Customer training

- At the end of installation, the customer should receive training on the use of the instrument with a max of 3 persons.

- This is basic operation of the instrument and software, not full applications training.

Customer training

- **Tour of the instrument**
  - Power switch
  - Bakeout control / lock out switch
  - Service connections
  - Cameras
  - Load-lock
- **Sample mounting**
  - Sample handling (gloves etc)
  - Considering the source positions
  - Different mounting options (rotating holder, powder holder)
- **Sample loading**

  Sample Navigation / Optical view

- **Setting up point analysis**
  - Survey spectra & narrow scans
  - Axial & scattered lighting controls
  - Manual height setting & auto-positioning
  - Charge compensation
- **Setting up auto-analysis**
  - Enable auto-positioning
- **Setting up line scans**
  - Snapshot acquisition
- **Setting up area scans**
- **Setting up depth profiles**
  - Rotation sample holder
- **Using the ion gun to clean samples**
- **Simple Advantage features**
  - Survey ID, adding peaks, simple peak fitting, reporting out to Word & Excel
  - Help files / Processing manual
- **NEXSA set-up tool**
  - How to calibrate & check performance
  - How to send logs / data to a service centre

Suggested samples

- **Essential**
  - PET (charge compensation specification)
    - Monitor protector
    - Mineral water bottles (clear plastic not coloured)
  - Al foil (testing gas purity, depth profile demonstration)
  - Glass (setting up the flood gun)
    - Microscope slide
- **Good training samples**
  - Business cards – need charge compensation
  - Ink on paper / PET
  - Samples with small features to show alignment

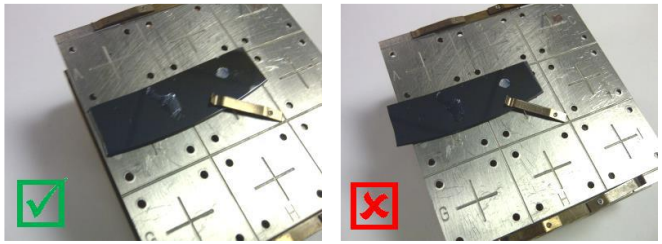
Sample Mounting

Always use gloves and tweezers to avoid contamination of the sample surface. Avoid touching areas that you wish to analyze.

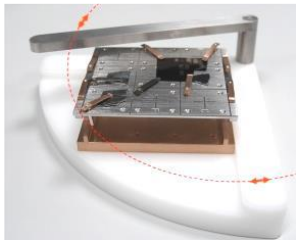
Samples are usually mounted onto a standard sample holder using the spring clips provided. Alternatively, conducting carbon adhesive tape may be used (sparingly).

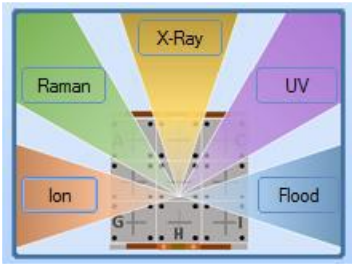
Samples must not go outside the area of the top plate (must not overhang the edges of the holder). This is to prevent samples hitting surfaces inside the system during transfer, which could cause internal damage to the transfer mechanism. **Before loading,** a gauge is used to **check sample height limit.**

Good and bad mounting examples.



Source orientation around the sample holder.

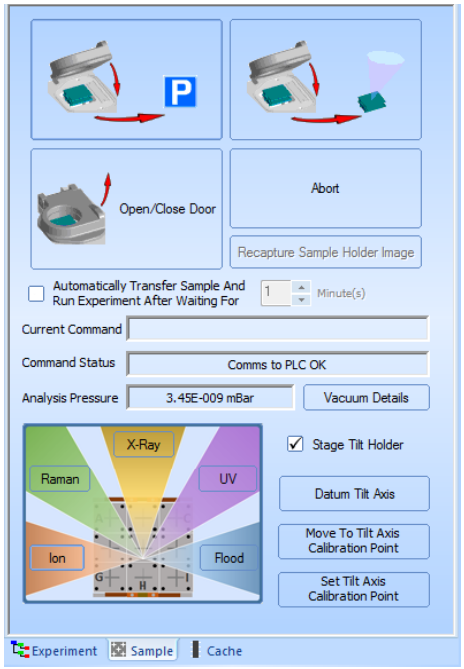


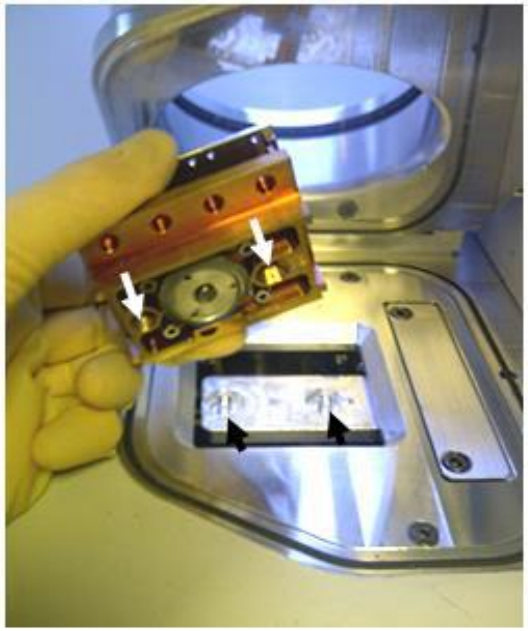


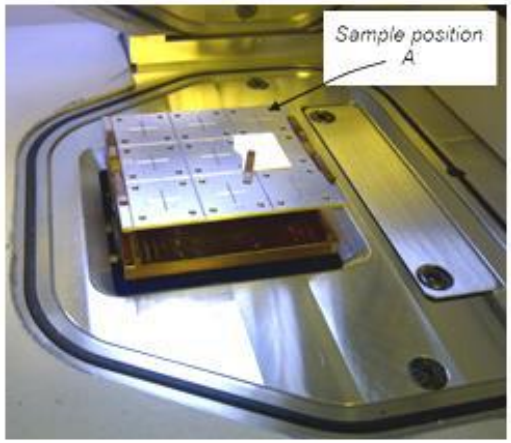
For more details on mounting options refer to OPERATION MANUAL pages 17-22

Sample Loading

- **Do not load samples that are touched by the loading test gauge. Do not attempt to load samples that are outside the edges of the top plate.**
- The **Sample** page is used to load and unload samples**.**
- The sample is loaded onto the plate in the entry-lock as shown, ensuring that the two holes on the bottom of the holder (white arrows) engage correctly with the pins on the carrier plate (black arrows).



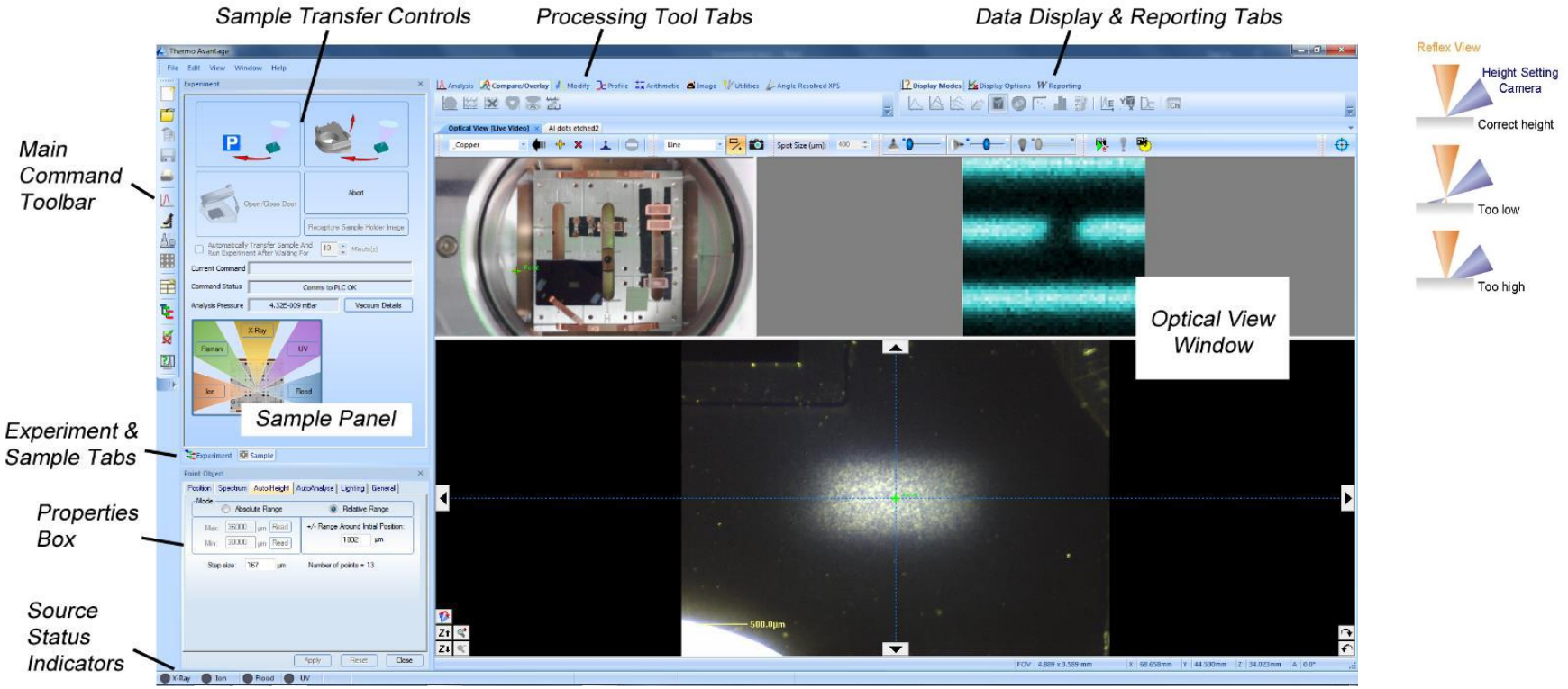




Sample Navigation

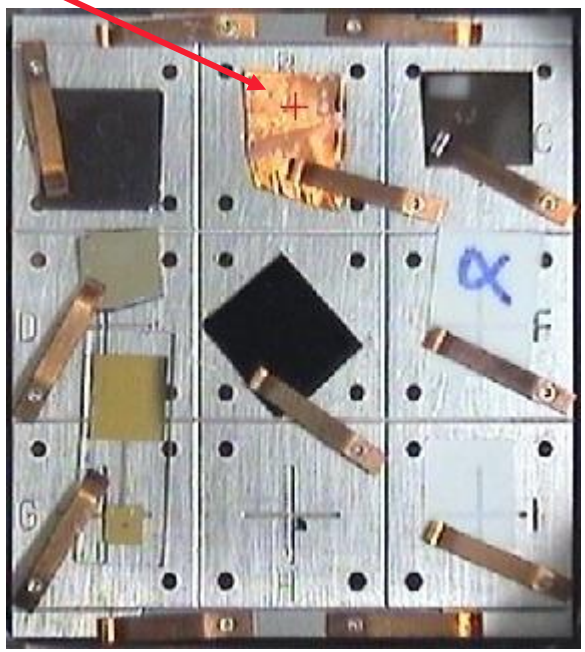
- Here is the main Screen layout**. Optical view** is opened via the **Main Command Toolbar.**
- **Optical View** contains an image of the entire sample holder and **light controls** for sample illumination.
- Area of interest is moved to the **cross hair,** hence to the **X-ray beam** and **analysis area**.

  (Electrons are captured from the cross hair region, then collected to generate XPS data. All beams land here).
- We can zoom in on small areas of interest or use the snap map feature (top right) for ultimate precision.



Point analysis

1. **Navigate to sample by double-clicking on the platter (upper view)**
2. Choose the analysis position by double-clicking on the required position
3. Set the height
4. Select “point” from menu
5. Hold down “Ctrl” and left-click on the analysis point required
6. Set the size of the x-ray spot
7. Click on the spectrum icon
8. Select “multi spectrum”
9. Choose required narrow scans / surveys
10. Turn on the flood gun in the x-ray object if required
11. Insert a Gun Shutdown (sources) object.
12. Run the experiment or the experiment step.



Point analysis

1. Navigate to sample by double-clicking on the platter (upper view)
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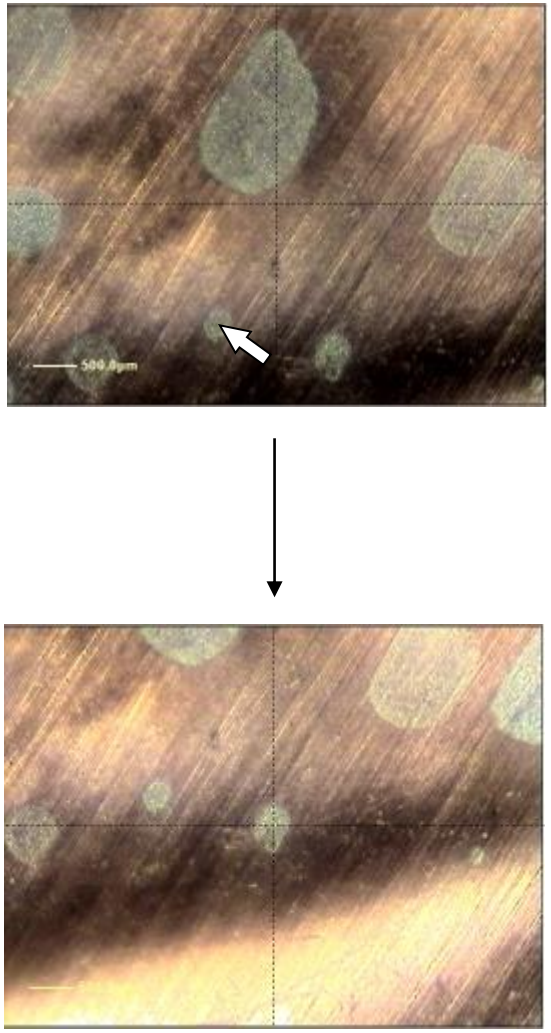

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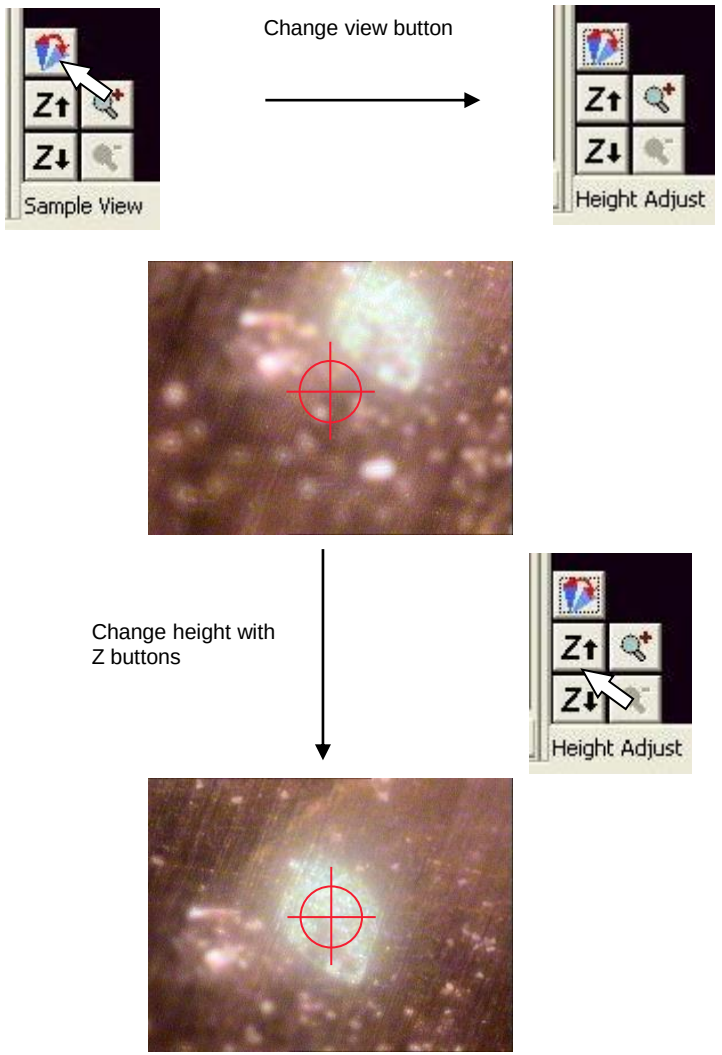

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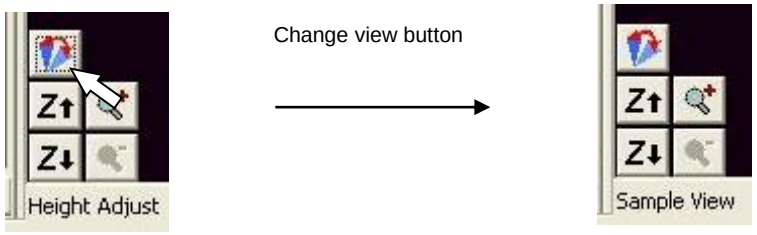

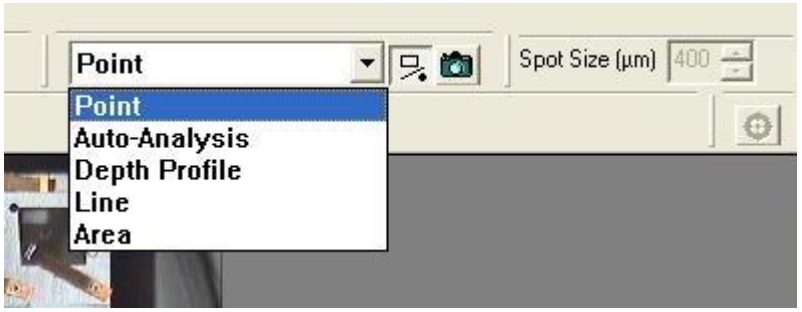

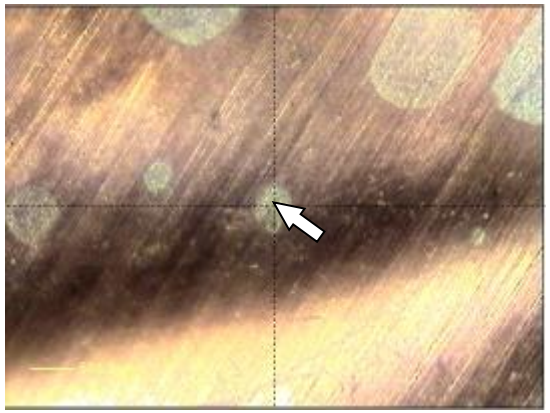

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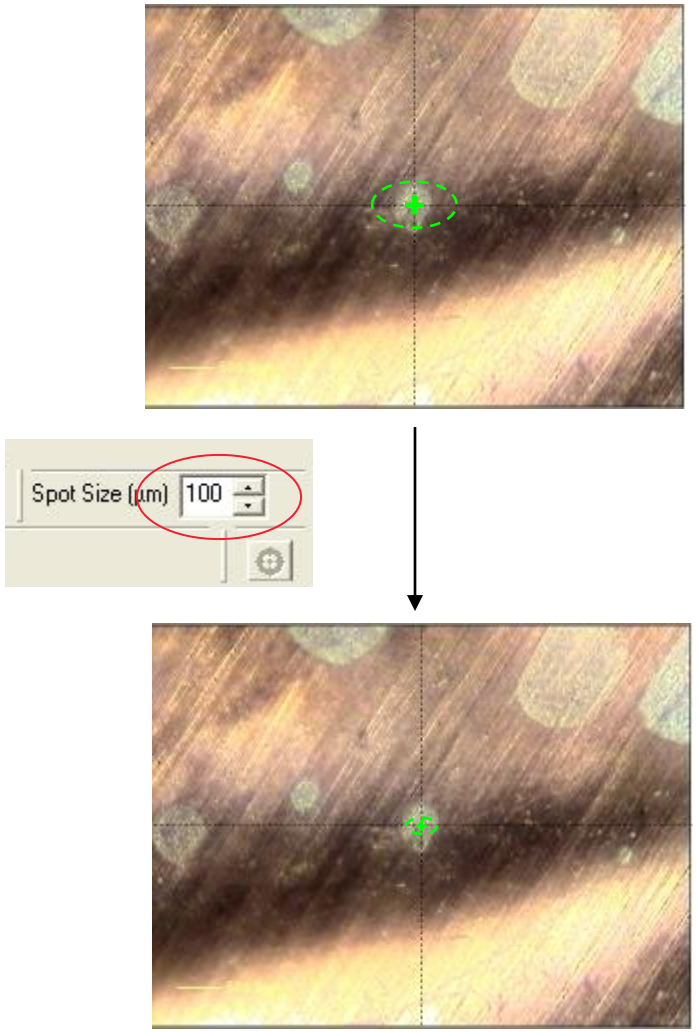

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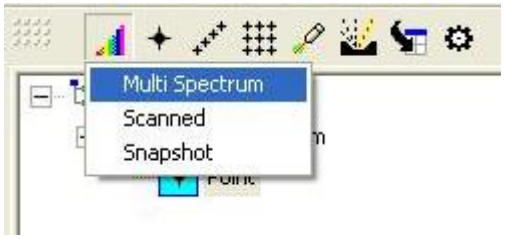

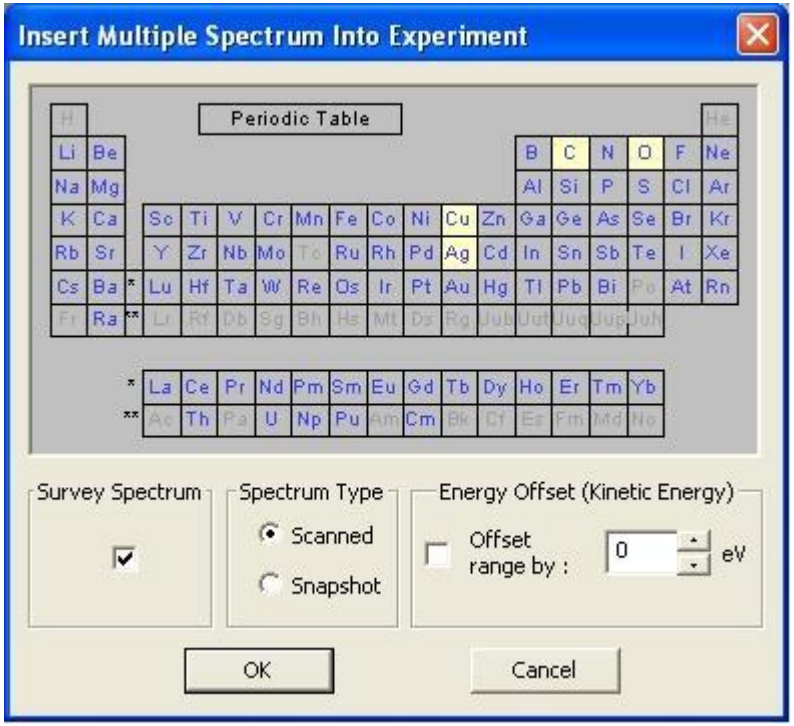

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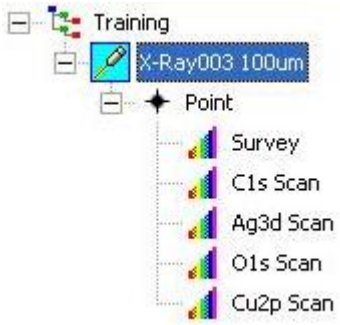
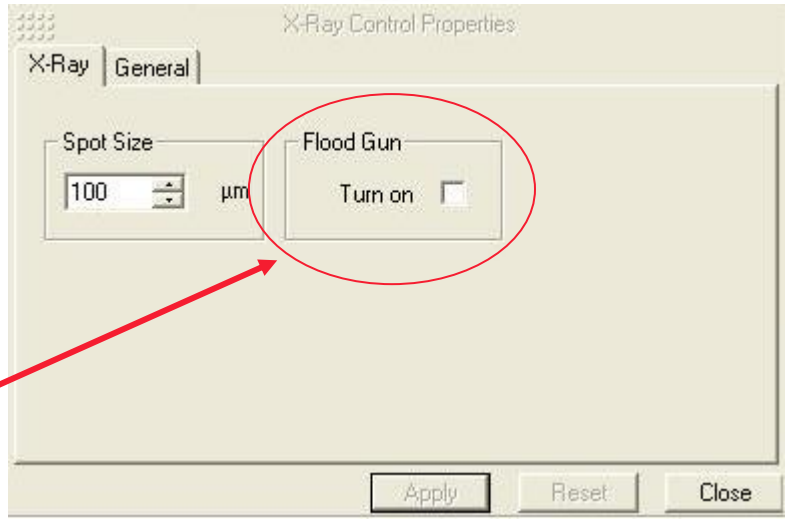
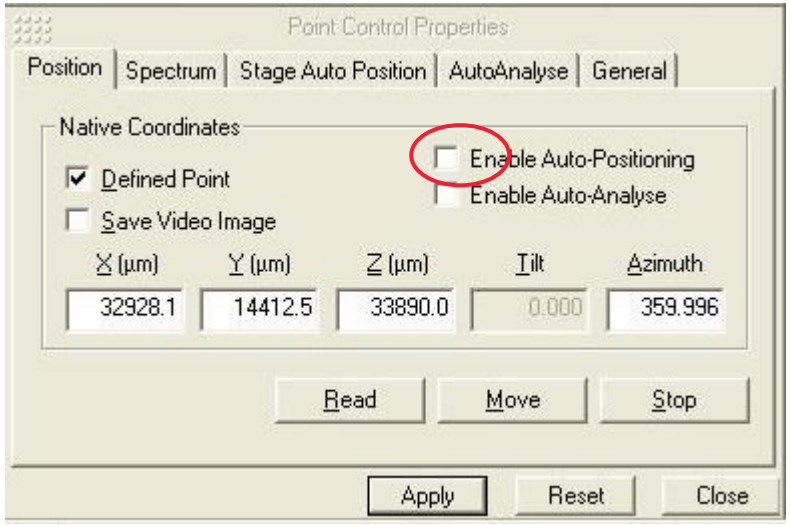
10. **Turn on the flood gun in the x-ray object if required**
11. **Run the experiment or the experiment step.**

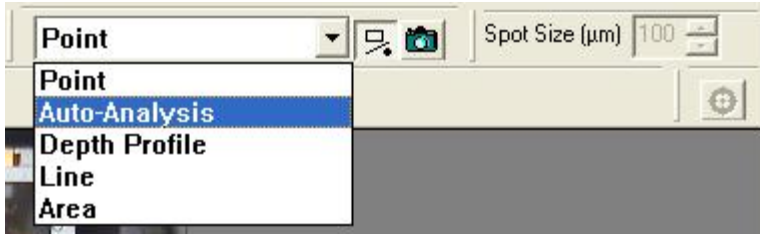




Auto Analysis

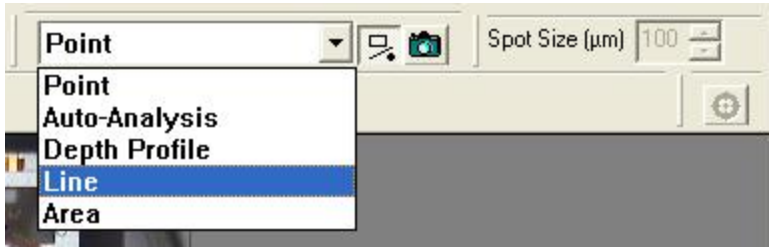
- Follow the same procedure for “point analysis”, but choose “auto analysis” on the menu. There is no need to insert any spectra, but you may need to turn on “auto-positioning” to set the height.

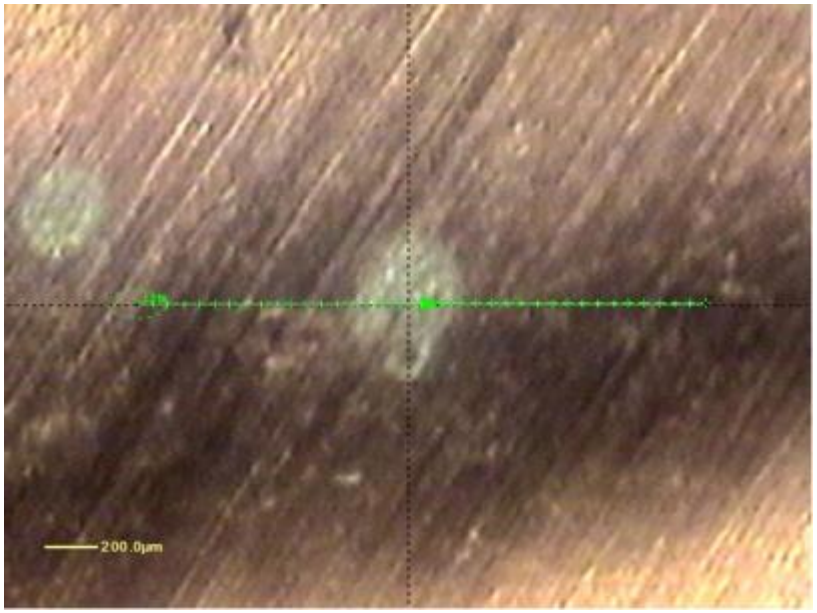




Line scans

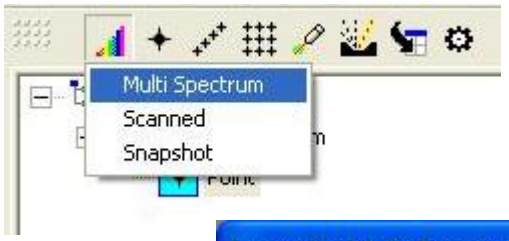
- Follow the same procedure for “point analysis”, but choose “line” on the menu, and draw the line on the optical view by holding down the left mouse button and “Ctrl”

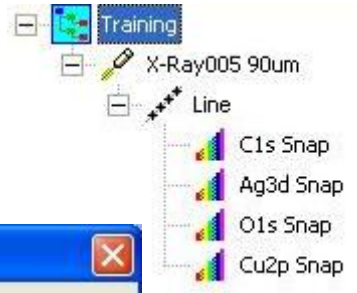


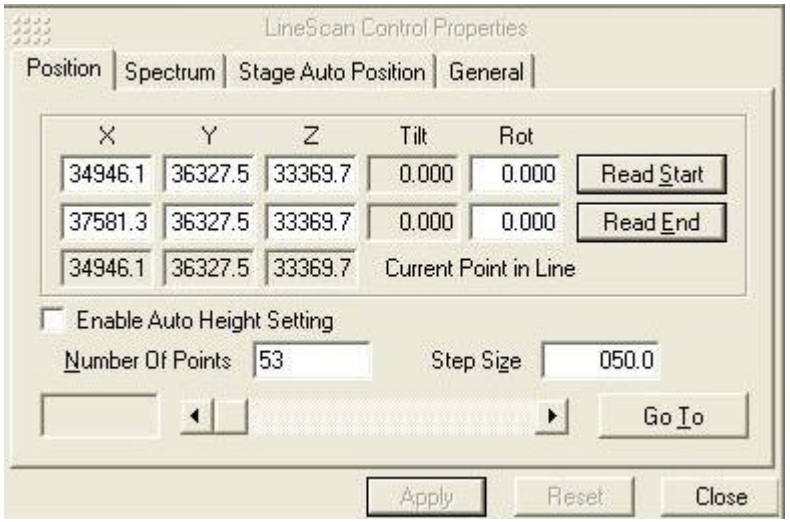


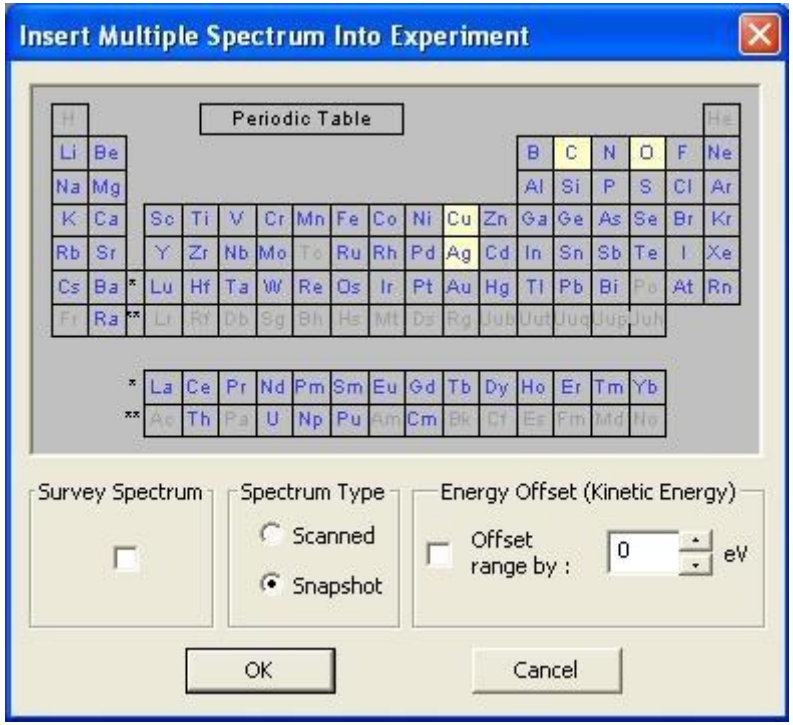
Line scans

- Set the number of points in the line in the properties dialog box, and insert either scanned or snapshot spectra from the multi-spectrum tool



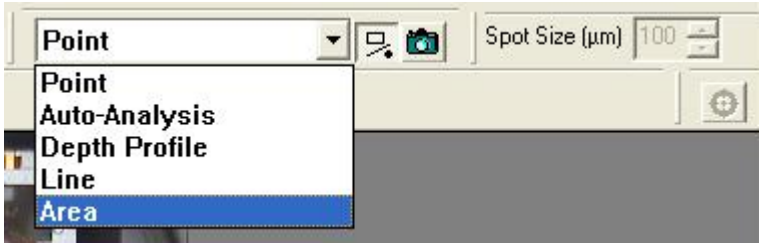


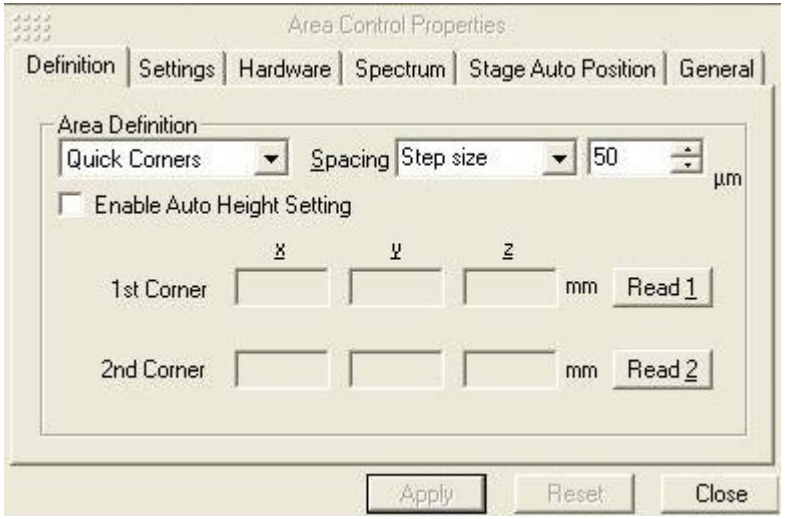


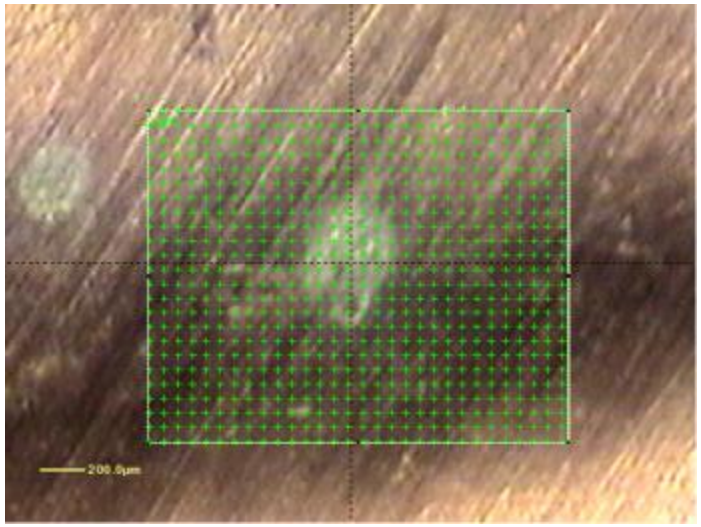


Area scans

- Follow the same procedure for “point analysis”, but choose “area” on the menu, and draw the area on the optical view by holding down the left mouse button and “Ctrl”. Set the step size in the properties area, and the x-ray spot size in the usual way

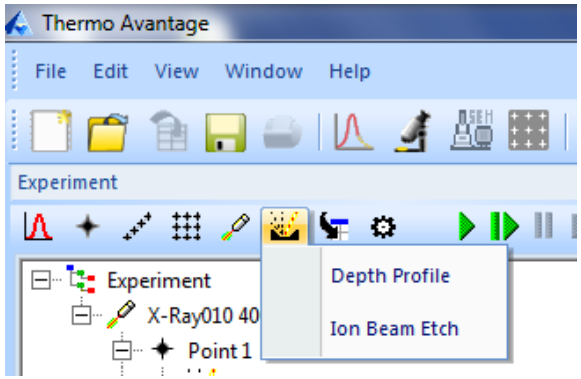


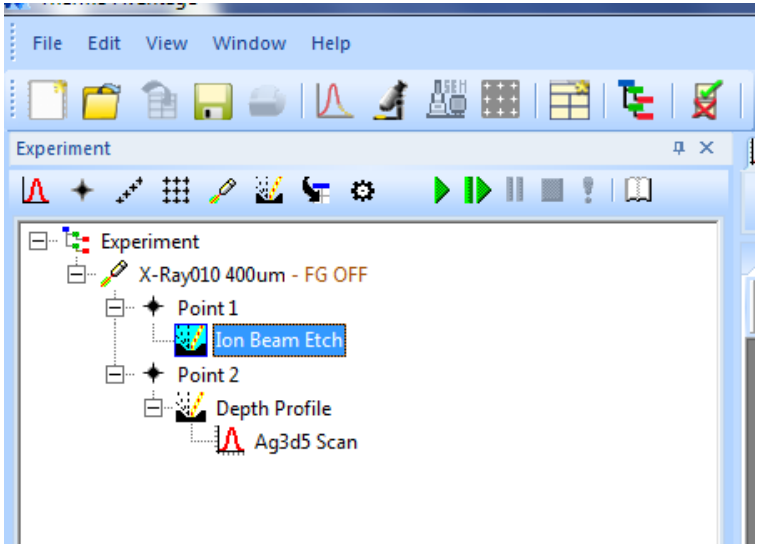


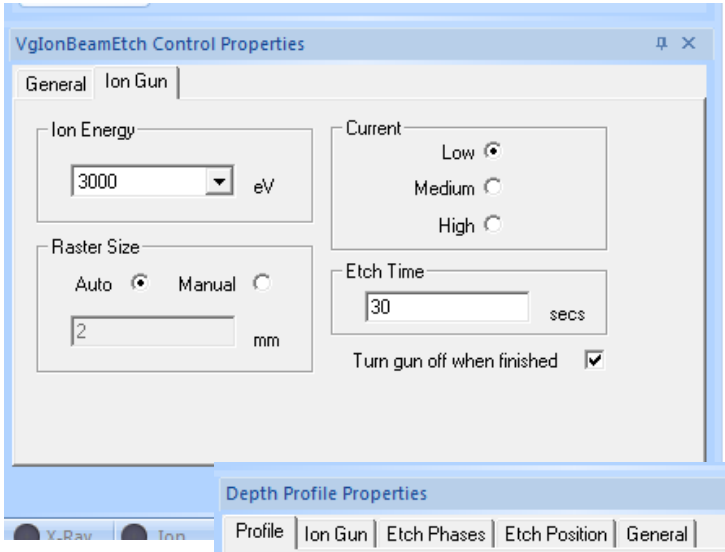


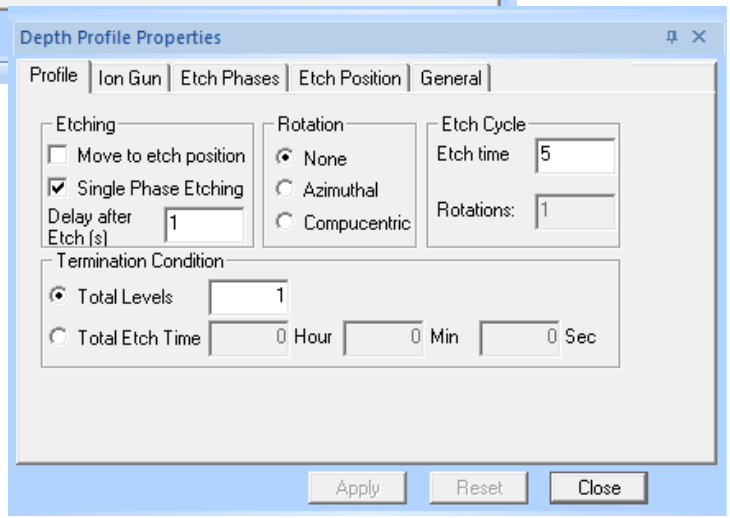
Ion Beam Etch / Depth Profile

- For a depth profile experiment use the “Depth Profile” object on the experiment menu and use the same procedure as point analysis. An ion beam etch object is just used to clean the sample and is selected from the icons.

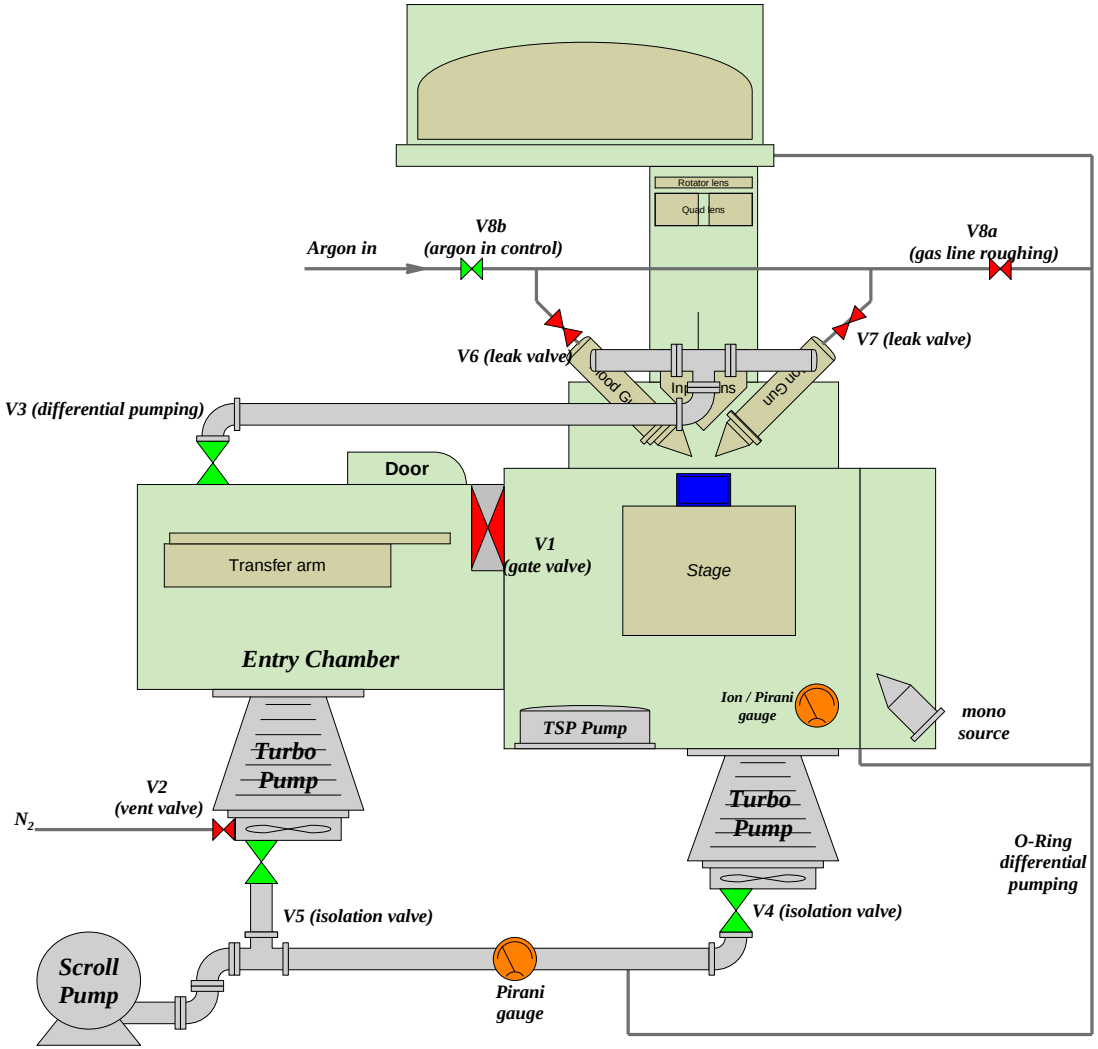








Vacuum System Overview



- Specification in analysis chamber
  5 x 10-9 mBar

- Analysis chamber / Entry chamber turbo pumped. 210l/s N2, Pfeiffer PTR27002

- Backed by single foreline pump,

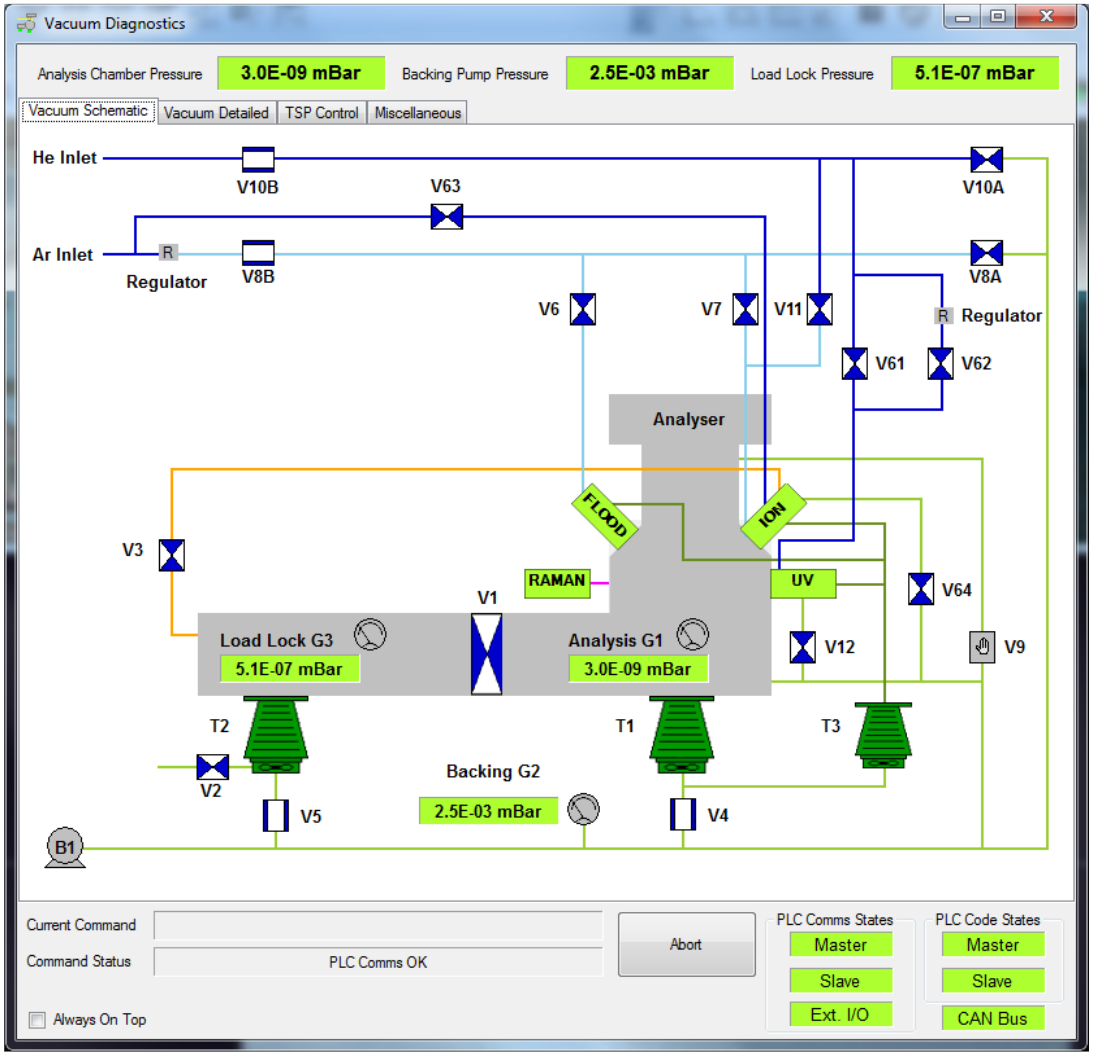
- Titanium sublimation pump (TSP) in main chamber

Vacuum System Overview

Specification in analysis chamber

5 x 10^{-9} mBar

Vacuum Schematic Window (layout seen depends on the options fitted)



Backing Pump

- One backing pump for all turbos
- Rotary Vane Pump
- OR Dry Pump option

  Mains Powered

  - Wide range input, selectable

Turbo Pumps

- Analysis chamber / entry chamber turbo pumped 260l/s N_2
- On-board controller (TC100)
  - Driven from 24V DC supply
  - 24V signal in to “Run/Stop”
  - 24V signal back indicating “at speed”
- Main pumps identical, ISO 100 interface
  - Seal to analysis chamber aluminium Knife-edge
  - Seal to entry turbo single O-ring

Titanium Sublimation Pump (TSP)

- Titanium Sublimation Pump (TSP)

  Runs at 50A for 1 minute automatically every 4 hours

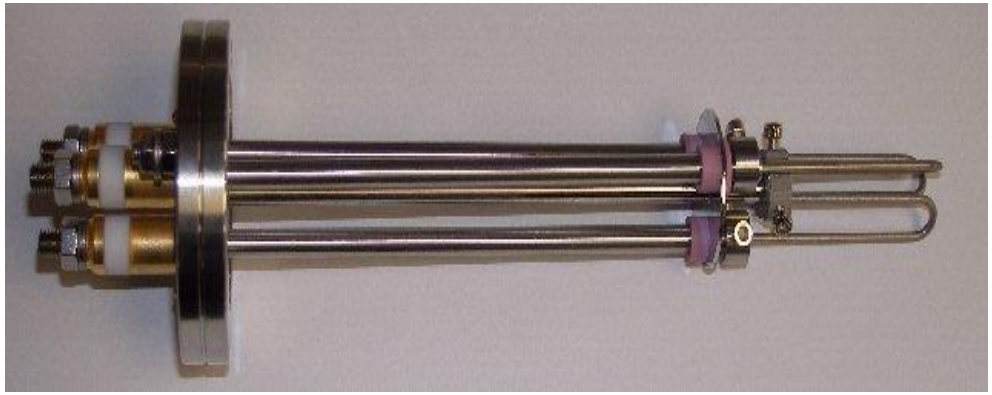
  Filaments are fired in turn

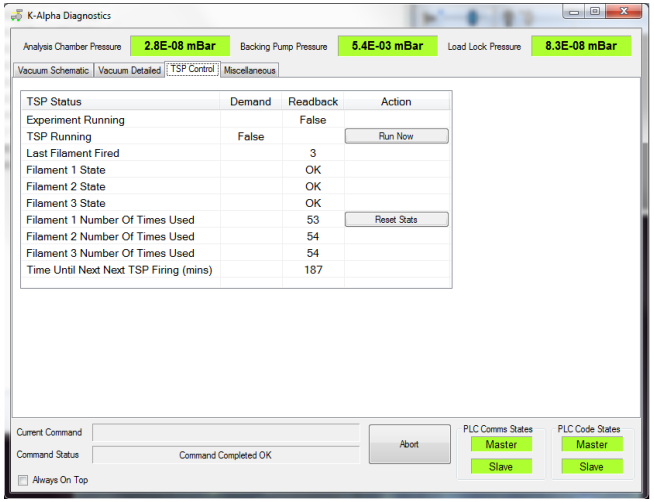
  Status can be viewed via vacuum details TSP Tab

  Periodic firings are Inhibited during experiment

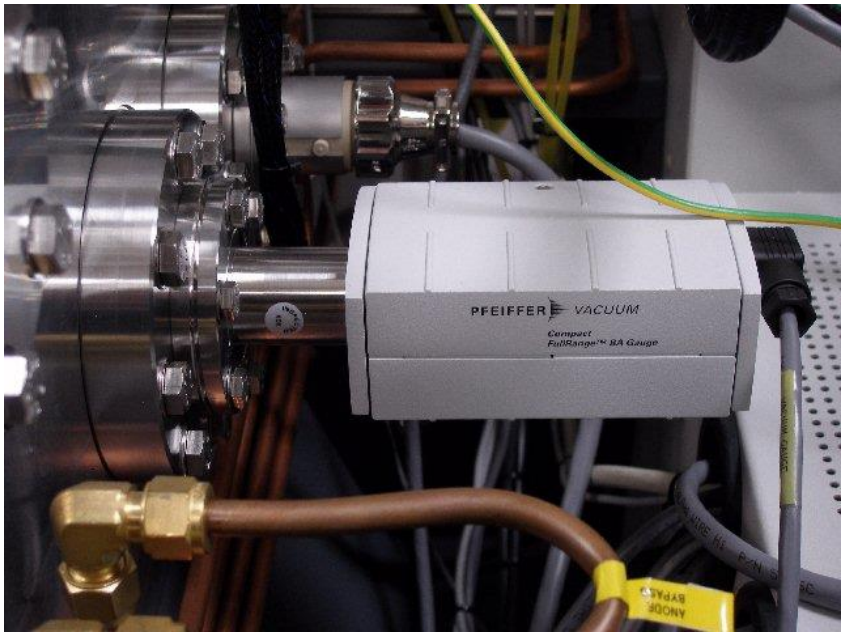
  Can be manually fired by user (via Engineer log on) in experiment

  Can be disabled.



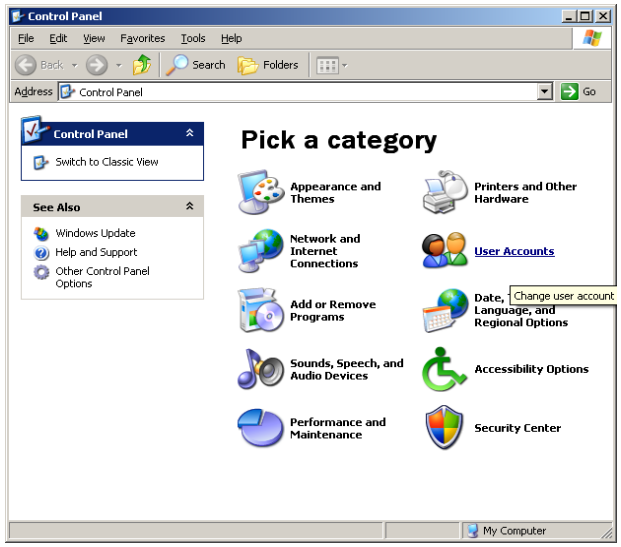


Vacuum Measurement



- Analysis chamber and Load Lock contain ion / Pirani combination gauge
  - *Reads from atm. to 5 x 10^{-10}mBar*
  - *Powered from 24VDC line*
  - *Analogue signal back to vacuum controller*
- Backing line contains Pirani gauge
  - *Reads from atm. to 5 x 10^{-4}mBar*
  - *Powered from 24V DC*
  - *Analogue signal back to vacuum controller*

User Accounts



VG Engineer: Everything

VG Expert: Typical user, create experiments. Cannot edit system settings.

VG Operator: Can only run experiments created by a higher user.

Administrator: Install software, install licence, add/remove users, change user access level.