

# Squirrel and Pika Tips

2019 Users Meeting

Lund, Sweden

Donna Sueper

# How can I make Squirrel or Pika go faster?

Updating the progress bars in Squirrel takes ~ 30% of the processing/calculating time!

You can temporarily disable the process bars by using the checkbox in the Squirrel panel – Miscellaneous tab.

When unchecked, the progress bars DO NOT UPDATE. To know when calculations are finished:

- For major operations like preprocessing, wait for comments in the history bar to indicate when the operation is completed.
- For other operations such as average mass spectra of large todo waves, you can always check if the 'Abort' button in the lower corner of the Igor experiment is available.

The screenshot shows the 'ToF-AMS Analysis Toolkit 1.62G' interface. The 'Odds & Ends' section is circled in red, containing the following options:

- Update Squirrel progress messages
- Kill temporary mats waves

Other visible sections include:

- Graphing:** Trace Thickness (2), Stick Thickness (2), Zero Line (checked), Gaps (unchecked), Cursors (unchecked), Add Legend (unchecked), Scale From Zero (unchecked), Do not modify existing traces (unchecked).
- External File Options:** .hdf (default, DAQ v.4.x) selected, .h5 (default DAQ v. 5.x+) unselected.
- ToDo Wave Selection:** ToDo: all
- ToDo Wave Creation:** Run formula: p51, Name: p51
- Time Base Selection:** As saved (unchecked), Set interval (min): 15 (selected), Custom wave (Igor secs): (empty)

At the bottom, there is a 'Done.' label and a progress bar with blue and red segments, and a small squirrel icon.

How can I keep track of all the files that are attached to an experiment?

By default external files in Squirrel/Pika will be named AMS\_intermediate\_XXXXXX.hdf

You can assign more intuitive names to files, names that match your experiment name by using the checkbox 'Use chosen interm. file, experim. prefix'.

When pre-processing begins, the user will be prompted for the name so replace the "AMS\_intermediate". This will be name of the files (followed by a 6 digit number); this will also be the name given to the experiment.

This option is only available once per experiment. This checkbox is replaced with text showing the user-supplied name once this option is activated.

The screenshot shows the 'AMS Analysis' software interface for 'ToF-AMS Analysis Toolkit 1.62G'. The interface includes a top navigation bar with tabs for 'HDF Index', 'Corrections', 'MS', 'PToF', 'Checks', and 'Misc'. The 'HDF File Index' section contains a 'Get Index' button and checkboxes for 'New only', 'No BFSP', 'Plot Diagnostics', and 'No fast mode'. The 'Checks for UMR Stick Recalculations/Adjustments' section has buttons for 'M/z calibration', 'Baseline, UMR', 'Single Ion', 'DC markers & ePToF Tool', and 'Fast MS'. The 'Pre-Process Data (finalize UMR sticks & raw spectra for HR)' section features a 'Pre-Process' button and a list of checkboxes: 'Save experiment after pre-process' (checked), 'on-pre-proc. only', 'User chosen interm. file, experim. prefix' (circled in red), 'Stick MS' (checked), 'Raw MS', 'MS m/z duty cycle' (checked), 'MS stick recalc', 'Use m/z fit params' (checked), and 'Subtract baseline' (checked). The 'ToDo Wave Selection' section has a 'ToDo' dropdown menu and buttons for 'ToDo Table' and 'ToDo Graph'. The 'ToDo Wave Creation' section includes a 'Run formula' field, a 'Name' field, and buttons for 'New ToDo' and 'Blacklist runs'. The 'Time Base Selection' section has radio buttons for 'As saved' (selected), 'Set interval (min): 0', and 'Custom wave (Igor secs):'. At the bottom, there is a 'Ready' button, a progress bar, and a squirrel icon.

# How do I upgrade Squirrel and Pika?

You can update your Squirrel and Pika experiments to the latest version of the code and not have to redo any calculations.

Users can download the stand-alone ipf and load into any experiment. Within the experiment, from the top-most menu select 'AMSIPFManage, select Update AMS ipfs and ADOPT ipfs'.

The code will prompt for the folder containing the ipfs and will automatically kill old ipfs, load the new ipfs and kill and recreate the main Squirrel and/or Pika panels.

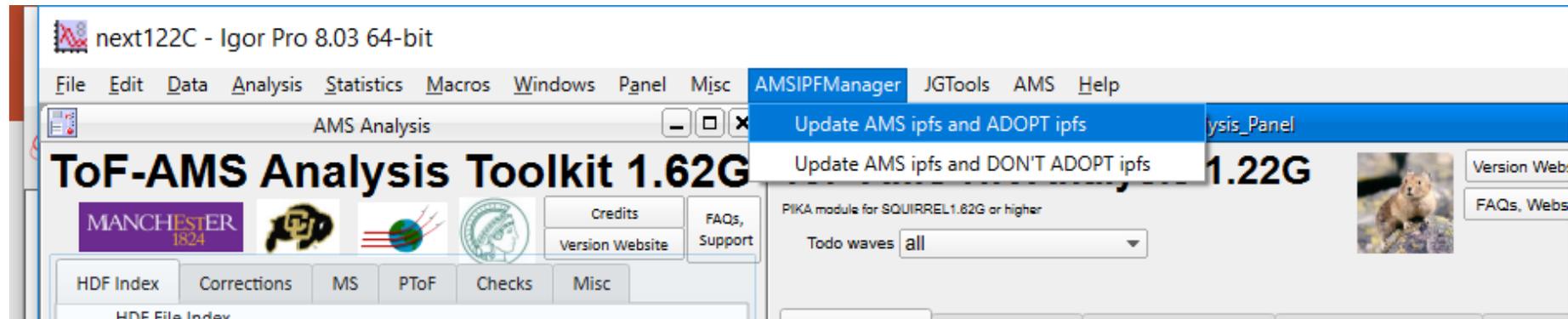


The banner features the University of Colorado logo on the left, the text 'TOF-AMS software downloads' in the center, and a stylized '2F' logo on the right. Below the text is a navigation bar with buttons for 'Upgrade', 'SQUIRREL', 'PIKA', 'APES', 'SPARROW', and 'IE Calibration'.

- DAQ web site
- Squirrel and PIKA Information Web Site
- AMS Analysis Web Site
- All Igor 6.x users are must upgrade to at least Igor 6.37. There is a [known issue with MacOS High Sierra and Igor notebooks for Igor versions < 7.07](#). For Igor 6.37 and High Sierra users, one must kill all notebooks, which include the readme files, before saving an experiment.
- All the latest code as of June, 8 2018 has been tested on Igor 7.07 and Igor 8.02 and is compatible.
- All Igor 7.x users are strongly encouraged to upgrade to at least [Igor 7.07](#)

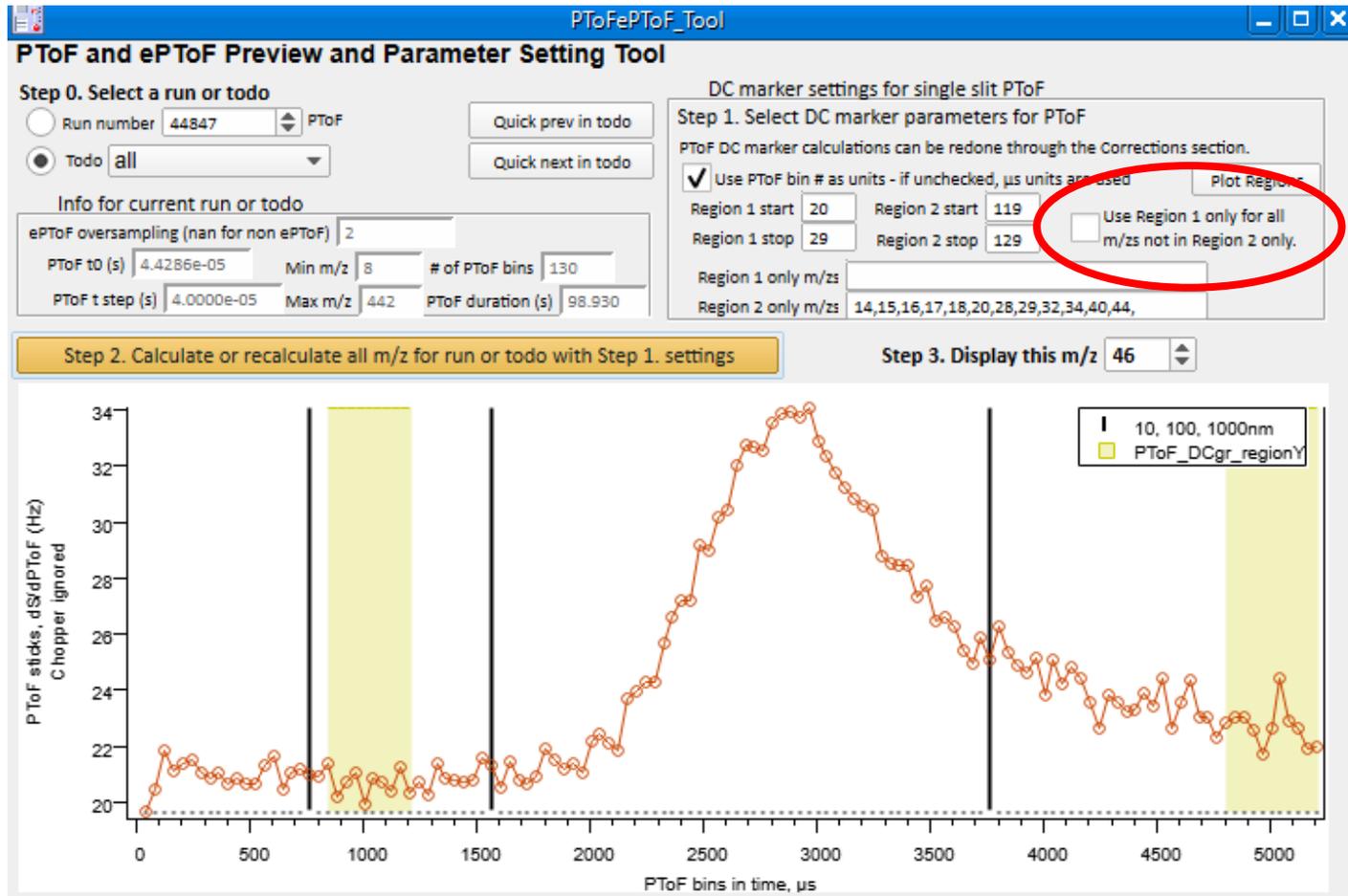
## Upgrade Existing SQUIRREL, PIKA Experiments

Version	Date	Release Notes	File Type	File Type
v1.04	5-Dec-2018	<a href="#">Release Notes v1.04</a>	1.04 Igor Update ipfs (single ipf that compiles independently)	zipped Procedures, ReadMe files (zipped ipf & readme file)



The screenshot shows the Igor Pro 8.03 64-bit interface. The 'AMSIPFManager' menu is open, showing options: 'Update AMS ipfs and ADOPT ipfs' (highlighted), 'Update AMS ipfs and DON'T ADOPT ipfs', and 'analysis\_Panel'. The main window displays 'ToF-AMS Analysis Toolkit 1.62G' with various tool icons and a 'PIKA module for SQUIRREL 1.82G or higher' section with a 'Todo waves' dropdown set to 'all'.

# How can I make my PToF data better?



Many users do not acquire PToF data far enough within a chopper rotation.

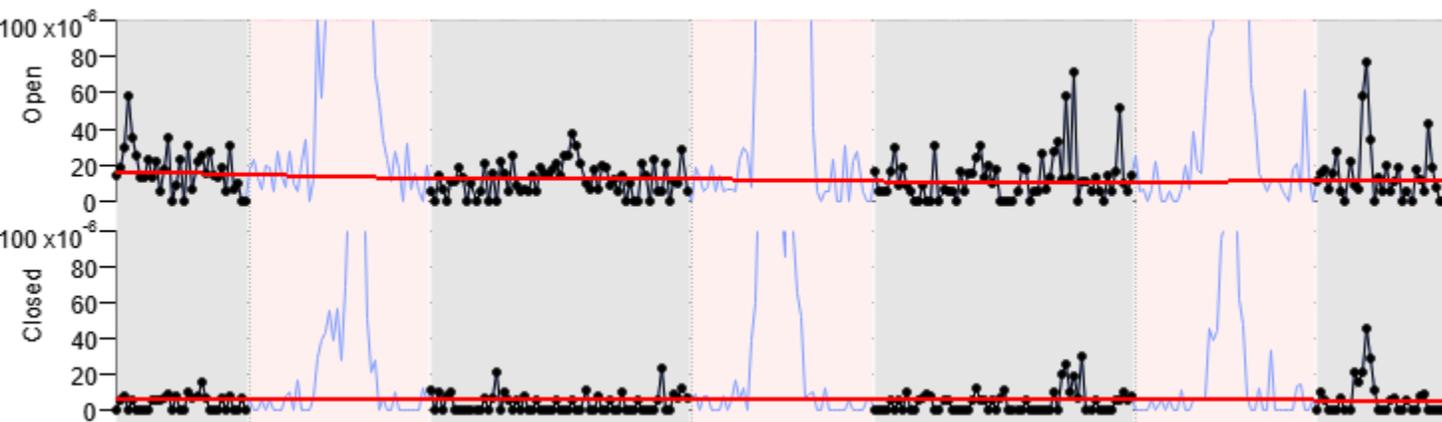
For the DC subtraction to work nicely it is a good idea to out until at least  $6500 \mu$ s.

For data already acquired you may want to use the checkbox 'Use Region 1 only for all m/zs not in Region 2 only'.

For ADQ cards it may be better to create a menu with only PToF (or ePToF) data that you can alternate between rather than within of a gen-alt menu.

# How can I make my HR data less noisy?

## Tofwerk's baseline algorithm

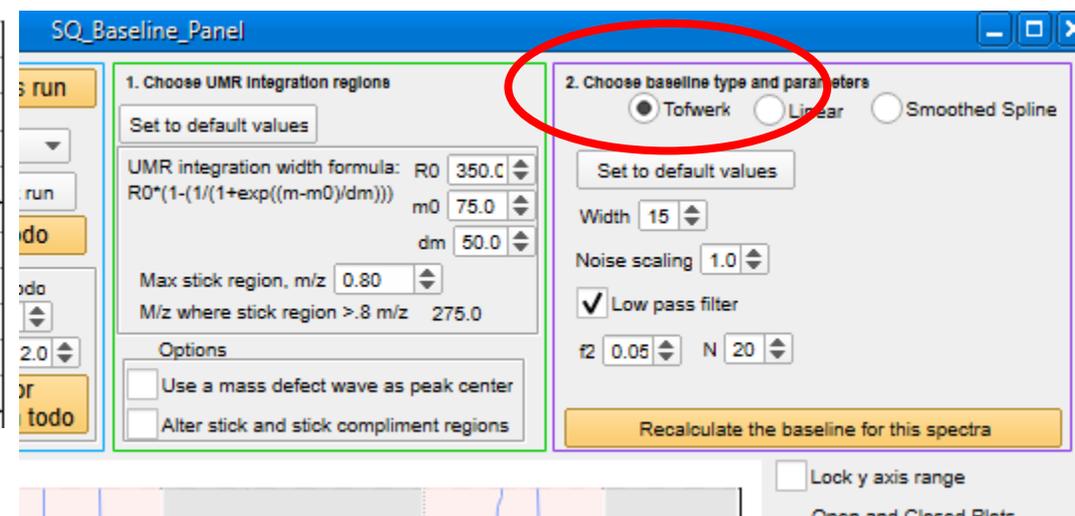
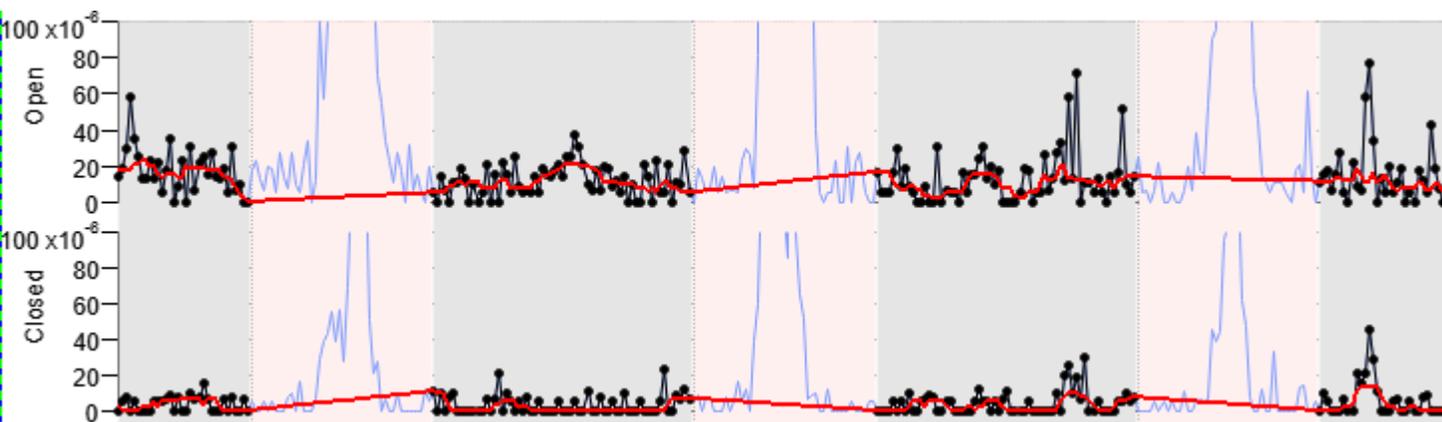


Tofwerk's algorithm for calculating spectral baselines was incorporated in Squirrel 1.62, but not as the default option.

After trying it out on many data sets, it works very well.

The improvement is very small but worthwhile, especially for smaller signals.

## Squirrel's linear baseline algorithm



# Is there an easier way to generate todo waves?

## Using different menus:

The following waves may be useful for generating todos based on specific user settings  
root:diagnostics:DAQSamplingType (not a one-to-one translation of user menus but is similar)  
root:diagnostics:toftype (will contain different numbers for V/W modes & different ionization types)  
root:diagnostics:analogInxx (analog in values – depends on which signals users connected)

As an example:

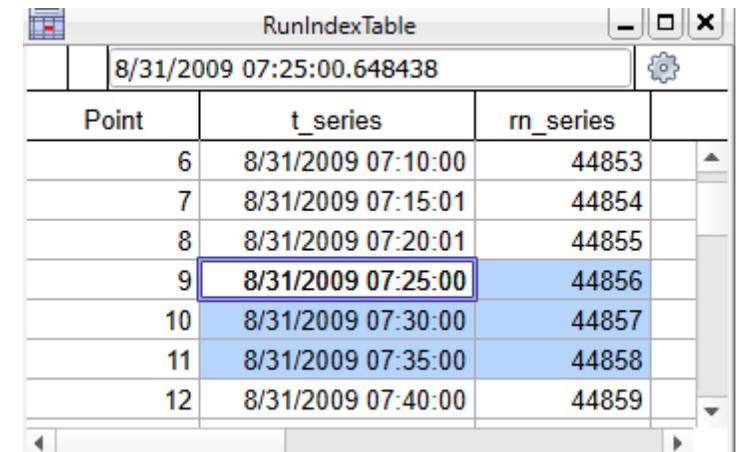
```
Make/o/n=(numpts(root:diagnostics:toftype)) root:TodoFlagWave = root:diagnostics:toftype==1 &&
```

```
root:diagnostics:DAQSamplingType == 3
```

Then enter TodoFlagWave instead of run numbers

## Using point numbers instead of run numbers:

From the run table, one can simply enter p# instead of the run numbers  
In this example one could use 'p9 – p11' instead of '44856 – 44858'



Point	t_series	m_series
6	8/31/2009 07:10:00	44853
7	8/31/2009 07:15:01	44854
8	8/31/2009 07:20:01	44855
9	8/31/2009 07:25:00	44856
10	8/31/2009 07:30:00	44857
11	8/31/2009 07:35:00	44858
12	8/31/2009 07:40:00	44859

## Where can I get more help?

Email [cacc-support@aerodyne.com](mailto:cacc-support@aerodyne.com)

Using this email will ensure someone will respond to your question soon.  
It is helpful if you indicate the version of Igor and Squirrel/Pika you are using,  
and if possible, when one might connect via teamviewer.

Search the wiki for phrases or topics of concern

[http://cires1.colorado.edu/jimenez-group/wiki/index.php/ToF-AMS\\_Analysis\\_Software](http://cires1.colorado.edu/jimenez-group/wiki/index.php/ToF-AMS_Analysis_Software)

I still regularly update/edit/add content to this wiki as the code evolves.

## What is new in Squirrel/Pika 1.63/1.23?

- Nice functions for making Squirrel and Pika (and other) panels larger or smaller
- New ability to perform HR fits on multiple data sets (MS and PToF)
- More multiprocessor functionality to speed things up
- Renovation of main Pika panel, removal many options that are no longer useful
- New ability to perform diurnal averages for any user-supplied data wave.
- Incorporation of optional calculations of Corbin et al, AMT 2015 errors generated from Monte Carlo simulations using m/z calibrations
- New default of 'Tofware' style of baseline calculation - 'Linear' and 'Smoothed Spline' options will be retired
- Igor 6 compatibility remains - but it may be the last version to be so!
- Released some time in September 2019