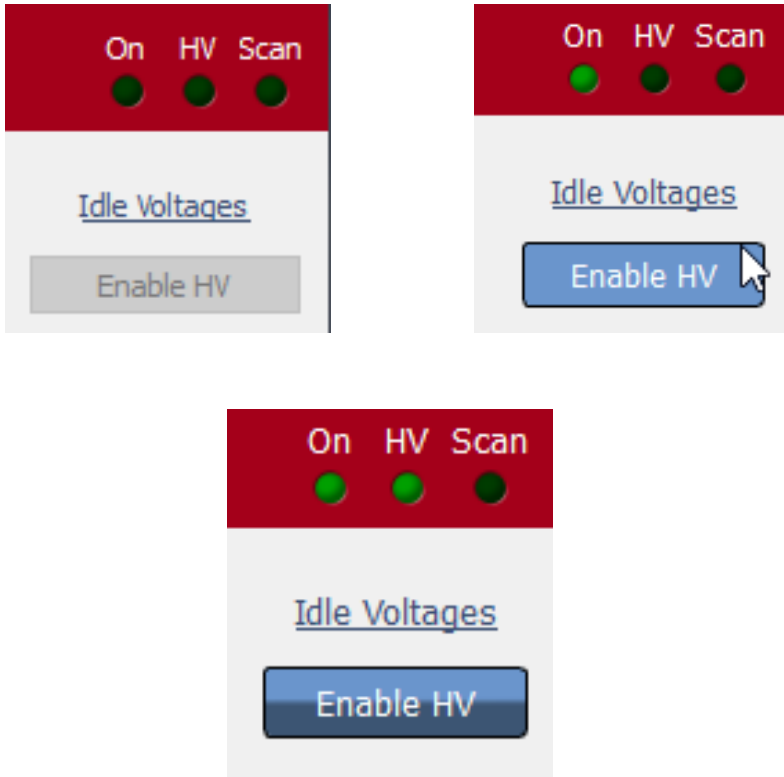


Semion Quick Start Guide

support@impedans.com

Initial Connection

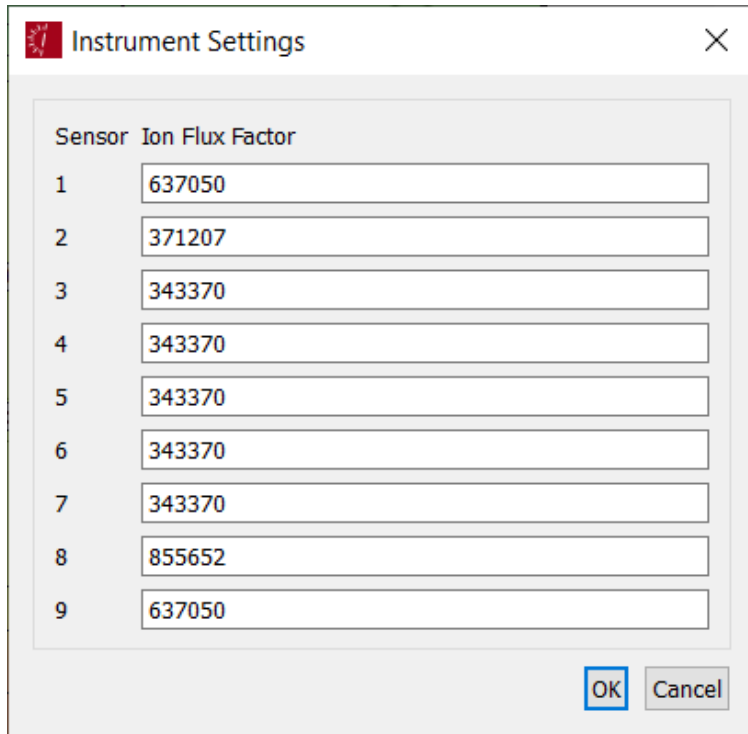
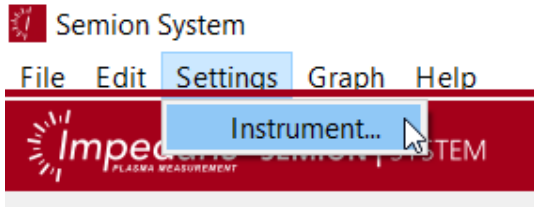


The initial hardware connections that must be made prior to the software connection is the power and USB to the control unit.

Once this is done then the software should automatically connect – Green Light will show.

Once this has happened it is recommend to turn on the High Voltage outputs by selecting ‘Enable HV’ after which the green light should turn on.

Flux Factor Settings



If using buttons that are not the standard density buttons then the flux factor should be changed.

This is done by opening the Instrument Settings page and filling in the flux factors for each individual button.

This allows the user to use a mixture of buttons if desired such as if the centre of the wafer will see a much denser plasma than the edges of the wafer then using high and standard density buttons respectively would be useful to prevent any buttons saturating

Flux Factor Settings

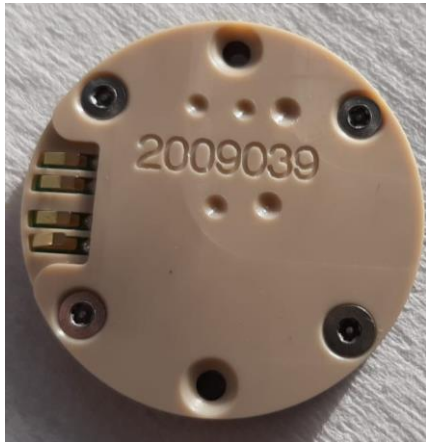
The table below shows the appropriate flux factor for the various buttons based on the number of indents on the back above and below the serial number as shown in the image of a button



Below / Above	1	2	3
1	3.71E+04	3.41E+05	4.62E+06
2	5.30e+04	6.32E+05	8.56E+06
3	2.24E+05	6.32E+05	8.56E+06
4	5.30e+04	6.32E+05	8.56E+06
5	5.30e+04	6.32E+05	8.56E+06
6	5.30e+04	6.32E+05	8.56E+06

Flux Factor Settings

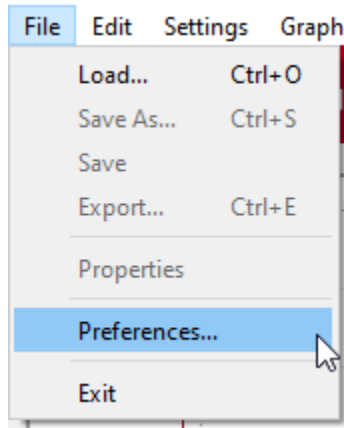
The table below shows the appropriate flux factor for the various buttons based on the number of indents on the back above and below the serial number as shown in the image of a button



Above	Button Type
1	pDC/800
2	2500
3	Vertex
4	5 keV
5	3 keV
6	High pressure 2500

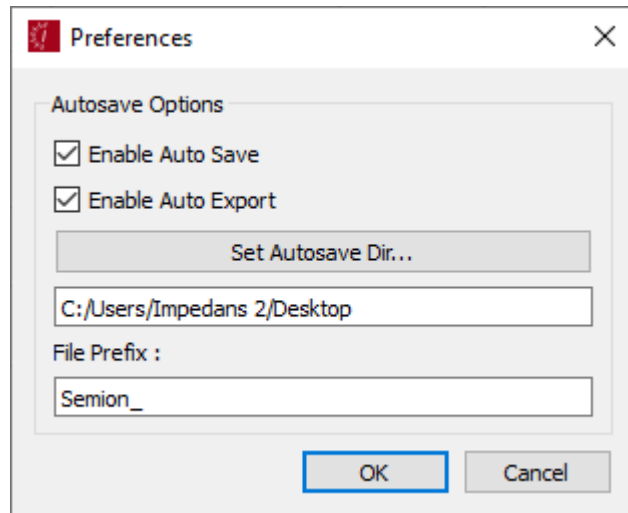
Below	Button Sensitivity
1	Low
2	Standard
3	High

Auto Save/Auto Export



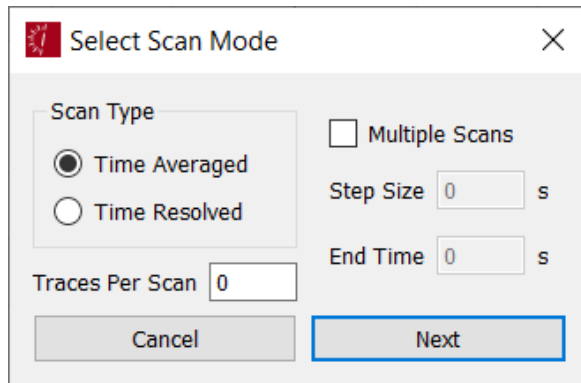
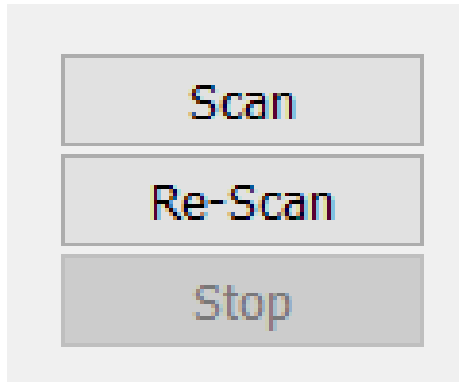
It is advised to set up the software to autosave the data by going to 'Preferences' under 'File' as shown

Autosave will save the native Semion file format (.sdf) which will be useful for any diagnostics if there are any problems



The Auto export will save the data as a csv file allowing the user access to the data

Scan Settings



To set up the scan click the 'Scan' button

The first scan that is typically run is a time averaged scan.

By setting the 'Traces Per Scan' to 0 it will continuously take IV traces until you manually stop the scan – Alternatively you can set a particular number of scans to be taken.

If you wish to look at the stability of the plasma over a particular period you can setup the multiple scans with a certain time frame and time step'

Scan Setup

Scan Settings

[Advanced Settings](#)

Electrode Voltage

Use Measured V

Override V

Energy Range eV

Energy Resolution eV

Cancel Previous Run Scan

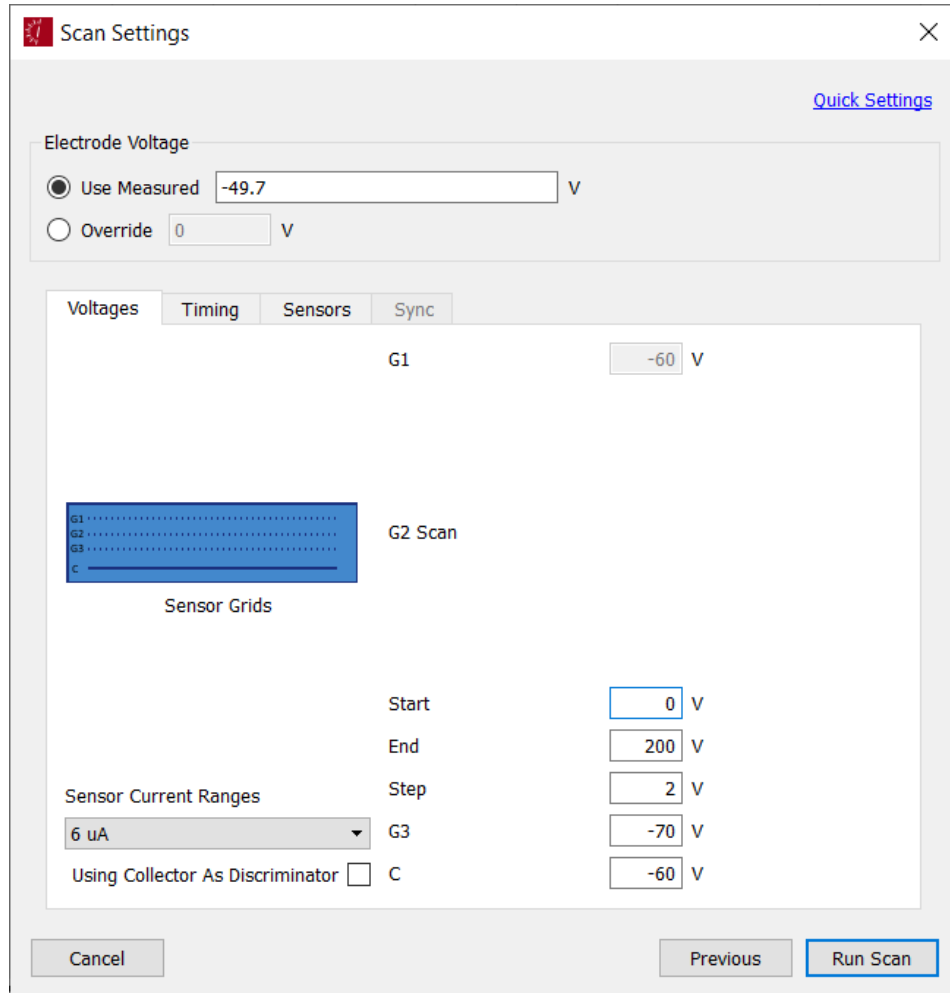
Select 'Use measured' for the Electrode Voltage (Vdc) – Will update live when connected to a system.

Input the Ion Energy Range (60 V or 2x the Bias voltage whatever is greater).

Select the Energy Resolution (1 eV or 1% of the Ion Energy Range which ever is greater – To the nearest eV).

This typically is enough to run the scan but there are more settings that can be accessed under 'Advanced Settings'

Scan Setup – Advanced Settings



The voltages are set based on the Vdc, energy range and resolution set in the previous window.

The recommend values for each as follows:

Start: $V_{dc} - 20 \text{ V}$

End: $V_{dc} + \text{Range} + 20 \text{ V}$

Step: Resolution Desired

G3: $V_{dc} - 70 \text{ V}$

C: $V_{dc} - 60 \text{ V}$

Can also adjust the Current range from the drop down menu

Scan Setup – Advanced Settings

Scan Settings

[Quick Settings](#)

Electrode Voltage

Use Measured V

Override V

Voltages | **Timing** | Sensors | Sync

1. Bias Grid settling time from end of previous scan ms

2. Bias grid settling time from end of previous step us

3. IV accumulation time us

Cancel Previous **Run Scan**

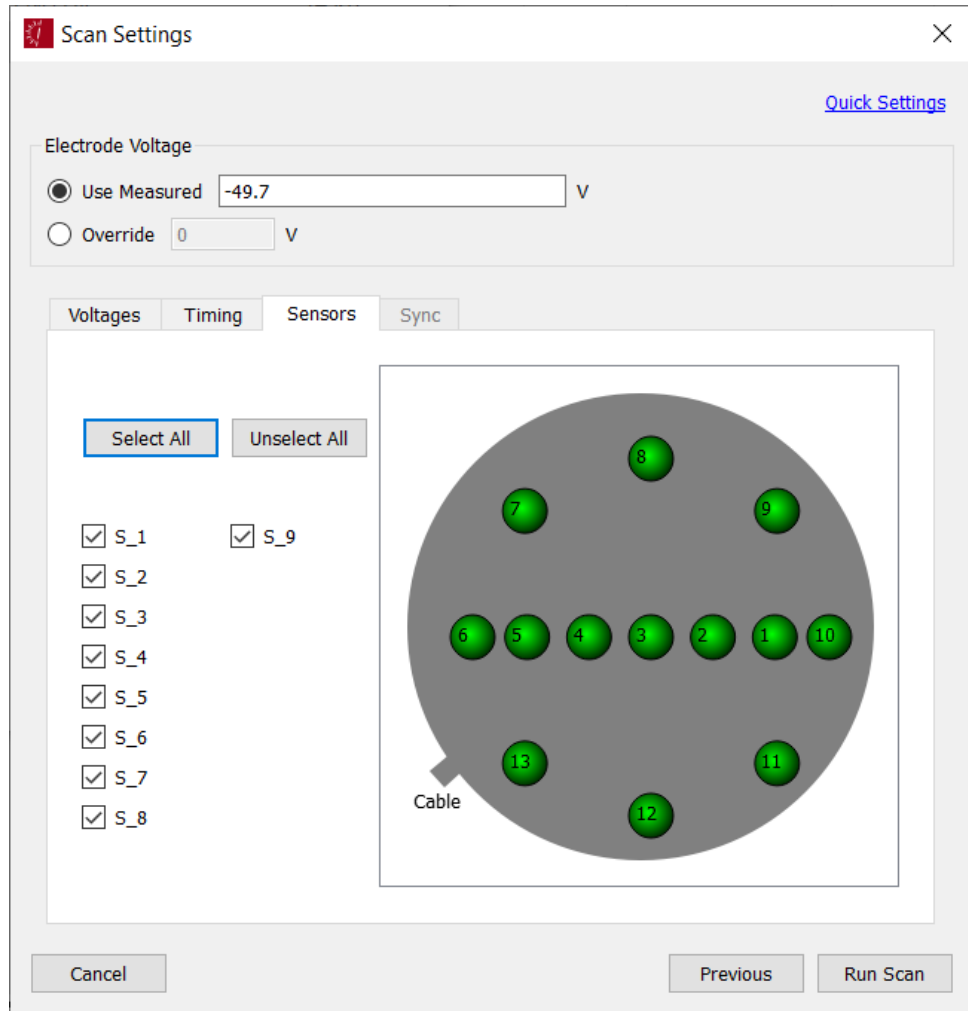
The recommended timings are shown.

First sets the wait time between scans to allow the electronics to change from the high voltage a scan ends at to the voltage it will start the following scan.

The second timing is how long it waits between voltage steps

Final is how long it spends at each voltage averaging data

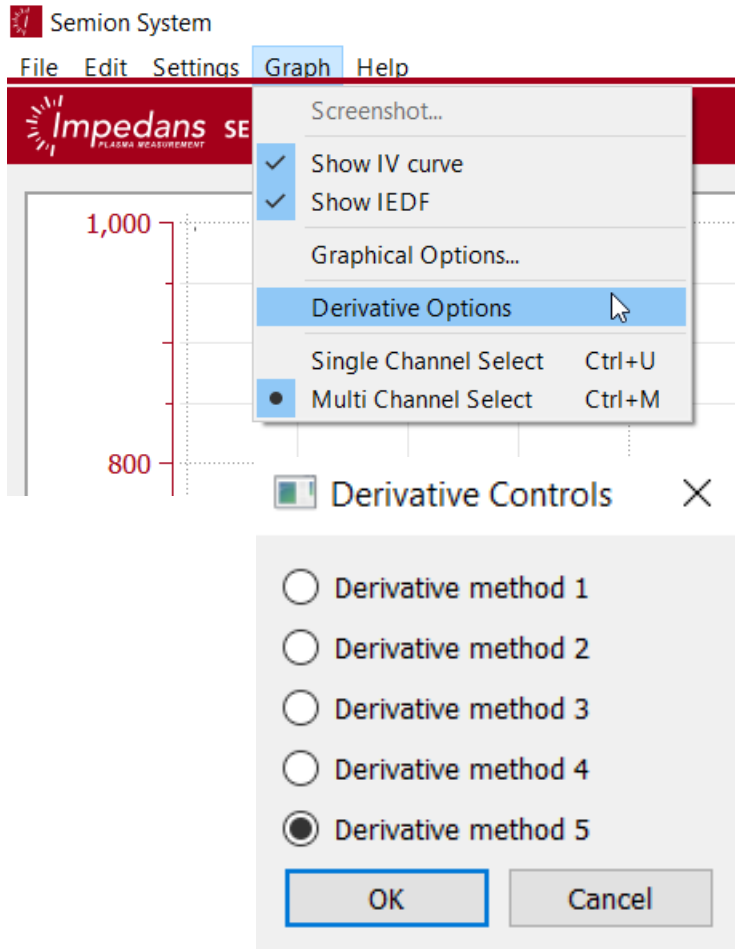
Scan Setup – Advanced Settings



This tab allows the user to select which sensors are active with a future update allowing different sensor geometries to also be selected.

Once all of these settings have been chosen the scan can be started by clicking 'Run Scan'

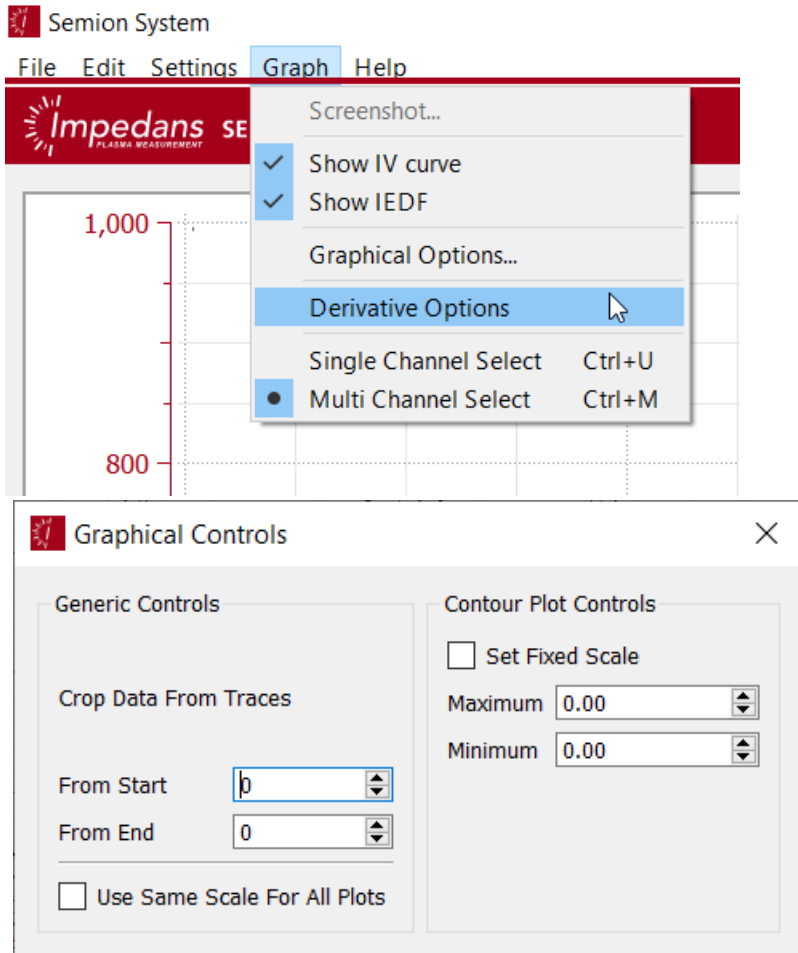
Graph Controls



The Derivative options allows the user to choose the 'method' for calculating the IEDF with the numbers referring to how many points are used either side of the current voltage.

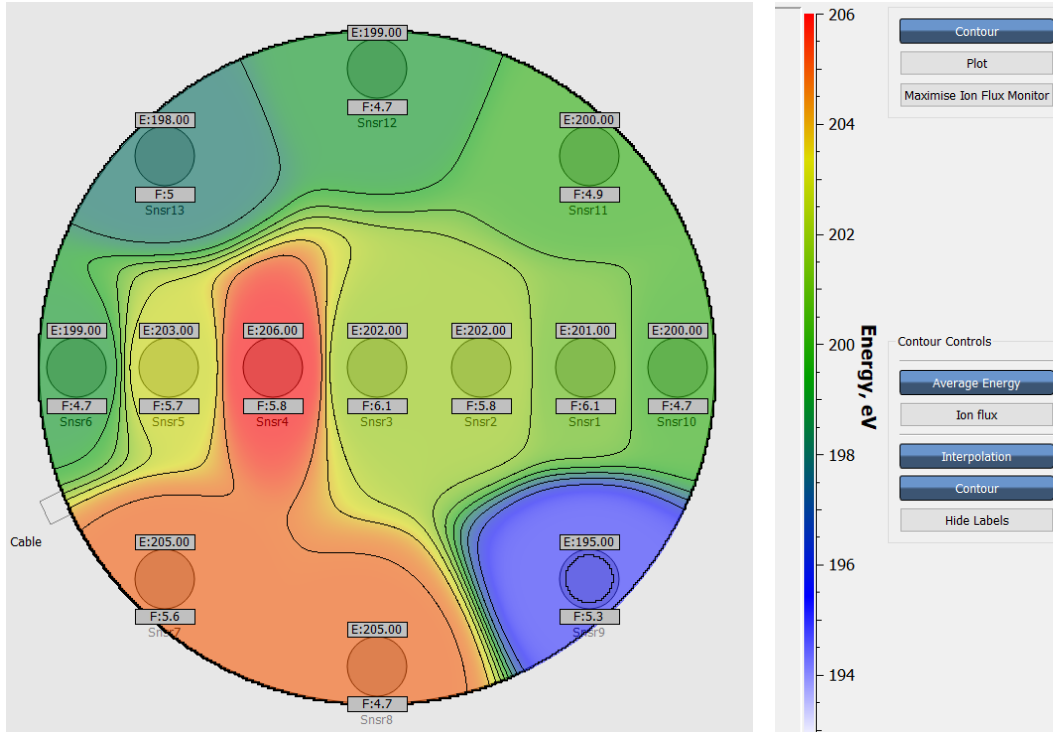
For more information on the derivative calculation see the user manual which can be accessed from: 'Help' → 'Help'

Graph Controls



The user also has the ability to crop data from the start or end of the scan which can be particularly useful if there is noise at the start or end of the scan.

Graph Controls

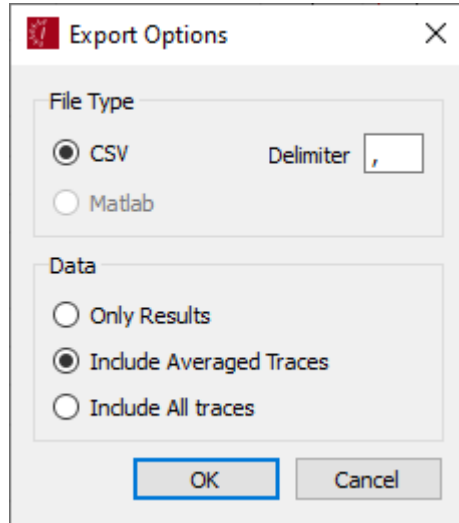


If using a multi-sensor you can also switch to Contour graphing mode

This plots either the 'Average energy' or 'Ion flux' at each position on the wafer with an interpolation between the points

User can also choose to have the contour lines and labels on each sensor showing or not as desired.

Scan Save/Export



Ensure to Save the scan (.sdf) as this is the native file format for the standard Ion energy monitor data (required for any diagnostics if a problem arises)

For access to the data you can export the data to a csv file with the ability to chose what data is exported as well as the separator used (, is not recommended for European computers)

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