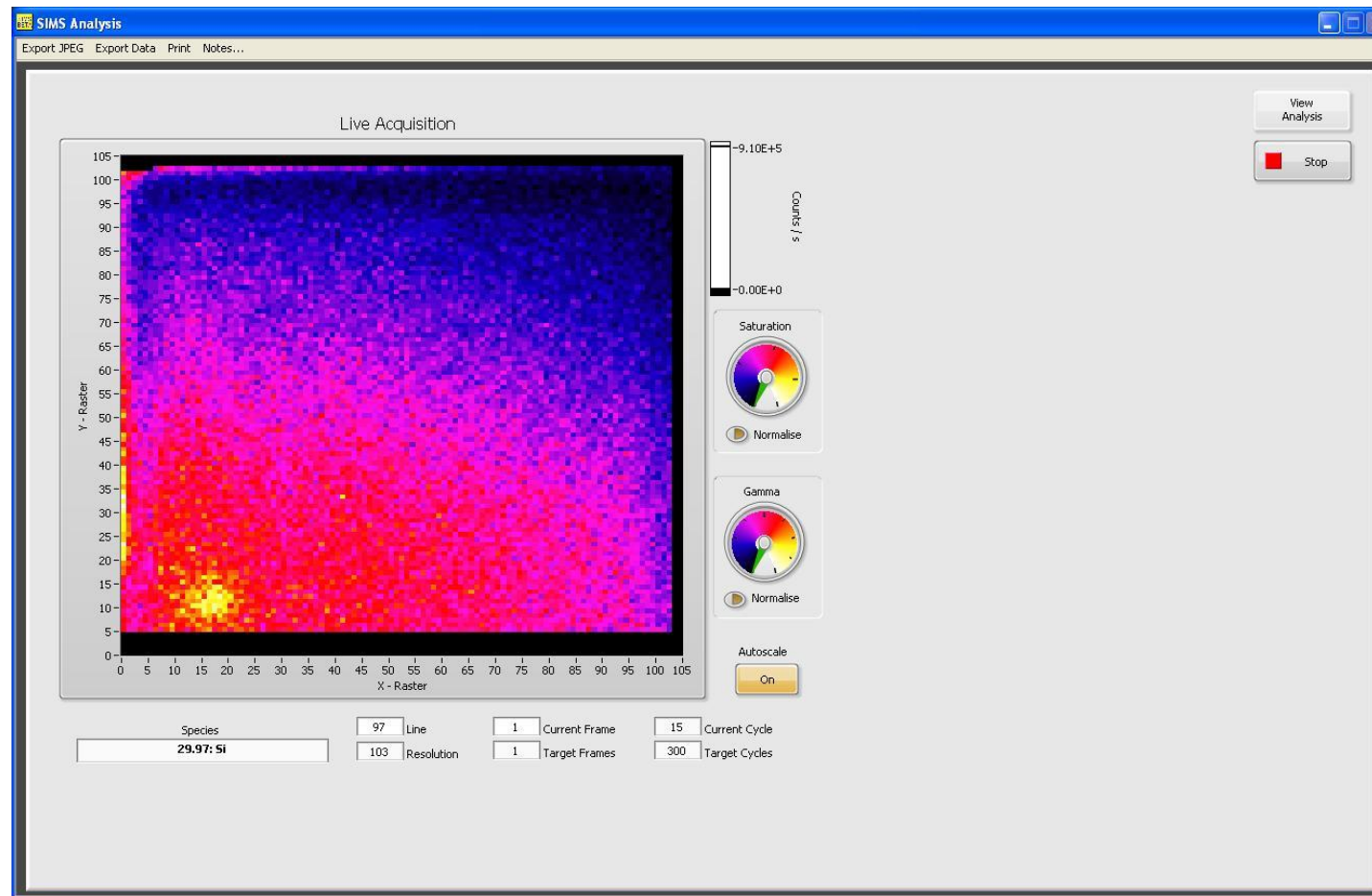
# Quadrupole Mass Spectrometers for Advanced Science



The experiment flow shown here has three channels (Si, Ge and B).

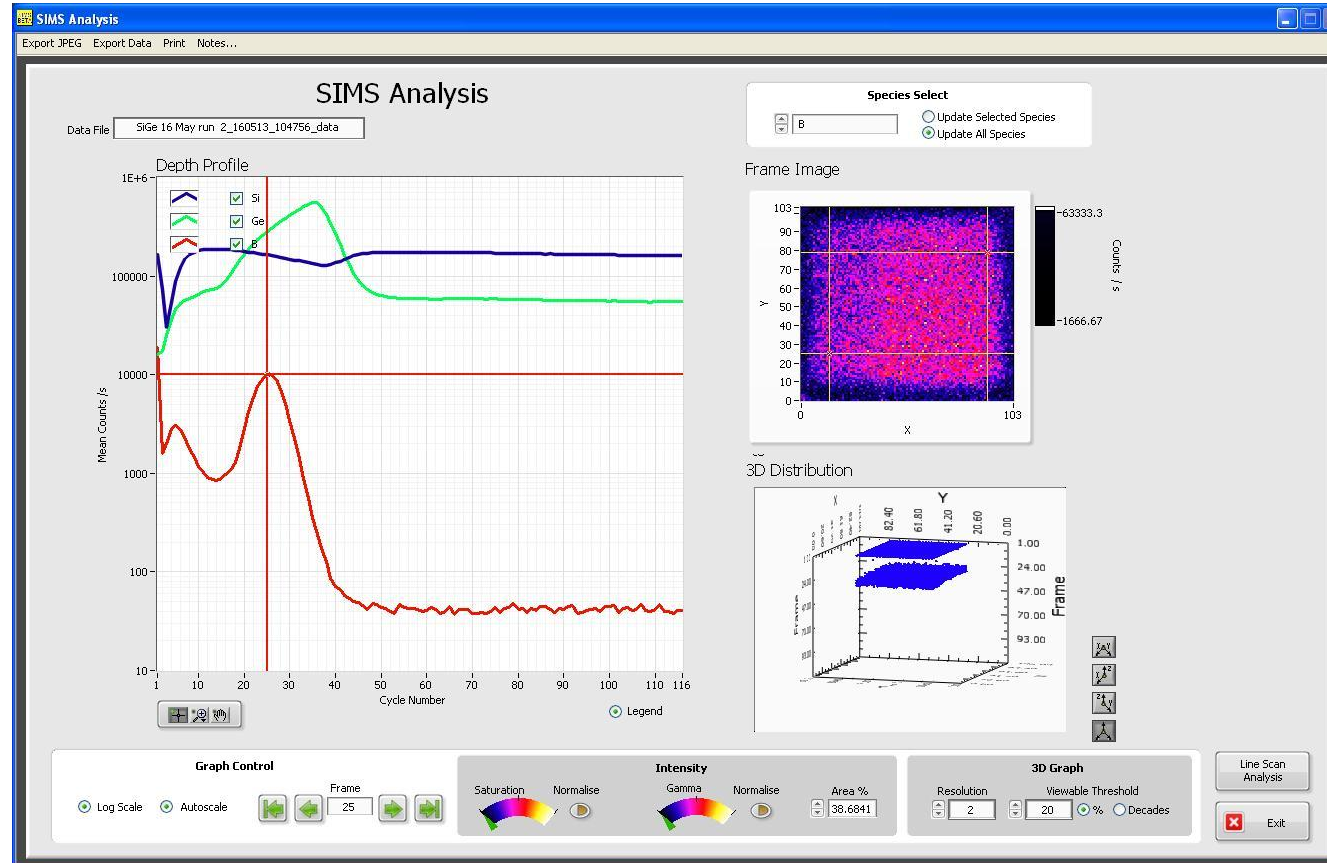
Species can be selected or deselected for analysis – this allows a non-expert user to control a range of experiments from a single template.

# Quadrupole Mass Spectrometers for Advanced Science



During analysis the live acquisition window displays the signal so that the progress of the experiment can be monitored and surface features observed.

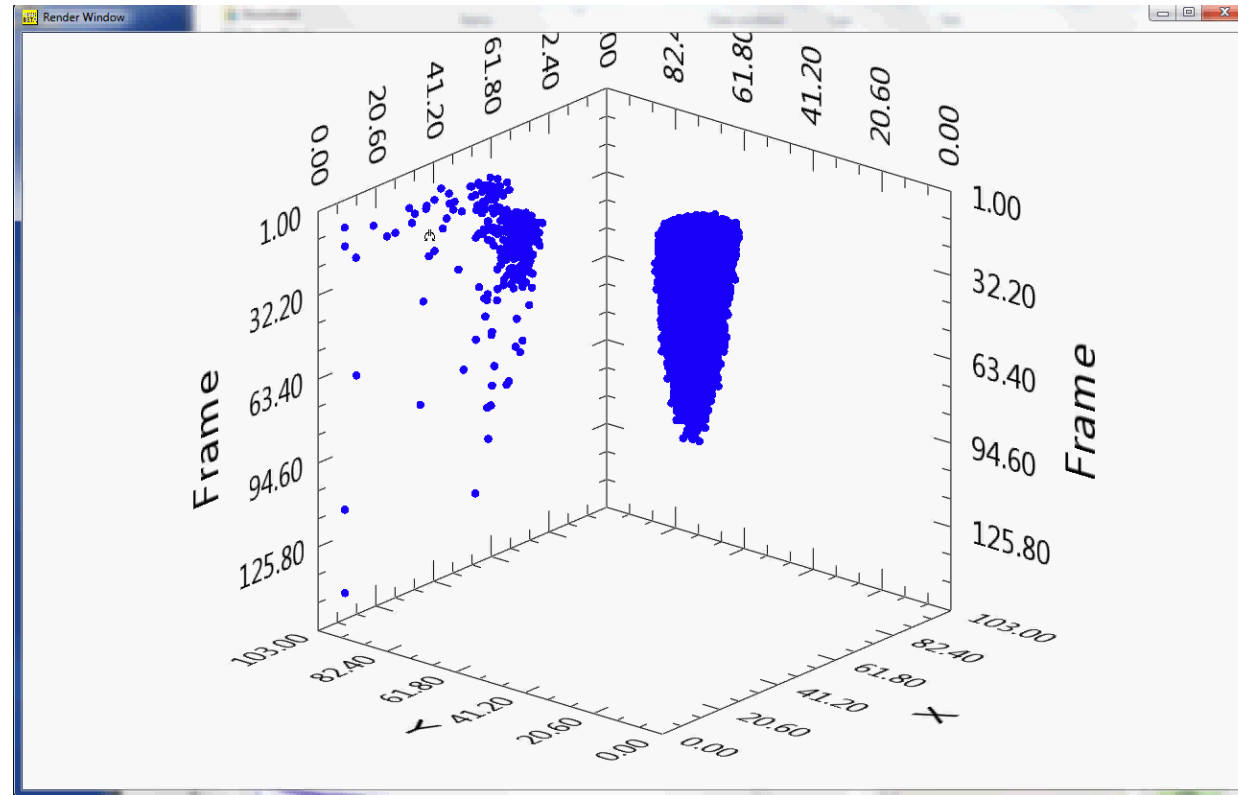
# Quadrupole Mass Spectrometers for Advanced Science



During analysis the analysis window displays the depth profile, image data and a 3D representation of the distribution. It also controls the electronic gating.

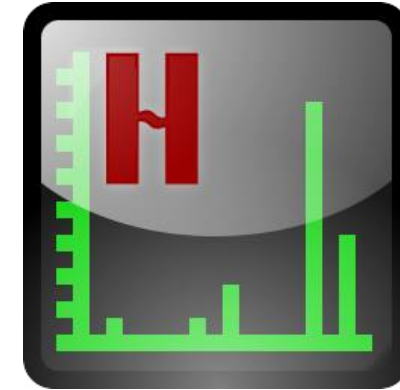
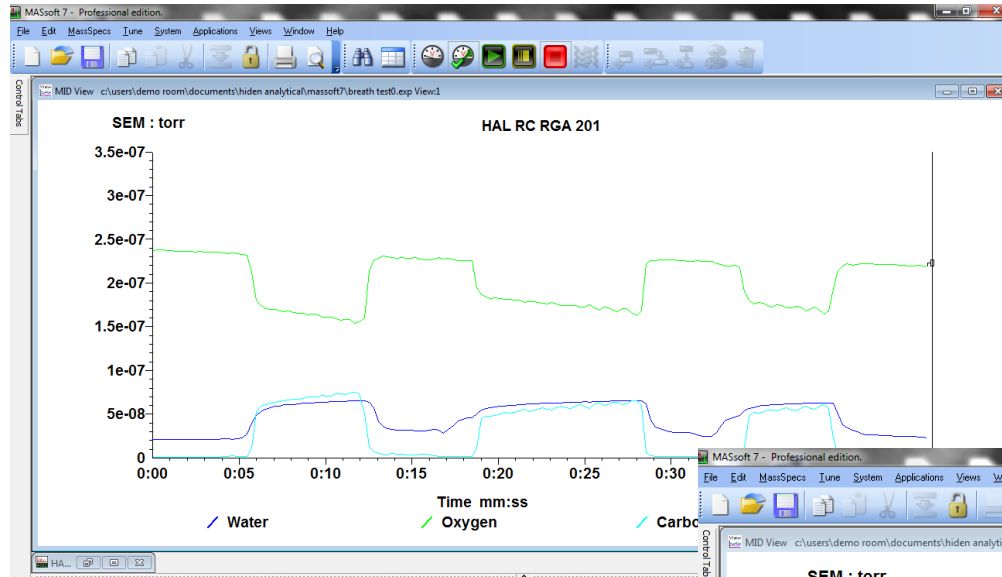
The electronic gate can be optimised independently and interactively for each mass and does not have to be concentric or square.

# 3D Profiling by SIMS

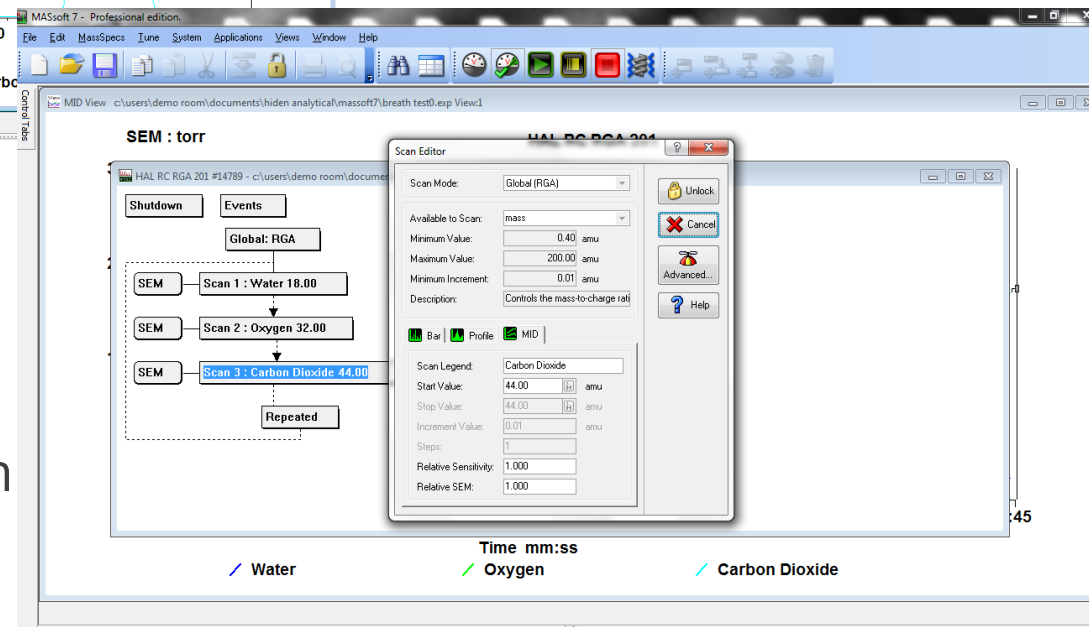


The video shows the mass resolved aluminium signal arising from aluminium oxide grit particles embedded in the work-piece after a grinding operation. Volume is 800µm square x 35 µm deep.

# MASsoft 7 Professional control software

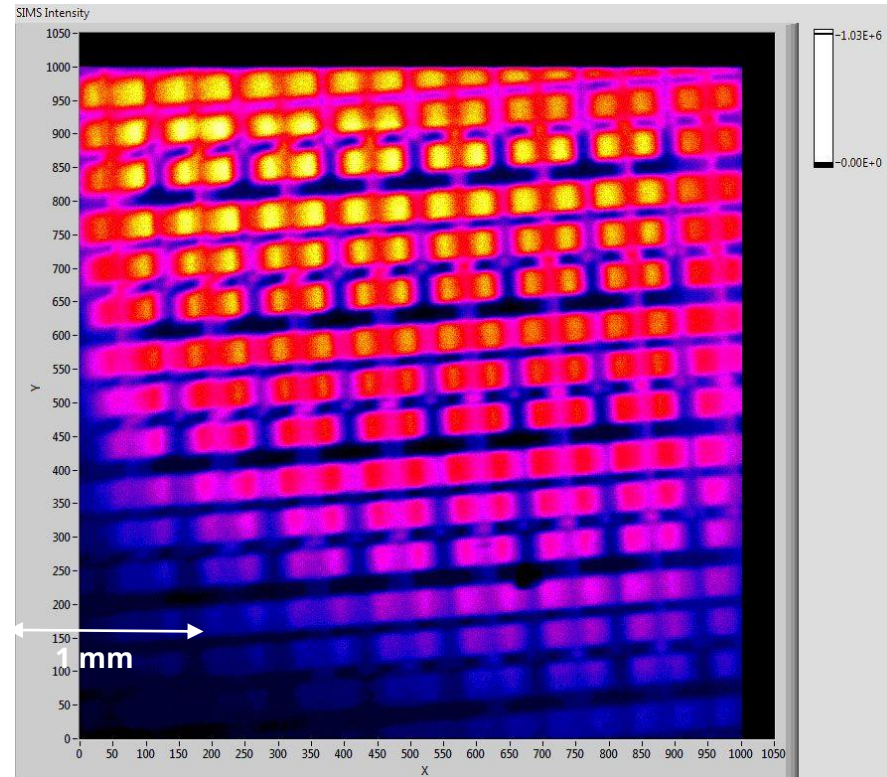


A multilevel software package allowing both simple control of mass spectrometer parameters and complex manipulation of data plus control of external devices.





# Elemental Surface Mapping



*Elemental Surface Map of semiconductor resistor array.*

- Easy to use elemental surface mapping software.

# Summary

- Small and easy to use SIMS and SNMS
- Fast characterisation of layered structures
  - Nanometre depth resolution





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