2010

SANS Data Reduction Guide

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Initial Setup

Before you begin to reduce the data collected at the HFIR SANS instruments, you will need a few things. First being a copy of Igor. Before you invest in Igor you can try it for 30 days by downloading it from Wavemetrics website. If you have purchased or downloaded Igor for use on your personal machine you will need to copy three files into your Igor file. When you update Igor it will erase everything in the files so it is better to copy shortcuts to the Igor folders and keep the HFIR Igor routines saved in another file, usually in the documents folder. The name of the three files and their corresponding Igor folders are listed in the table below:

Name of folder in KCL package	Folder to be saved in Igor
KCL Igor Procedures	Igor Procedures
Spice User Procedures	User Procedures
KCL User Procedures	User Procedures

After moving those files in, Igor should have an option on the menu when you start up called Packages. There will be two packages listed: SPICE SANS Reduction and KCL SAS Analysis. Before you dive head first into the reduction the other useful item to have on hand is the experimental worksheet your local contact helped you fill out while you were on the beam line. If you don't have this worksheet, please email your local contact and they can help you fill out a new one.

When starting Igor your screen should look like the following picture:

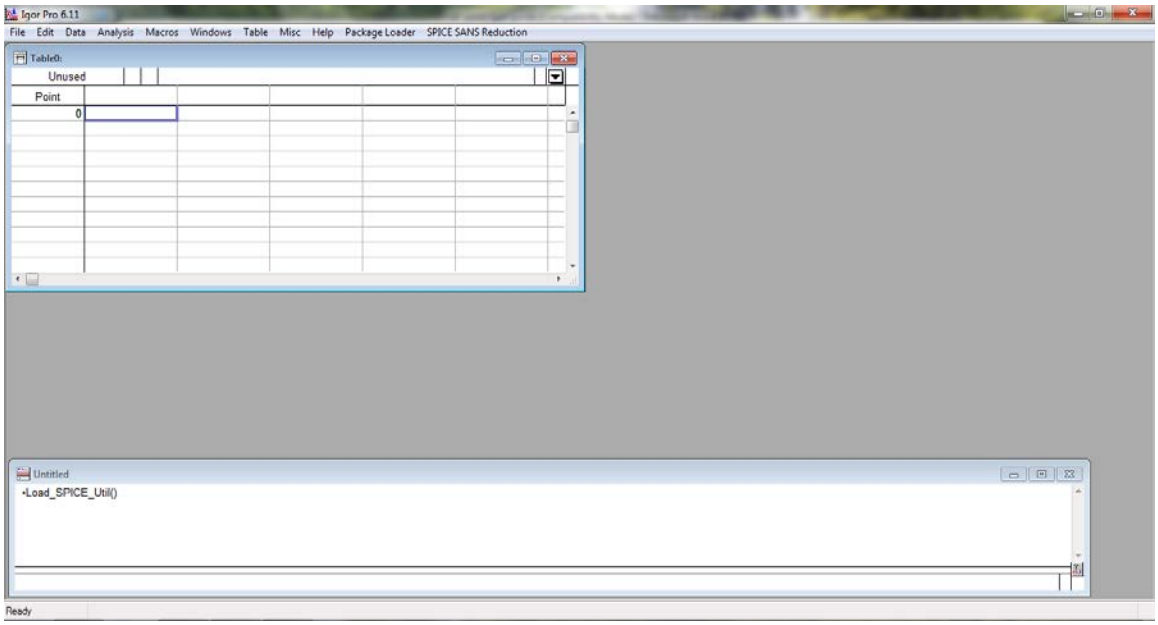

Figure 1

You will need to load the Spice SANS Reduction. Your toolbar should look like this:

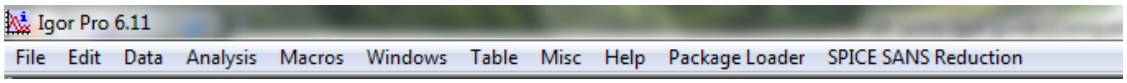

Figure 2

Loading Sample Data

To start reducing your data, click on "Spice SANS Reduction." The following window will pop up on to your screen

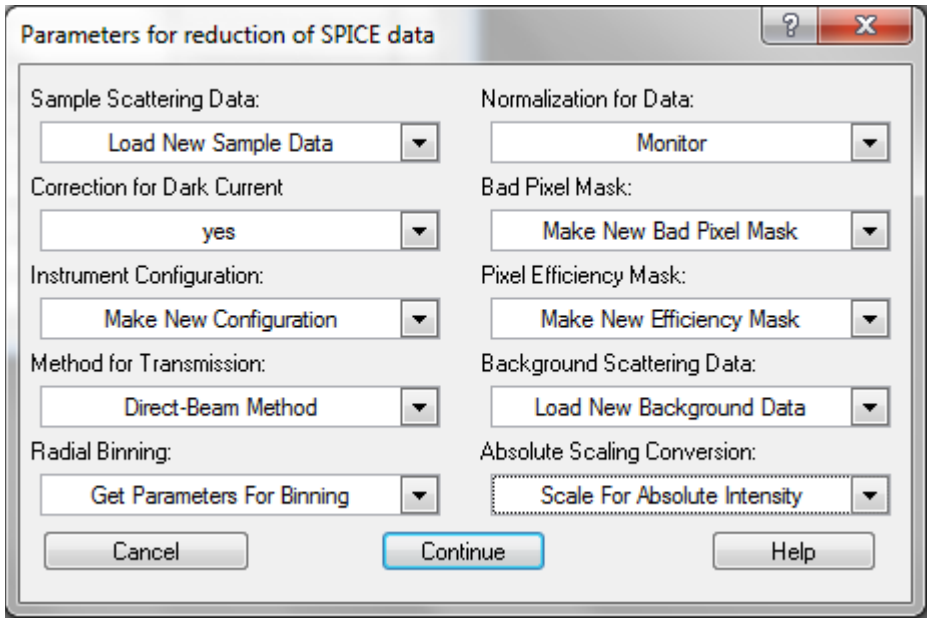

Figure 3

You should fill it out just as you see above.

Next you will get a popup asking for the sample data xml file. Search your directory until you reach the folder with the data files in it.

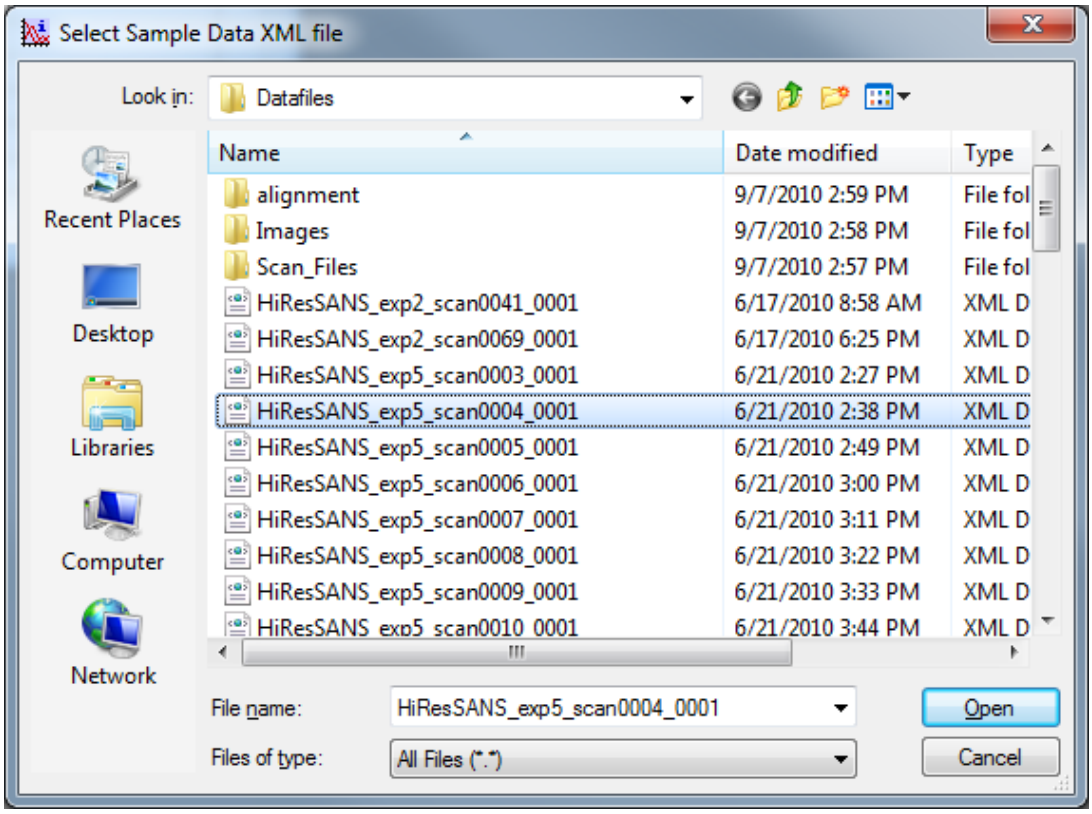

Figure 4

After selecting your data file, you will need to fill in the total thickness for your sample.

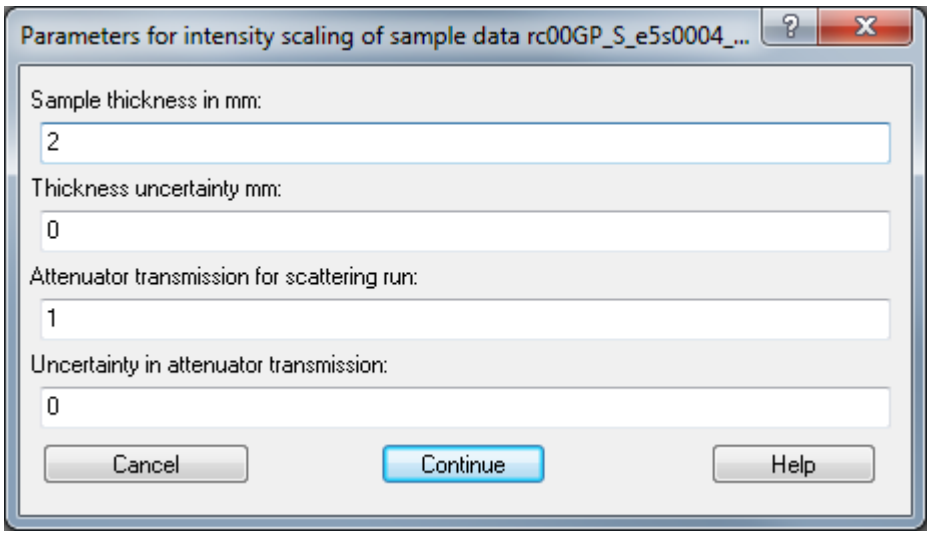

Figure 5

If you needed to attenuate your beam, this is where you put in the attenuation. Below is the list of attenuations for three separate wavelengths:

Attenuator Efficiency Chart			
Attenuator	4.75 Å (5319 rpm)	6 Å (4185 rpm)	12 Å (1995 rpm)
open (apercent)	1	1	1
x3 (bpercent)	0.348969	0.336153	0.211102
x30 (cpercent)	0.041883	0.036888	0.009□84
x300 (dpercent)	0.00475871	0.0038403	0.000443
x2k (epercent)	0.000991763	0.0006339	
x10k (fpercent)	0.000209□21	0.000141878	
x100k (gpercent)	4.53E-05	4.35E-05	
close (hpercent)	0	0	0

Bad Pixel Mask

Click “Continue” to move on to create your bad pixel mask. Rename the mask to something that makes sense to you. Most users name a mask for both the short and long configurations so that if he/she needs to change the mask for a certain instrument configuration it is already there.

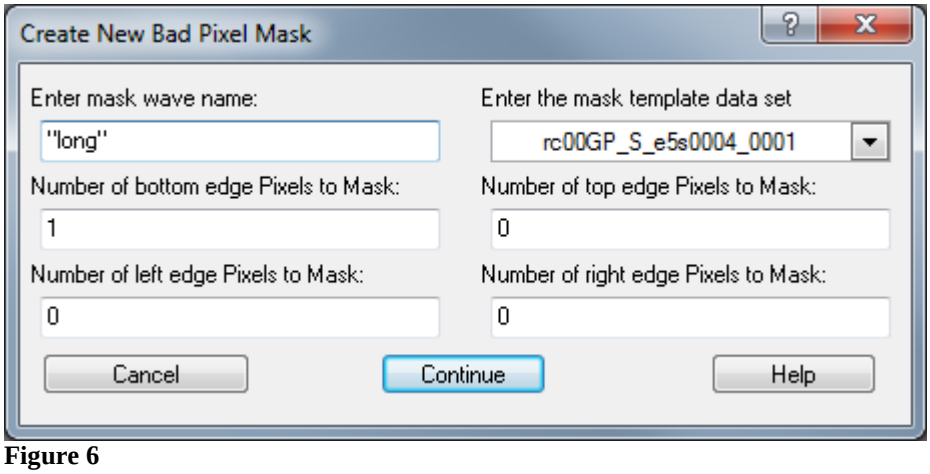

Figure 6

It is always good practice to mask out the bottom edge of the detector. Fill out your window to match the one above to start with. If you need to mask out more of your data,

you can always do it later by adding a marquee to mask which is discussed later in this guide.

Instrument Configuration

Next you will make your first instrument configuration. You will need to fill information from your experimental worksheet:

1. Wavelength
2. Sample to detector distance in **mm**
3. Source to sample distance in **mm**
4. Sample aperture radius in **mm**
5. Beam trap radius in **mm**

Your local contact should have helped you calculate the sample to detector distance. This distance comprises the detector distance that SPICE recorded, the distance of the sample from the Si window, and the internal offset. If you are missing any of these numbers, email/call your local contact; they should be able to help you get these numbers. An example of how your instrument configuration should be filled out is shown below.

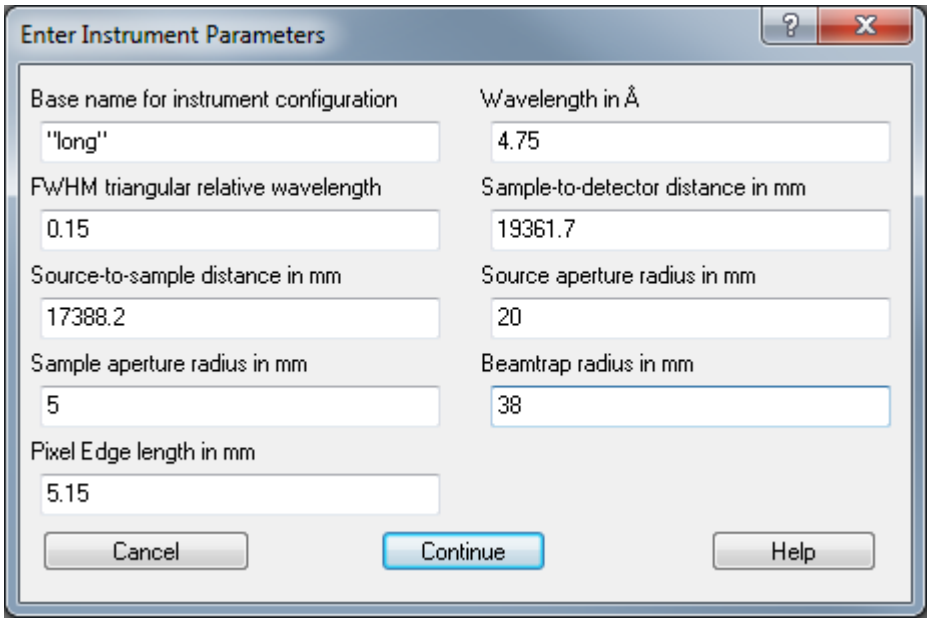

Figure 7

Dark Current

Igor will then ask you for the dark current file. This will be listed on your experimental worksheet. Another quick cheat for locating the dark current file in your data file directory is to look for one of the two experiment data files that are not the same experiment number as yours.

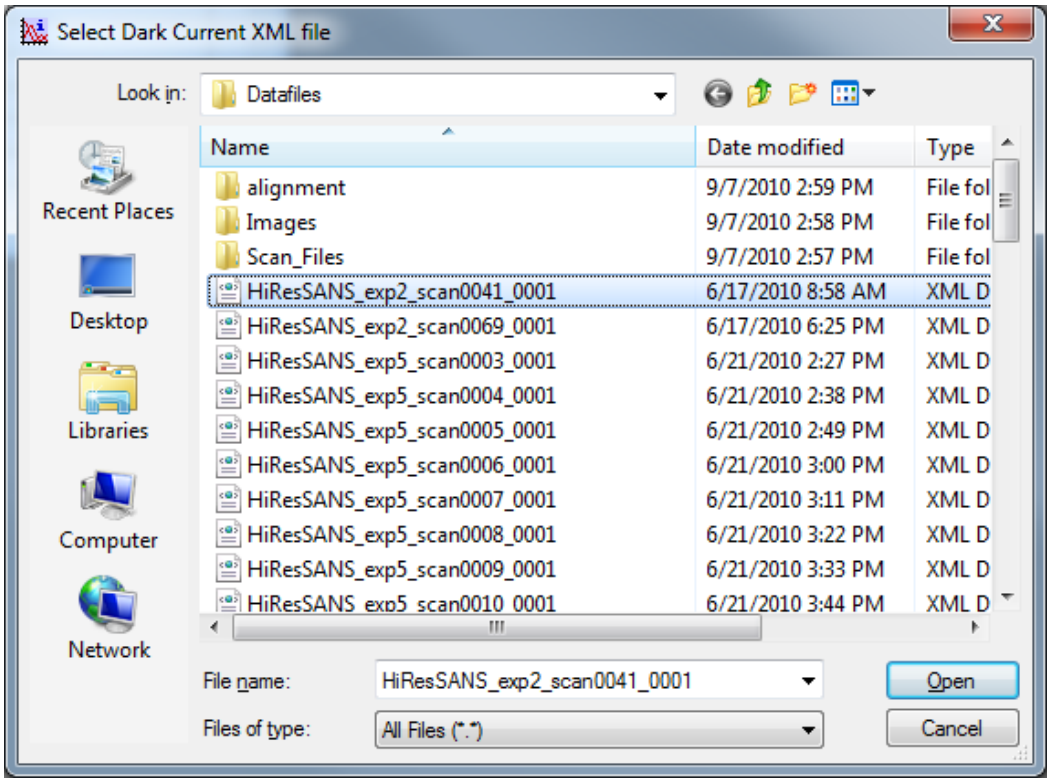

Figure 8

Beam Center

Next step is to find the beam center. This is usually done using the direct beam method. The window first appears as below.

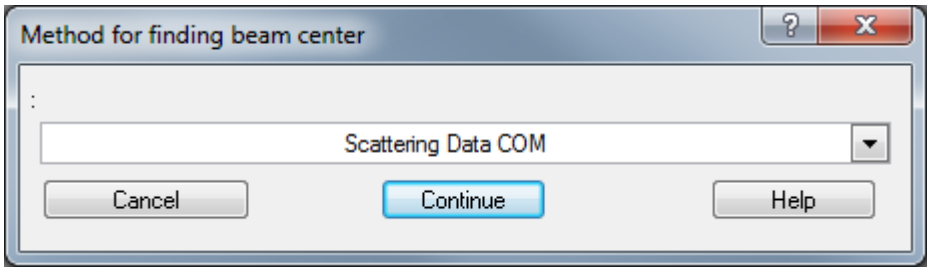

Figure 9

You will need to select the direct beam method.

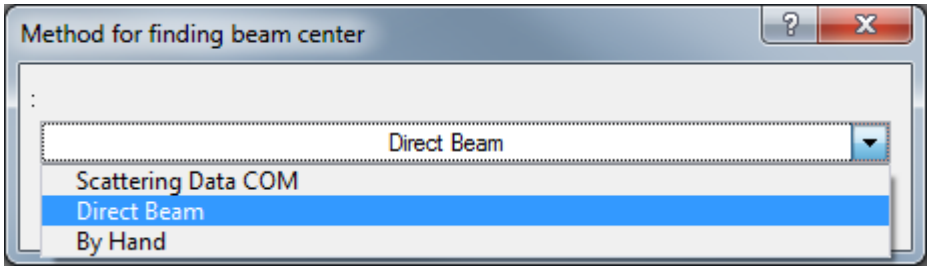

Figure 10

Load the new center data. When you collected your data you should have collected a direct beam or transmission file at each of the different distances you measured your samples. For the long (18.5) distance, you can use the empty beam transmission file. The other distances will be labeled something like the “db for center at 6m”.

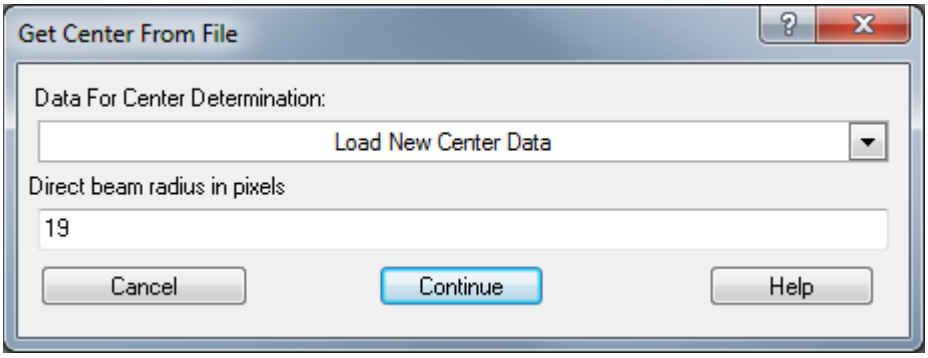

Figure 11

Click “Continue” to proceed to the next screen where you will select your center data.

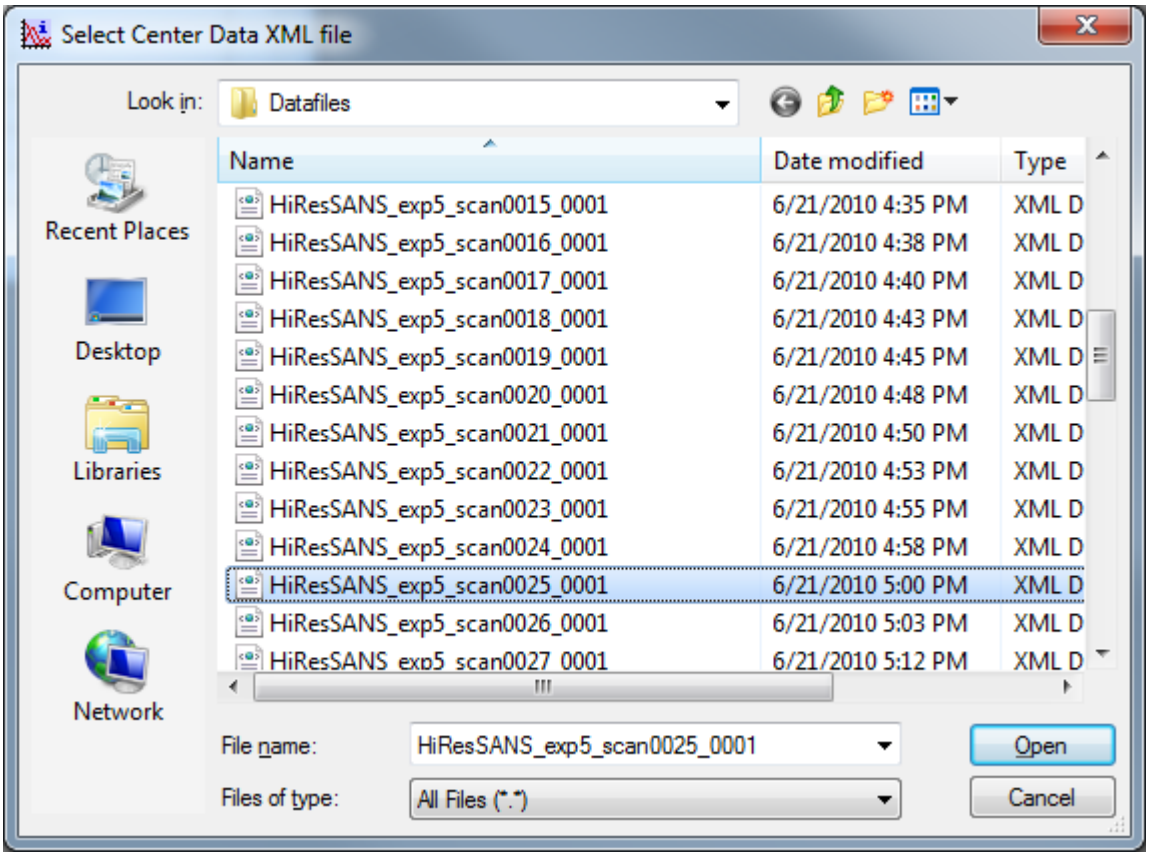

Figure 12

Absolute Scaling- Direct Beam Method

Now the next step is where reduction can vary depending on how you need to do the absolute intensity scaling. This walk through will use the direct beam method for scaling. Appendix 1 will take you through using the "from I0 standard" method. When the absolute intensity window pops up it looks like the following:

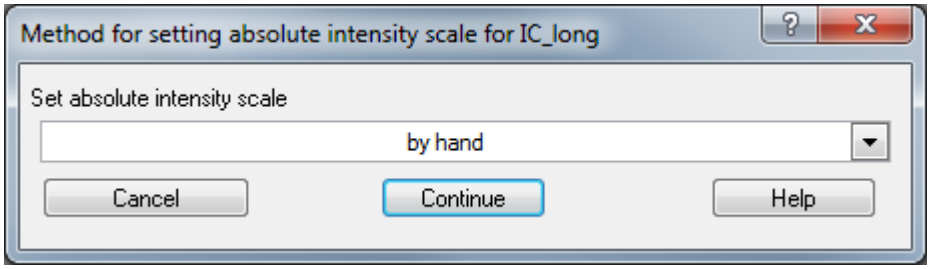

Figure 13

Each scaling is saved to the instrument configuration. To go back and change the absolute scale, you will need to redo the corresponding instrument configuration. Next you will need to select "by direct beam" in the drop down list.

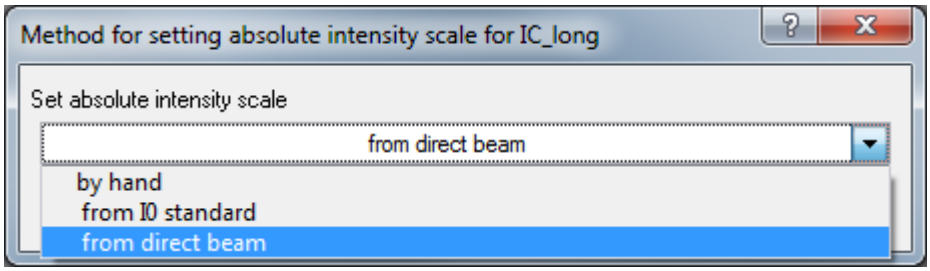

Figure 14

You will need to use your transmission for empty beam and the corresponding attenuation factor that is listed on your worksheet.

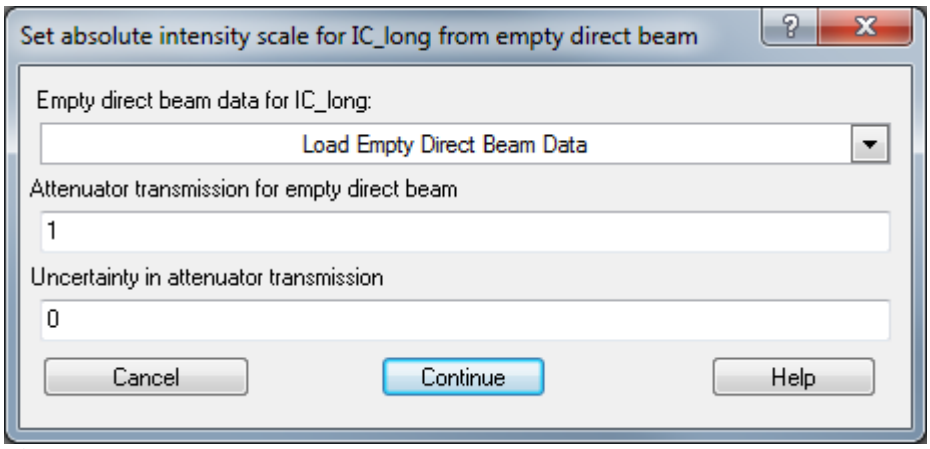

Figure 15

Since you used your empty direct beam to find the center for the long configuration, you can load it by using the drop down menu under the “Empty direct beam data for IC_long:” heading

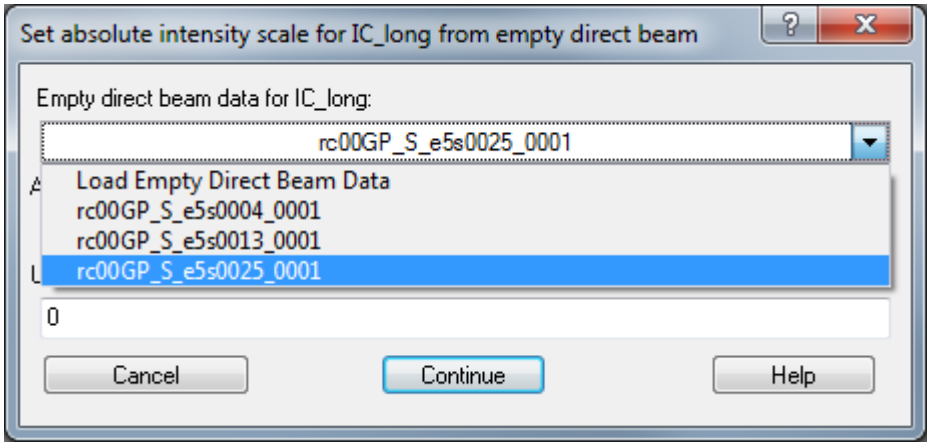

Figure 16

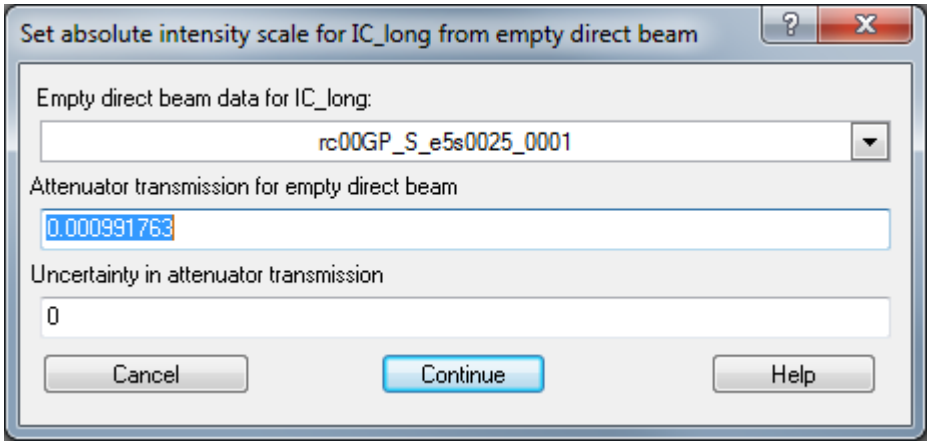

Figure 17

After selecting Continue, Igor will fit a Gaussian distribution to your direct beam and calculate the area under the curve.

Flood Pattern (Efficiency Mask)

For the next step in the reduction, you will need to configure the efficiency mask or Flood pattern as it is referred to on the beam line. You should have all the important information on your experimental set up sheet. The file you will be looking for will again have a different experiment number than your experiment. It will usually be one of the two data files at the top. You will want to rename the mask to something that is recognizable by you, usually “Flood.” Make sure you tell Igor not to automatically name your efficiency mask.

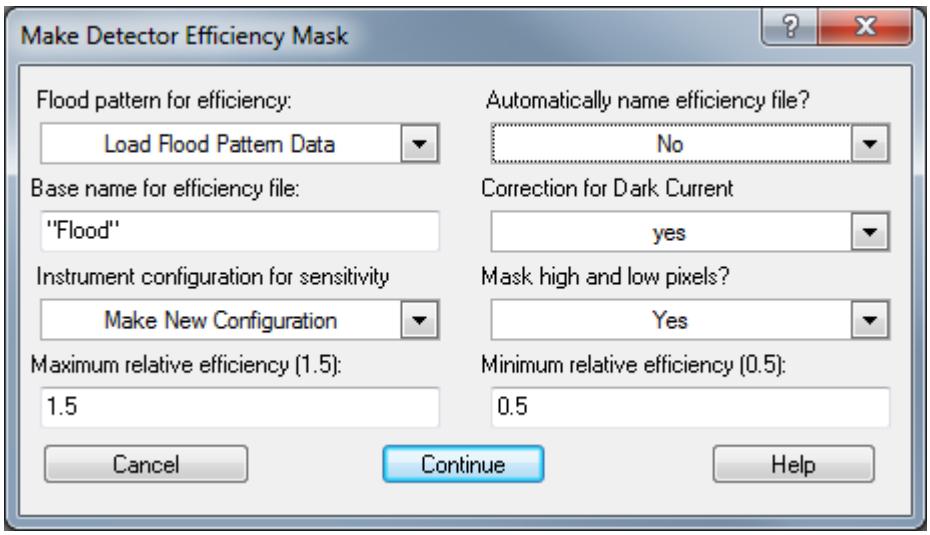

Figure 18

You will almost always have to make a new configuration for the flood pattern. This pattern is usually done at a middle distance, 4 m. Your local contact will supply with the necessary instrument parameters and the files.

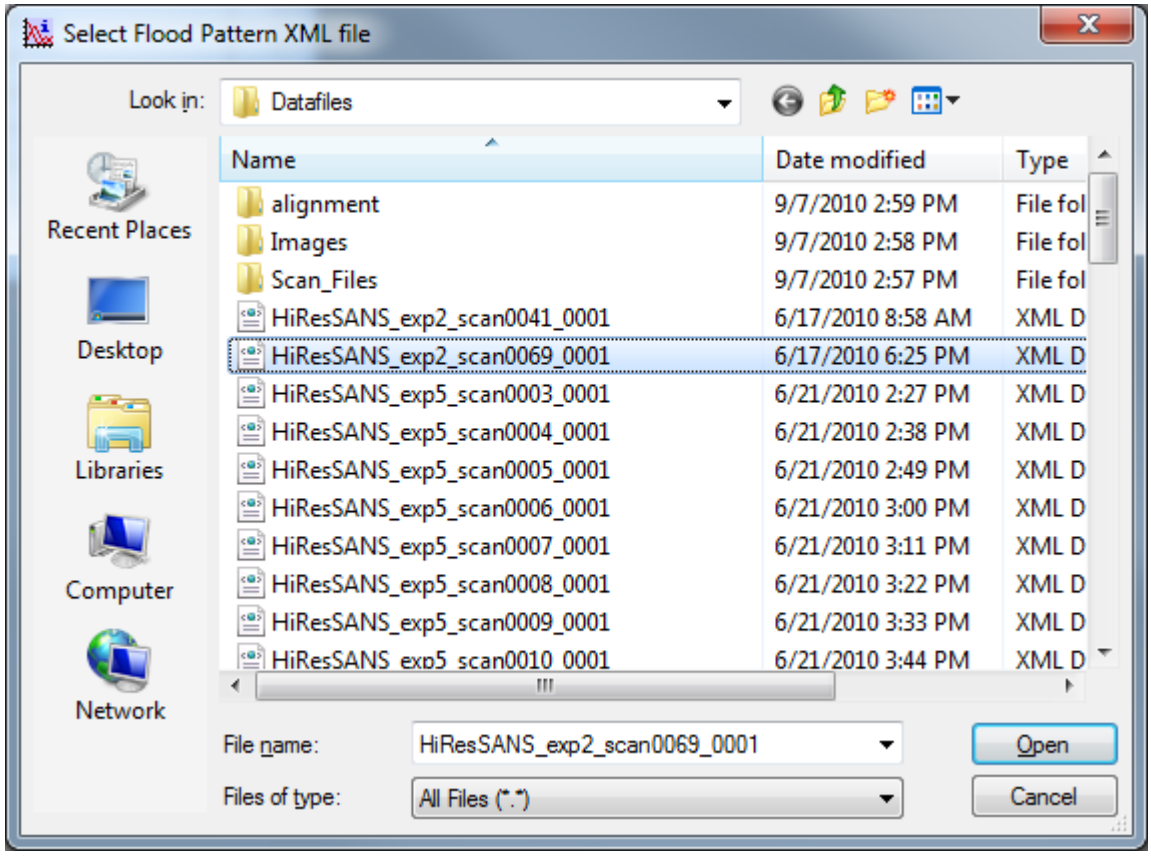

Figure 19

The sample thickness doesn't matter in this case, but for the PMMA, it is 33 mm.

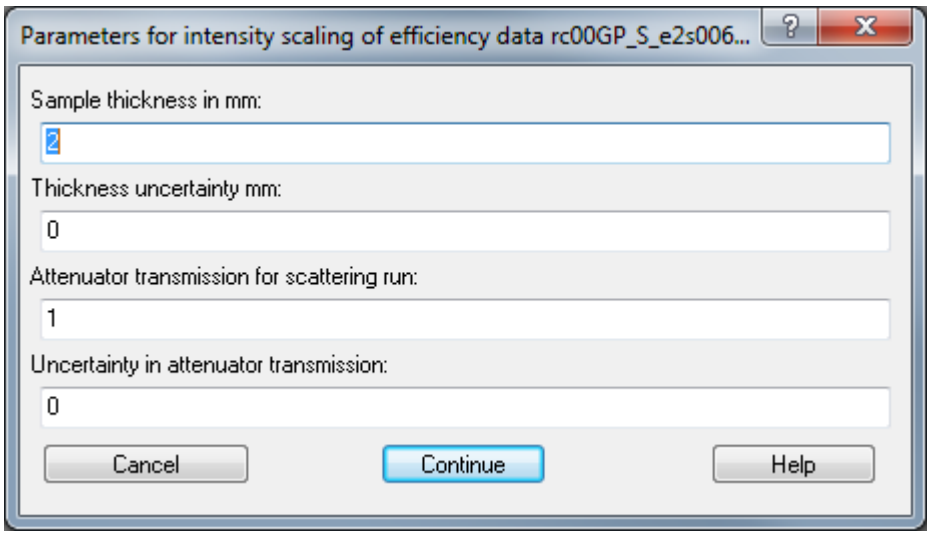

Figure 20

Again, you will be asked to fill out the instrument configuration. It is typical to call this configuration "Flood," so that you know that it corresponds to the efficiency mask. Refer to your worksheet for the correct distances, wavelength and apertures.

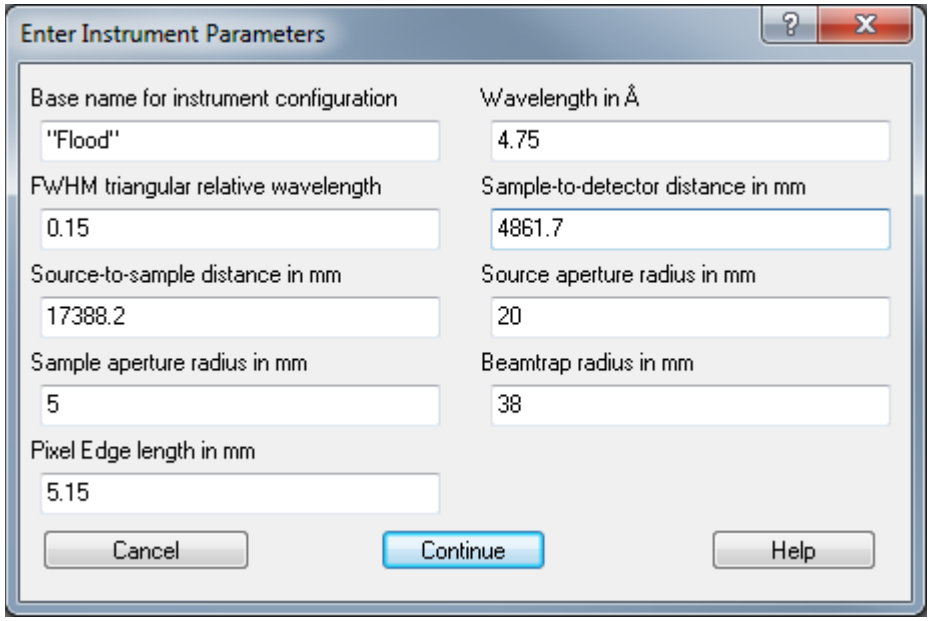

Figure 21

Since this is a new configuration, Igor will ask you again for both the dark current and the center. For the center, you may have a data file labeled "Center for Flood", use that here. If you do not have a specific center for the flood pattern you can make due with using the center for your data as long as the flood pattern was done with the same detector offset as your empty beams. If not then you should contact your local contact for what center would work for your data.

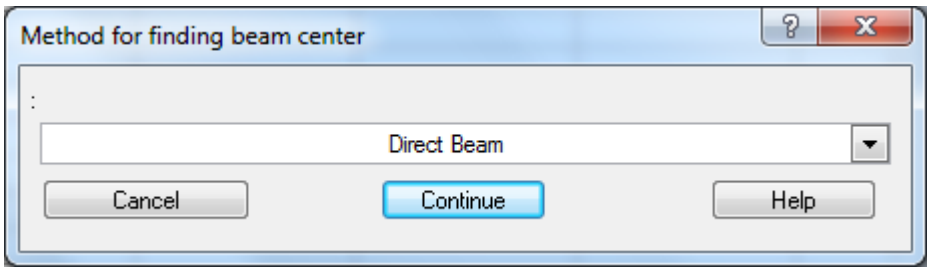

Figure 22

When Igor is finished with its calculations, your screen should look something like what you see below:

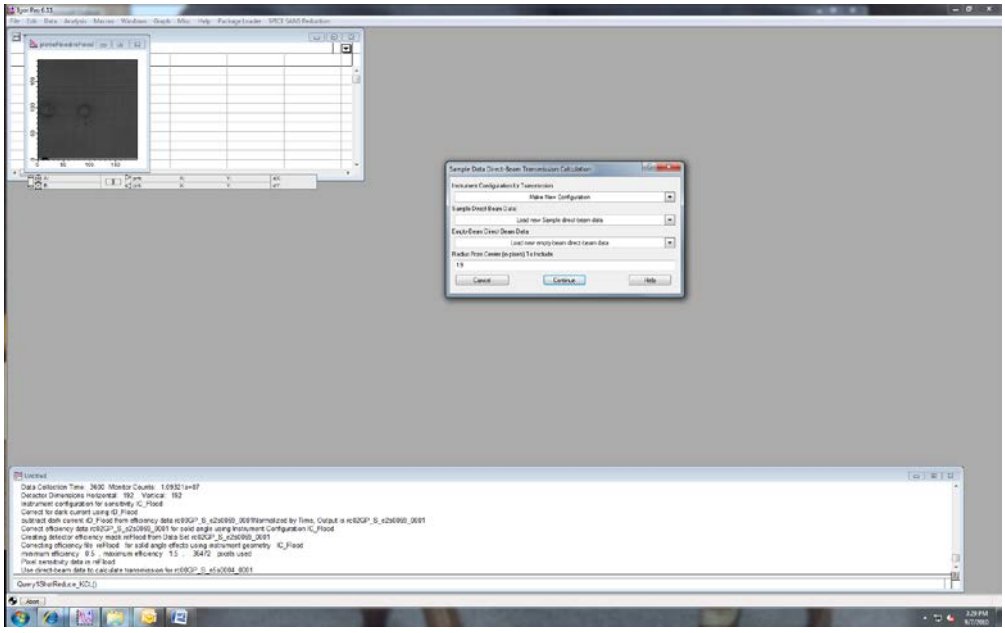

Figure 23

Transmission

Now it is time to deal with your sample's transmission. Usually transmissions are taken at the back of the tank (a long configuration). Click "Continue" to load the transmission data. Sometimes transmissions are taken a different wavelength than the sample data, you will need to make an instrument configuration that takes these differences into account. The transmission wavelength will be noted on your experimental worksheet.

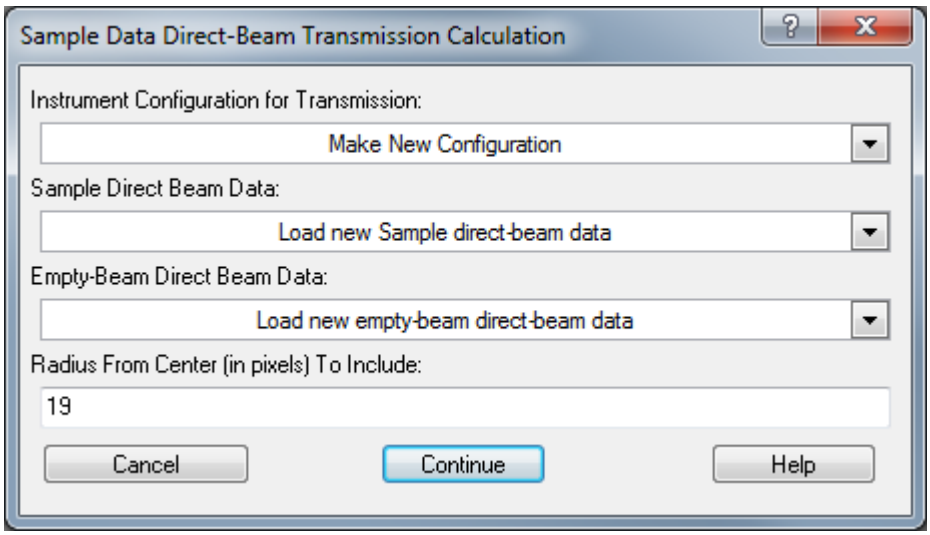

Figure 23

Different transmission configuration

If your transmissions were done at the same instrument settings as your long configuration, that was just created, skip this section. If you selected make new configuration due to having different settings, you will need to load both your sample direct beam data and your empty direct beam data. The next screen will be same as when you set up the instrument parameters for the detector and the flood pattern. Fill in the different settings and click "Continue."

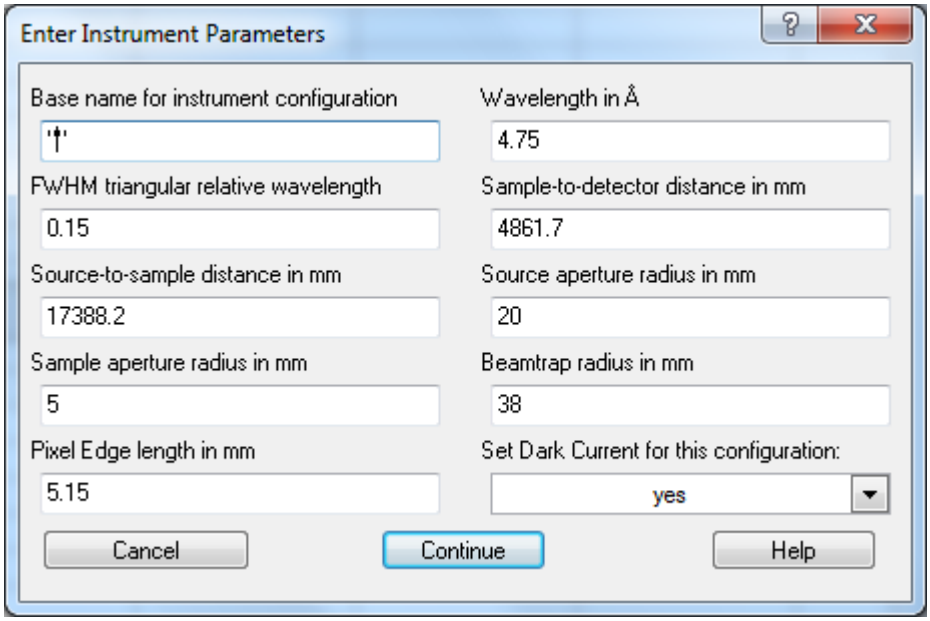

Figure 24

Same Transmission Configuration

If you have the same configuration as your long detector distance, then you will only have to change the configuration to “IC_long” and to enter your empty direct beam data that was previously loaded for absolute scaling. This means that only your “Sample direct beam data” will need to be loaded as shown in figure below

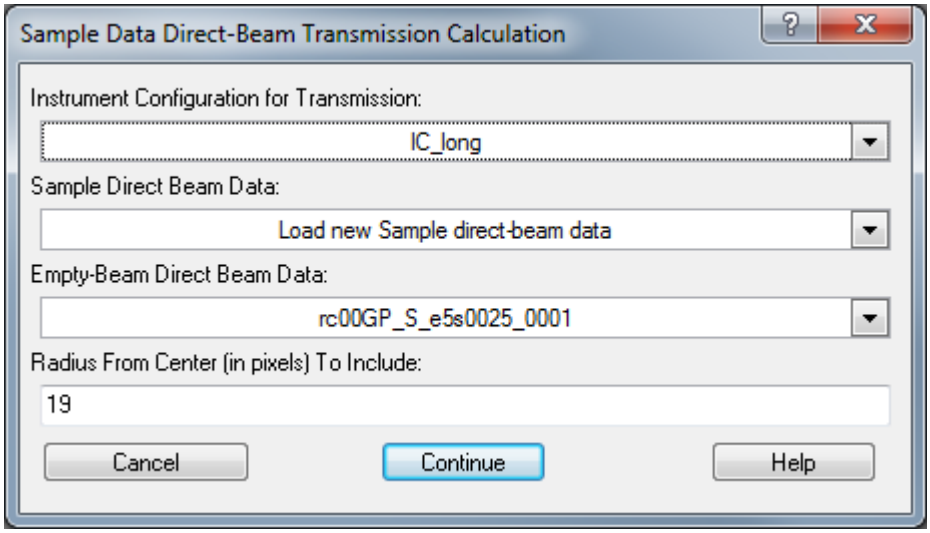

Figure 25

Either way you work through, the next part will be to select the sample transmission and then the empty beam. These should be labeled and you can find the one that corresponds to your sample in the images part of your data file folder or in your logbook

Selecting Background Data

After you have selected your sample transmission, it will be time to select your background data if you used the same configuration. The next window should look like

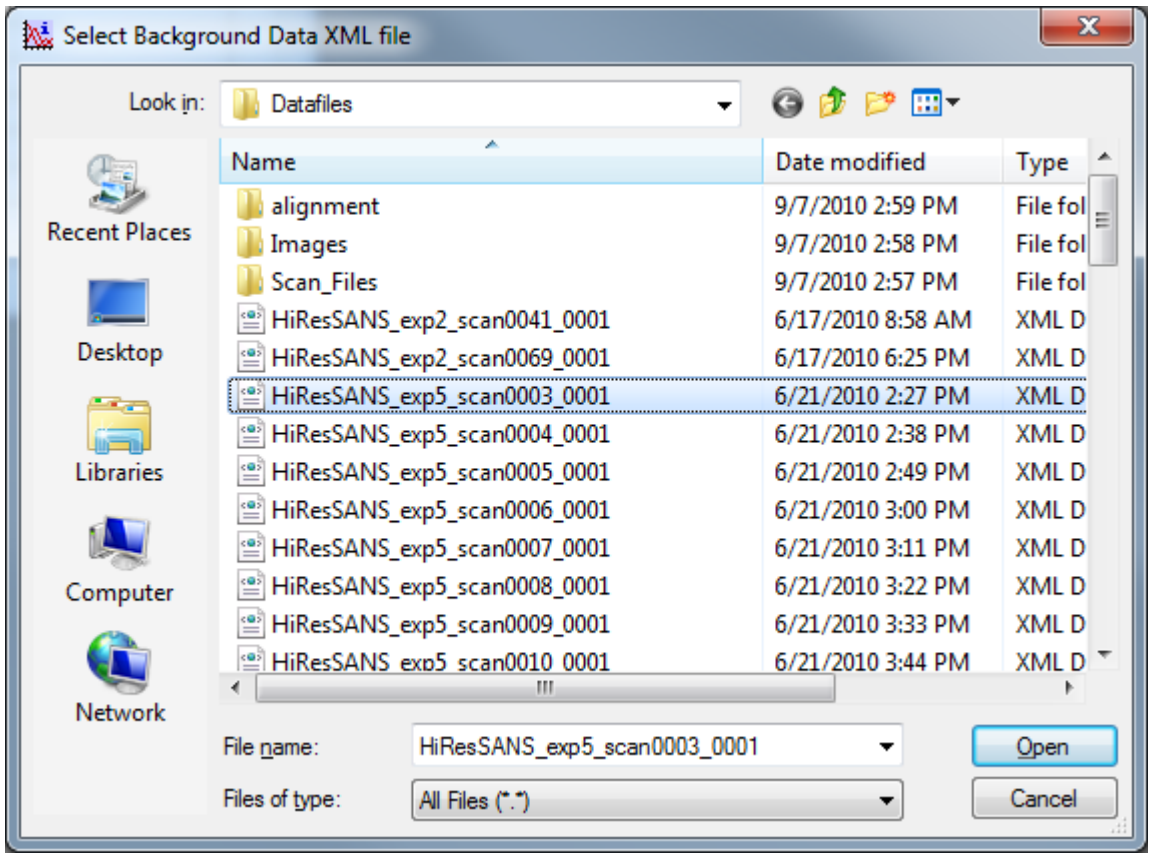

Figure 26

Keep the same thickness for the background data as what you entered for your sample.

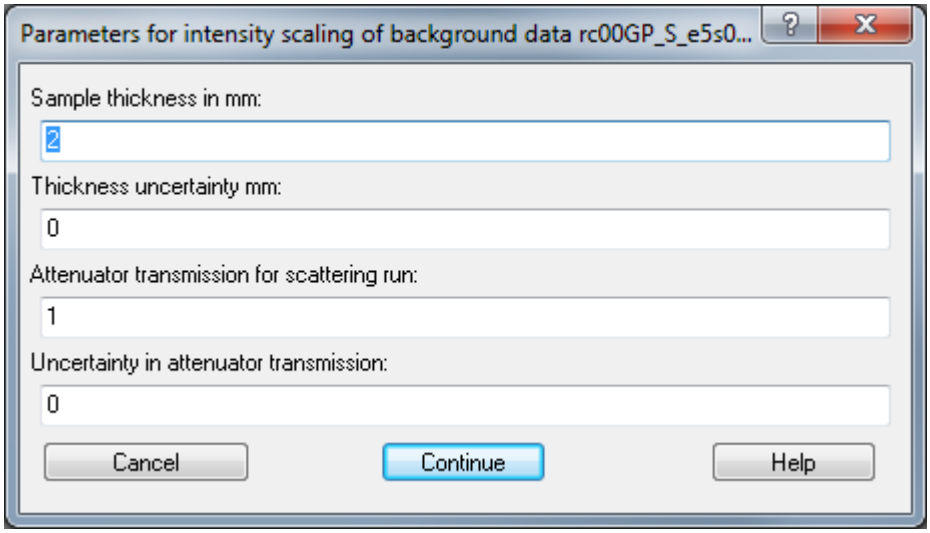

Figure 27

Background transmissions

Next you will select the background transmission files. This is done exactly as for the sample.

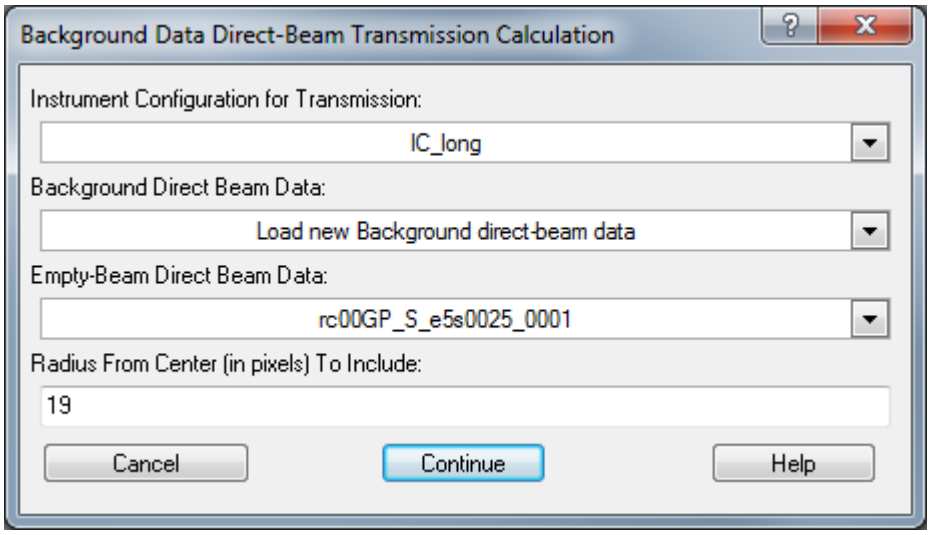

Figure 28

Finishing Reduction

When you see the following screen, get up and do a little dance you have made it through your first reduction! Not all of the reductions will be this long and complicated. The first time through and for the first time you do a new a instrument configuration, you will have more steps to do. After you have created your instrument configurations, effiency masks, and centers, you will only need to enter the sample data, the corresponding backgrounds and transmission files.

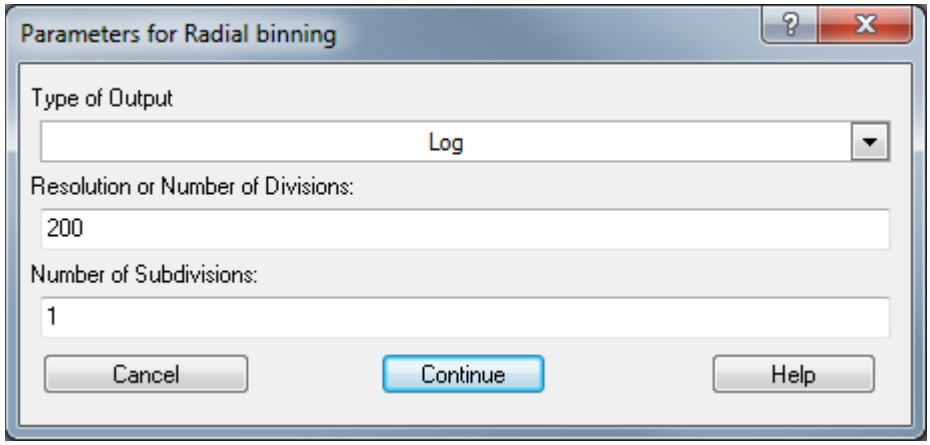

Figure 29

There will be a 2D plot that pops up in the upper left hand corner. This is the 2D map of the efficiency pattern for the detector. For all intents and purposes, you can just ignore this plot. Your screen should look something like this:

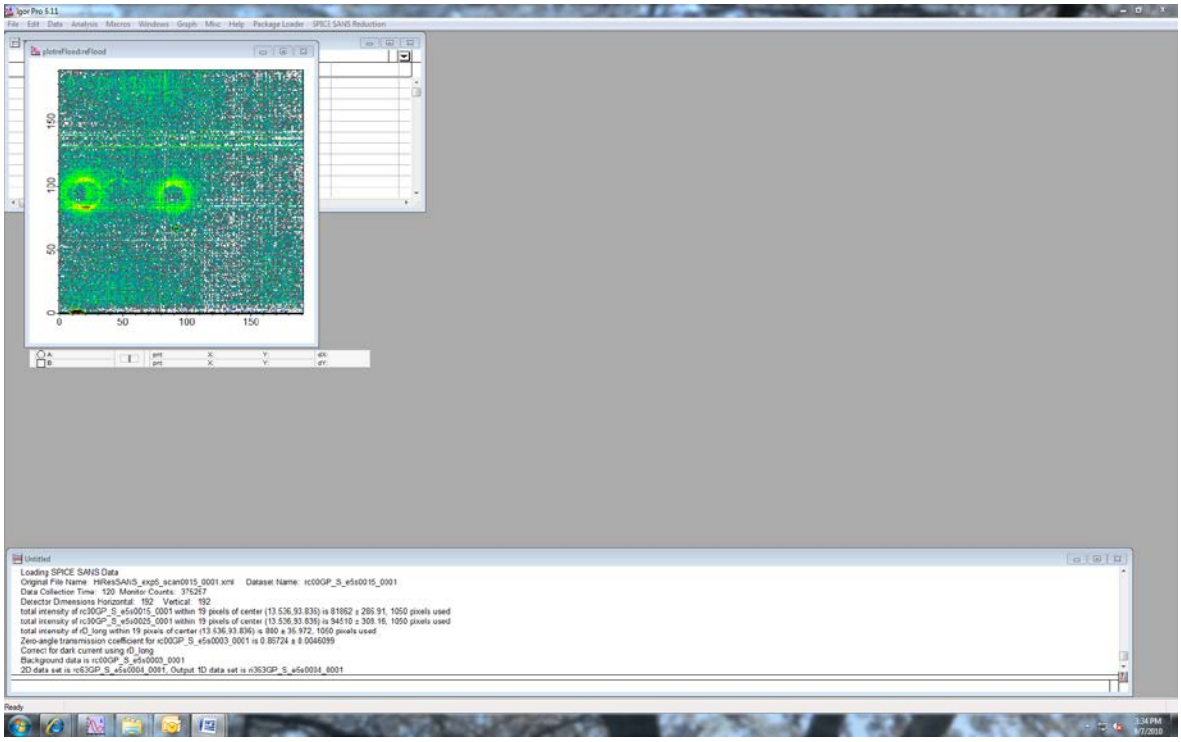

Figure 30

Plotting Reduced Data

To make a plot of your data or wave as Igor refers to data, you will need to select “Make 1D log log plot” from the Spice SANS Reduction toolbar menu

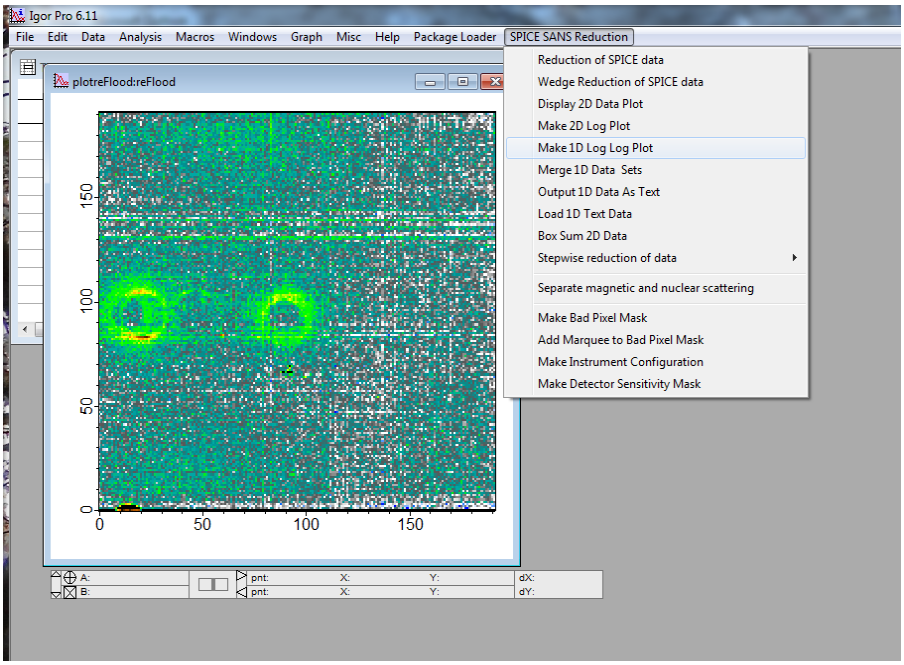

Figure 31

Select the sample data you just reduced and click continue.

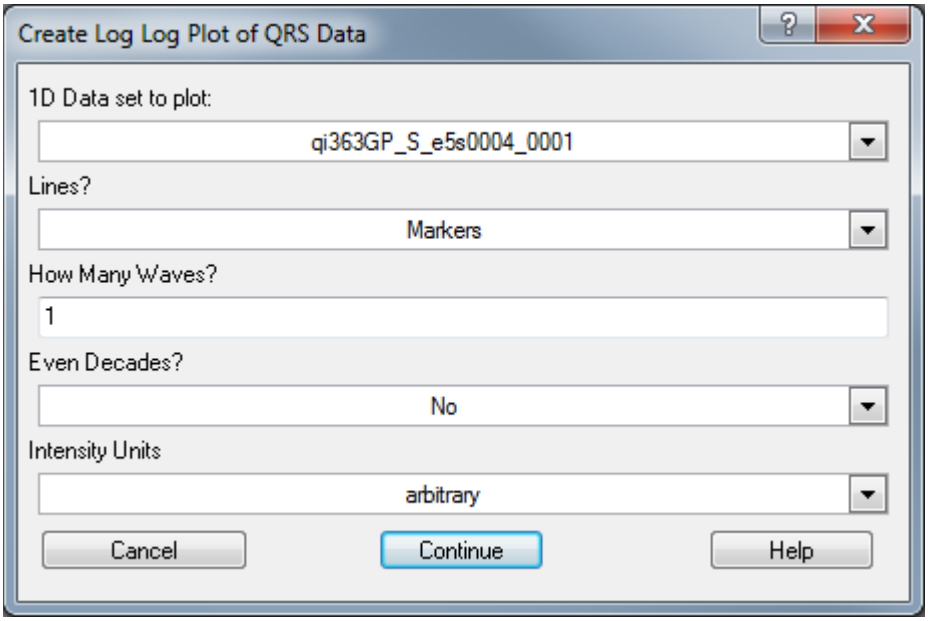

Figure 32

Here is a sample of reduced data set looks like.

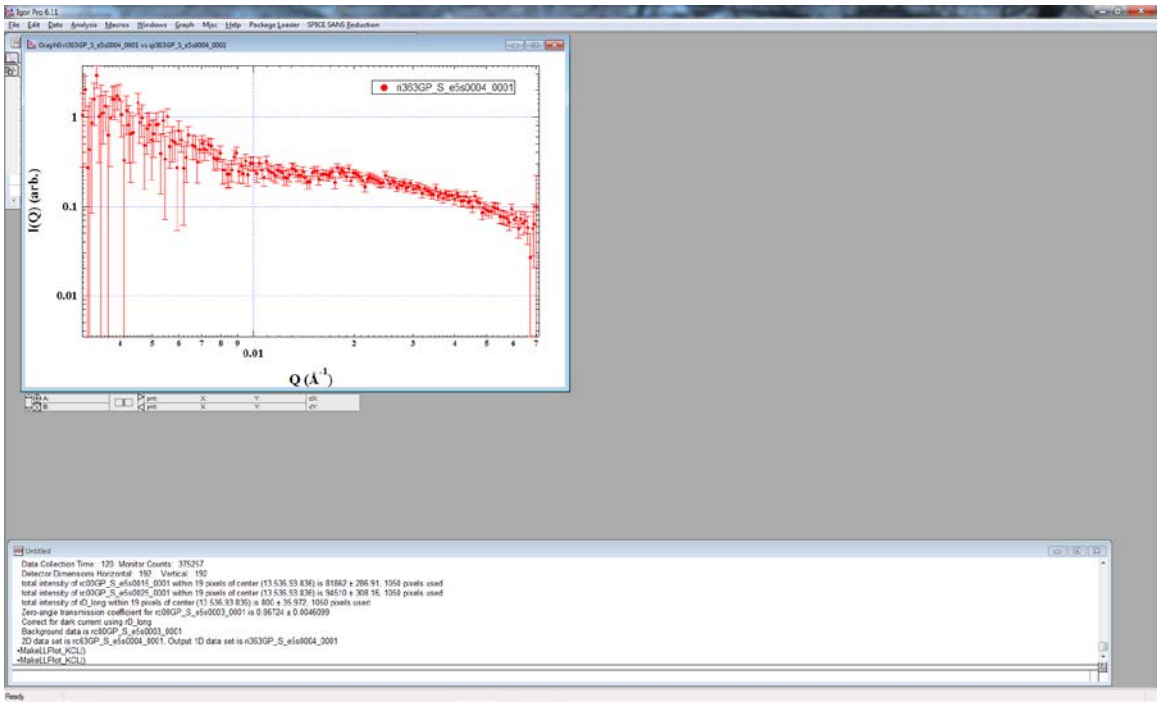

Figure 33

Your data will mostly likely look different due to using different samples. Below is a table that shows the naming relationship to what options you have selected on your opening screen. For example, if you had selected to correct for dark current, masking bad pixels, correcting for monitor, and transmission but did not correct for the detector efficiency and background then your finished file will be named ri_123GP_S_...

Table 1

number	Dark current	Trans-mission	monitor	No time scale	bad pixel mask	flood	background	No Abs. Scale
101								x
102	x			x				x
103	x		x					x
104				x	x			x
105			x		x			x
106	x			x	x			x
107	x		x		x			x
108				x		x		x
109			x			x		x
110	x			x		x		x
111	x		x			x		x
112				x	x	x		x
113			x		x	x		x
114	x			x	x	x		x
115	x		x		x	x		x
116		x		x				x
117		x	x					x
118	x	x		x				x
119	x	x	x					x
120		x		x	x			x
121		x	x		x			x
122	x	x		x	x			x
123	x	x	x		x			x
124		x		x		x		x

number	Dark current	Trans-mission	monitor	No time scale	bad pixel mask	flood	background	No Abs. scale
125		x	x			x		x
126	x	x		x		x		x
127	x	x	x			x		x
128		x		x	x	x		x
129		x	x		x	x		x
130	x	x		x	x	x		x
131	x	x	x		x	x		x
132				x			x	x
133			x				x	x
134	x			x			x	x
135	x		x				x	x
136				x	x		x	x
137			x		x		x	x
138	x			x	x		x	x
139	x		x		x		x	x
140				x		x	x	x
141			x			x	x	x
142	x			x		x	x	x
143	x		x			x	x	x
144				x	x	x	x	x
145			x		x	x	x	x
146	x			x	x	x	x	x
147	x		x		x	x	x	x
148		x		x			x	x
149		x	x				x	x
150	x	x		x			x	x
151	x	x	x				x	x
152		x		x	x		x	x
153		x	x		x		x	x
154	x	x		x	x		x	x
155	x	x	x		x		x	x
156		x		x		x	x	x
157		x	x			x	x	x
158	x	x		x		x	x	x
159	x	x	x			x	x	x
160		x		x	x	x	x	x
161		x	x		x	x	x	x
162	x	x		x	x	x	x	x
163	x	x	x		x	x	x	x

When you correct for geometry or absolute scale the numbers will change. No scaling is the numbers in the 100's as seen in Table 1. Scaling for geometry only is 200's and Absolute scaling will be 300's. This means when you have fully reduced your data it will be labeled ri_363GP…

Reducing Next Detector Setting

The next step in this reduction is to move on to another detector setting for the same sample. If done correctly the two detector settings will over lay each other using the direct beam method. If you do not have the empty beam at each of your detector settings you can use a method called "matching" which is discussed in Appendix 2.

Return to the “Spice SANS Reduction” option on the toolbar, and select “Reduction of Spice Data.” This will bring up the following screen.

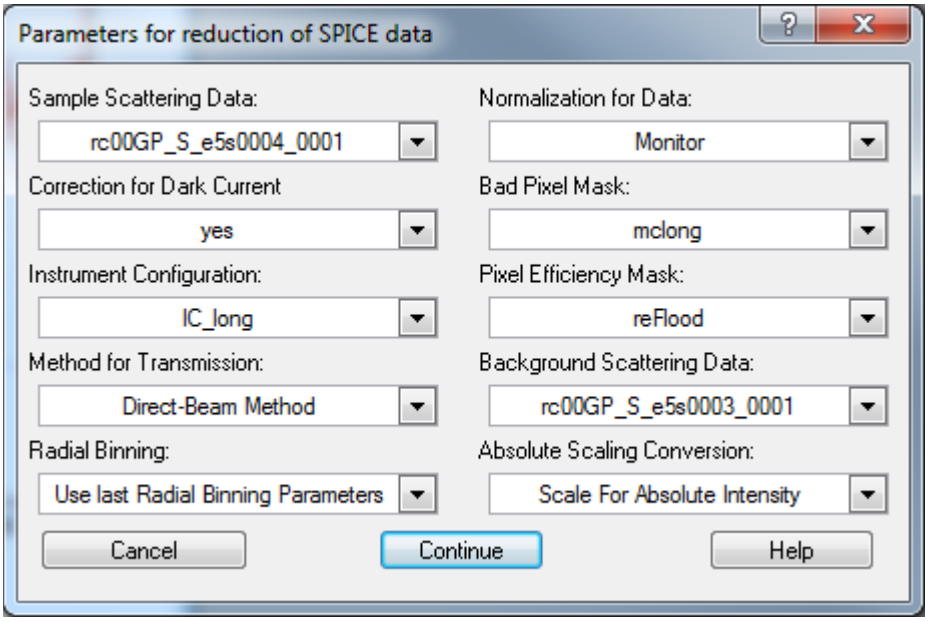

Figure 34

You will need to change a few answers on this setting. First, select load new sample and background data. You will also need to make a new instrument configuration because you are moving the detector to a different distance so the sample-to-detector distance will be different from the long configuration you made earlier. It should be mentioned that this procedure is for the direct-beam method of scaling the data. If you are going to use the standard method, please refer to Appendix 1. Finally, you will want to make a new bad pixel mask so that if you find that at medium distance you have pixels you want to mask out, you have the proper mask already made. Instructions for how to add to this mask will be discussed the “Bad Pixel Mask” section of this guide. Your window should look like the one below before you select continue:

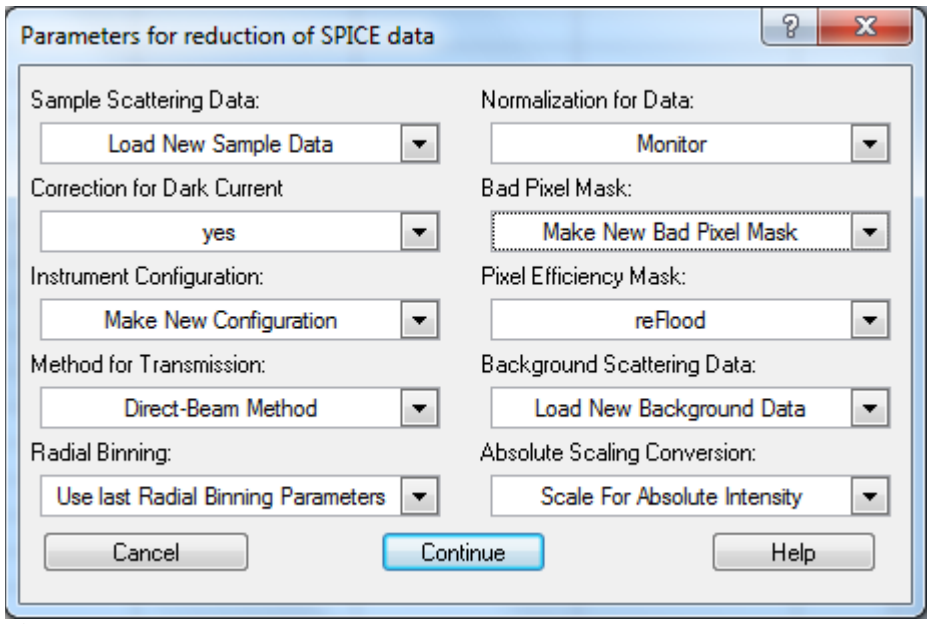

Figure 35

Select your middle distance data, and click "Continue." It should have the same thickness as your long distance, so click "Continue" to move on to making your new bad pixel mask. Again, when setting up this mask, only mask the bottom edge of the detector.

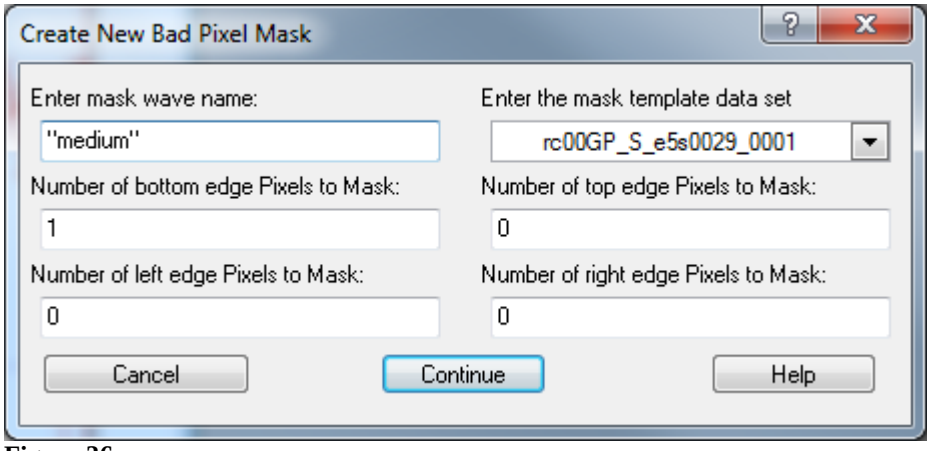

Figure 36

It is once again time to make a new instrument configuration. You will need to consult your experimental sheet to see what sample-to-detector distance is correct for this setting.

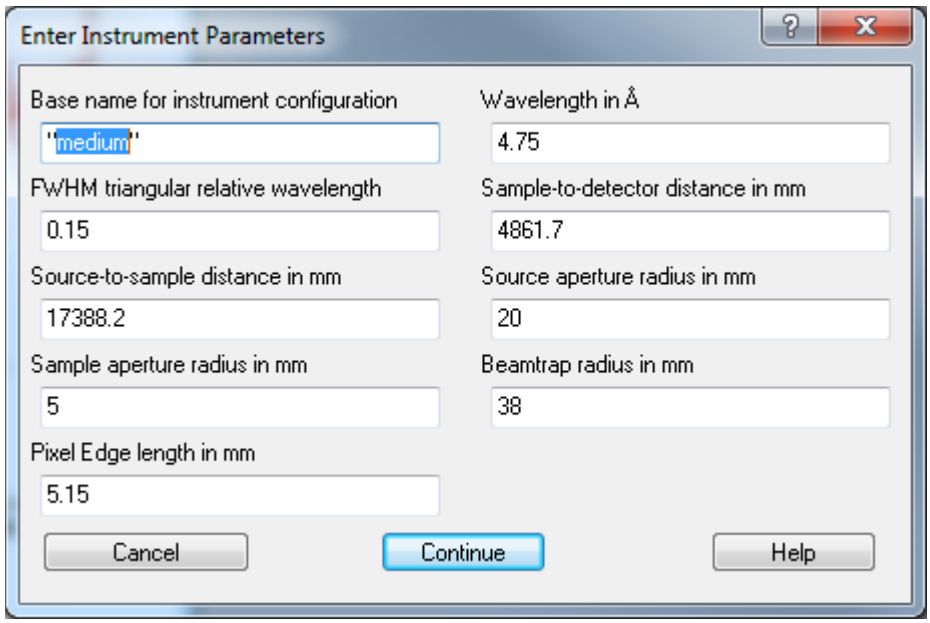

Figure 37

Click "Continue" to move on to selecting the dark current. After the dark current, you will need to find the center for this instrument configuration. There should be a direct beam that is labeled db for center. It will be listed on your experimental sheet. Select the direct beam method and load in that direct beam.

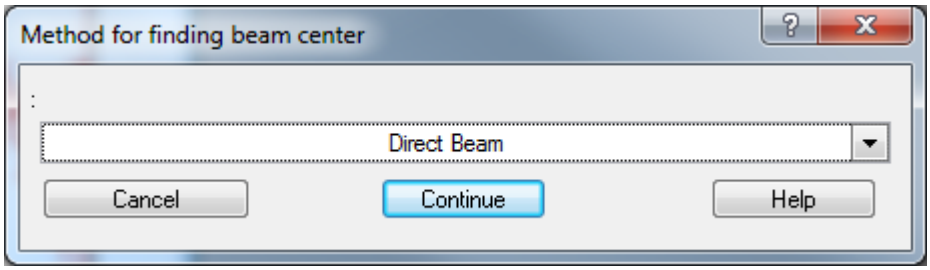

Figure 38

You will need to load new center data because this transmission has not have been loaded yet.

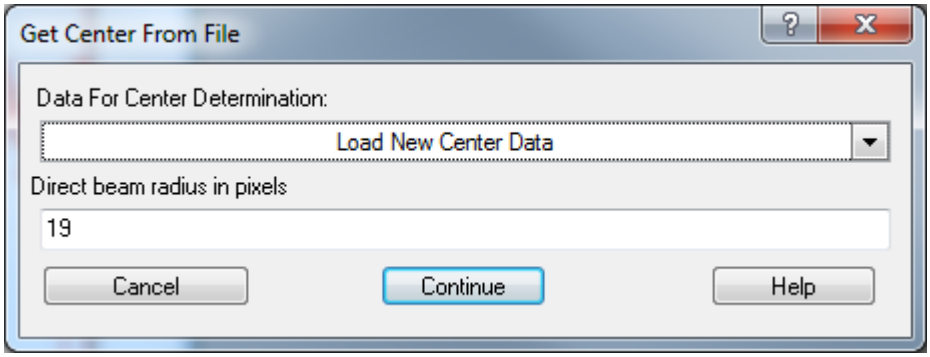

Figure 39

Just like with the first time through for the long configuration, you will select the direct beam method for finding the absolute intensity as shown below in Fig 40

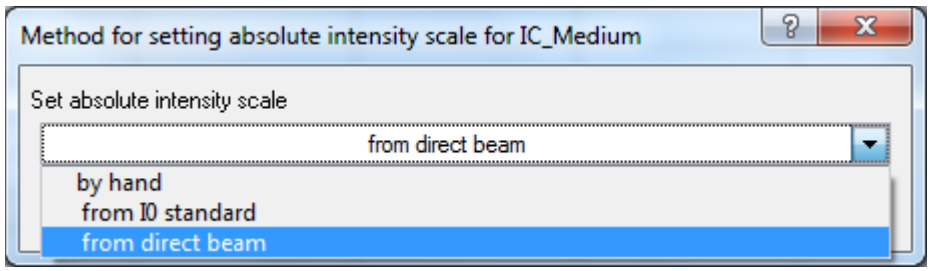

Figure 40

The next window should look like Fig 41

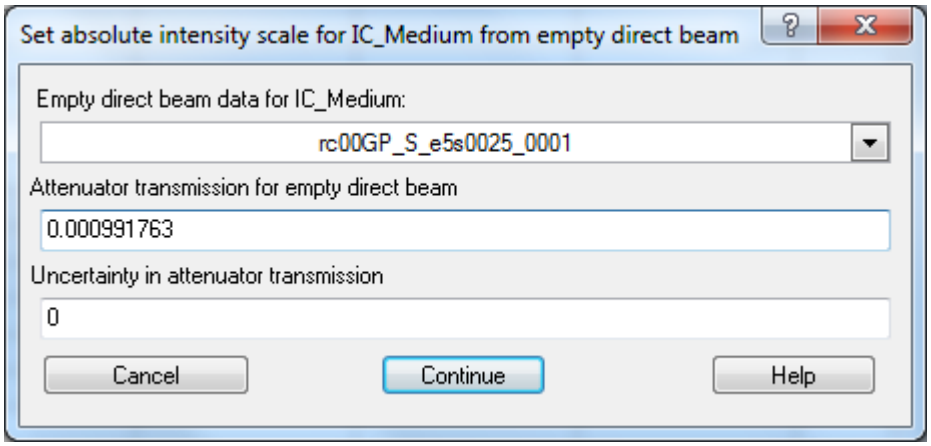

Figure 41

You will need to load the empty direct beam data for this distance which will be denoted on your experimental worksheet. You will again need to find out what attenuation was used and refer back to Table 1 so that it can be entered in the second box in Fig 42

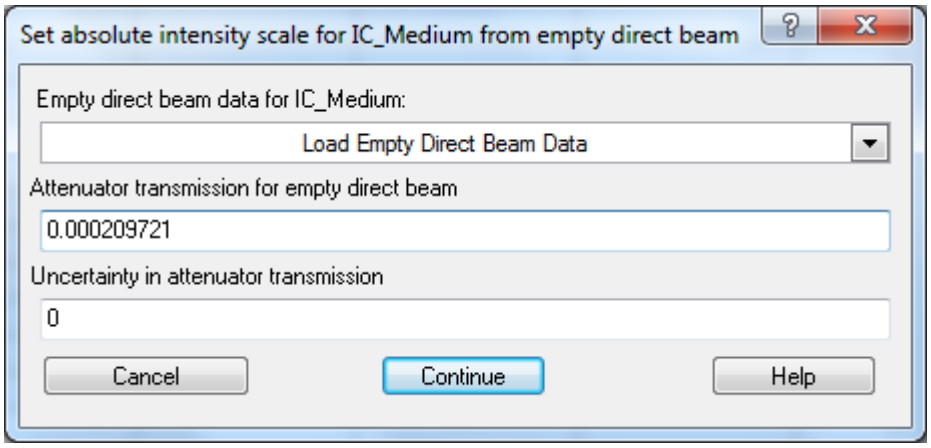

Figure 42

After selecting “Continue,” you will now be back to the sample transmission part of the reduction. You will not need to change anything on this window because you have not changed samples only detector settings. You will need to load new sample transmissions only when you change samples or wavelengths.

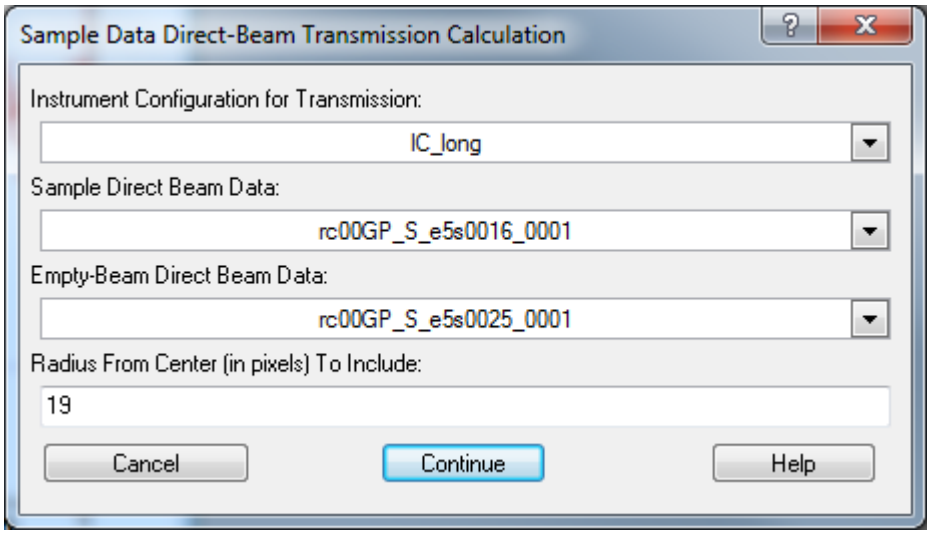

Figure 43

Now you will need to load your background. Select the background data that corresponds to the medium detector setting

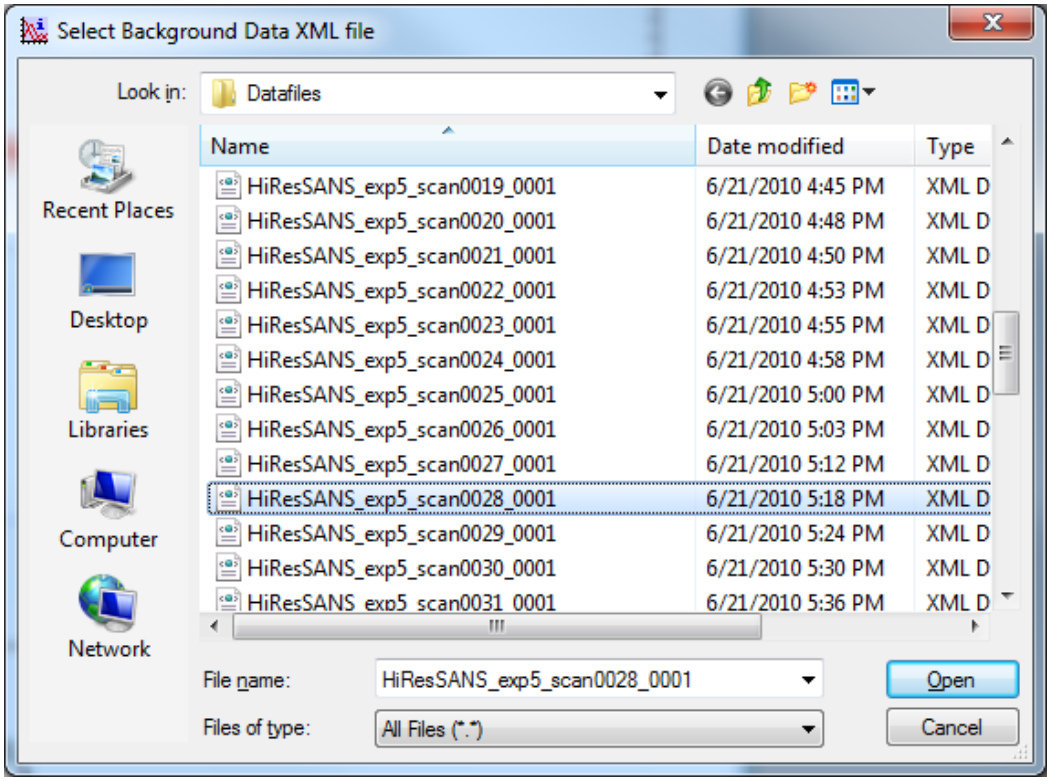

Figure 44

The thickness will be the same so, click “Continue.” Again you will not need to change the background transmission until you change samples/backgrounds for all configurations. After a moment, Igor will finish its calculations. Now you can make a 1D log log plot of your two waves (data sets). To get two waves on one plot, change the 1 to a 2 in the section labled “How Many Waves?” You will get something like below:

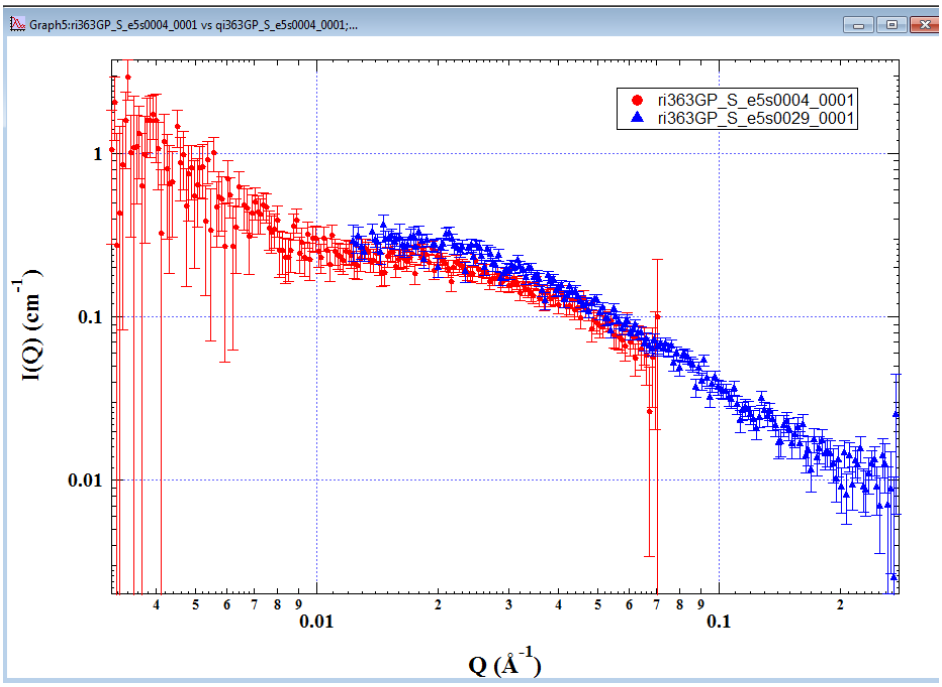

Figure 45

If you have another setting, you can follow the same steps above to reduce the short data. If everything is done correctly, you will get the following when you plot all three distances on the same graph:

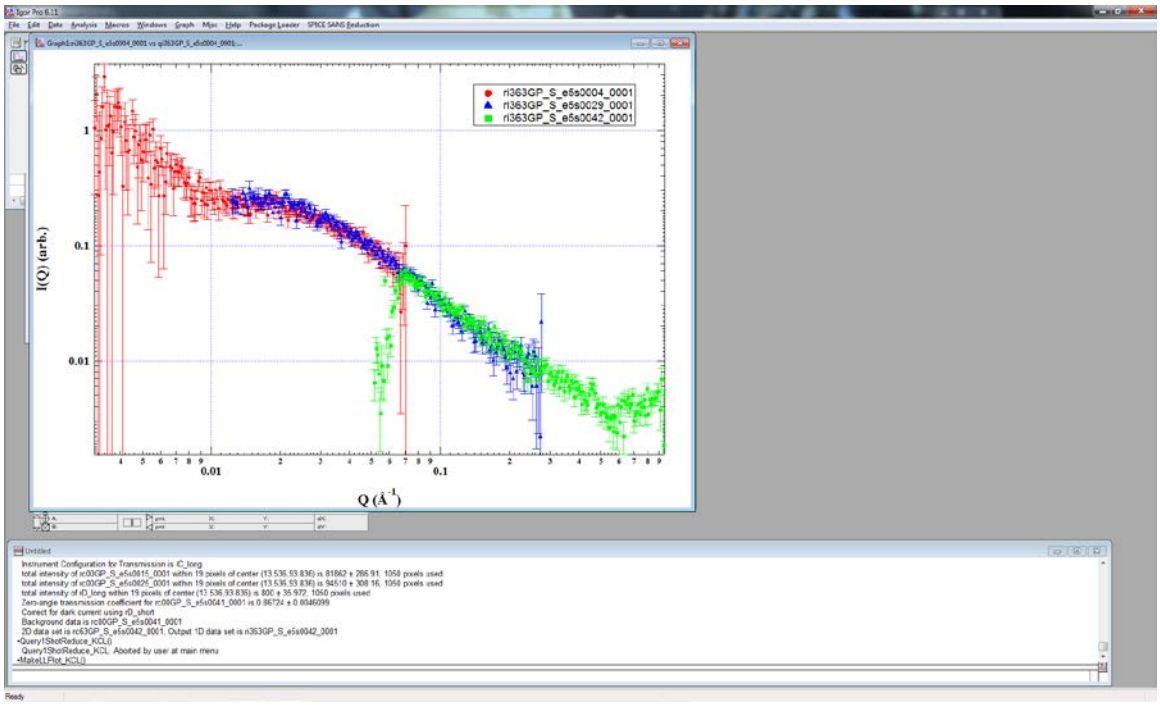

Figure 46

Clean up and Refining Data

As seen above, this picture is not yet publishable. There are many ways to do this. One is to delete the points near the edge of the detector in each setting. This can be done by adding the edges to the "Bad Pixel Mask" or you can mark out any area and added to the mask. This is discussed more in the next section.

Adding bad pixels to Mask

If you mask out the center in the short data set, you can mask out the bad pixels. To do this, you need to plot the 2D form of the data. Select "Make 2D plot" from "Spice SANS Reduction." You will need to plot the data that has 63 in the number.

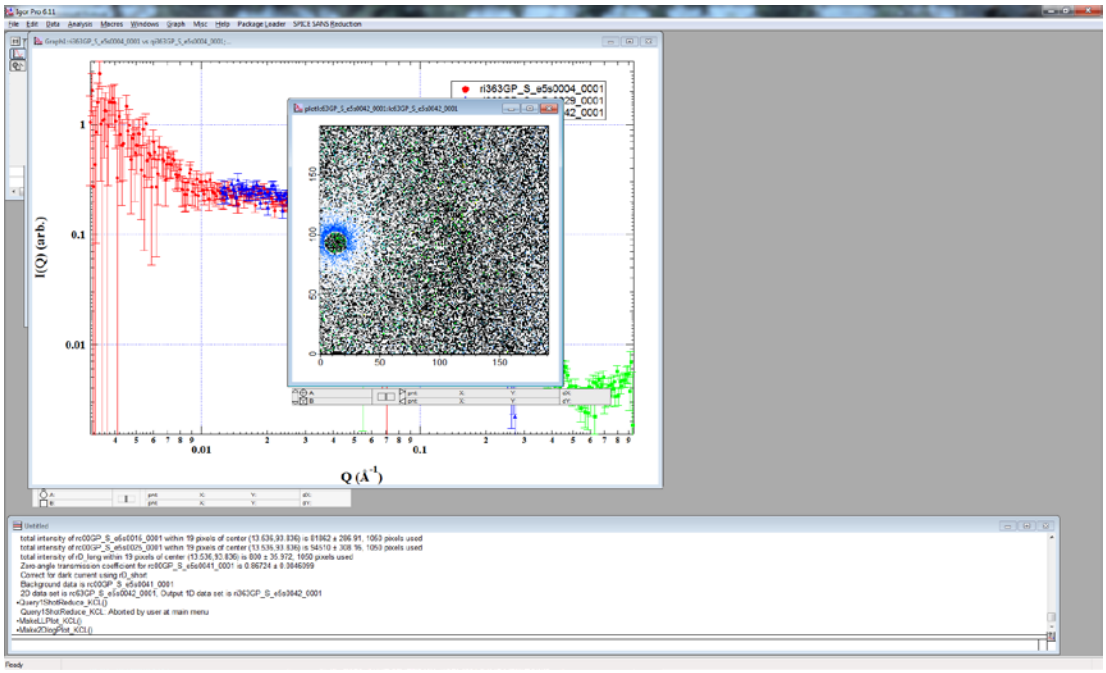

Figure 47

You will get a plot similar to the one shown above. To mask out the pixels, you need to zoom in. To do this, click on the plot and drag across the circle. When you release the mouse button, there will be a rectangle. Right click inside the rectangle and select expand. This will expand the area inside the rectangle to the rest of the window. Now click and drag to highlight the area you want to mask out. Once you have your highlighted area, you can add it mask by selecting "Add marquee to bad pixel mask" from the "Spice SANS Reduction"

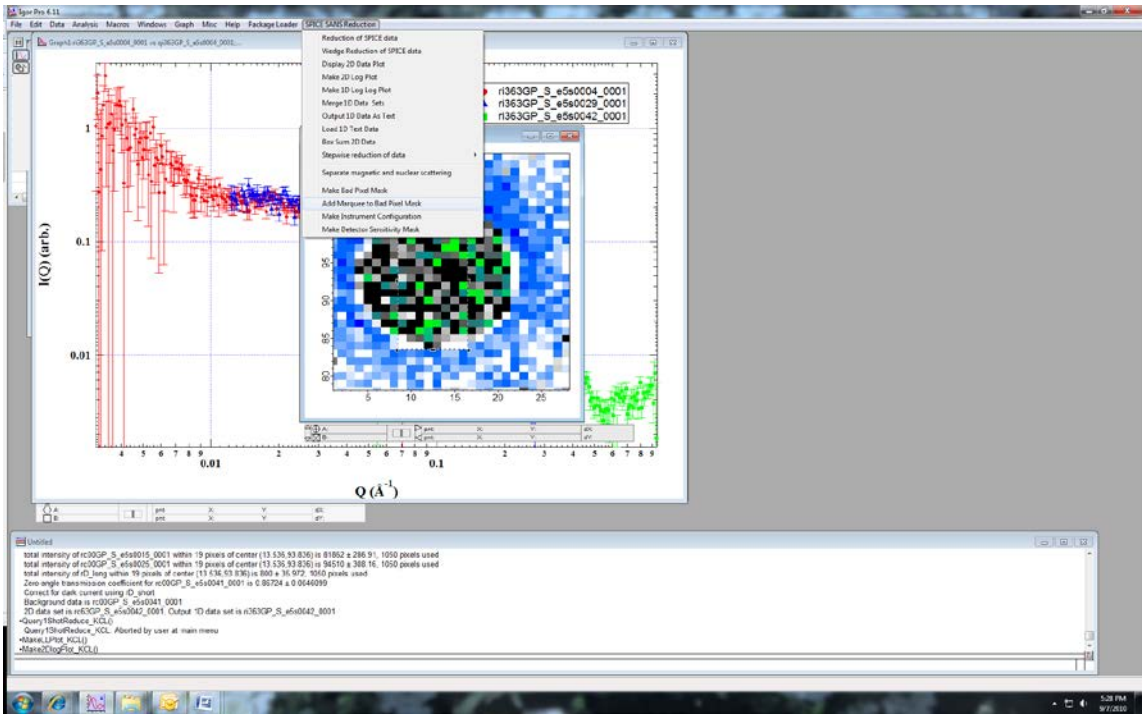

Figure 48

Make sure you pick the correct mask to add the marquee to.

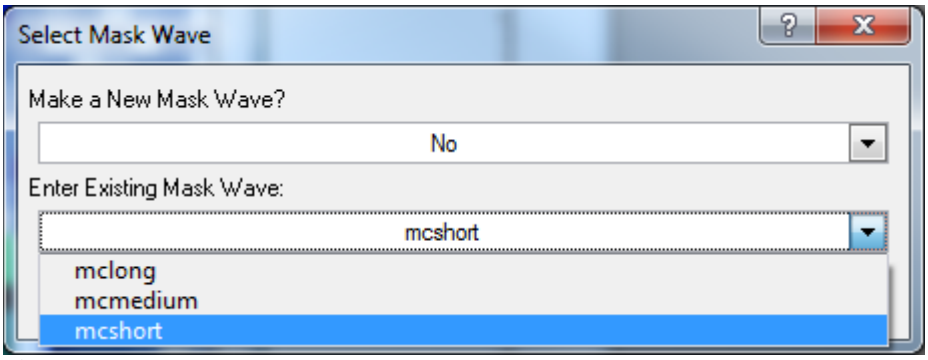

Figure 49

Once that is done you can continue to make highlighted areas and add them to your mask. To see your progress you will have to re-reduce the data and make a new 2D plot. You should see the following if you mask out all the pixels inside the ring.

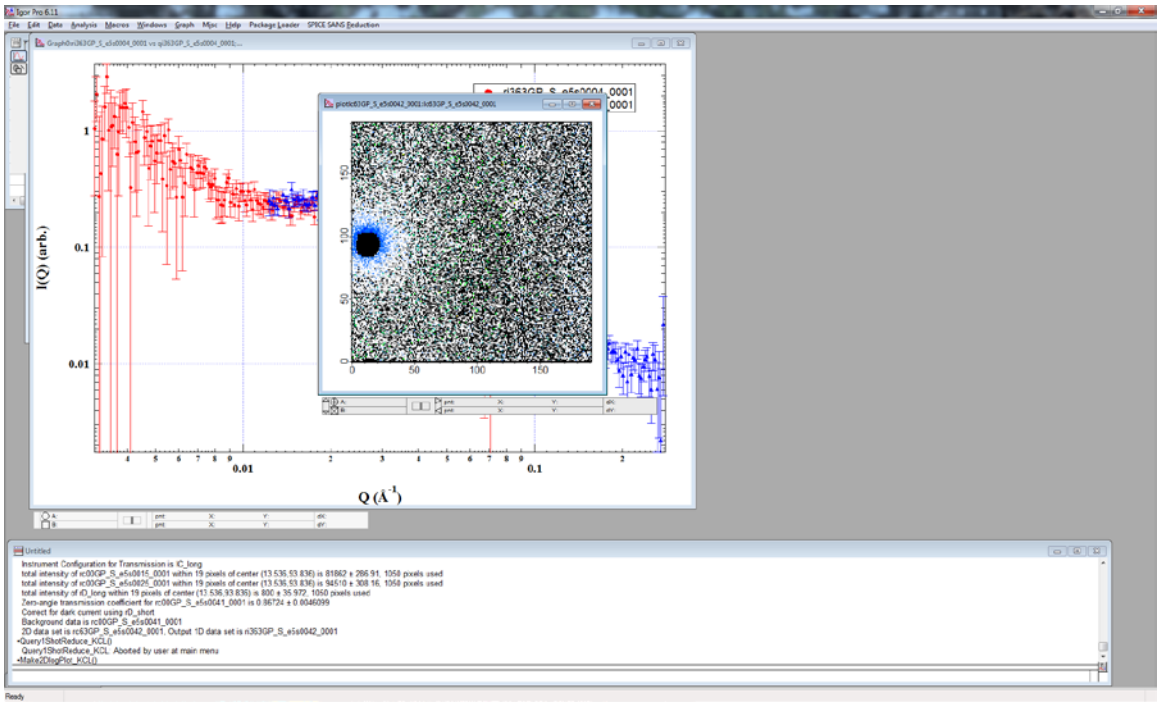

Figure 50

Now if you plot the 1D data again, the down turn on the green data should be gone.

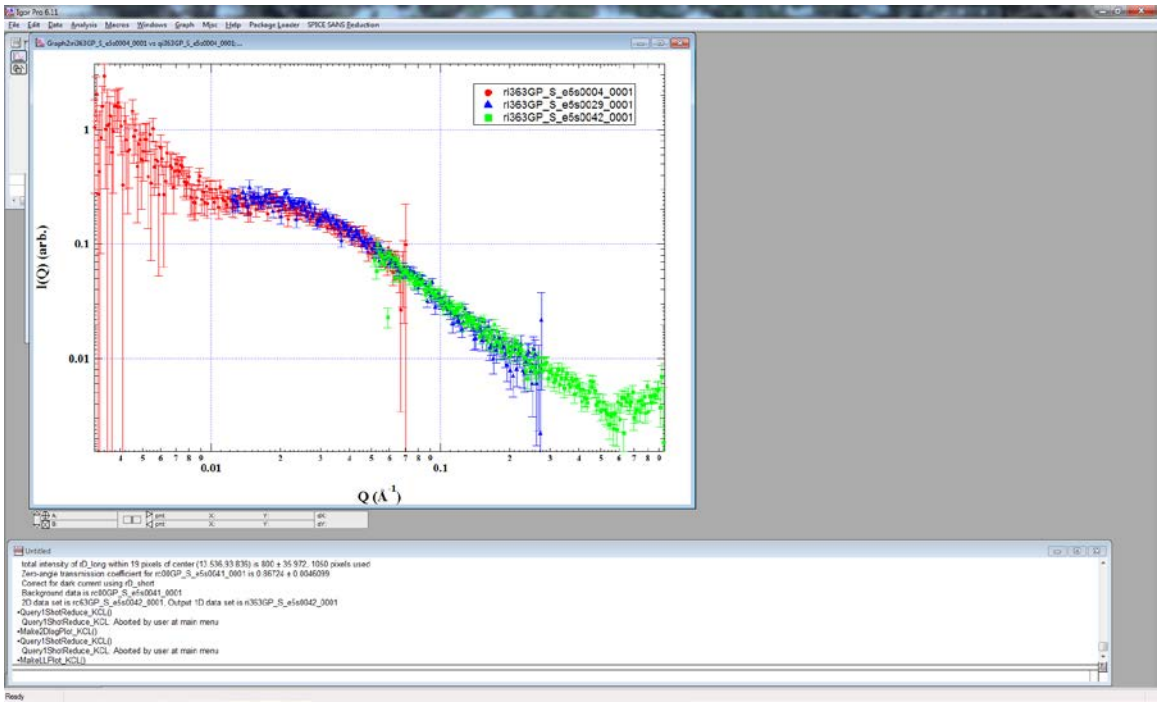

Figure 51

Masking out the bad pixels will take time and patience. The secret is that the data starts from inside the beam stop and works its way out to the edge of the detector. This should help you locate where the bad pixels are. You can also remove data that is not relevant

by making a table that contains qi, ri, si, and ti waves of the same run number and deleting the bad rows.

Merging data sets

There is a new feature to Igor that allows you to merge the three data sets into one so that you can apply fits. To do this you will need to select “Merge 1D data sets” from the “Spice SANS Reduction” menu.

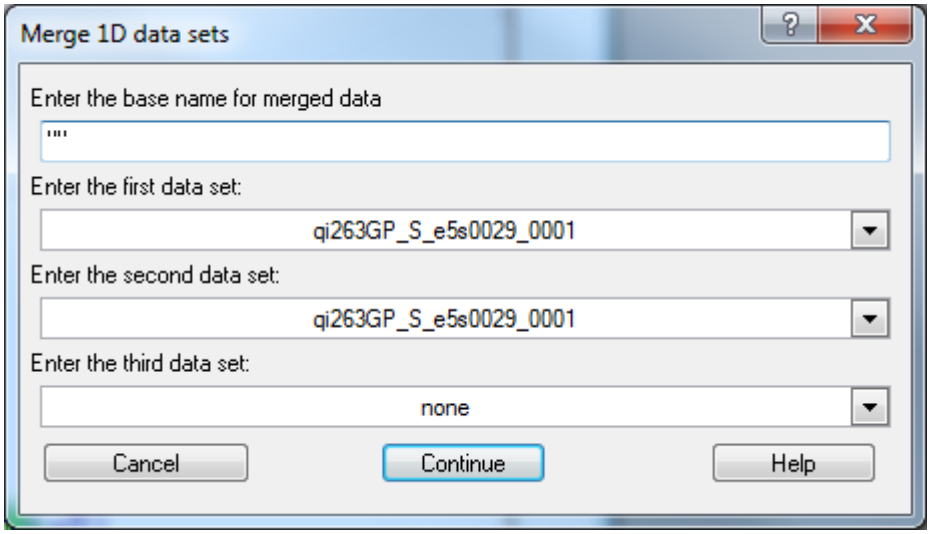

Figure 52

Add a meaningful name to the data set so you can recognize which data files were merged together.

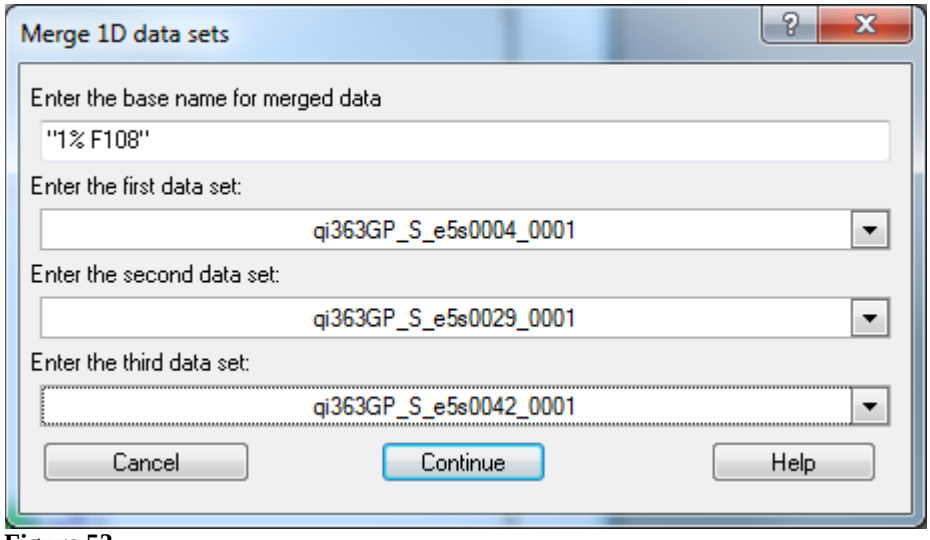

Figure 53

Once you have selected your three data sets, you can plot the new data set by going to "Make 1D log log plot" and selecting the data set that is labeled qi"your title".

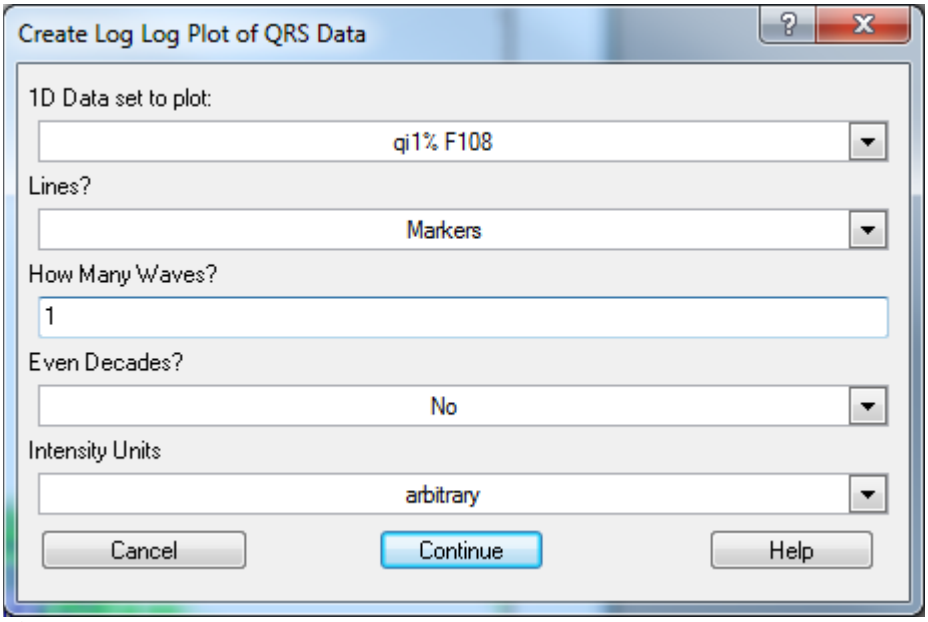

Figure 54

Here is the same data from above, but now merged into one data set. You will want to wait to do the merge until you have fully cleaned up your data, and are happy with the reduction.

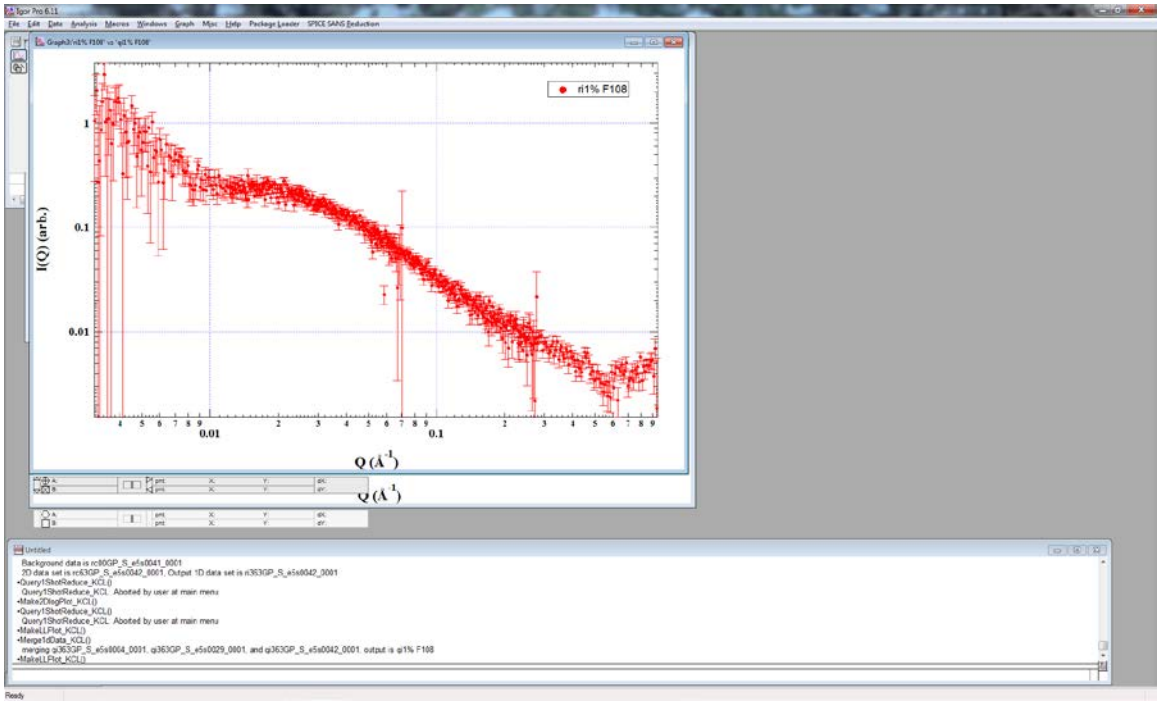

Figure 55

Appendix 1: Using a standard for absolute intensity scaling

To scale the data using a standard method, you will need to start by reducing the standard data that was collected for you before your experiment or was done along side of your samples. The standard will be one of the samples listed in Table 1 in Appendix 2. The standard data files should be filled out on your experimental worksheet. If you have any questions about which data files correspond to the standard, please contact your local contact and he/she will be able to help you.

The rest of this guide will be done using Porasil A as its standard. You will need to reduce the standard data that corresponds to the range over which your standard is accurate. For Porasil, you need to look at Q's that are in the range of $0.001<Q<0.06$ Å^{-1}. This means you only need to reduce the 18.5 m data or the long as it is usually referred. Once you have the data reduced, you will need to plot it on a log log plot like the one below:

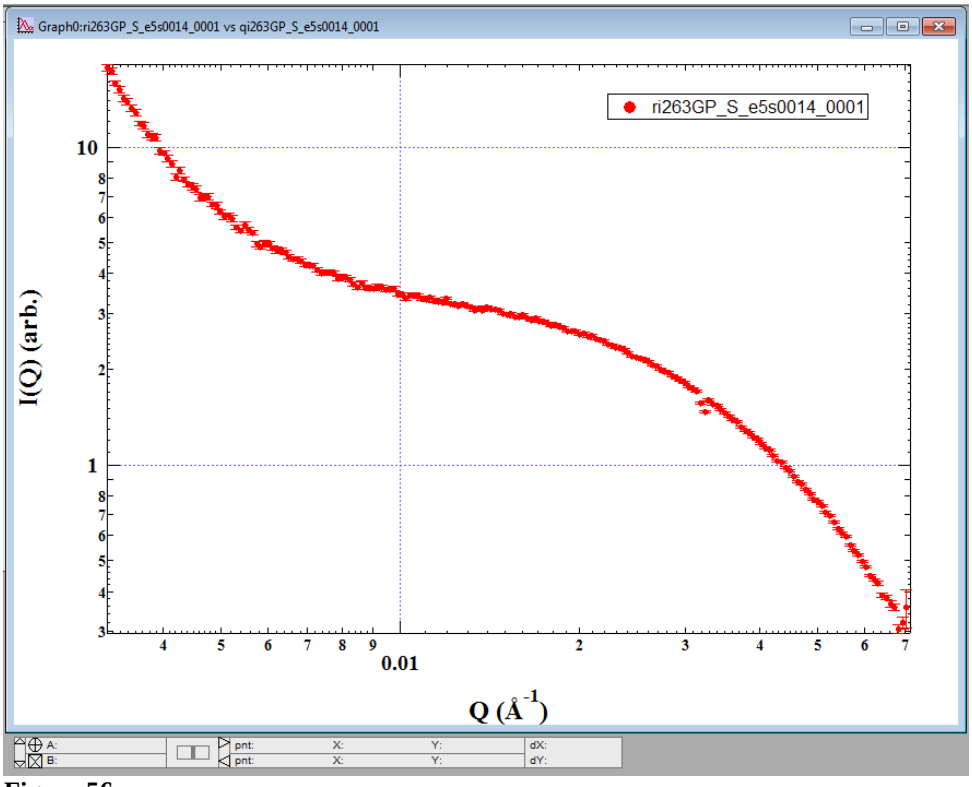

Figure 56

Now load the "KCL SAS Analysis" package from the "Package Loader" option on the main toolbar. This will load all the fitting functions that have been built out. You need to select the correct fitting function for this standard. From the fit you will calculate the scale factor that will be applied to the data for absolute scaling.

For Porasil A, the fit function is the Debye-Bueche (DB). It is located under "KCL SAS Analysis" under the Debye-Bueche heading. For a DB fit, you will need to first make a DB plot.

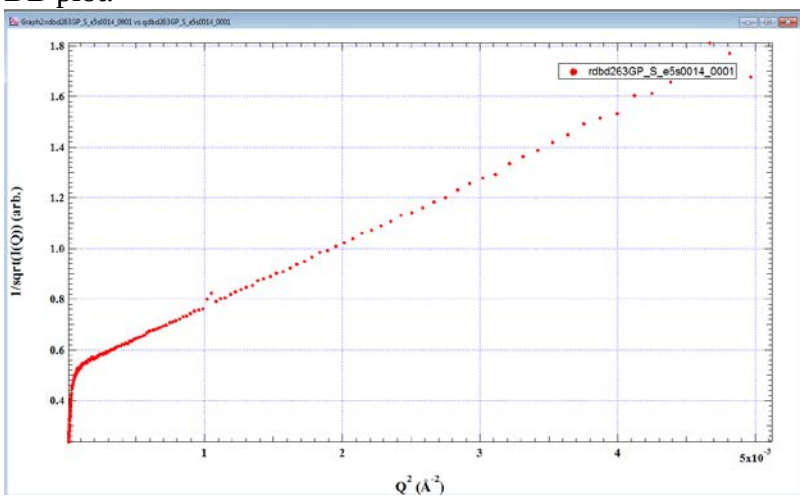

Figure 57

Before you fit this data you will need to put the cursors on the graph. This tells Igor the start and end points to use for the fit. To do this, use the same markers as you did in the match from earlier. They are located under the graph and are labeled A and B. Click on the circle to the left of A and drag the circle to your graph. Let go of the mouse button, and the cursor should be on your data. Repeat for the B marker.

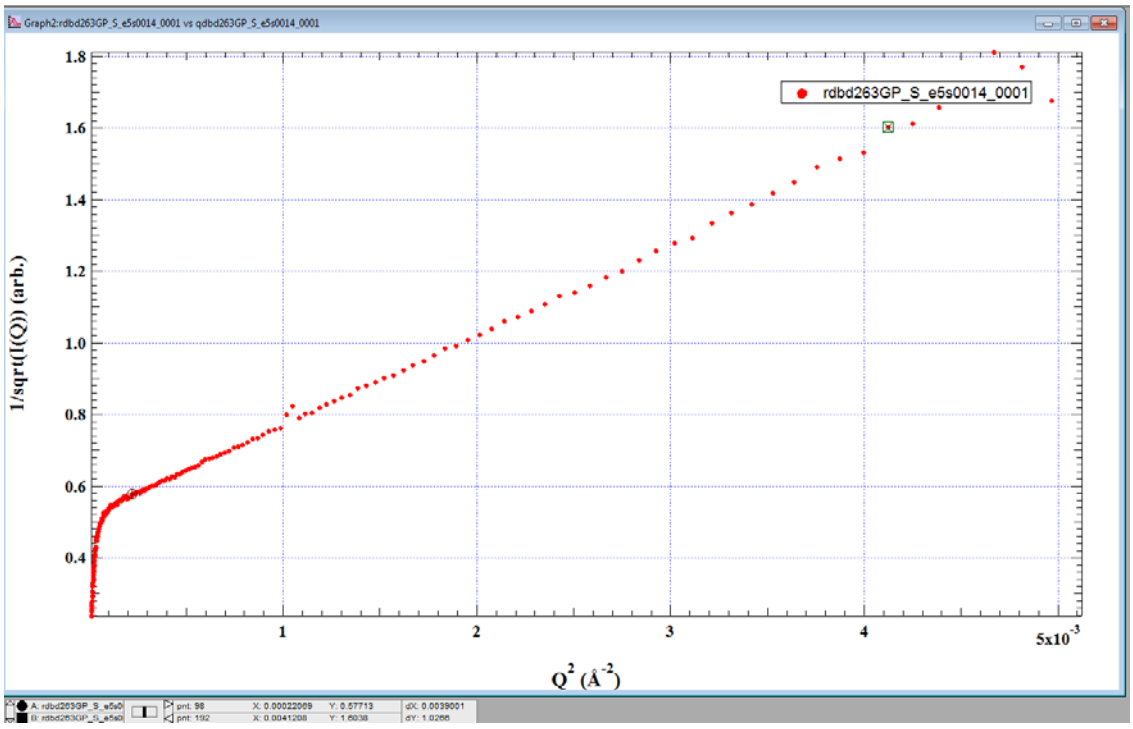

Figure 58

Once this is done, you can fit the data. The fit is found under the “Debye-Bueche” heading and is labeled as “Perform Debye-Bueche fit.”

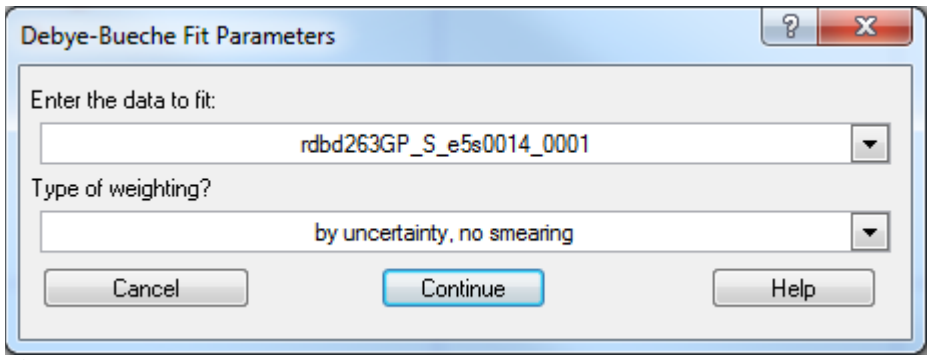

Figure 59

You will want to select “by uncertainty, no smearing.” Once this is selected Igor will apply a fit to your data between your two data points and will create a legend with the fitting parameters on your graph as seen in the figure below

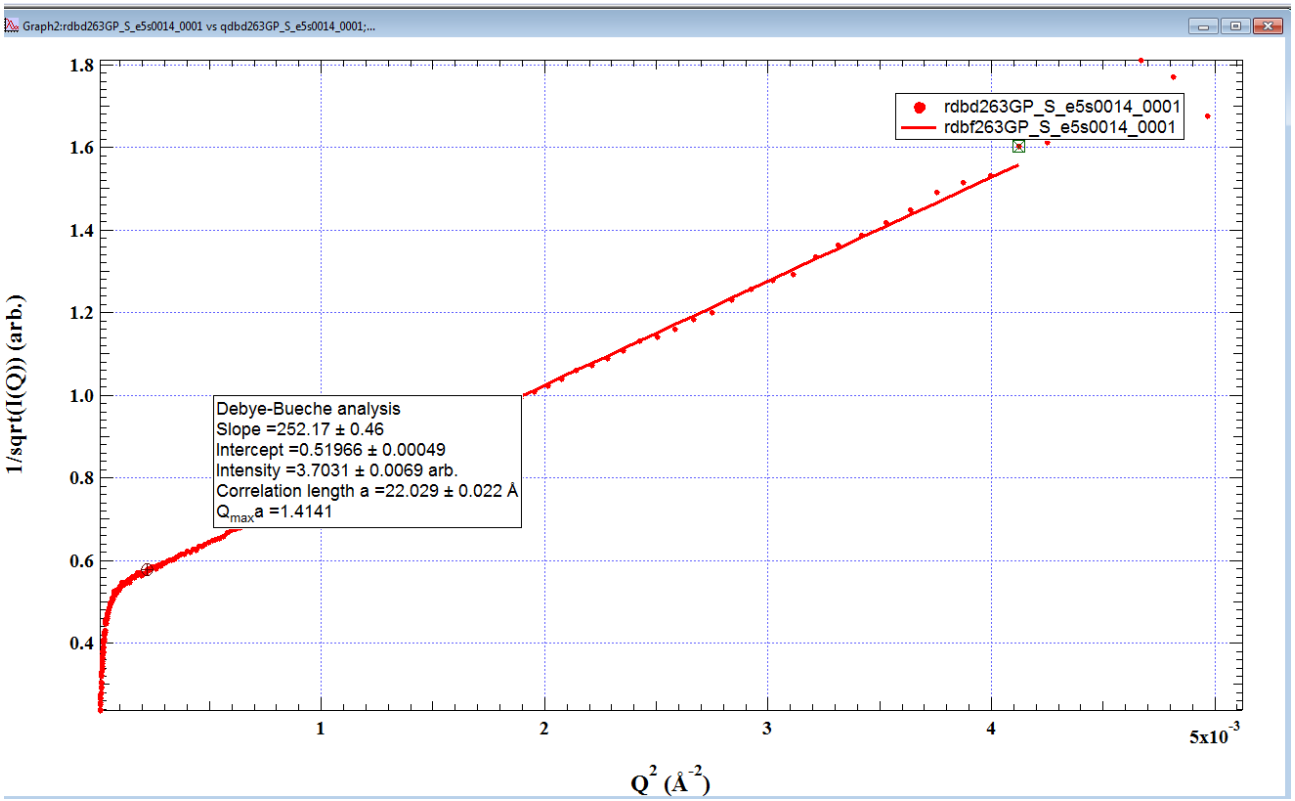

Figure 60

To calculate the scale factor for this plot, you need the I(0) for Porasil A. This is the $d\Sigma/d\Omega$ (0) listed in the chart in Appendix 2. So the scale factor, A, is as follows

$$A = I(0)/I(\text{from legend})$$

For the example above, you would get

I(0) = 47.5 cm^{-1}
I(from legend) = 3.7 cm^{-1}

$$A = 47.5 / 3.7 = 43.8\ cm^{-1}$$

Now take this scaling factor and apply it to your data. Move through the data reduction as demonstrated previously. The only difference is the method you select for absolute scaling which is "from I0 standard."

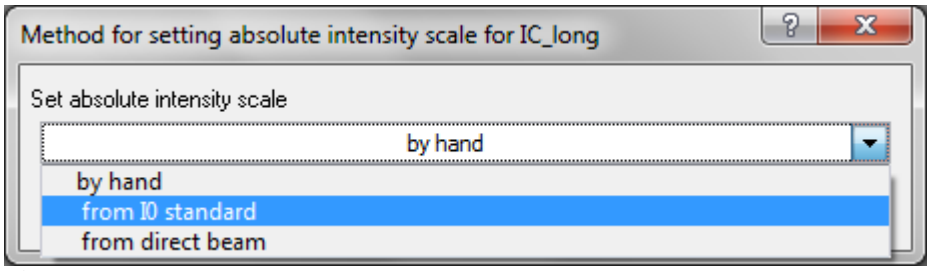

Figure 61

The next window will ask you to input the numbers you found when you reduced your standard.

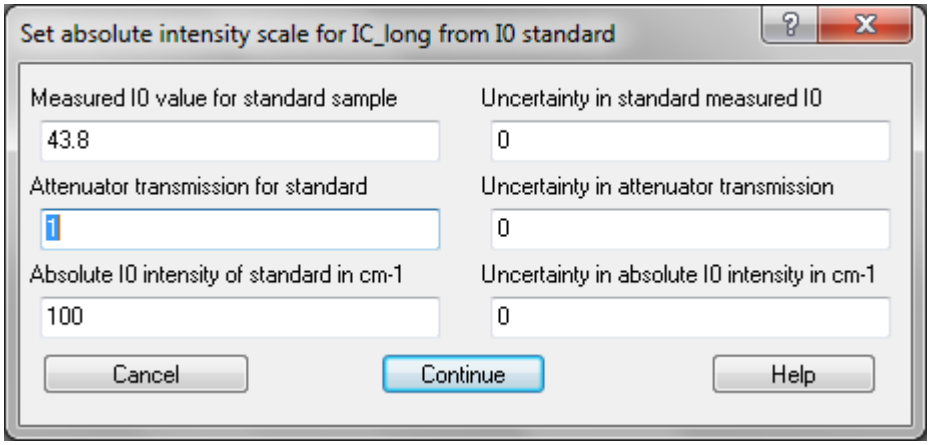

Figure 62

When you finish your reduction, you will have a graph that is on an absolute scale, as seen below

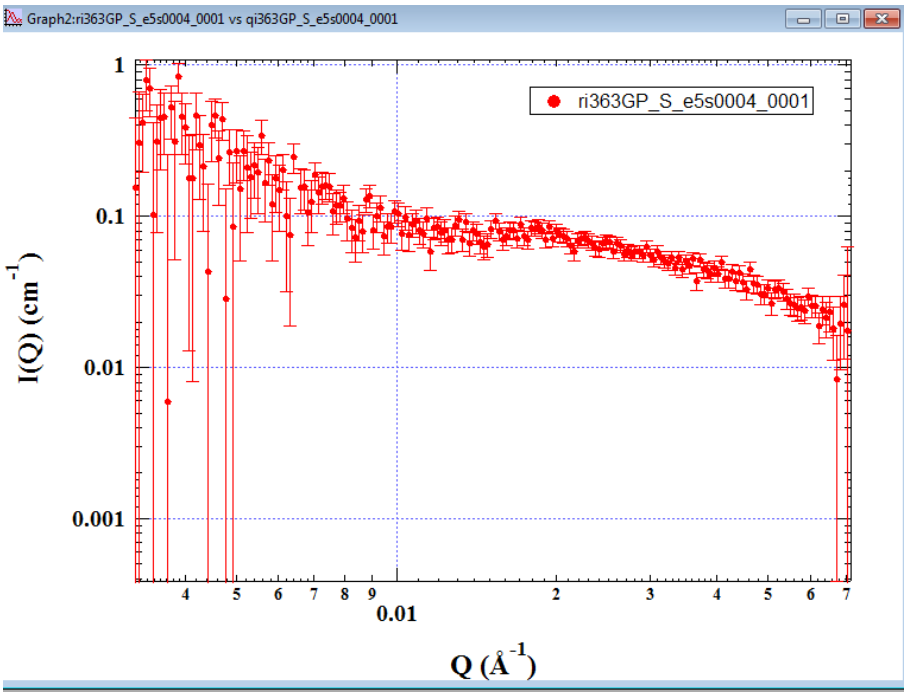

Figure 63

Now you can follow the rest of the guide. To match up your other detector distances do the matching as described in Appendix 2.

Standard Calibration Data

Standard	T (λ)	t mm	dΣ/dΩ (0) cm^{-1}	Fit param Å	Range $Å^{-2}$	Type
Porasil A	0.915 (4.75)	1.0	47.5±2	α 20.9±1	$0.0001<Q^2<0.004$	DB
Porasil B	0.871 (4.75)	1.81	450±30	α 43.5±2	$0.0001<Q^2<0.001$	
Urupunga 4	0.612 (7)	1.1				
Al-4 (1)	0.954	11.14	130	R_g 203±3		Guinier
Al-4 (2)	0.96 (4.75) 0.935 (8) 0.917 (6)	9.6	122±5	R_g 201±3		
D30	0.66	1.25	63.7±2	R_g 73.2±2	SDD 4-8m	Debye
D30	0.66	1.25	0.3	Z_H 721 Z_D 744	SDD 1.5-5m	Kratsy
2mm H_2O	0.3006 (4.75)	2	1.335			
PSH #3	0.562 (4.75)	1.37	0.644		SDD < 5m	
Ag Behenate						

Matching Data Sets

Another way to overlay the data from different detector settings is to do it by matching. If done correctly the two detector settings will over lay each other matching can be used to overlay the other detector setting in the standard or direct beam method. It is commonly used in the direct beam method if you don't have empty beam data at the other detector distances, short and medium.

To start, return to the "Spice SANS Reduction" option on the toolbar, and select "Reduction of Spice Data." This will bring up the following screen.

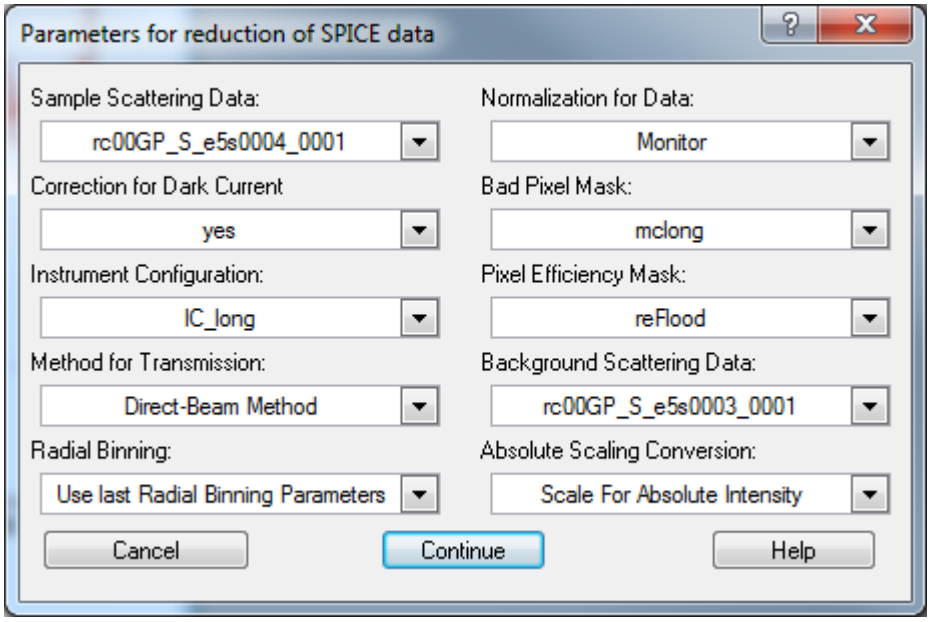

Figure 64

You will need to load your new sample data and create a new instrument configuration. To do matching you will select "Scale for Geometry Only" so that you can get a ratio between the absolute long data and the geometry only medium distance. Once you have this ratio, you will need to re-reduce the data. Finally, you will want to make a new bad pixel mask so that if you find that at medium distance you have pixels you want to mask out, you have the proper mask already made. Instructions for how to add to this mask will be discussed in the "Bad Pixel Mask" section of this guide. Your window should look like the one below before you select continue:

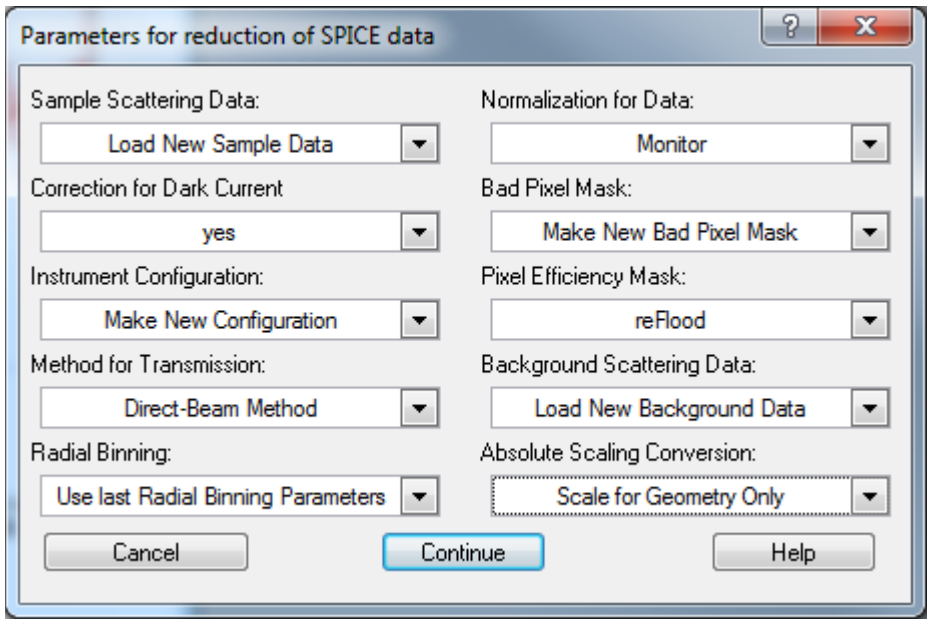

Figure 65

Select your middle distance, data, and click "Continue." It should have the same thickness as your long distance, so click "Continue" to move on to making your new bad pixel mask. Again, when setting up this mask, only mask the bottom edge of the detector.

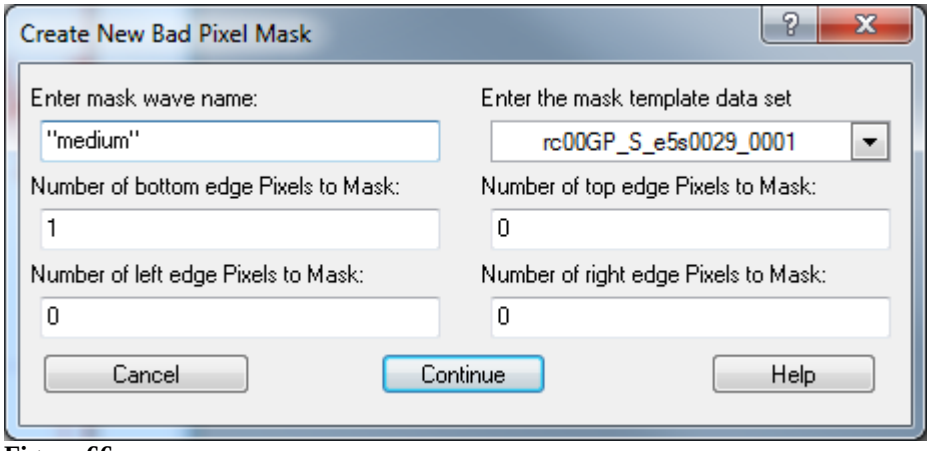

Figure 66

It is once again time to make a new instrument configuration. You will need to consult your experimental sheet to see what sample-to-detector distance is correct for this setting.

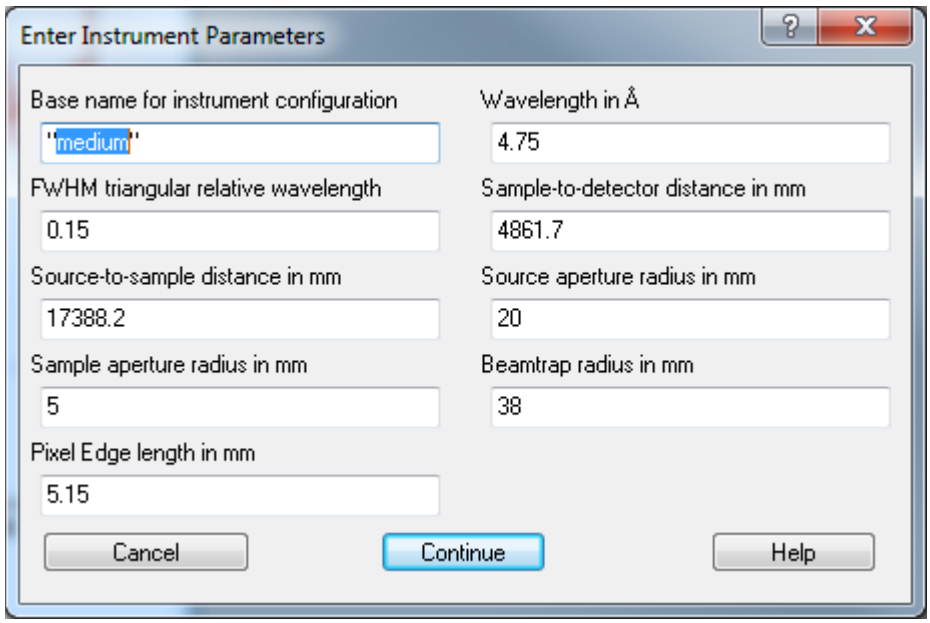

Figure 67

Click "Continue" to move on to selecting the dark current. After the dark current, you will need to find the center for this instrument configuration. There should be a direct beam that is labeled db for center. It will be listed on your experimental sheet. Select the direct beam method and load in that direct beam.

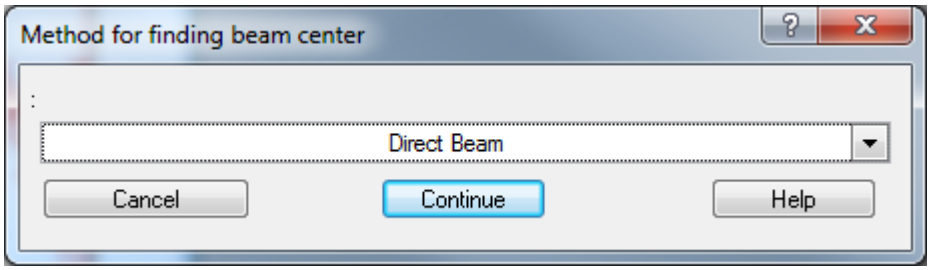

Figure 68

You will need to load new center data because this transmission has not have been loaded yet.

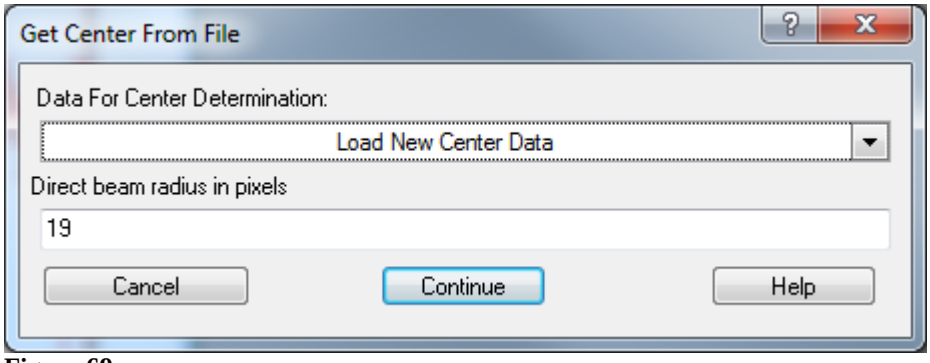

Figure 69

You are now back to the sample transmission part of the reduction. You will not need to change anything on this window because you have not changed samples only detector settings. You will need to load new sample transmissions only when you change samples or wavelengths.

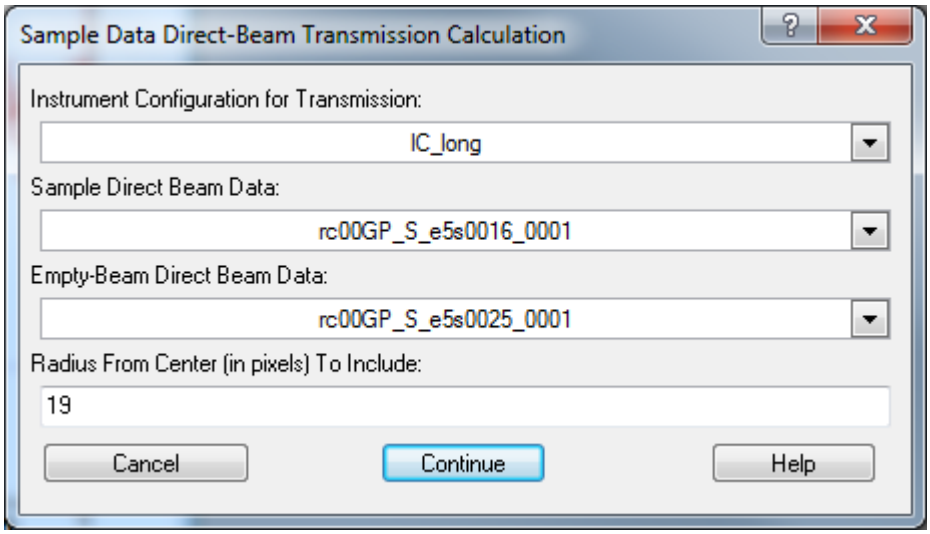

Figure 70

Now you will need to load your background. Select the background data that corresponds to the medium detector setting

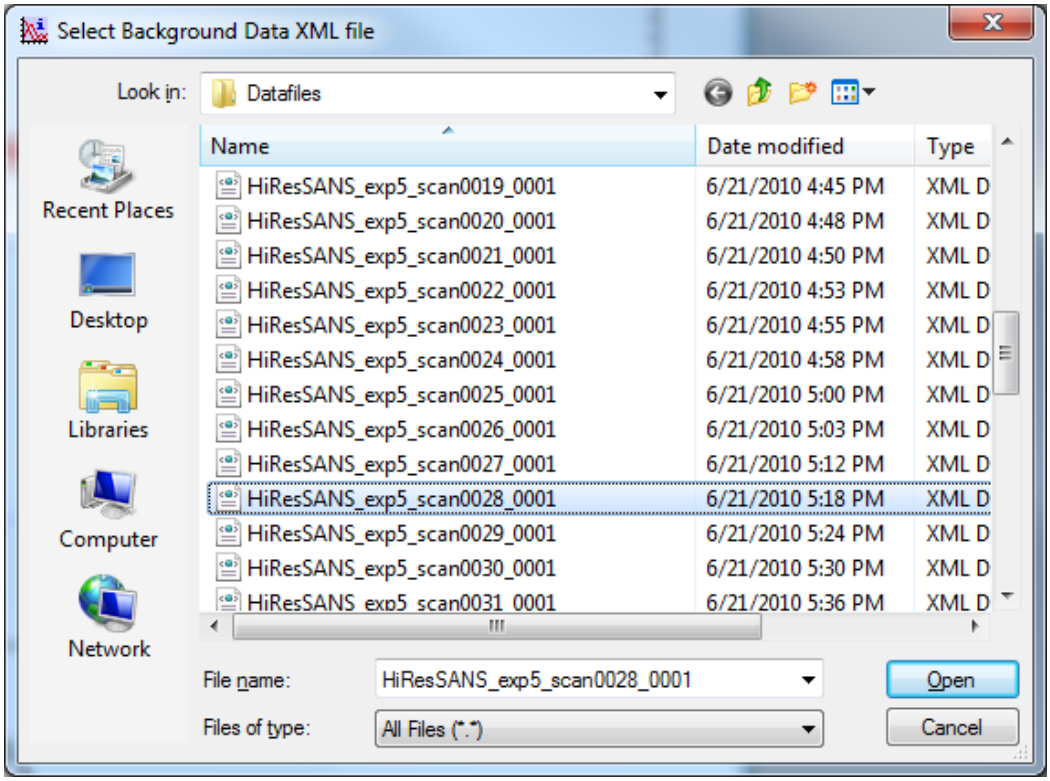

Figure 71

The thickness will be the same so, click “Continue.” Again you will not need to change the background transmission until you change samples/backgrounds for all configurations. After a moment, Igor will finish its calculations. You will get something like below:

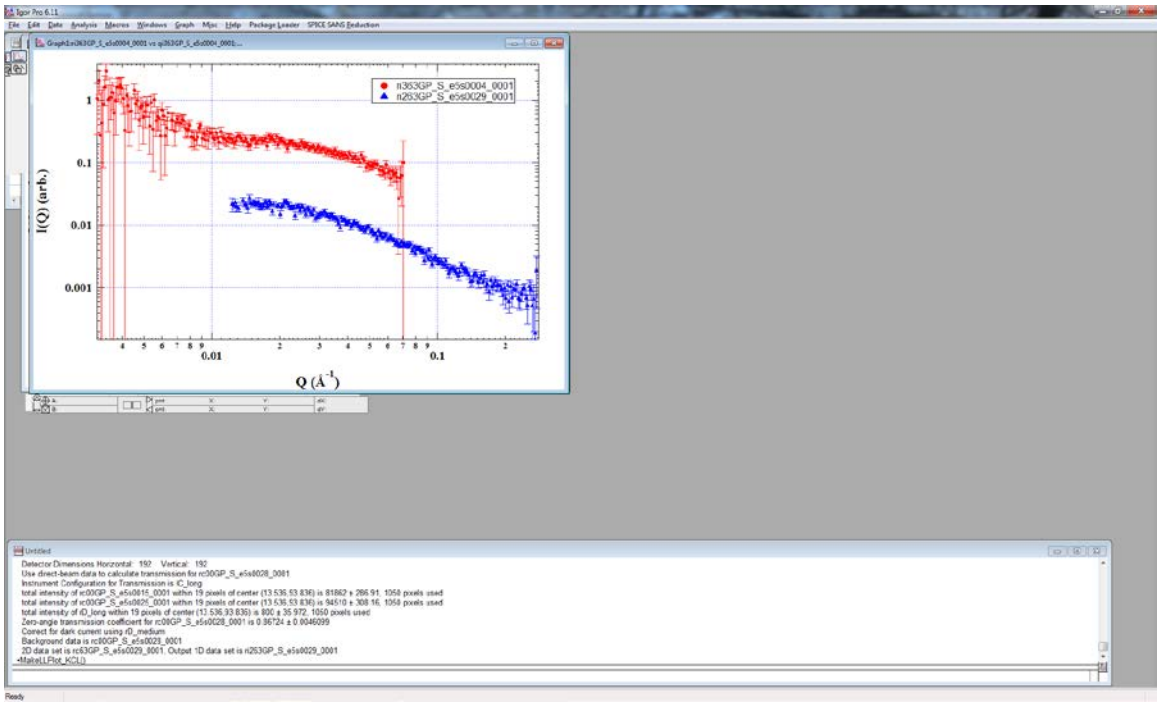

Figure 72

Now you need to match the curves up. To do this you will need to place the markers A and B one the two curves. Place marker A on the Top curve and marker B on the bottom curve. You will want to make the X values match as close as possible. Also you will want to do this on a flat or constant slope part of the graph.

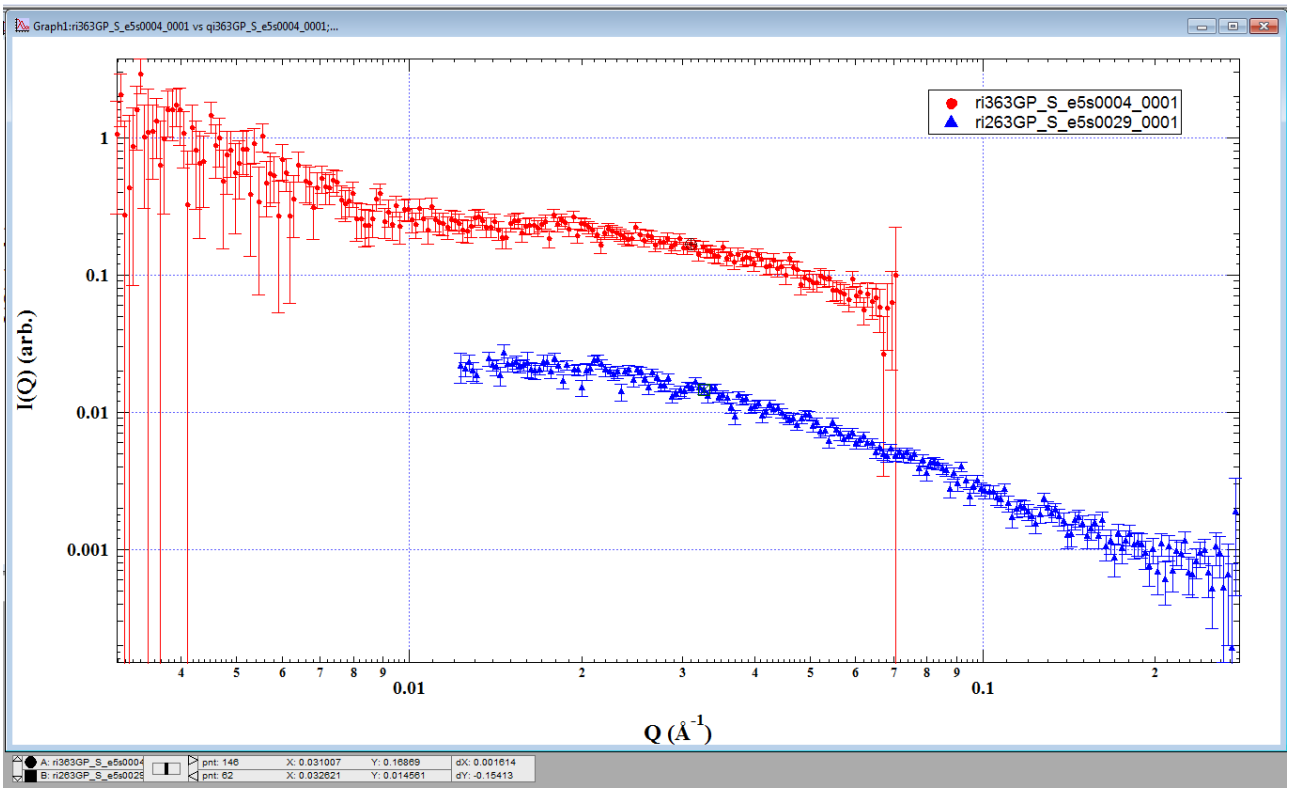

Figure 73

One thing that should be mentioned is that when you do scaling for geometry only, the label for the data set is in the 200's instead of the 300's for absolute scaling. You always want to match the geometry to the absolute scale. So for this case, you would want to match the ri263GP_S_e5s_0029_001 (blue) to ri363GP_S_e5s_0004_001 (red). To do this, take the Y value for the blue curve and divide it by the Y value for the red curve. Mark this value on your experimental sheet. Now you need to redo this data but this time select "Scale for Absolute intensity." You will need to load new sample and background data to make sure that Igor correctly analyzes your data. After reloading your sample data, you will get to absolute intensity screen. Here instead of selecting direct beam like last time you will select "by hand."

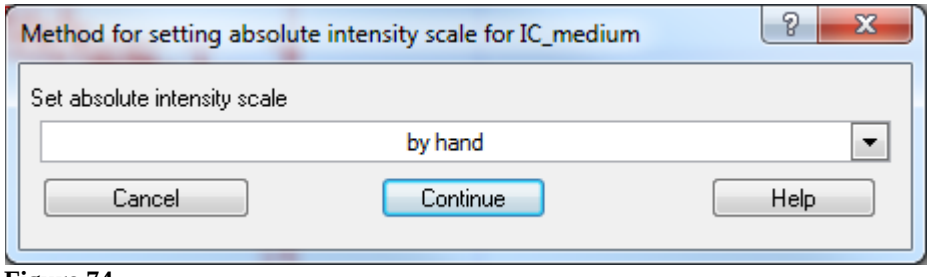

Figure 74

Enter the scaling factor you just calculated into the first box, and click "Continue."

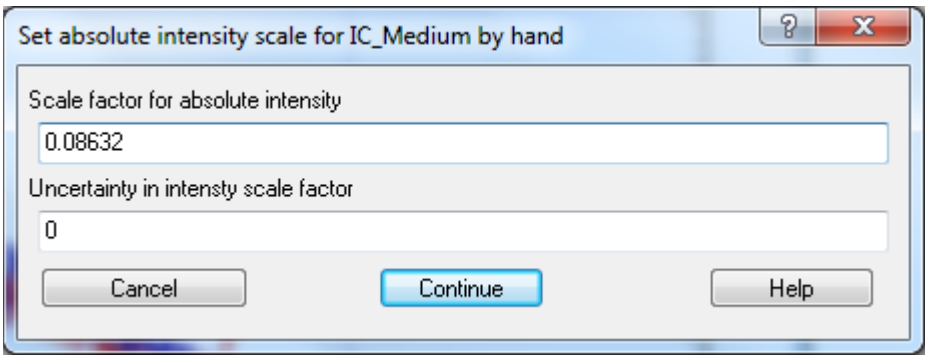

Figure 75

After that, continue through until you need to reload the background. Select the background and continue to the end. You will need to make a new 1D log log plot to see the data sets overlay, because the new data will be saved as ri363GP_...

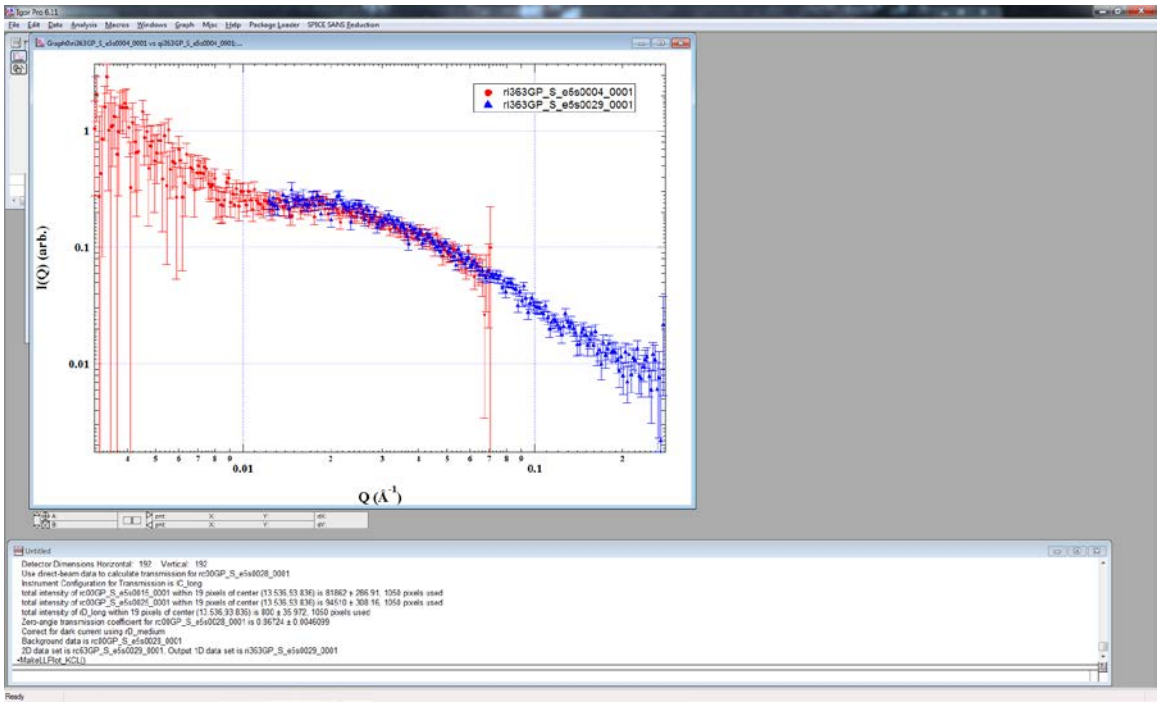

Figure 76

If you have another setting, you can follow the same steps above to reduce the short data. If everything is done correctly, you will get the following when you plot all three distances on the same graph:

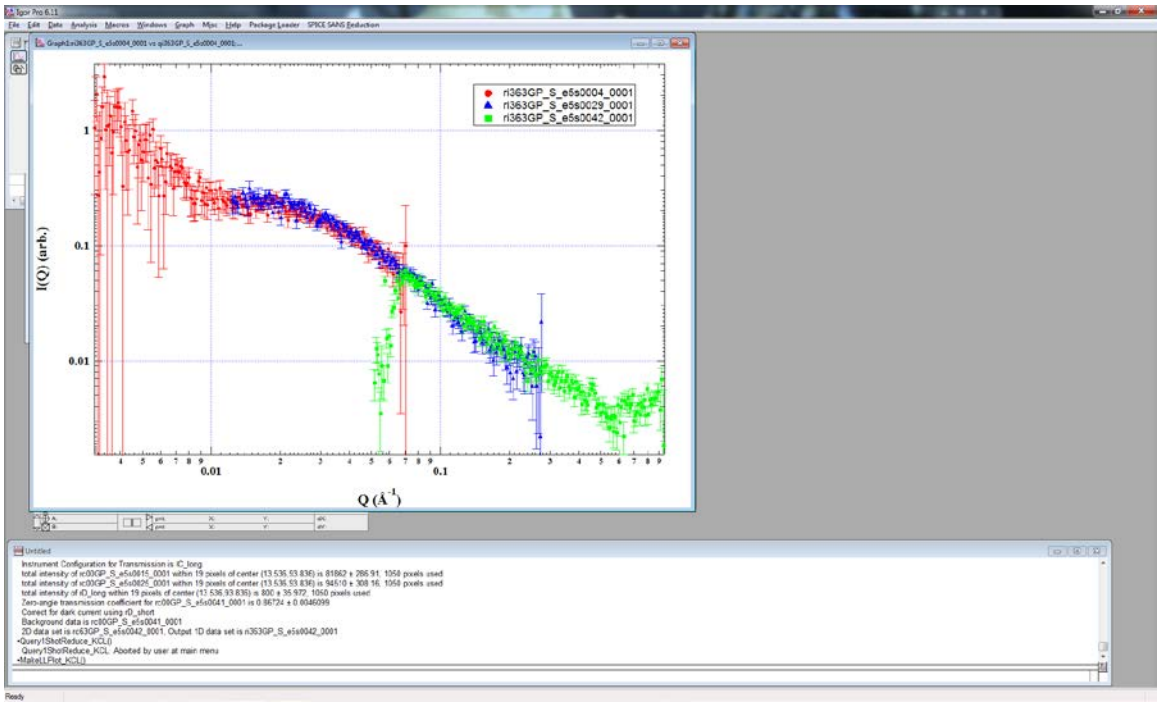
Igor Pro 6.11
File Edit Data Analysis Macros Windows Graph Misc Help Package Loader SPICE SANS Reduction
n363GP_S_e5s0004_0001
n363GP_S_e5s0029_0001
n363GP_S_e5s0042_0001
I(Q) (arb.)
Q (Å^{-1})
Untitled
Instrument Configuration for Transmission is IC_long
total intensity of rc03GP_S_e5s0815_0001 within 19 pixels of center (13.535,53.836) is 81862 ± 286.91. 1058 pixels used
total intensity of rc03GP_S_e5s0826_0001 within 19 pixels of center (13.535,53.836) is 945.0 ± 308.16. 1058 pixels used
total intensity of ID_long within 19 pixels of center (13.535,53.836) is 800 ± 35.972. 1050 pixels used
Zero-angle transmission coefficient for rc09GP_S_e5s0041_0001 is 0.86724 ± 0.0046099
Correct for dark current using rD_short
Background data is rc80GP_S_e5s0041_0001
2D data set is rc63GP_S_e5s0042_0001. Output 1D data set is n353GP_S_e5s0042_0001
•Query1ShotReduce_KCL()
Query1ShotReduce_KCL: Aborted by user at main menu
•MakeLLPlot_KCL()
Ready

Figure 77

Appendix 3: Using the Wedge Reduction

One of the newest features is the ability to reduce anisotropic data by taking vertical and horizontal slices. To start this reduction, select "Wedge Reduction of Spice data" instead of the "Reduction of Spice data" that was used in the rest of this guide. The first pop up window is the same, and asks for the same information as the original way.

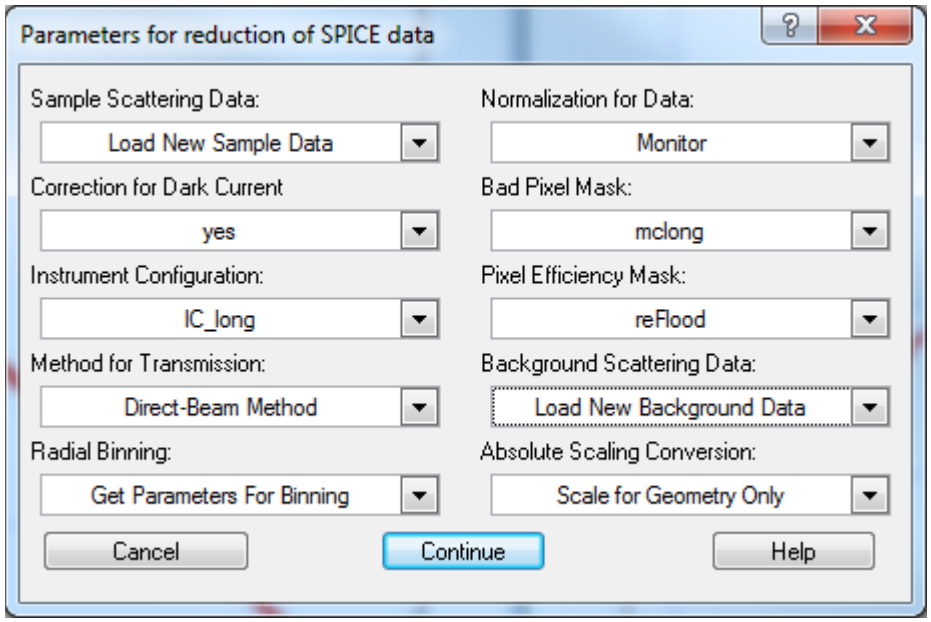

Figure 78

The only difference is in the selection of binning parameters. There is an extra option that allows you to select how wide your wedge is in degrees.

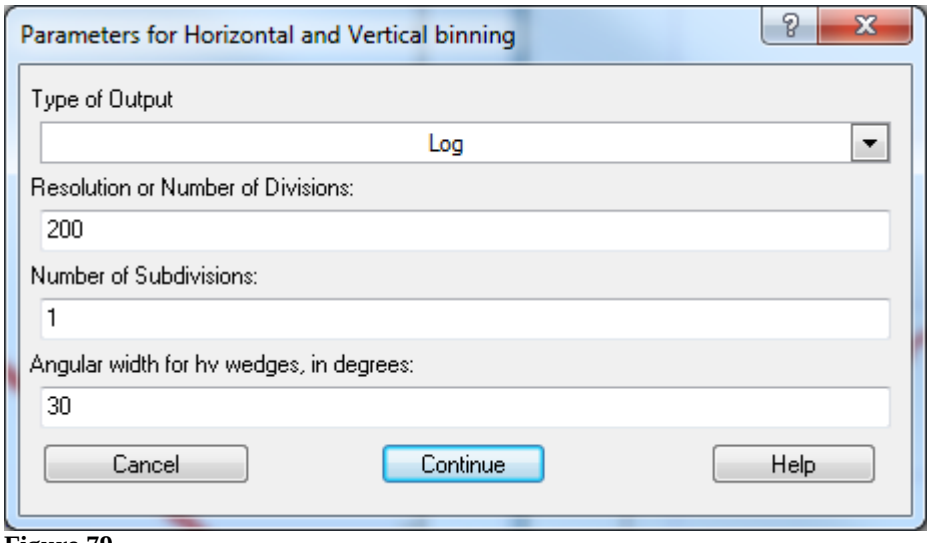

Figure 79

Once you have selected the binning parameters you want, they will be saved until you select “Get new binning parameters” on the first window.

When you plot the wedge data, the 1D log log data you want to plot will be labeled with either qh… or qv….

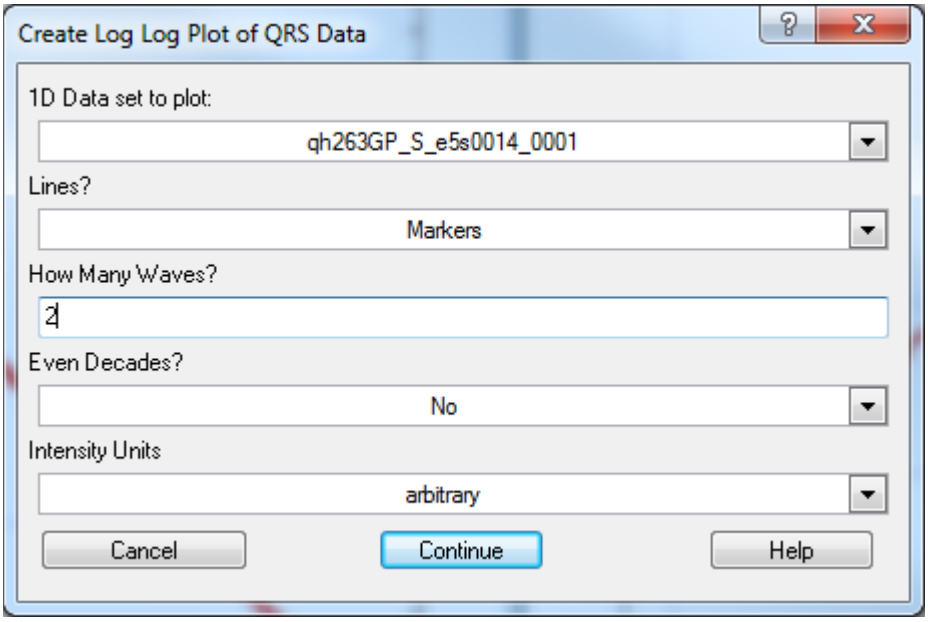

Figure 80

This is an example of what you will get if you plot qv and qh on the same graph.

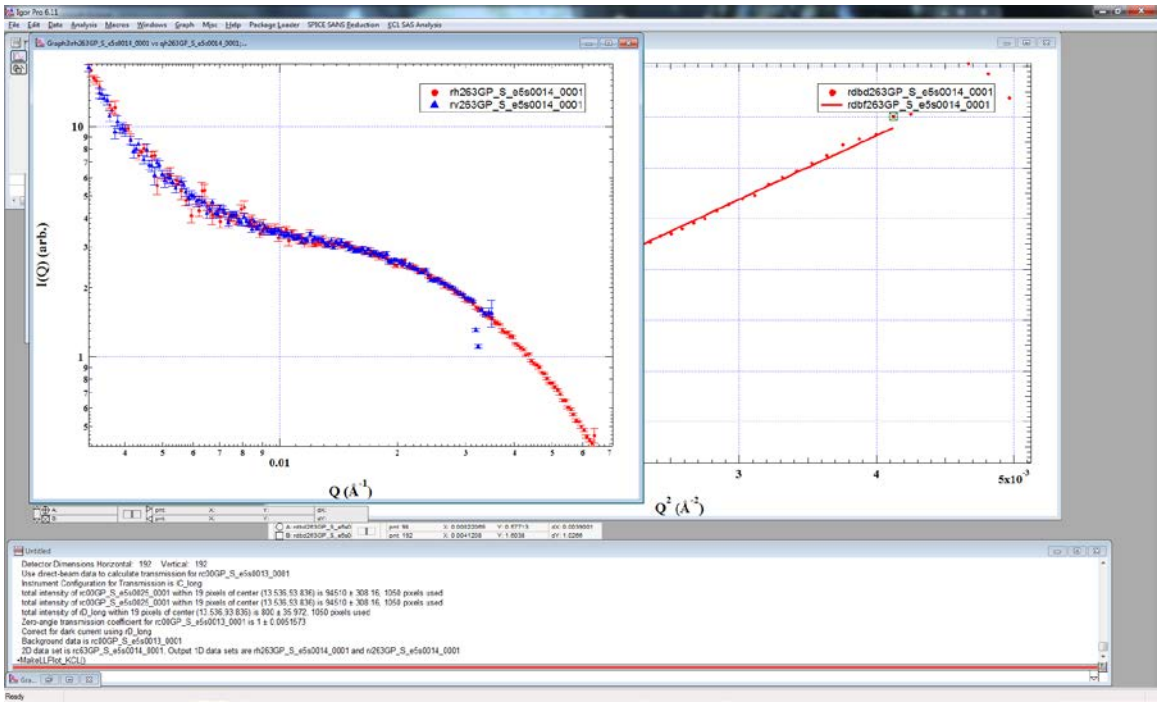

Figure 81