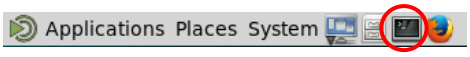
EQSANS Instrument Controls – Quick Reference for CS-Studio (updated 1/10/2018)

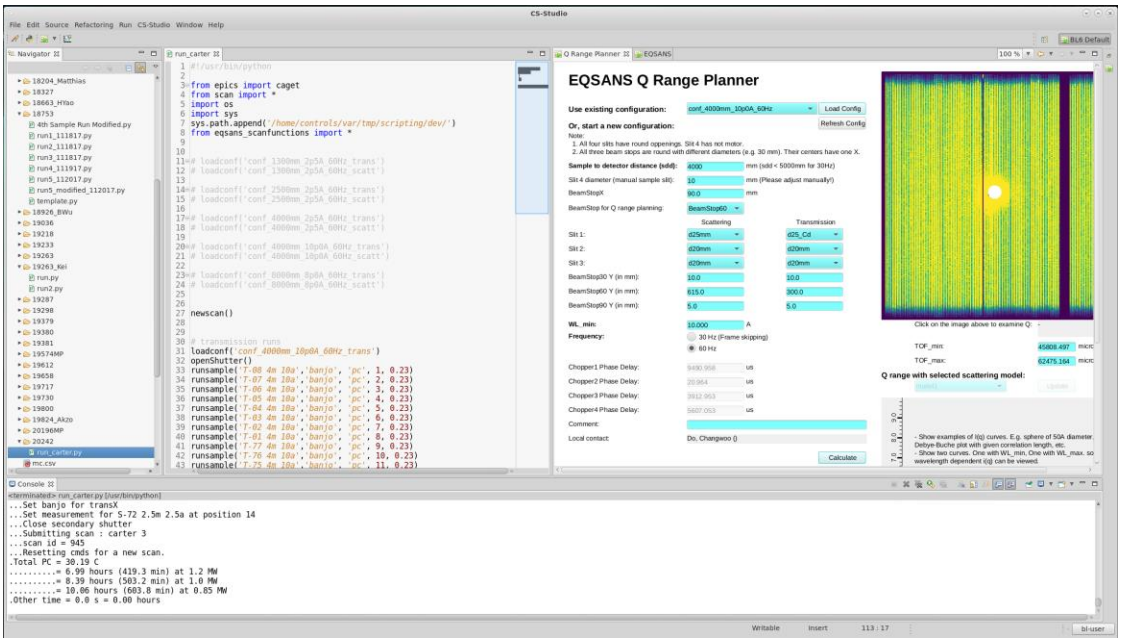
1. Launch CS-Studio

A. Double-click the Desktop icon for CSS.

B. Or open a terminal window and type: css



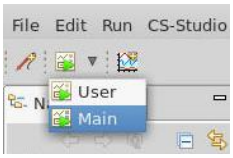
Two windows, like the ones below, will appear.

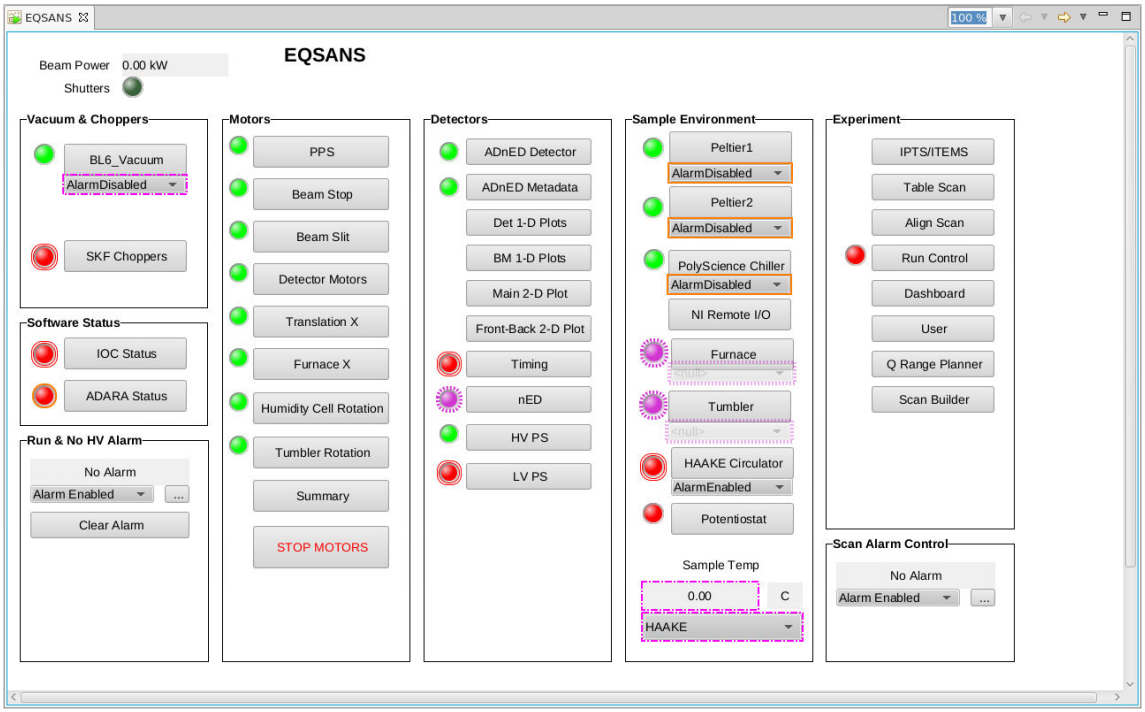


2. EQSANS Main Tab

The **EQSANS** tab provides a top view to access the different instrument controls and experiment setup options.

To open this tab, go to the left window and click the “green play button” icon at the top-left and choose “Main”.



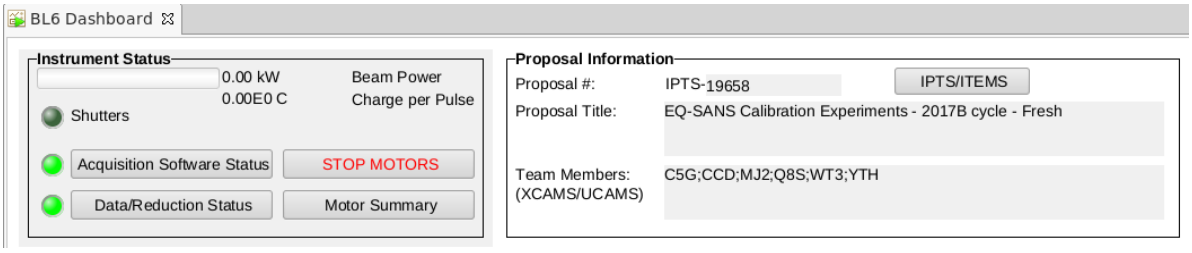


Lights indicate the state of the instrument controls: green = OK, red = error, purple = disconnected.

Clicking a button will take you one level deeper. The back and forward buttons at the top-right of the tab can be used to navigate.

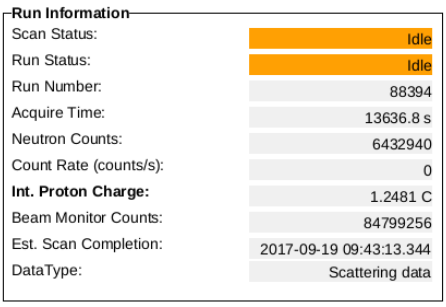
3. BL6 Dashboard

The **BL6 Dashboard** tab provides an integrated view of the instrument and allows for manual controls.



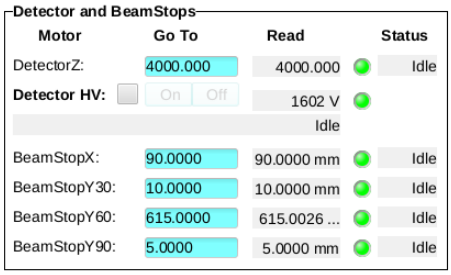
The SNS beam status is listed at the top of the **BL6 Dashboard** tab in the **Instrument Status** box. The Beam Power (kW) and Charge per Pulse (C) are given. Proposal details (e.g. IPTS #) also are listed at the top in the **Proposal Information** box.

Run Information shows if a Scan/Run is active or idle. The panel also lists run progress information, e.g. Acquire Time, Count Rate on detector, and Integrated Proton Charge.



Detector and BeamStops allows motor movement of the DetectorZ (sample-to-detector distance, or SDD, in mm) and BeamStop positions.

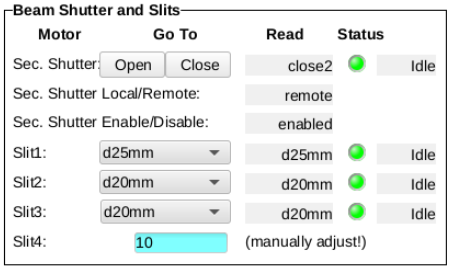
Note: You must press "Enter" after updating a "Go To" input box for the value to be accepted. This is true for all input boxes in CSS.



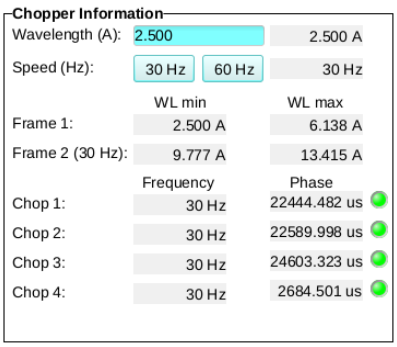
The valid range for DetectorZ is 1300 to 8500 mm. The detector will automatically go through a high voltage (HV) power down/up procedure when a move is requested.

There are 3 beamstop sizes available: 30, 60, and 90 mm diameter. They share a common X-axis and have individual Y-axis translations. Typically, the 60 mm beamstop is used. The 30 mm beamstop can be used at SDD = 1.3 m. Beamstop alignments (X-Y positions) are checked by the instrument team and provided to you.

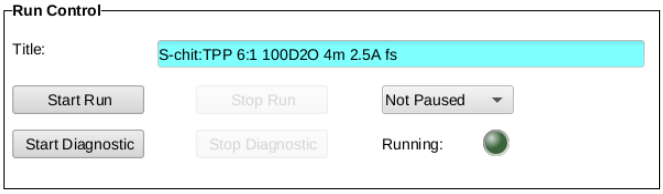
Beam Shutter and Slits allows the secondary shutter (Sec. Shutter) to be moved Open and Close by pressing the corresponding button. The Slit wheel motors also are located in this section. The most common settings are Slit1 = d25mm (or d25_Cd for transmission runs), Slit2 = d20mm, and Slit3 = d20mm. Slit 4 is the sample aperture and is manually inserted.



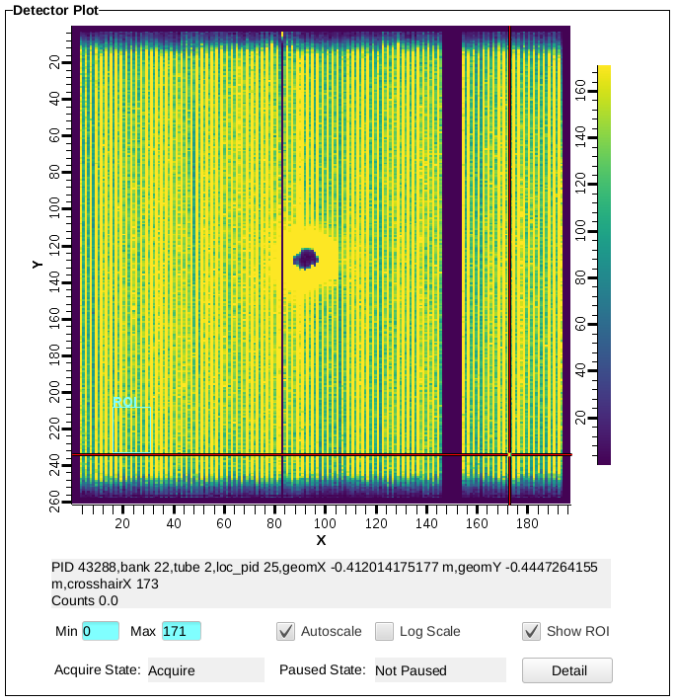
Chopper Information allows the Wavelength (Å) minimum and Speed (30 or 60 Hz) to be set. The 30 Hz speed is known as "frame-skipping" mode and provides two wavelength bands (Frame 1 and Frame 2) simultaneously.



Run Control shows the sample Title for the current run. It also allows manual runs to be performed. To start a run and save the data, use "Start Run" followed by "Stop Run". To not save the data, instead use "Start Diagnostic" followed by "Stop Diagnostic".

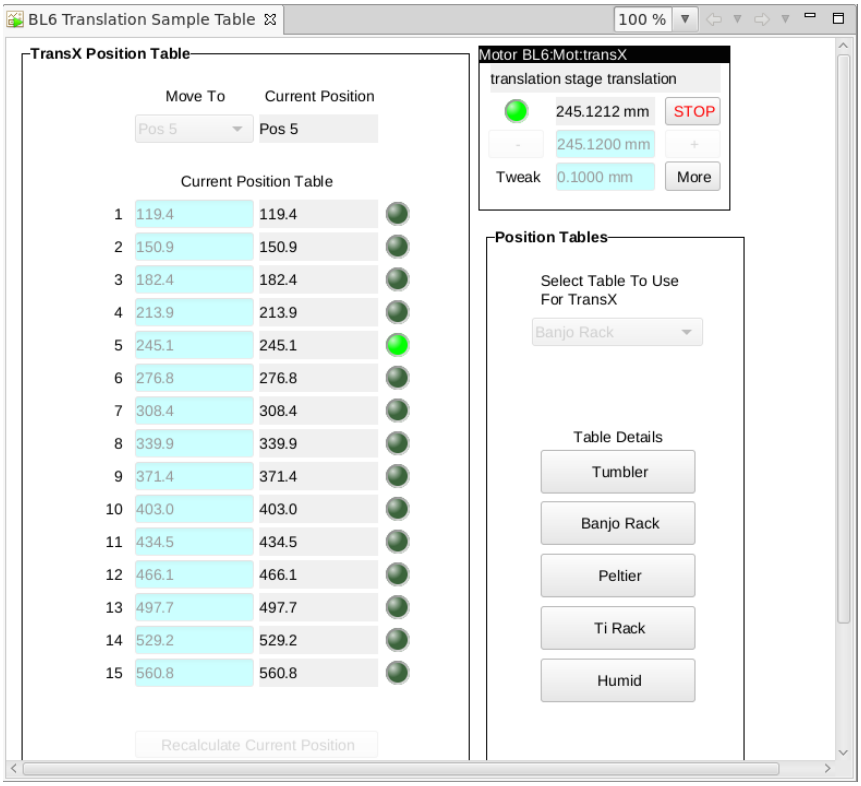


Detector Plot shows the real-time detector image with accumulated counts.

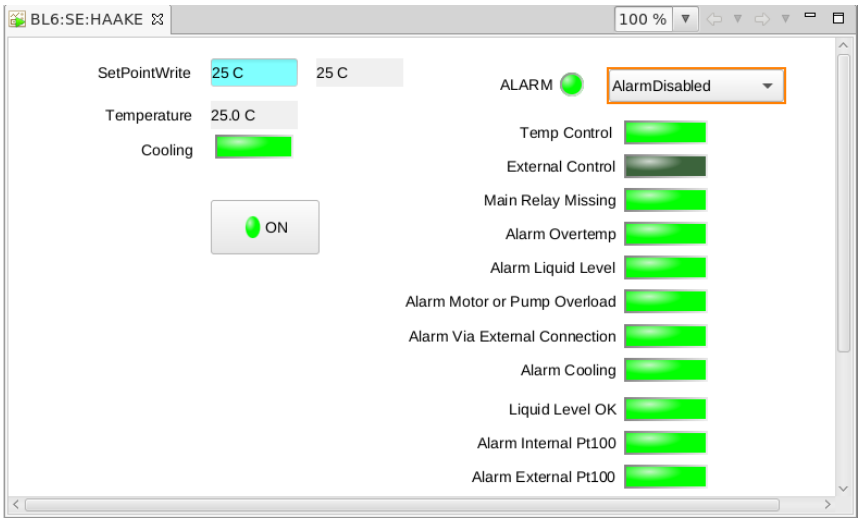


4. Sample Environment

The **BL6 Translation Sample Table** tab shows the sample positions for a selected sample environment. Choose a sample environment from the drop-down menu in the **Position Tables** box. Then request a sample position from the drop-down menu in the **TransX Position Table** box. The illuminated green light indicates the current sample position.



Set Temperature. The Banjo Rack and Ti Rack have water bath temperature control with a 5 to 80 ^{o}C range. Set the temperature from the BL6:SE:HAAKE tab in the SetPointWrite (^{o}C) input box.

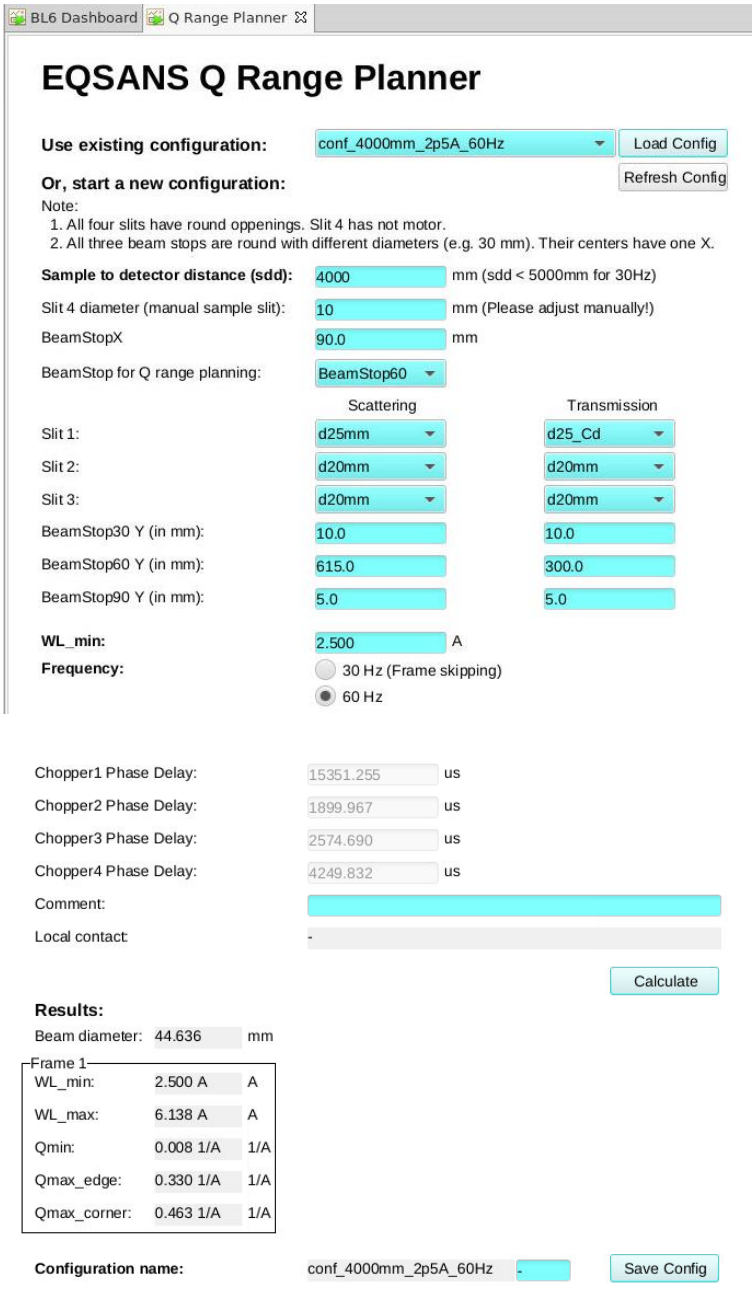


5. Planning Experiment Runs

Use the **Q Range Planner** tab to generate a new configuration and calculate the Q-range. An existing configuration also can be loaded from the "Use existing configuration:" drop-down menu and clicking "Load Config".

Click "Calculate" to update the Qmin and Qmax values in the Results section.

To save a configuration, append the Configuration name with a suffix (optional) and click "Save Config".

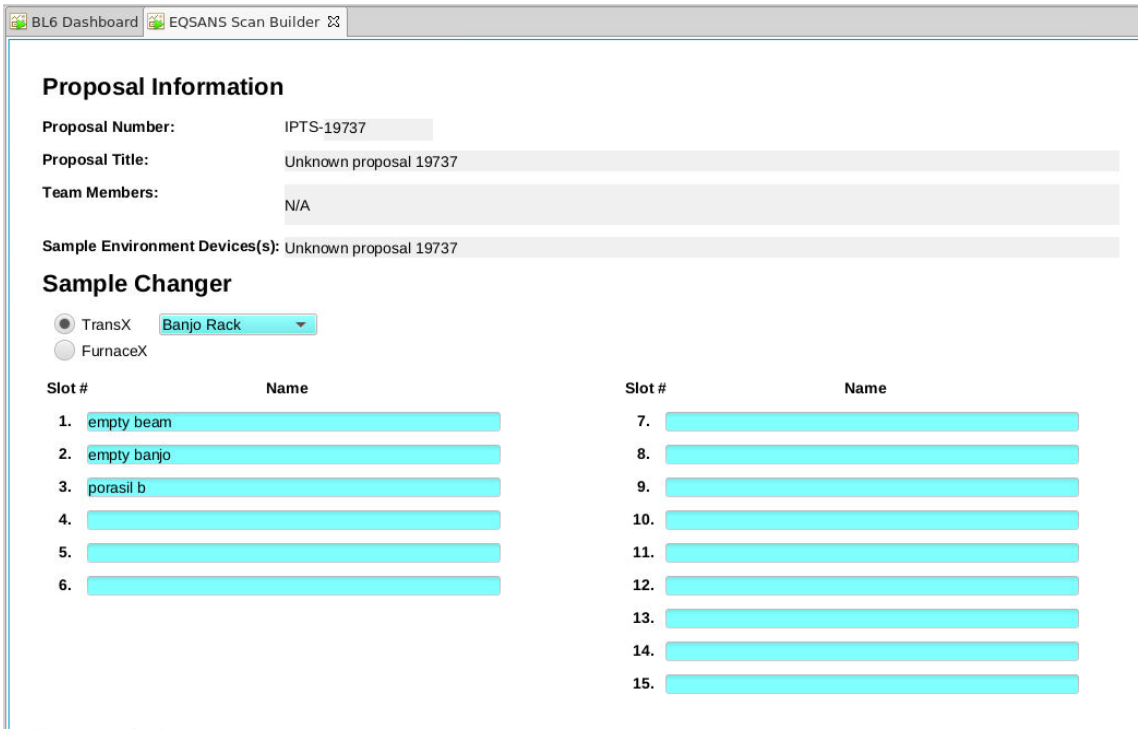


6. Performing Measurements

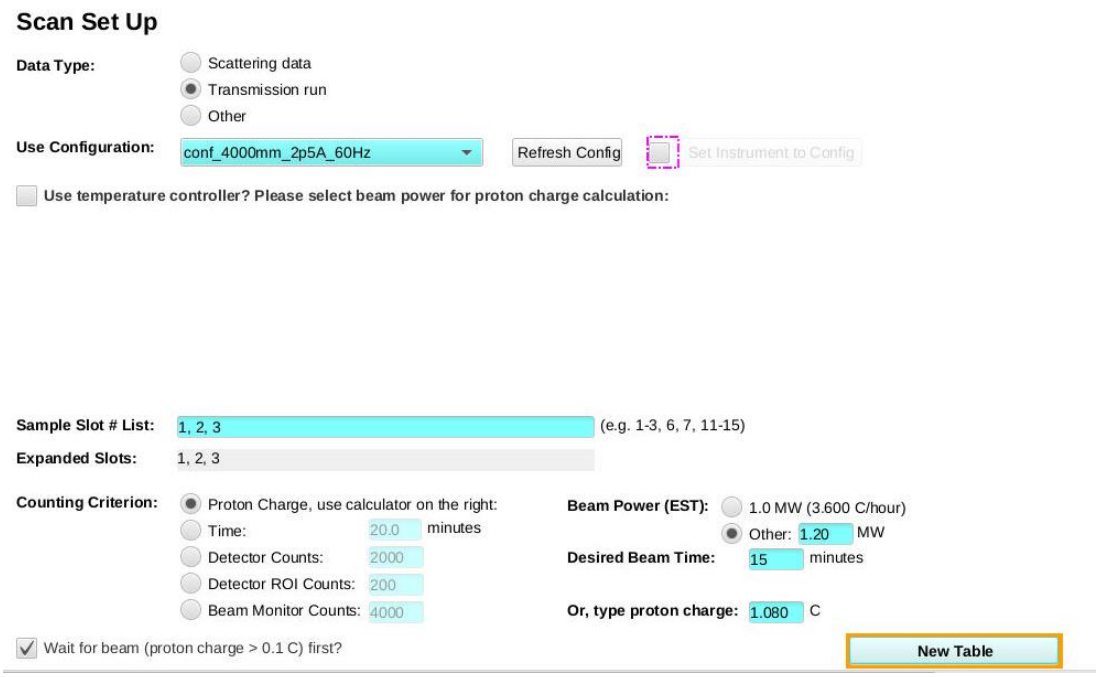
There are three main options to generate a series of measurement runs:

a) Scan Builder
b) Table Scan
c) Python Script

a) **Scan Builder** – Use the **EQSANS Scan Builder** tab to select the Sample Changer and populate the sample Slot # Names.



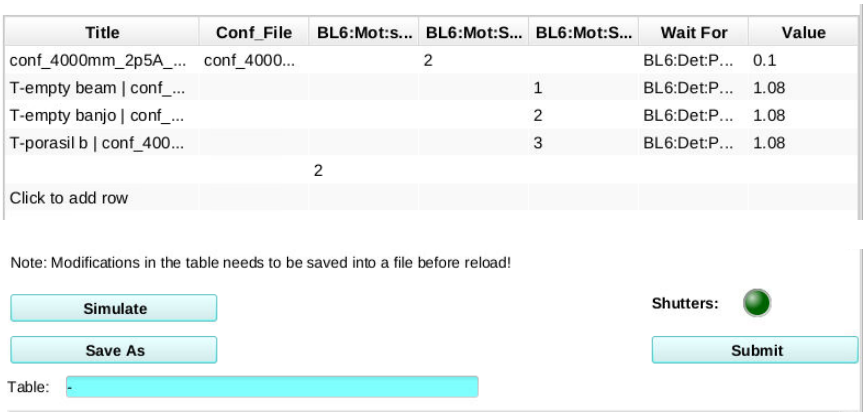
In Scan Set Up, select the Data Type (Scattering or Transmission) and choose the desired configuration. Input the sample positions to be run in the Sample Slot # List and then choose Counting Criterion (typically, Proton Charge). Options at the bottom-right can be used to estimate run time. Once complete, click the "New Table" button.



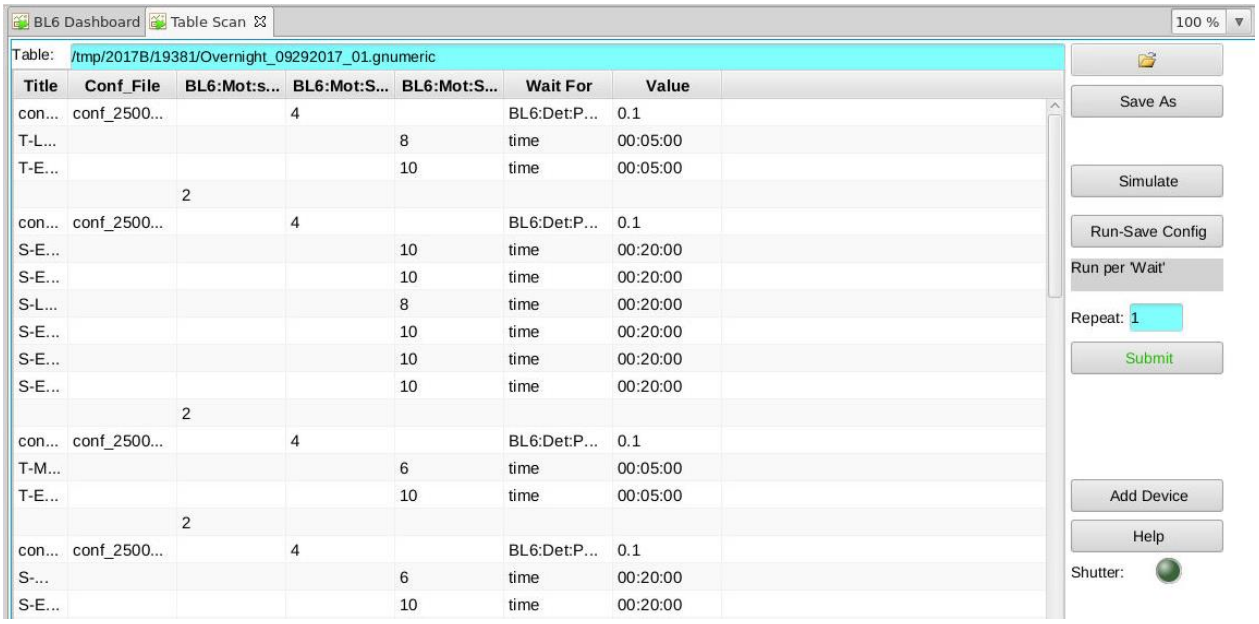
The table at the top-right will be populated with your runs. Check for accuracy and then click “Submit” to start runs.

Note: Transmission and Scattering runs have to be submitted separately. You can submit your Transmission runs, then go back and change Data Type to Scattering data and submit again. This will stack the scans and show up in the **Scan Monitor** tab (described below).

The run list also can be saved using the “Save As” button and then loaded into the **Table Scan** tab shown below.



b) **Table Scan** – Create a table scan spreadsheet (.cvs or .gnumeric; your local contact can provide you with a template) or construct using the **Scan Builder** above. Open the scan in the **Table Scan** tab, further edit (if necessary), and then click “Submit”. Multiple scans can be submitted as a stack that are run in succession.



c) **Python Script** – Runs can be scripted, as shown in the example below (your local contact will provide a template).

script_template

```
#!/usr/bin/python

from epics import caget
from scan import *
import os
import sys
sys.path.append('/home/controls/var/tmp/scripting/dev/')
from eqsans_scanfunctions import *


newscan()

# transmission runs
loadconf('conf_4000mm_2p5A_30Hz_trans')
openShutter()
runsample('T-empty beam 4m 2.5A fs','banjo', 'pc', 1, 0.2)
runsample('T-empty banjo 4m 2.5A fs','banjo', 'pc', 2, 0.2)
runsample('T-porasil B 4m 2.5A fs','banjo', 'pc', 3, 0.2)
closeShutter()

# scattering runs
loadconf('conf_4000mm_2p5A_30Hz_scatt')
openShutter()
runsample('S-empty banjo 4m 2.5A fs','banjo', 'pc', 2, 1)
runsample('S-porasil B 4m 2.5A fs','banjo', 'pc', 3, 1)
closeShutter()

submit('19730_run01')
estimatetime()
```

The **Scan Monitor** tab will show the current scans in progress. To stop a single scan, right-click it and choose "Abort". To stop all scans, click the "Stop" button (red square) at the top-right of the **Scan Monitor** tab.

Scan Monitor

ID	Created	Name	State	%	Runtime	Finish	Command	Error
1081	2017-12-19 20:27:28.6	ipts-19737 nanodiamond measureme	Logged			?		
1080	2017-12-19 16:58:42.3	IPTS-20334	Logged			?		
1079	2017-12-19 16:58:42.2	switch IPTS20334	Logged			?		
1078	2017-12-18 18:37:41.4	19150_all_runs	Logged			?		
1077	2017-12-18 14:20:50.2	MP new floods - 12-18-17	Logged			?		
1076	2017-12-18 14:20:50.2	switch IPTS20196	Logged			?		
1075	2017-12-18 14:11:06.3	switch IPTS20196	Logged			?		

The State will show if the scan Finished-OK, was Aborted, or Failed:

State	%
Failed	
Failed	
Aborted	
Finished - OK	