LISE for Excel porting to 64-bit, SpecTk Development

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LISE for Excel 64-bit

LISE for Excel 64-bit allows for the use of many LISE functions and some exclusive functions in an Excel format. Users have access to 75+ functions that can be used freely in user-created Excel sheets, or pre-made Excel sheets. Functions range from statistics calculations like a sum of chi squared to nuclear physics related functions some of which can be seen in Fig. 2. The 64-bit version will be receiving updates with LISE and offers some new features not seen in LISE Excel 32-bit. Some of which are more energy loss calculation methods, and new functions.

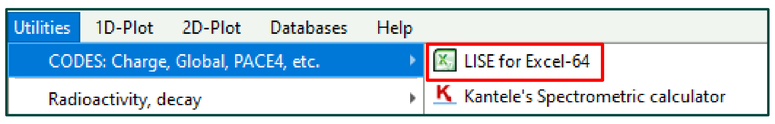


Figure 1. LISE for Excel can be opened directly from the LISE^{++} program.

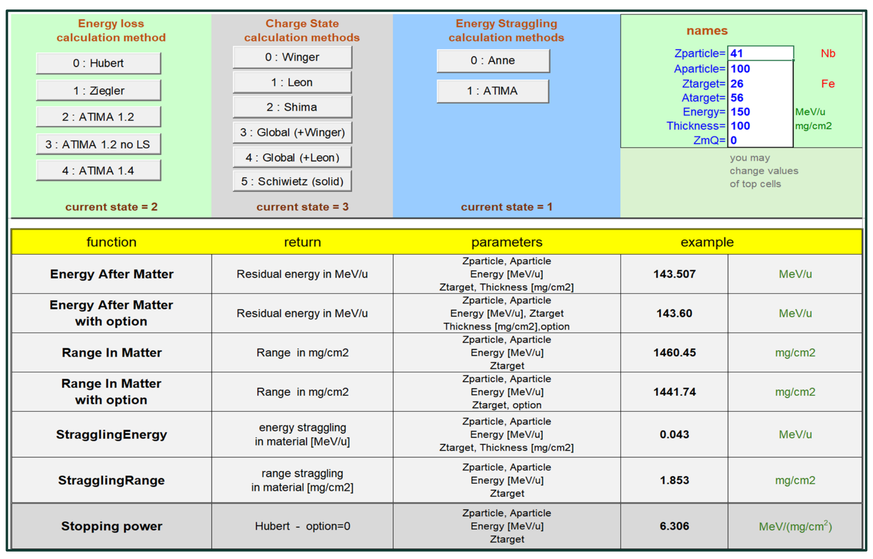


Figure 2. shows one of the 6+ pre-made Excel sheets designed for a simplified user experience, featuring new energy loss calculation methods 3 and 4 in LISE Excel 64-bit.

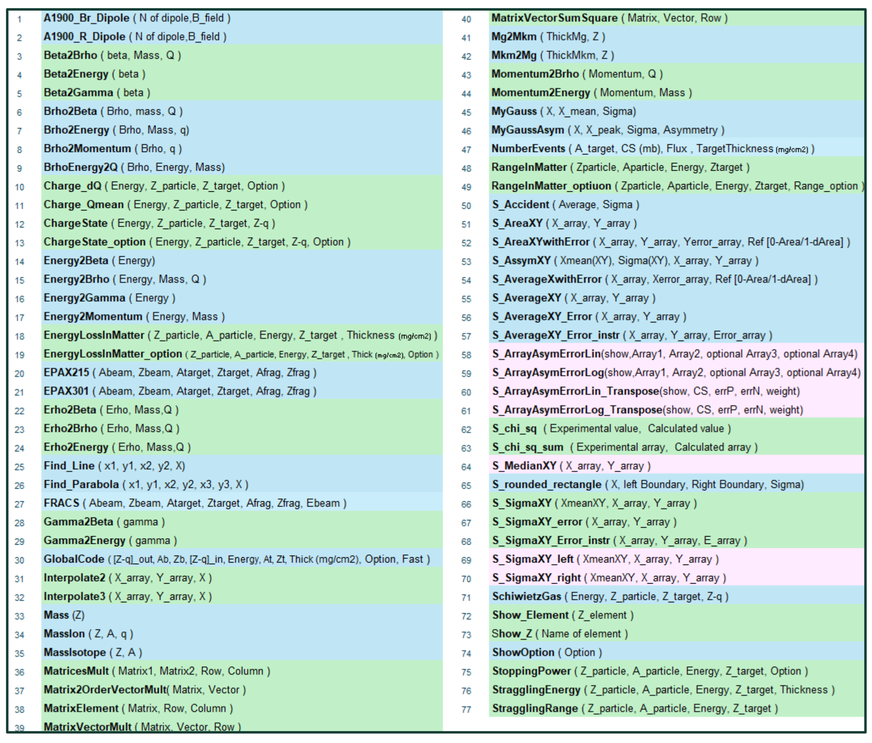
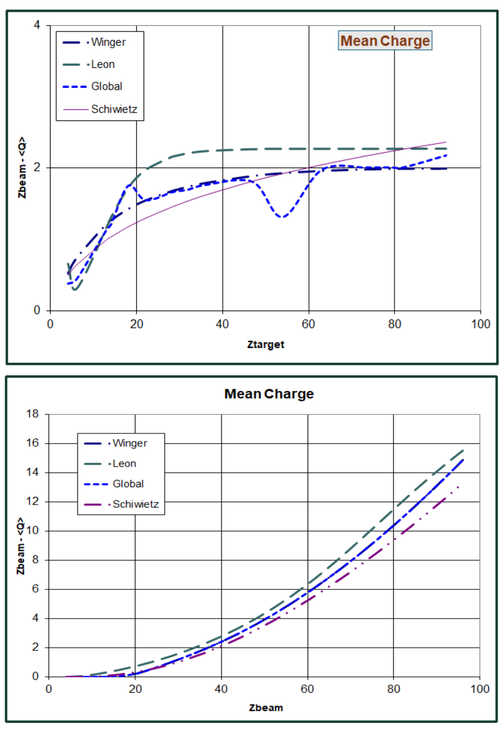


Figure 3. Is a list of the LISE for Excel 64-bit functions available.



Figures 4 & 5. Illustrate some of the capabilities of LISE for Excel and display the differences between the various charge state calculation methods offered. Fig. 4 shows the charge states as a function of the target's proton count, and Fig. 5. Corresponds to the beam's proton count.

SpecTk Background

SpecTk is a visualizer written in TCL and initially developed by Daniel Bazin [1]. SpecTk can use data read in from SpecTcl for PID and data analyses, as can be seen in Figs. 6 & 7. It is very similar to Xamine but with some clear differences, i.e., the capability for displaying multiple windows or pages, manipulation of contours, Gaussian fit calculations, and a more comprehensive GUI.

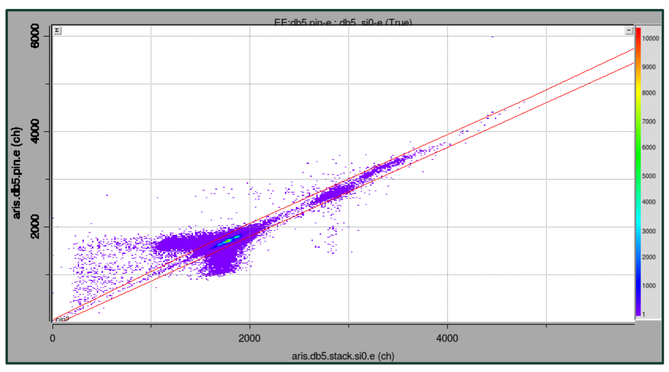


Figure 6. This is an example of how gating can be used to clean the data in SpecTk. In this case, gating on the energy lost in the first silicon stack.

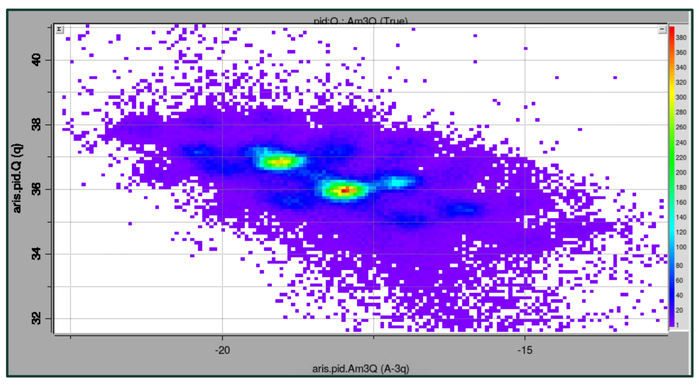


Figure 7. Using data brought in from SpecTcl and the cleaning done in SpecTk, we can do PID and get data similar to that seen above. Of course, this is very rough and uncleaned.

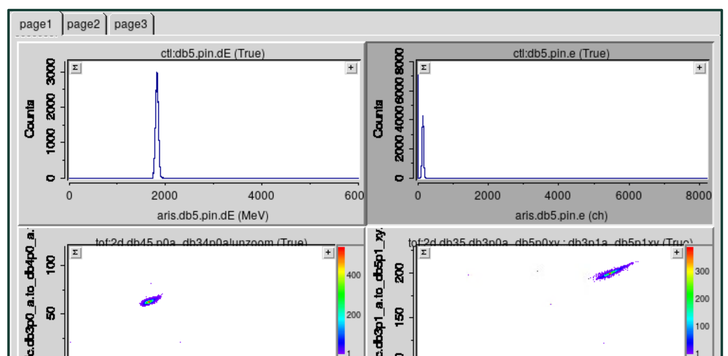


Figure 8. An important feature of SpecTk is the ability to display multiple spectra at once and have multiple pages of spectra, which can be seen in the tabs in the top left corner.

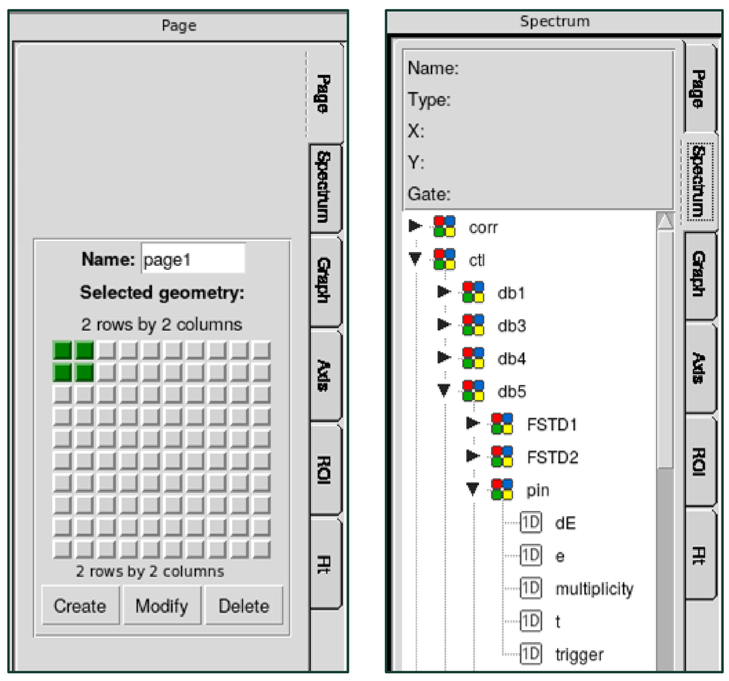


Figure 9. Shows two of the "Drawer" tabs SpecTk provides. The left is used to create pages, and the right is used to assign spectra to displays.

References

1. D. Bazin, *SpecTk*, https://github.com/DBazin/SpecTk
2. O. B. Tarasov. , "LISE^{++} for EXCEL," https://lise.frib.msu.edu/excel.html

SpecTk Updates

Since SpecTk version 1.3.1, there have been many new features and bug fixes leading up to version 1.7.0, with some of the changes seen below.

Bug Fixes:

- Corrected a Binning Error (Fig. 10)
  - SpecTcl data was being imported with an index starting at one. This caused a shift right by one bin.
- Log Bug (Fig. 11)
  - Initially all zero values were being graphed at 1 instead
- Fixed Buttons
  - The minus button no longer throws an error when pressed
  - Clear selected/page works and doesn't cause errors
- Miscellaneous
  - Spectrums no longer go away when changes are made in SpecTcl.
  - Fixed an error that would occur if the directory in a config file was no longer correct.
  - Graph buttons ie. Zoom, Contour, and Select no longer lock randomly. (Fig. 12)

New Features:

- Xamine Config Import/Export
- Page Reordering (Fig. 12)
  - Reorder pages alphabetically, and as desired.
  - Temporarily disable pages.
- Append SpecTk Configs
  - Additional option to remove appended configs.
- Auto-Update Tool (Fig. 12)
  - Allows for control over update type and interval between said updates.
- Added "ROI Print"
  - Outputs ROI data to a .csv file in SpecTk's directory.
- Added the "Purge" option
  - Removes unused spectra decreasing file size and ram usage.
- Miscellaneous
  - Improved config/data load times by ~30%.
  - Added the Grid Button . (Fig. 12)
  - Page names can have Upper-Case letters.
  - Creation of the SpecTk logo. (Top right of poster)

Figure 10. Version 1.6.0 introduced fixes to how binning was calculated. Initially, an offset was applied that shifted all data right one bin and cut off the last bin.

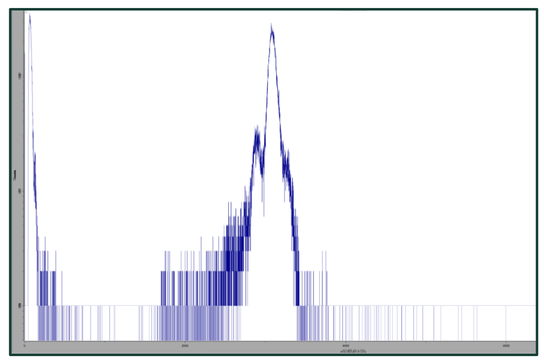


Figure 11. In version 1.3.0, 1D log plots were displayed with a line at one. This issue was resolved in a version 1.3.2, and plots now go down to zero instead of stopping at one.

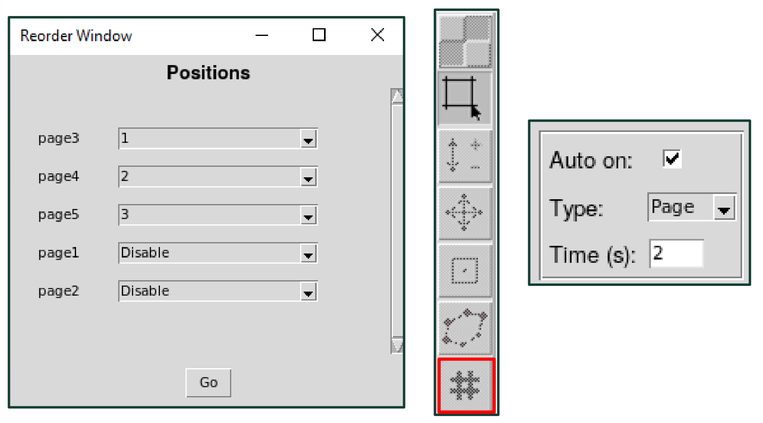


Figure 12. The reorder window, grid button, and auto-update tool are shown. Due to a bug resolved in version 1.6.8, the Grid, Select, Expand, Scroll, Inspect, and Contour buttons are disabled.

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