

# Data Analysis Software

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Ewan Cook

Muon user's meeting,  
July 2018

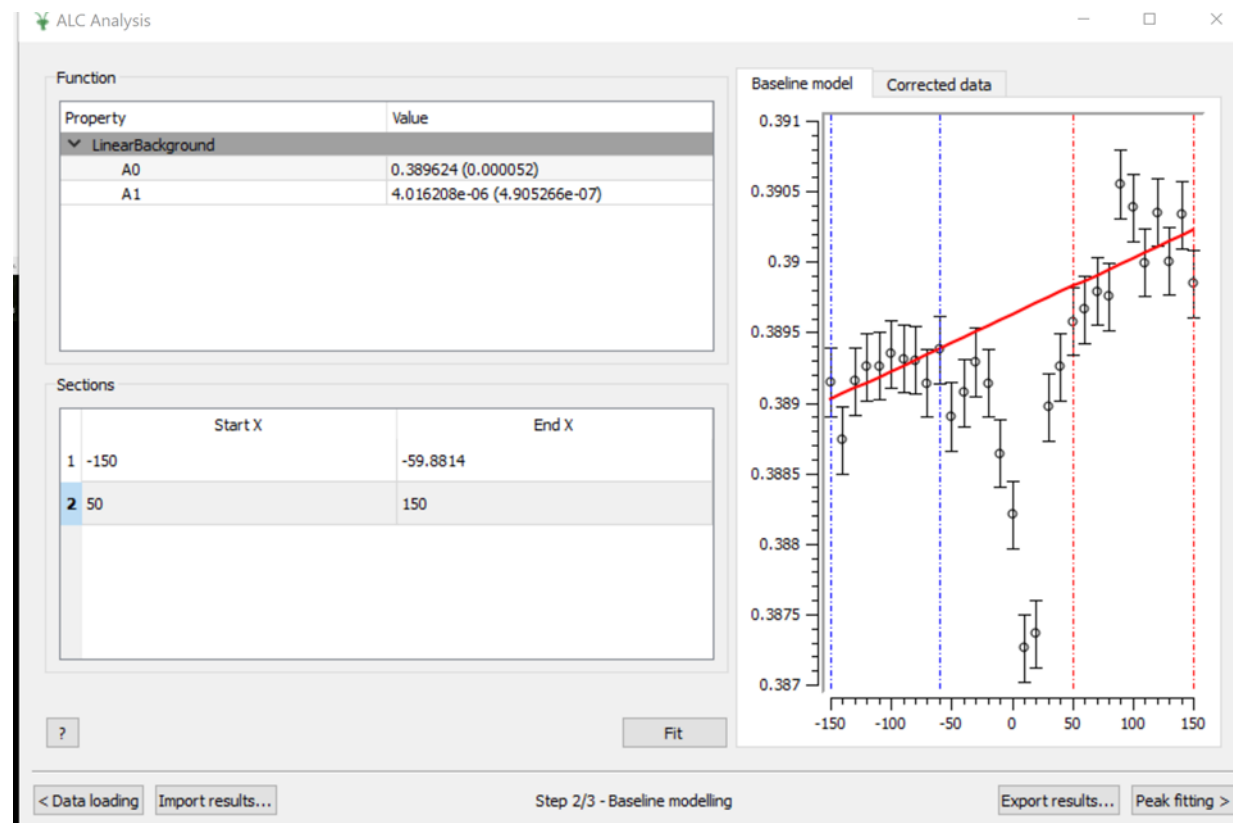


Science & Technology Facilities Council

ISIS

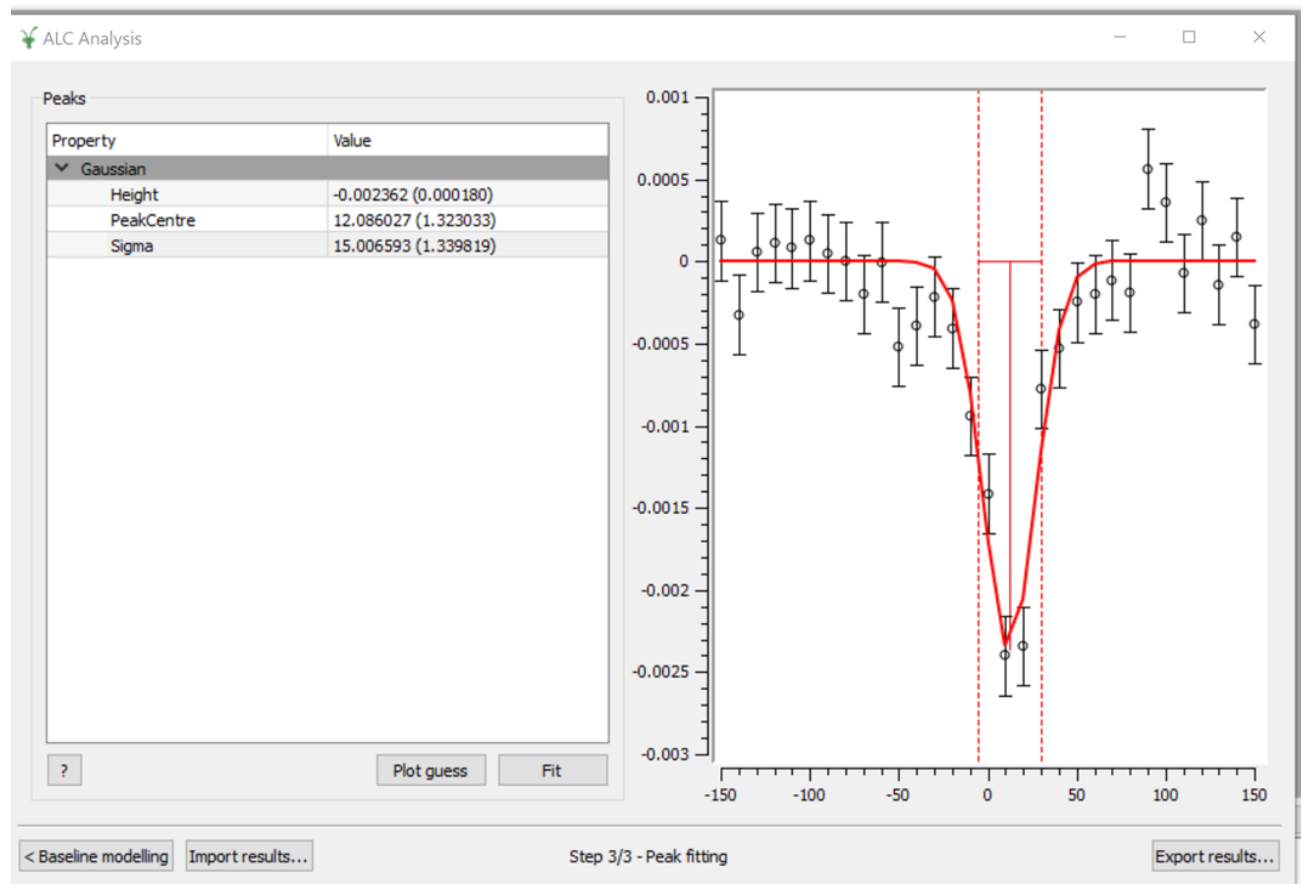
# Avoided level crossings (ALC)

- For looking at scans of data.
- Can fit to the base line.



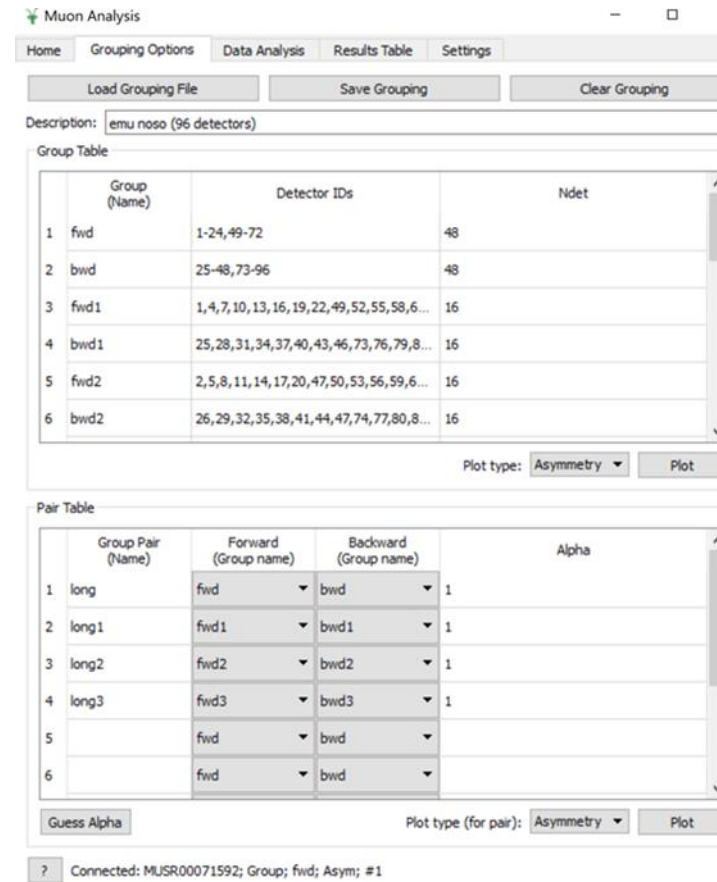
# Avoided level crossings (ALC)

- Can the fit peak to remaining data.



# Muon Analysis

- For looking at time domain data.
- Can easily change the group/pair of detectors.



The screenshot displays the Muon Analysis software interface. At the top, there are tabs for Home, Grouping Options, Data Analysis, Results Table, and Settings. Below the tabs are buttons for Load Grouping File, Save Grouping, and Clear Grouping. The Description field shows "emu noso (96 detectors)".

The Group Table is shown below, with columns for Group (Name), Detector IDs, and Ndet. The table contains the following data:

	Group (Name)	Detector IDs	Ndet
1	fwd	1-24,49-72	48
2	bwd	25-48,73-96	48
3	fwd1	1,4,7,10,13,16,19,22,49,52,55,58,6...	16
4	bwd1	25,28,31,34,37,40,43,46,73,76,79,8...	16
5	fwd2	2,5,8,11,14,17,20,47,50,53,56,59,6...	16
6	bwd2	26,29,32,35,38,41,44,47,74,77,80,8...	16

Below the Group Table is a Pair Table with columns for Group Pair (Name), Forward (Group name), Backward (Group name), and Alpha. The table contains the following data:

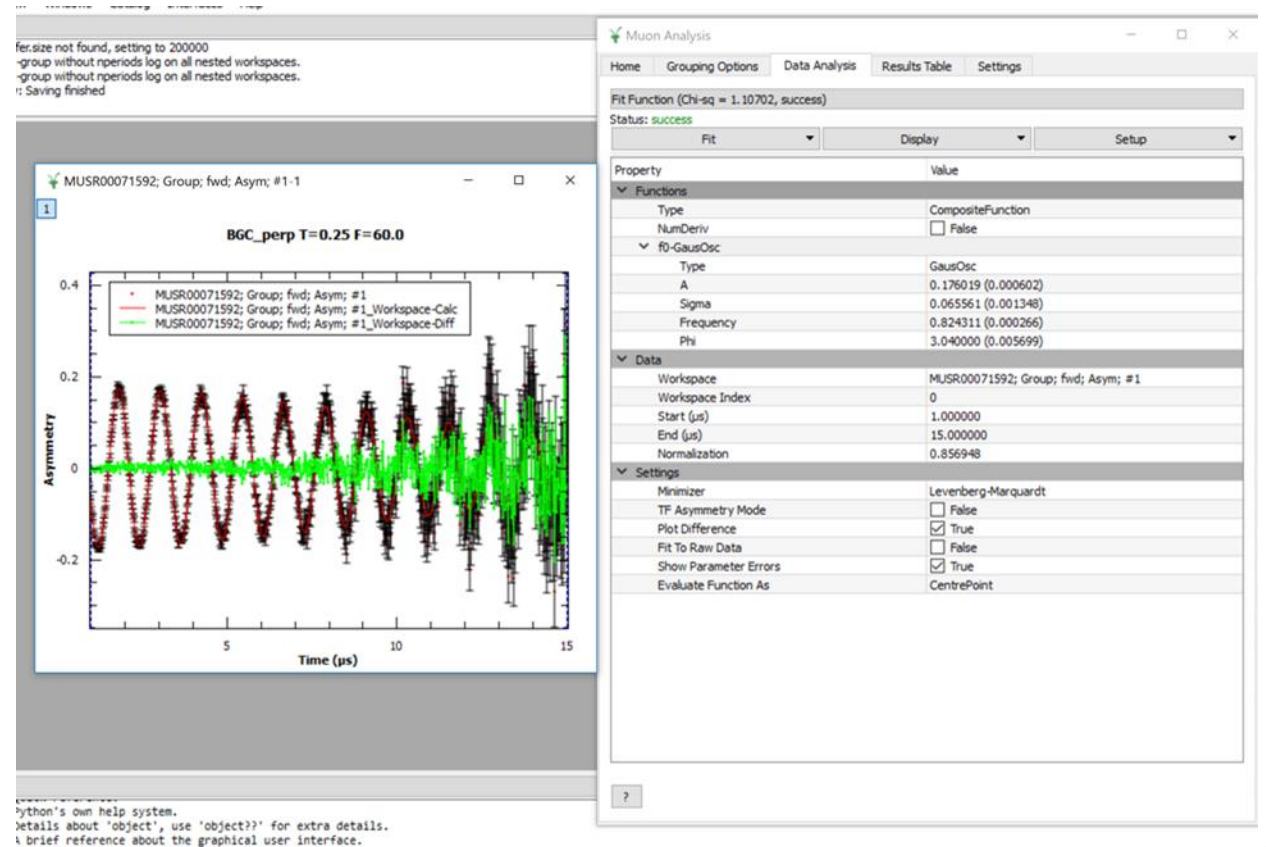
	Group Pair (Name)	Forward (Group name)	Backward (Group name)	Alpha
1	long	fwd	bwd	1
2	long1	fwd1	bwd1	1
3	long2	fwd2	bwd2	1
4	long3	fwd3	bwd3	1
5		fwd	bwd	
6		fwd	bwd	

At the bottom of the interface, there are buttons for Guess Alpha and Plot type (for pair): Asymmetry, and a Plot button. A status bar at the very bottom shows: Connected: MUSR00071592; Group: fwd; Asym; #1.



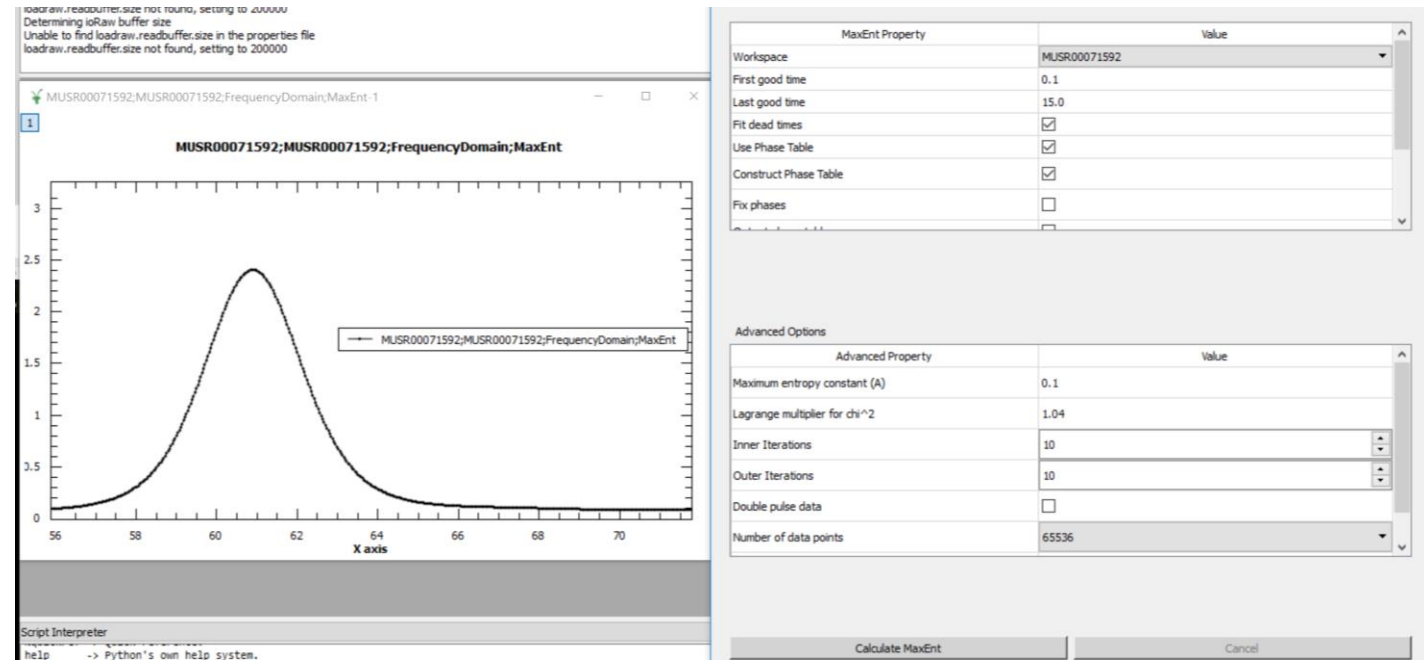
# Muon Analysis

- Graphical interface for fitting.
- Shows the data, fit and the difference.



# Frequency Domain Analysis

- Currently needs the data to be prepared in Muon Analysis.
- Can do both maximum entropy and FFT.

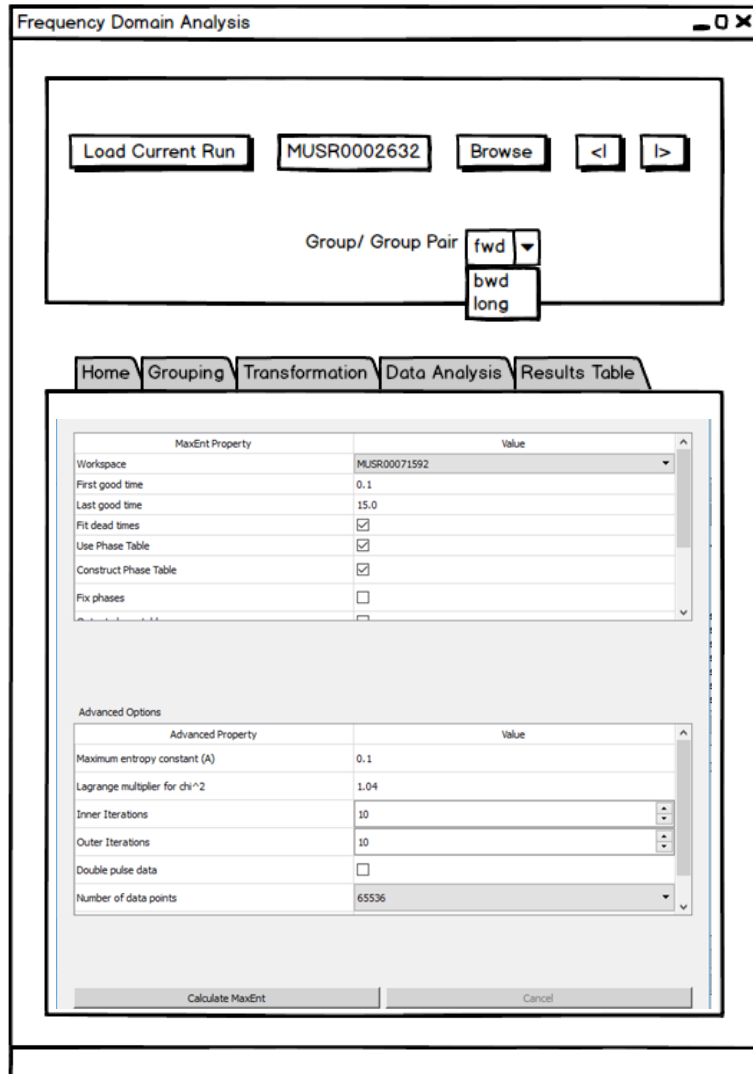


# The future

- Currently adding a data loader for PSI data.
- Upgrade of Muon Analysis.
- Complete stand alone Frequency Domain Analysis.
- Elemental Analysis (negative muons).
- Save state of interfaces.



# Muon and Frequency Domain Analysis

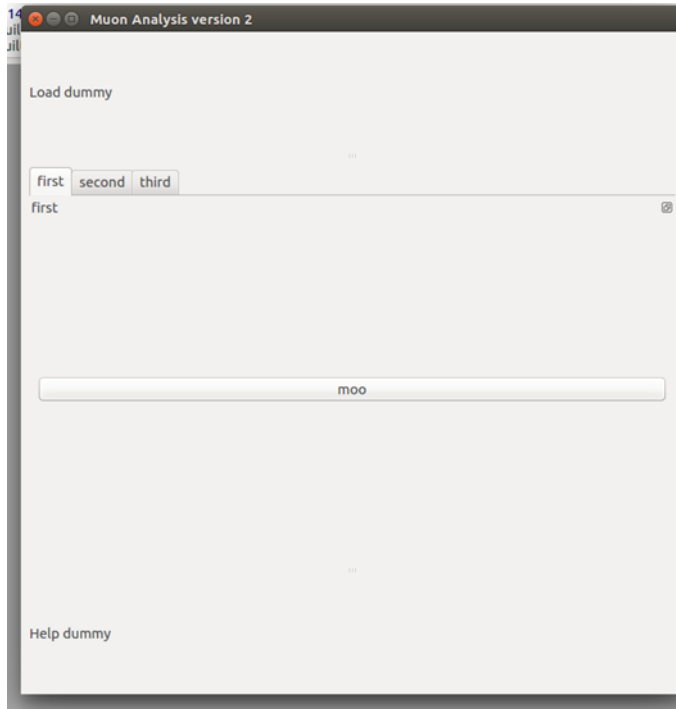


- Muon Analysis is being rewritten to improve stability.
- It will share code with Frequency Domain Analysis.
- Rewrite will allow for automated testing.





# Muon and Frequency Domain Analysis

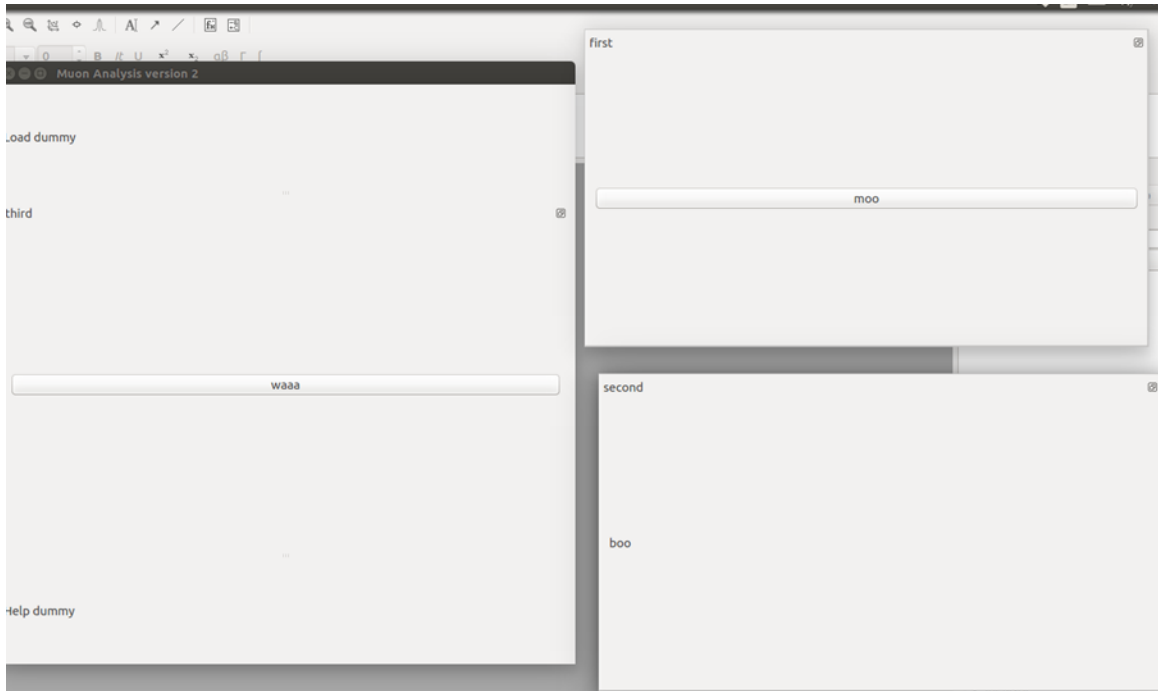


- Will be able to eject the tabs.



# Muon and Frequency Domain Analysis

- Will be able to eject the tabs.



# Elemental Analysis

The screenshot shows a software interface for elemental analysis. At the top, three yellow sticky notes provide instructions:

- File:**
  - [ ] Load File
  - [ ] Save File
  - [ ] Exit etc.
- Edit:**
  - [ ] Modify YAML Config etc.
- Tabs for each datafile loaded:** see below 'Load Data' button

The main window displays a periodic table with elements color-coded. A 'moredata' tab is active, showing a list of elements with checkboxes for 'Major Peaks', 'Minor Peaks', 'Gamma Peaks', and 'Electron Peaks'. The 'Major Peaks' section is checked, and a dialog box is open showing the following data for Helium:

Helium (Z: 2; A: 4.003)  
 Major Peaks:  
 K(2->1): 8.22  
 Minor Peaks:  
 K(3->1): 9.74  
 K(4->1): 10.28  
 K(5->1): 10.48

Another dialog box for 'Electron Peaks' is open, showing:

Electron Peaks:  
 72.8 (59%)  
 75.0 (100%)  
 84.45 (12%)  
 84.94 (22%)  
 87.3 (10%)

A third dialog box for 'Gamma Peaks' is open, showing:

Gamma Peaks  
 Major Peaks:  
 g54Mn25:  
 1528.  
 g55Mn25:  
 126.0  
 Minor Peaks:  
 72Ge(n,n')72Ge:  
 691.0  
 73Ge(n,g)74Ge:

The main interface also includes a 'Detectors' section with checkboxes for GE1, GE2, GE3, and GE4, and a 'Browse' button with the number 2632.



# How to be involved

- Share information about crashes.
- Talk to me  
([anthony.lim@stfc.ac.uk](mailto:anthony.lim@stfc.ac.uk)).
- Use the Mantid forum  
(requests and bugs)  
<http://forum.mantidproject.org/> .

