

ISAW Tutorial

Tom Worlton

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Install ISAW

- Download and install ISAW per instructions (0Readme.txt) on the ISAW ftp site, <ftp://zuul.pns.anl.gov/isaw>
 - Either the Java Runtime Environment (JRE) or Java Development Kit (JDK) must be installed before installing ISAW. Java distributions are different for different platforms, but the same ISAW installer works on all platforms.
 - *Because of the size of the files, be patient when downloading and opening them.*

The ISAW ftp site

Server: zuul.pns.anl.gov
User Name: Anonymous

WARNING: This is a United States Department of Energy computer system, which may be accessed and used only for official Government business by authorized personnel. Unauthorized access or use of this computer system may subject violators to criminal, civil, and/or administrative action. All information on this computer system may be intercepted, recorded, read, copied, and disclosed by

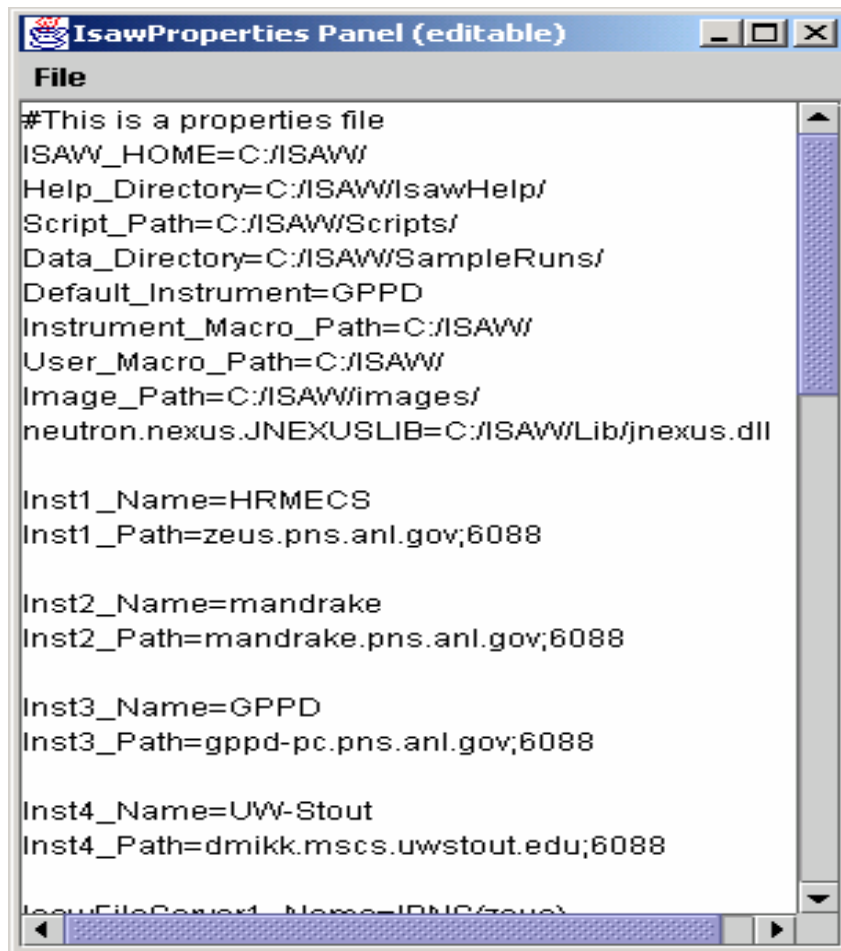
Name	Size	Type	Modified
Documents		File Folder	2/1/2002 12:00 AM
java		File Folder	9/13/2002 3:21 PM
MoreSampleData		File Folder	4/12/2002 6:57 PM
old		File Folder	3/22/2002 12:00 AM
OtherSW		File Folder	9/27/2002 2:27 PM
0Readme.txt	4.00 KB	Text Document	9/16/2002 3:17 PM
Isaw-111-install.jar	9.58 MB	Executable Jar File	2/19/2002 12:00 AM
Isaw-120-install.jar	9.87 MB	Executable Jar File	3/4/2002 12:00 AM
Isaw-121-install.jar	8.72 MB	Executable Jar File	3/12/2002 12:00 AM
Isaw-130-install.jar	8.47 MB	Executable Jar File	4/8/2002 10:18 PM
Isaw-131-install.jar	8.67 MB	Executable Jar File	4/29/2002 4:52 PM
Isaw-140-install.jar	9.66 MB	Executable Jar File	8/15/2002 7:53 PM
Isaw-141a2-install.jar	9.73 MB	Executable Jar File	9/10/2002 10:07 PM
Isaw-141a3-install.jar	9.74 MB	Executable Jar File	9/11/2002 3:12 PM
Isaw-141a5-install.jar	9.74 MB	Executable Jar File	9/13/2002 3:17 PM
Isaw-141b-install.jar	9.83 MB	Executable Jar File	9/27/2002 7:26 PM

Done User: Anonymous Internet

Run ISAW

- Run ISAW following the instructions in “Test Installation of ISAW” in the “0Readme.txt” file.
- The first time you run ISAW, the IsawProps.dat file will be created in your home directory. This file will contain default locations for various files and directories used by ISAW, plus viewer defaults, etc.
- Choose "Edit Properties File" from the file menu to view and/or edit this file. Restarting ISAW is necessary to use new values.

A sample IsawProps.dat



```
IsawProperties Panel (editable)
File
#This is a properties file
ISAW_HOME=C:/ISAW/
Help_Directory=C:/ISAW/IsawHelp/
Script_Path=C:/ISAW/Scripts/
Data_Directory=C:/ISAW/SampleRuns/
Default_Instrument=GPPD
Instrument_Macro_Path=C:/ISAW/
User_Macro_Path=C:/ISAW/
Image_Path=C:/ISAW/images/
neutron.nexus.JNEXUSLIB=C:/ISAW/Lib/jnexus.dll

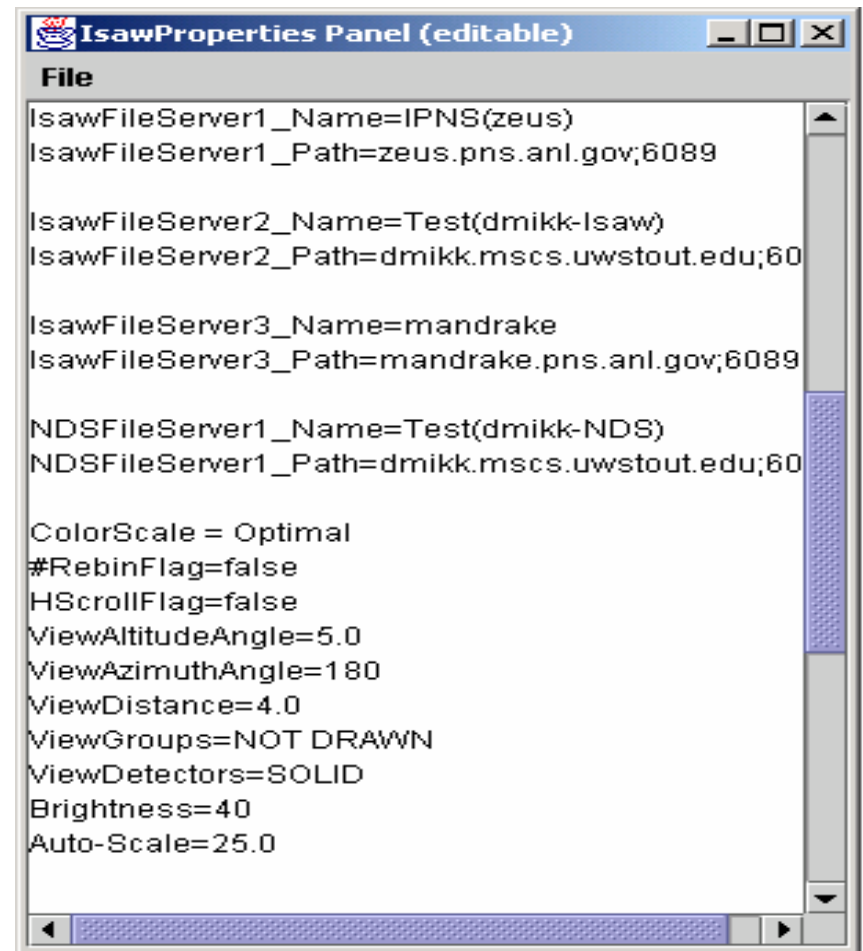
Inst1_Name=HRMECS
Inst1_Path=zeus.pns.anl.gov;6088

Inst2_Name=mandrake
Inst2_Path=mandrake.pns.anl.gov;6088

Inst3_Name=GPPD
Inst3_Path=gppd-pc.pns.anl.gov;6088

Inst4_Name=UW-Stout
Inst4_Path=dmikk.mscs.uwstout.edu;6088

IsawFileServer1_Name=IPNS(zeus)
```



```
IsawProperties Panel (editable)
File
IsawFileServer1_Path=zeus.pns.anl.gov;6089

IsawFileServer2_Name=Test(dmikk-Isaw)
IsawFileServer2_Path=dmikk.mscs.uwstout.edu;60

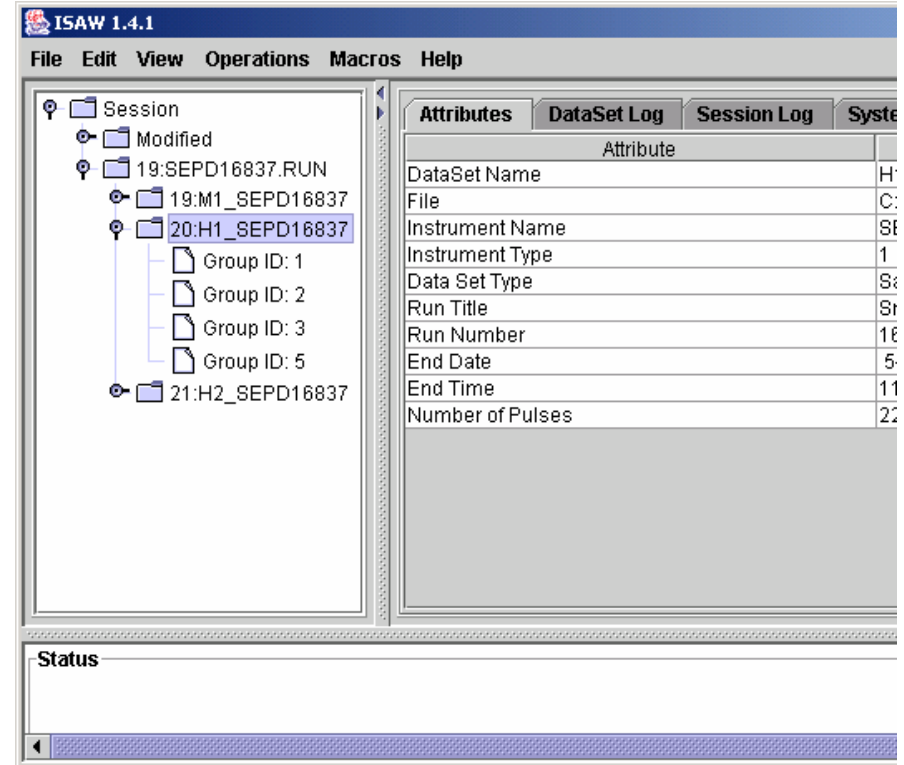
IsawFileServer3_Name=mandrake
IsawFileServer3_Path=mandrake.pns.anl.gov;6089

NDSFileServer1_Name=Test(dmikk-NDS)
NDSFileServer1_Path=dmikk.mscs.uwstout.edu;60

ColorScale = Optimal
#RebinFlag=false
HScrollFlag=false
ViewAltitudeAngle=5.0
ViewAzimuthAngle=180
ViewDistance=4.0
ViewGroups=NOT DRAWN
ViewDetectors=SOLID
Brightness=40
Auto-Scale=25.0
```

Load some data

- From the "File" menu on the menu bar, select "Load Data", "Local" and select "sepd16837.run" from the file dialog box.
- Note that In the tree view, the file name SEPD16837.RUN appears.
- Click on the "pushpin" icon at the left of this filename to expand the view, then click on the icon to the left of H1_SEPD16937 to show the groups. You may need to change component sizes to see details



View Attributes

- Click on the DataSet H1_SEPD16837 and the "Attributes" tab.
- Note the attributes information for the DataSet, then click on Group #1 and note the group attributes. Detector ID's 1 through 80 (1:80) are summed together in group 1.
- Click on Group 5 and see how non-contiguous ID's are listed.

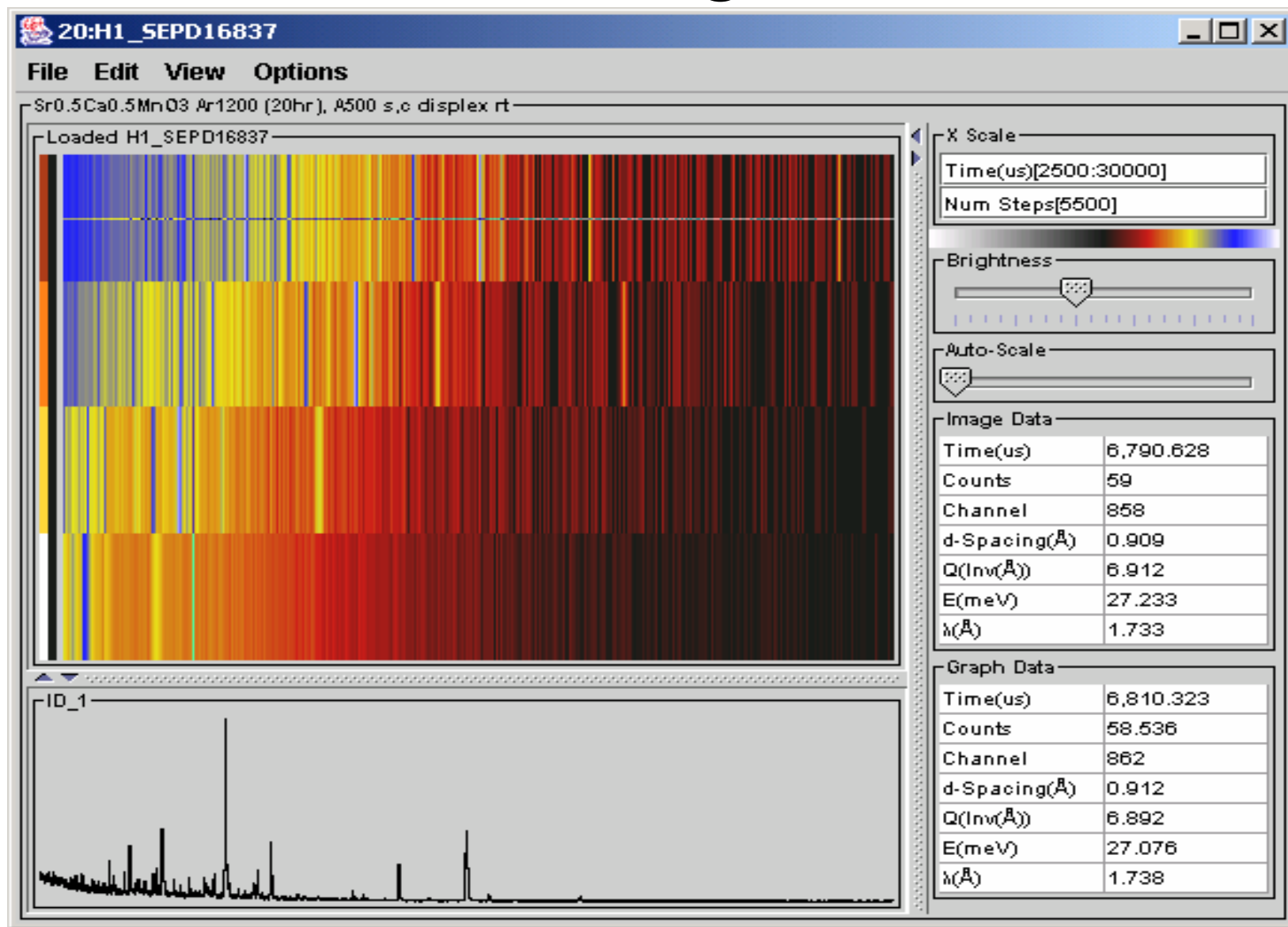
The screenshot shows the ISAW 1.4.1 software interface. The left pane displays a tree view of the session structure, with 'Group ID: 1' selected under the '20:H1_SEPD16837' dataset. The right pane shows the 'Attributes' tab, which contains a table of data for the selected group. The table has two columns: 'Attribute' and 'Value'. The 'Total Count' attribute is highlighted in blue.

Attribute	Value
Group ID	1
Run Number	16837
Detector IDs	1:80
Segment IDs	1:80
Initial Path	14
Effective Position	2θ=144.85;φ=1.5;ψ=-144.85;ζ=0
Omega	62.577
Raw Detector Angle	-134.795
Δ2θ	0.97
Det Info List	Seg: 1 Det: 1 (row, col) = (1, 1) 2θ=1...
Crate	1
Slot	1:10
Input	1:8
Total Solid Angle	0.346
Efficiency	1
Number of Pulses	22806
Total Count	182,640

Display an Image View

- Click on DataSet H1_SEPD16837, then select "Image View" from the "View" menu.
- Note the four bands of color in the image view. The horizontal axis refers to time-of-flight and the color indicates intensity. The four color bands represent the four detector groups. For DataSets with more groups narrower bands will appear, down to one pixel wide. For larger numbers of groups, vertical scroll bars will appear.

ISAW Image View



Test Cursor Interaction

- Put the cursor over the image and drag it to different positions while holding down the left mouse button.
- Notice how the readout information in the lower right changes as the cursor moves. Also notice that the lower graph changes when you point at different detector groups.
- Notice that the Attributes display on the ISAW GUI also responds to the cursor pointing at different groups.

Test arrow keys

- Use the up and down arrow keys to move between detector groups. Notice that the cross hairs move exactly one group for each click.
- You can also move the cross hairs left and right using the arrow keys.
- Arrow key movements will leave the cross hairs on the display.

Transform X Axis

- Select "Axis Conversions" from the "View" menu and select convert to d-spacing.
- Use the cursor to find a good range of d-values and change the range by clicking in the range following "Angstroms" in the upper right of the image view and editing the numbers. A colon separates the minimum and maximum values.
- You can also use an operator to convert axes. This creates a new DataSet and puts it in the "Modified" folder of the tree view.

Test zoom function

- Hold down the middle mouse button and drag the cursor over the image to select an area to zoom into. Double-click on the image to unzoom. Select again to zoom multiple times.
- If you don't have a middle button, use the shift key with the left mouse button to select the zoom region.
- The graph region will not change until you drag the cursor on the image with the left mouse button down.

View all data points

- In the default image view the data is compressed horizontally to allow the full spectrum to be shown in the view area. To see all points, select "Horizontal Scroll" from the "Options" menu. You will now probably need to use the scroll bar to see all of the data for each spectrum.
- Uncheck "Horizontal Scroll" to return to the default (compressed) view.
- From the View menu on the image view, select "Axis Conversions" → "None" to return to time-of-flight axes.

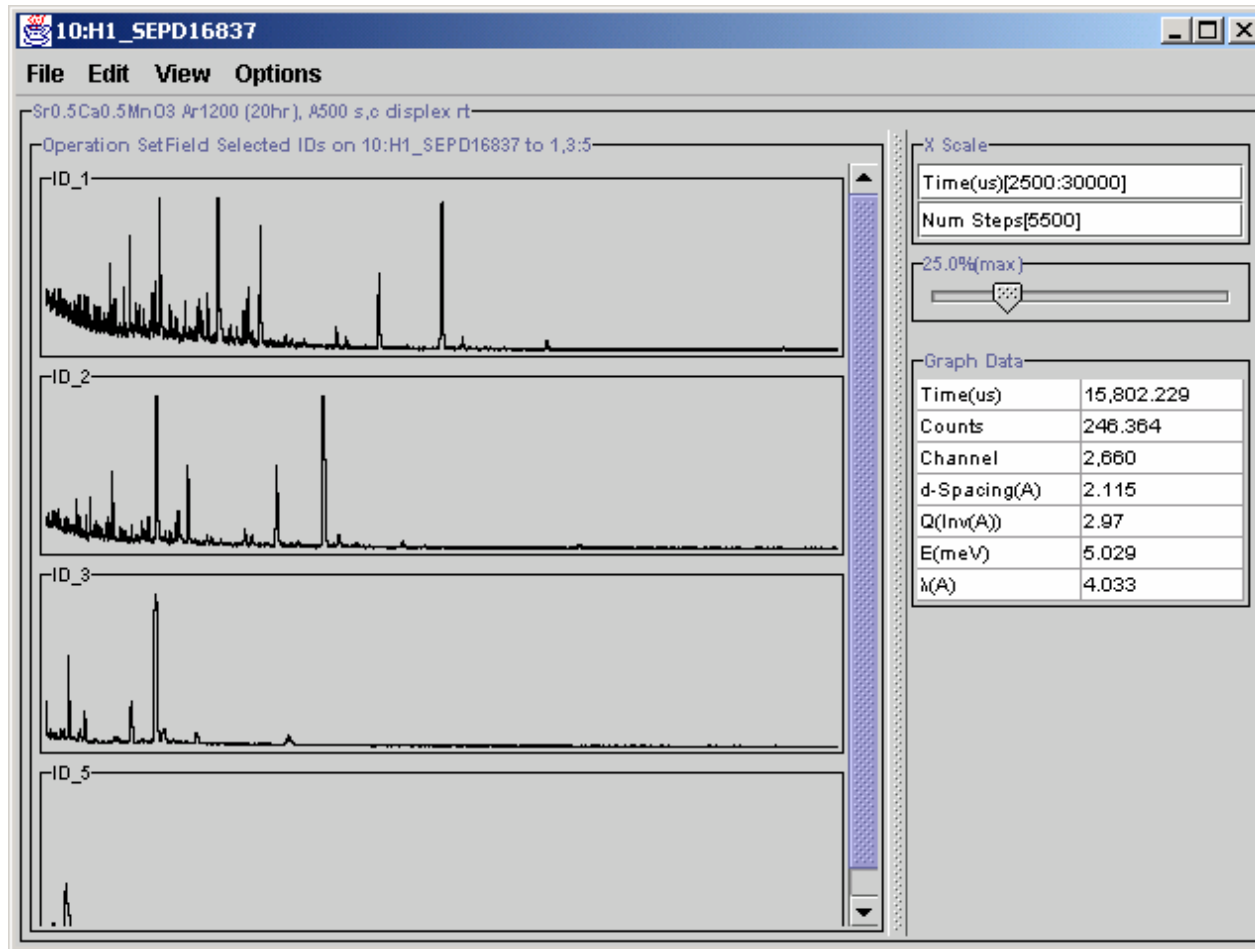
Test Viewer Controls

- There are several display controls on the right of the image display.
 - The number of steps is initially equal to the number of channels of data, but the data may be rebinned into fewer steps by editing the number.
 - The Brightness slider controls image brightness. The lower half of the brightness scale is for negative numbers.
 - The percentage slider controls the percentage of maximum for the graph display.

Test Scrolled Graph View

- With H1_SEPD16837 still highlighted on the tree view, create a "Scrolled Graph View" from the "View" menu.
- Drag the new view window so both views can be seen.
- In the scrolled graph view, the spectrum for each detector group can be seen individually by dragging the scroll bar.
- Drag the cursor over the scrolled graph view and watch the response on the Graph Data cursor readout and the Attributes panel of the ISAW GUI.

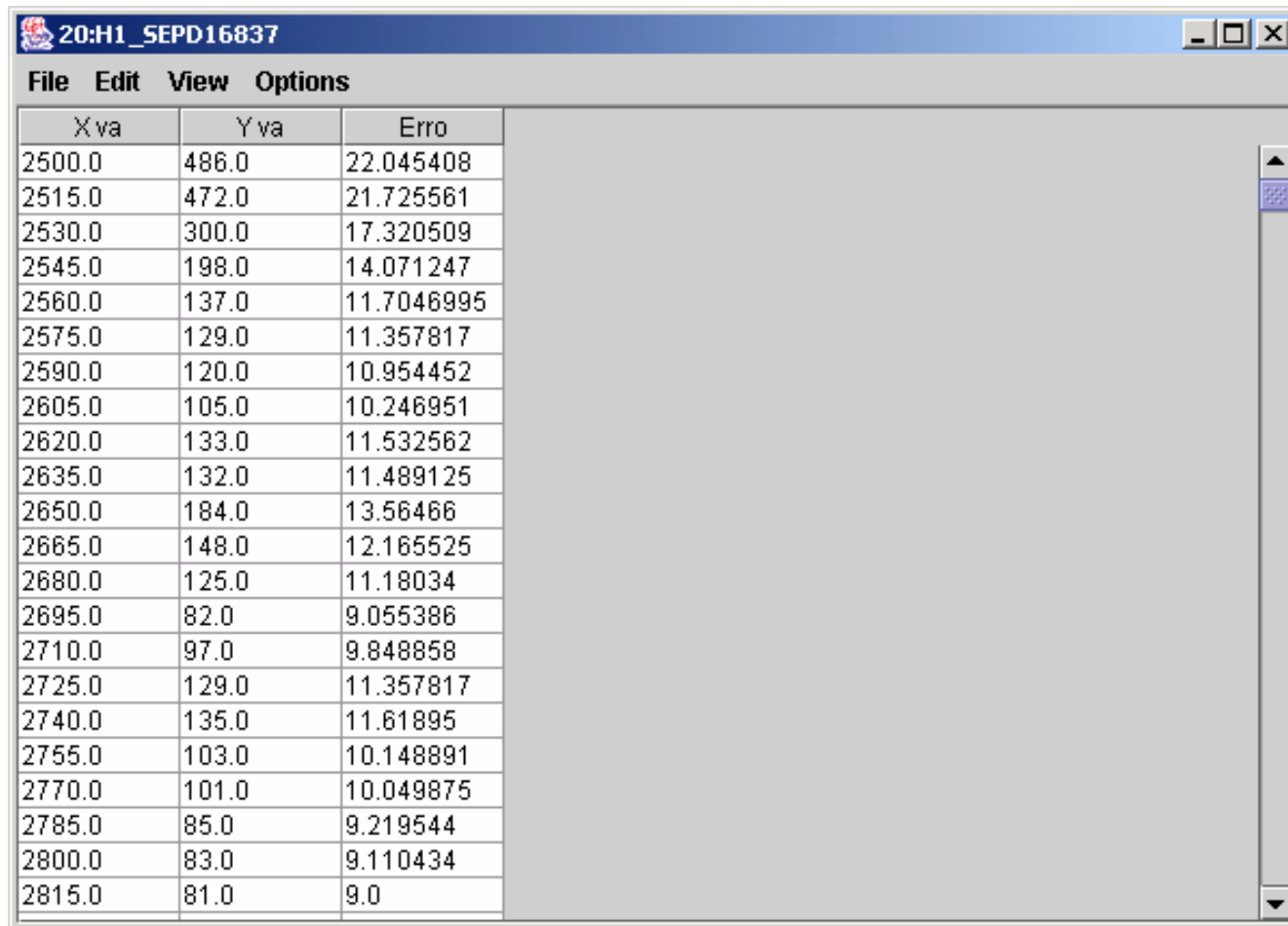
Scrolled Graph View



Test Table View

- With H1_SEPD16837 still highlighted, choose “SelectedTable View” and “Group x versus y” from the “View” menu. By default, the Table view shows just the first spectrum.
- Right-click on Group #3 of H1_SEPD16837 in the tree view and choose “select”. Note changes in viewers.
- Click on “Options” and “Show Errors” on the table view menu bar. Before any data manipulations, the errors are just the square root of the counts in each channel.

ISAW Table View



The image shows a screenshot of a software window titled "20:H1_SEPD16837". The window has a menu bar with "File", "Edit", "View", and "Options". The main content area displays a table with three columns: "X va", "Y va", and "Erro". The table contains 20 rows of data. A vertical scrollbar is visible on the right side of the table.

X va	Y va	Erro
2500.0	486.0	22.045408
2515.0	472.0	21.725561
2530.0	300.0	17.320509
2545.0	198.0	14.071247
2560.0	137.0	11.7046995
2575.0	129.0	11.357817
2590.0	120.0	10.954452
2605.0	105.0	10.246951
2620.0	133.0	11.532562
2635.0	132.0	11.489125
2650.0	184.0	13.56466
2665.0	148.0	12.165525
2680.0	125.0	11.18034
2695.0	82.0	9.055386
2710.0	97.0	9.848858
2725.0	129.0	11.357817
2740.0	135.0	11.61895
2755.0	103.0	10.148891
2770.0	101.0	10.049875
2785.0	85.0	9.219544
2800.0	83.0	9.110434
2815.0	81.0	9.0

Spectra selection

- Spectra can be marked as "Selected" through the tree view, image view, or scrolled graph view.
 - On the tree view, spectra are "selected" through a right-click operation as shown at the right.
 - On the viewers, the spectra are "selected" through typing "S" to select a single spectrum or "shift-S" to select a range of spectra.

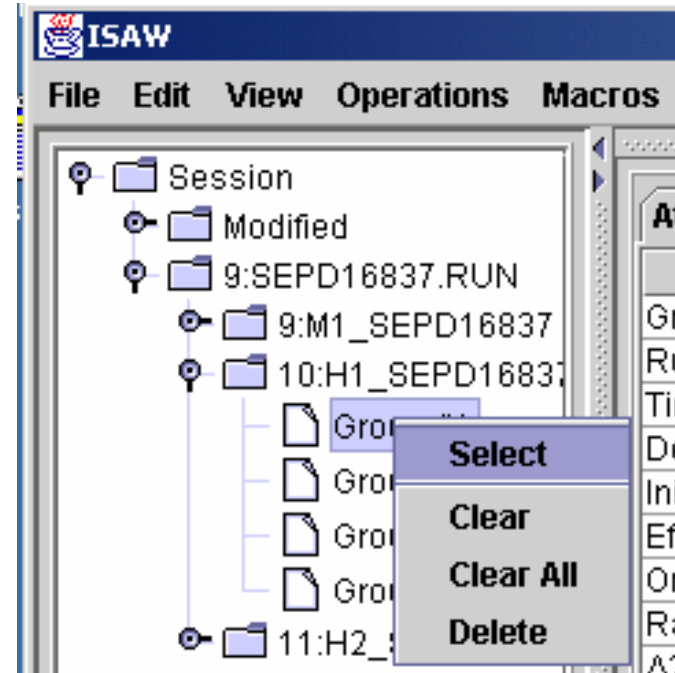
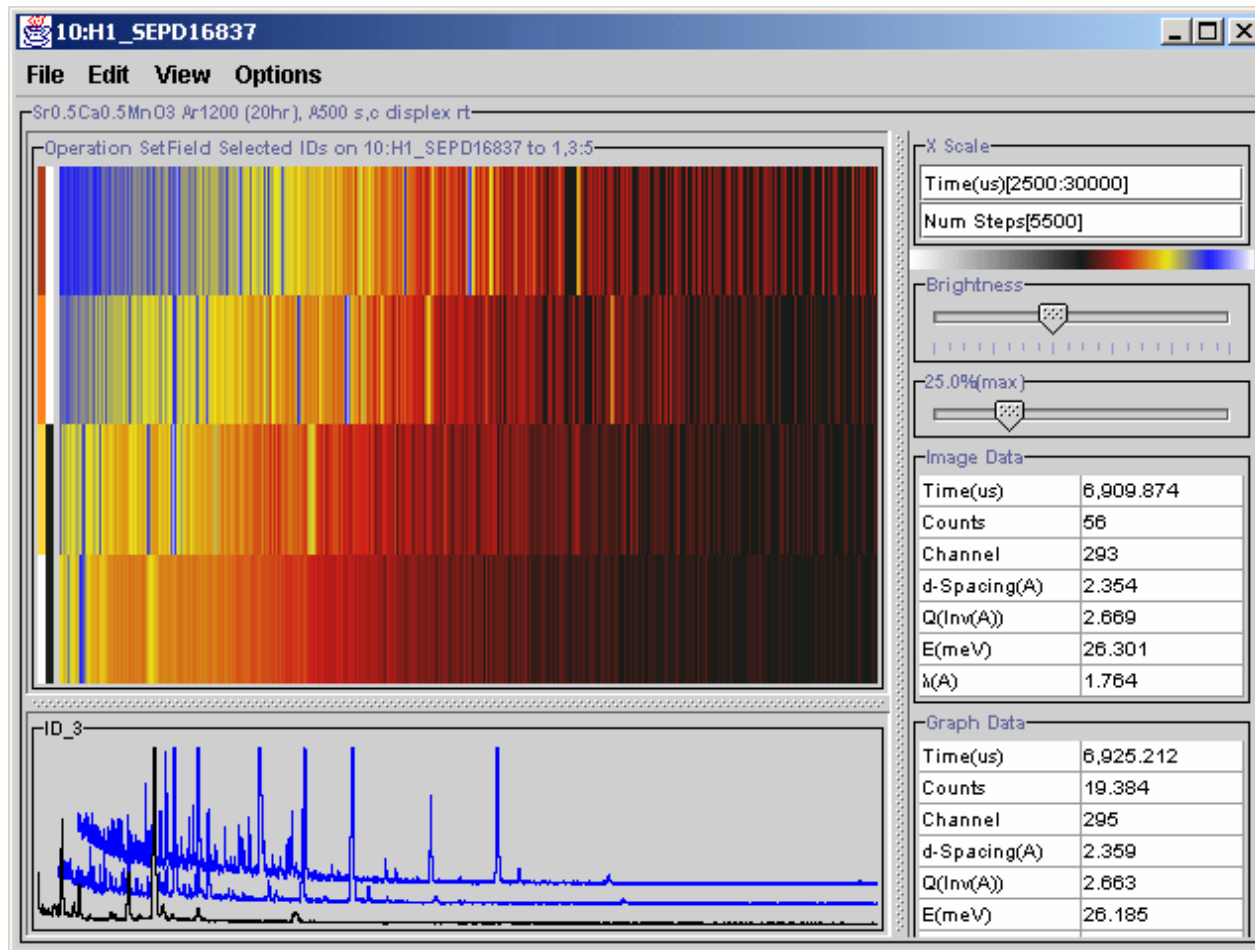


Image view selected graphs

- When there are spectra selected, the image view graph area shows up to 16 of the selected spectra plus the spectrum pointed at by the cursor. Each selected spectrum will show in blue unless the cursor also points at it.
- Try the different options under "Options", "Graph Selected (16 Max)".
- Use the Viewer "File" menu to close the DataSet viewers.

Image View selected graphs

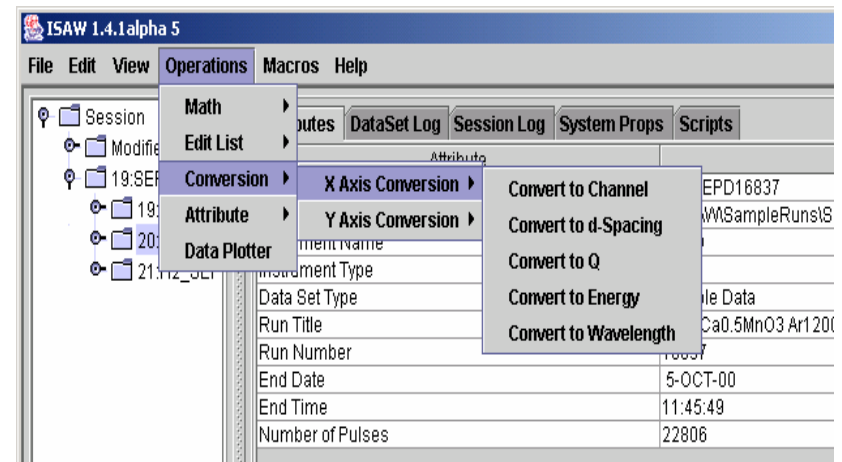
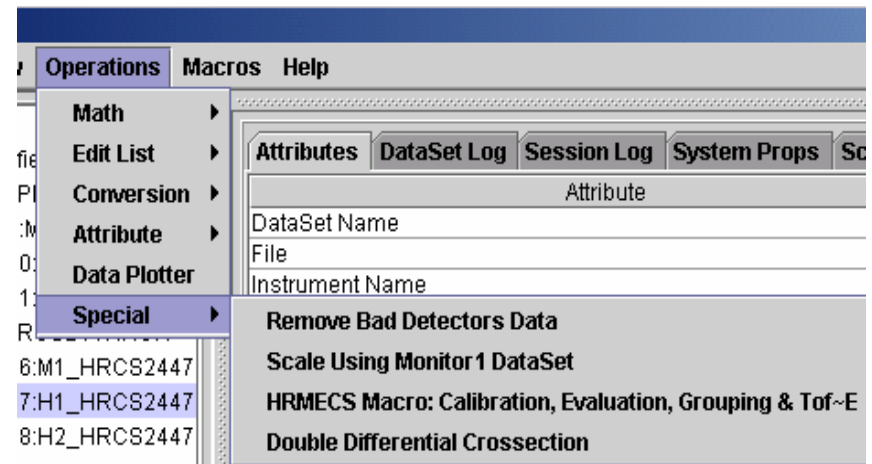


Load spectrometer data

- Use the ISAW GUI File menu to load file HRCS2447.RUN.
- Click on the push-pin icons to expand the tree view of the file, then select DataSet H1_HRCS2447.
- Compare the operations for this DataSet with the operations for DataSet H1_SEPD16837.

Spectrometer/Diffractometer operations

- The operations menu adjusts to the selected DataSet, so each DataSet has different operations.
- Note the difference in operations for spectrometer and diffractometer DataSets.



Load large DataSet

- Download GLAD6942.RUN from the "MoreSampleData" folder on the ISAW ftp site to the Data_Directory (Use the "Data_Directory" listed in properties file, IsawProps.dat).
- Use the file menu to load this file.
- Note that there are more than a thousand spectra in DataSet H1_GLAD6942.
- In Attributes for the groups, note that many of the groups (spectra) include data from a number of detector elements.

H1_GLAD6942 views

- Create an Image View of H1_GLAD6942.
- Create a 3D View of H1_GLAD6942
- Click on the title bar and drag the 3D view to uncover the Image View.
- Notice how the 3D view changes as you adjust the view controls.
- Notice how the VCR-like controls at the bottom allow you to step through time channels.

Image and 3D views

The screenshot displays the ISAW 1.4.1 software interface, which is used for analyzing detector data. It features several windows and panels:

- Top Left Window (20:H1_glad6942):** Shows a 2D image view of the detector data. The image is a color-coded plot with a vertical axis labeled 'ID_44' and a horizontal axis. The plot shows a series of horizontal bands with varying colors (blue, yellow, red) and some diagonal streaks.
- Top Right Window (20:H1_glad6942):** Shows a 3D view of the detector data. The data is represented as a curved, ring-like structure in a 3D coordinate system. The ring is color-coded similarly to the 2D view.
- Bottom Left Window (ISAW 1.4.1):** Shows the main software interface with a file tree on the left and a table of attributes in the center. The file tree shows a hierarchy of folders and files, with '20:H1_glad6942' selected. The table of attributes provides detailed information about the current data set.
- Bottom Right Window:** A terminal window showing a command prompt with various system paths and file names, including 'T:\System32\When;C:\Program Files\files\Hummingbird\Connectivity\7.1' and 'C:\MinGW\bin;./lib'.

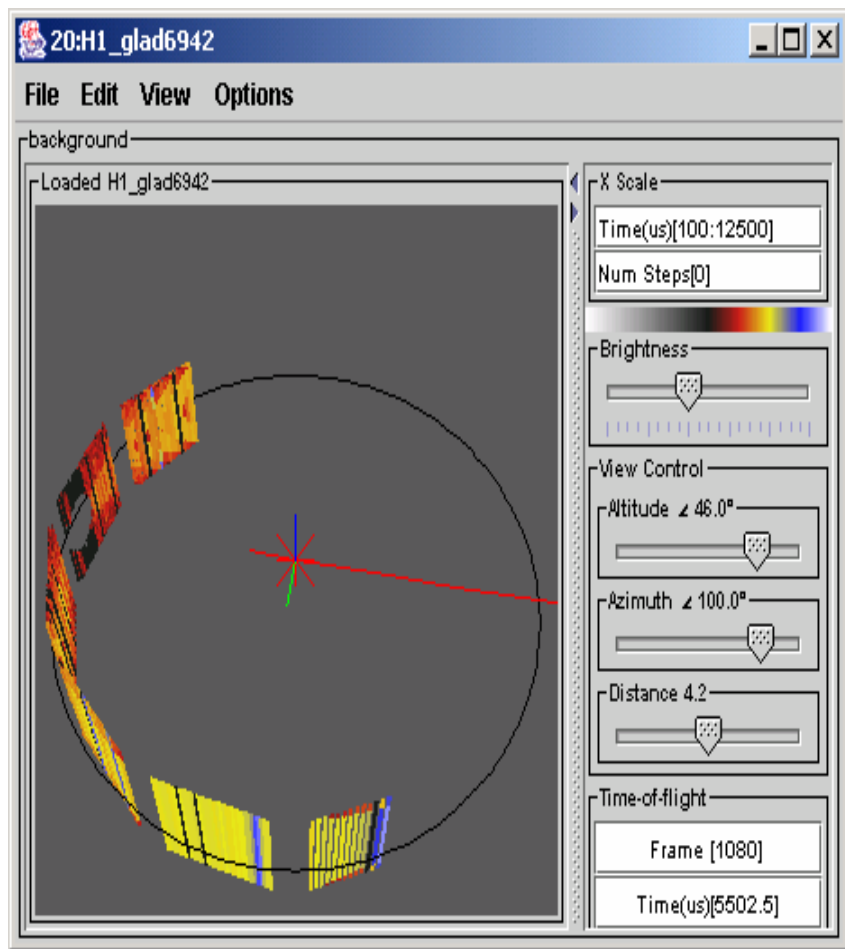
The table of attributes in the bottom left window is as follows:

Attribute	Value
Group ID	44
Run Number	6942
Detector IDs	1359:1394
Segment IDs	1359:1394
Initial Path	10.5
Effective Position	$2\theta=52.56; r=1.501, \varphi=52.48, z=0.09$
Omega	-18.758
Raw Detector Angle	52.484
$\Delta 2\theta$	0.968
Det Info List	Seg: 1359 Det: 1359(row, col) = (14, 1)2\theta...

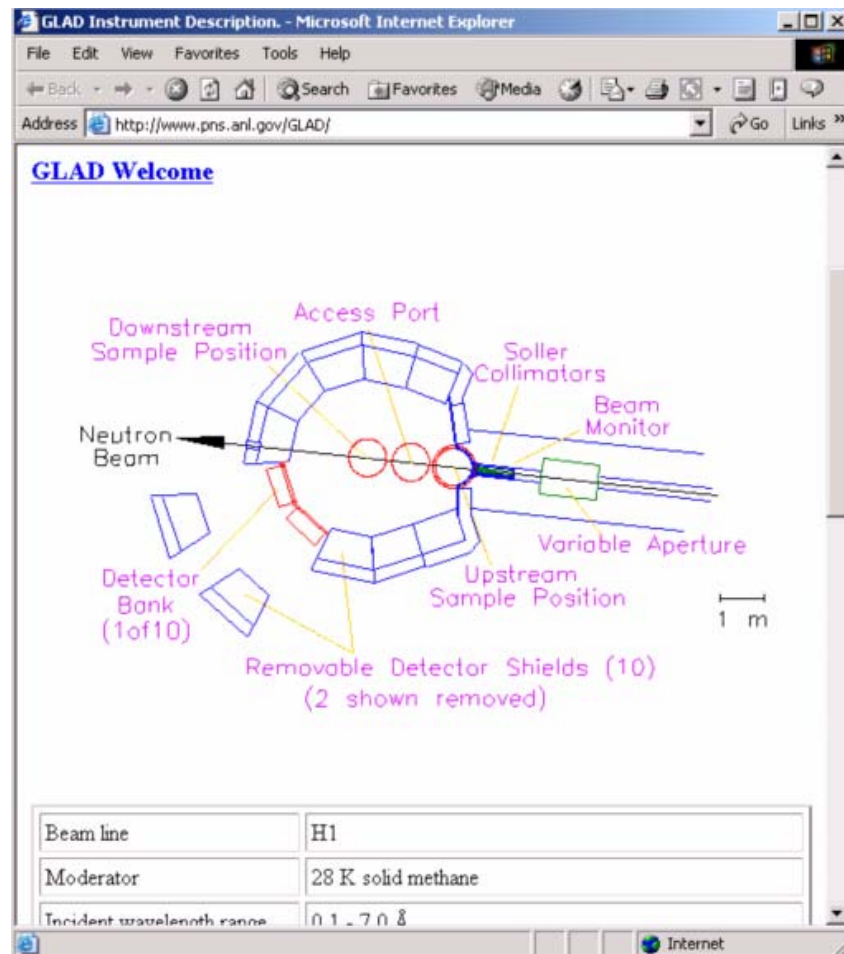
Test 3D View

- Drag the cursor over the Image view and notice the response on the cursor readout area, the 3D View, and the ISAW GUI Attributes display.
- Select "GLAD Link" from the "Instrument Info" submenu of the ISAW GUI "View" menu.
- On the 3D view, change the azimuthal angle to about -50 degrees and the altitude to about 45 degrees, then compare the instrument sketch with the 3D view.

GLAD 3D View and sketch



3D view of GLAD6942.RUN



Sketch of GLAD instrument

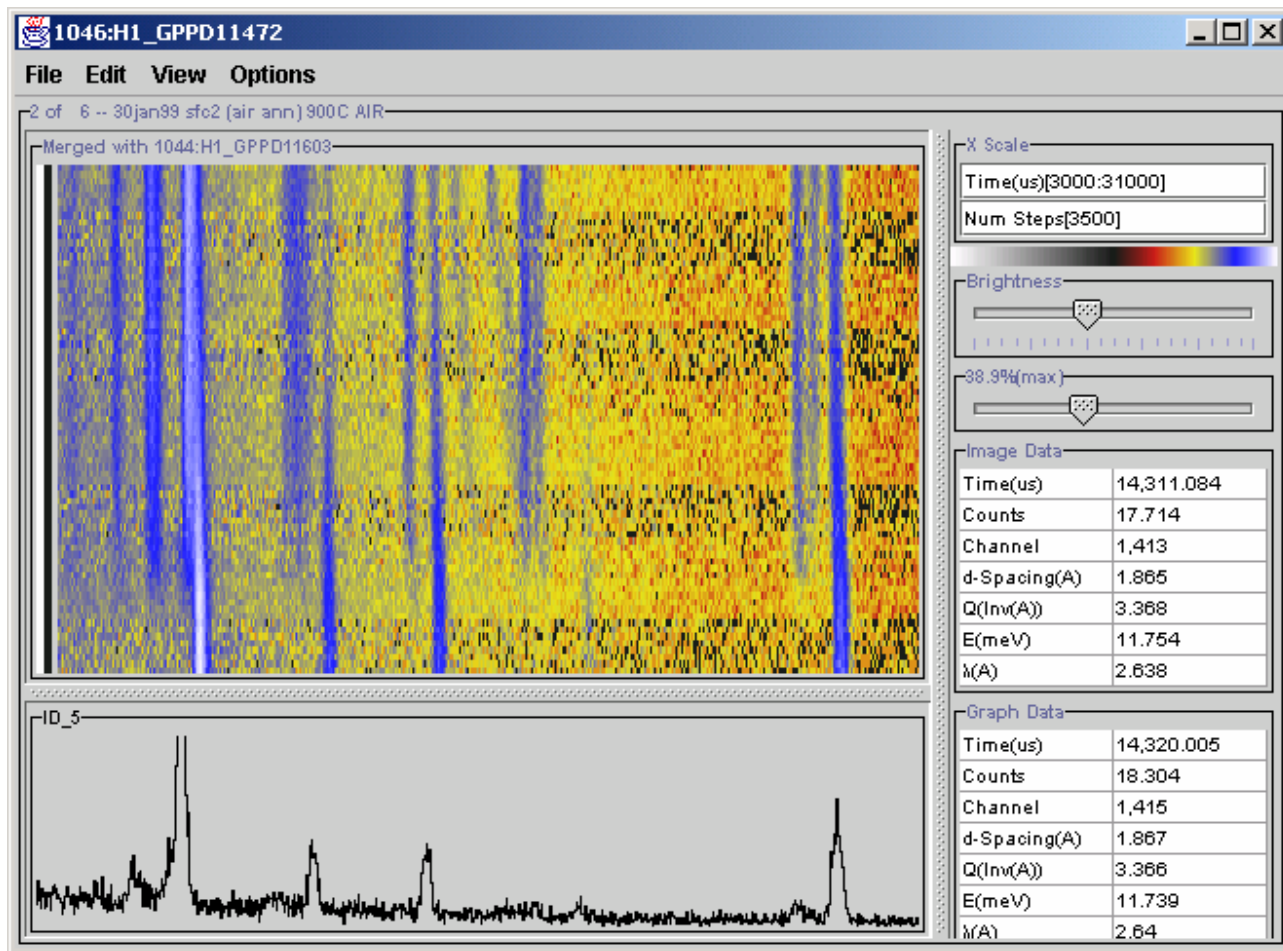
Scripts

- Scripts simplify repeating complex operations or operating on a large number of files.
- Download files: gppd11472:11603.run from the "MoreSampleData" folder at <ftp://zuul.pns.anl.gov/isaw/>
 - These files are a parametric study of one sample

Use a Script to merge files

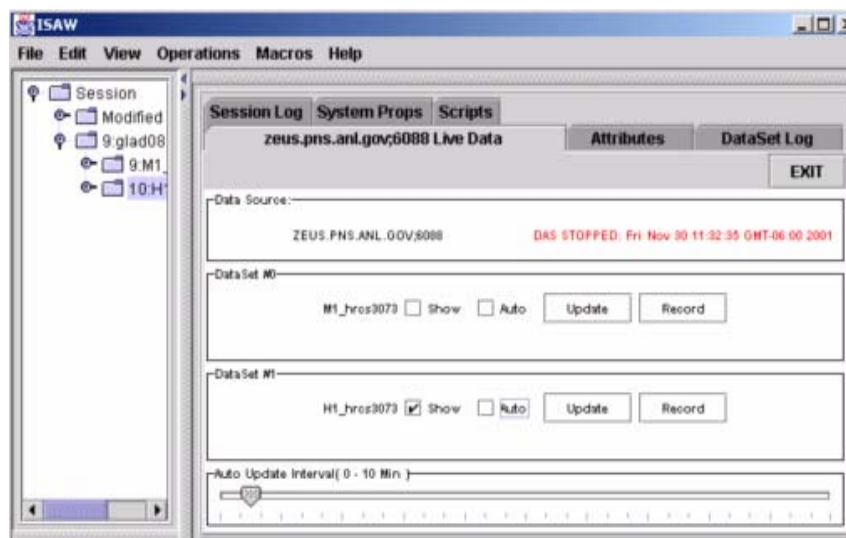
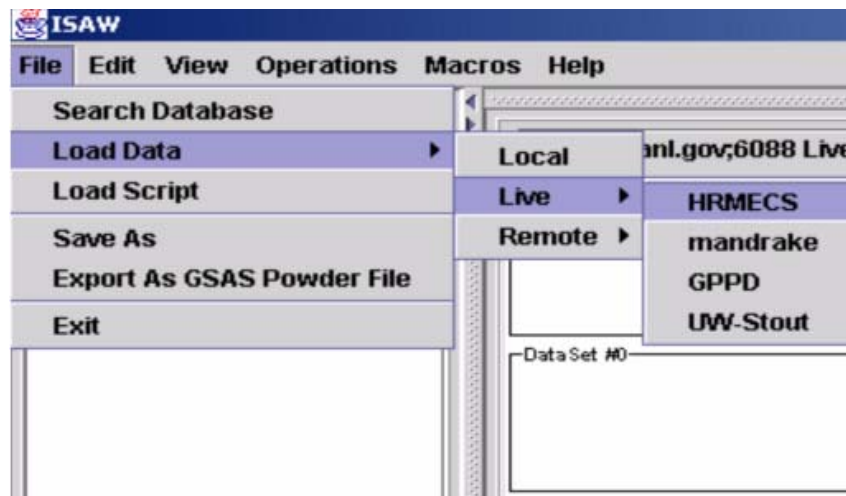
- Select the ISAW GUI "Scripts" tab.
- Select "Open Script" and open the "merge90_4" script.
- Select "Run Script" and enter 11472:11603 between the square brackets. Make sure "instrument" is "GPPD".
- ISAW should start loading 132 files (on Windows, watch the DOS window for load messages).
- When loading finishes, an image display showing one group (angle -95 to -85) from each run should appear.
- Select "EXIT" on the dialog box.
- Use the cursor to zoom in and examine the phase transition.

Image view of phase transition



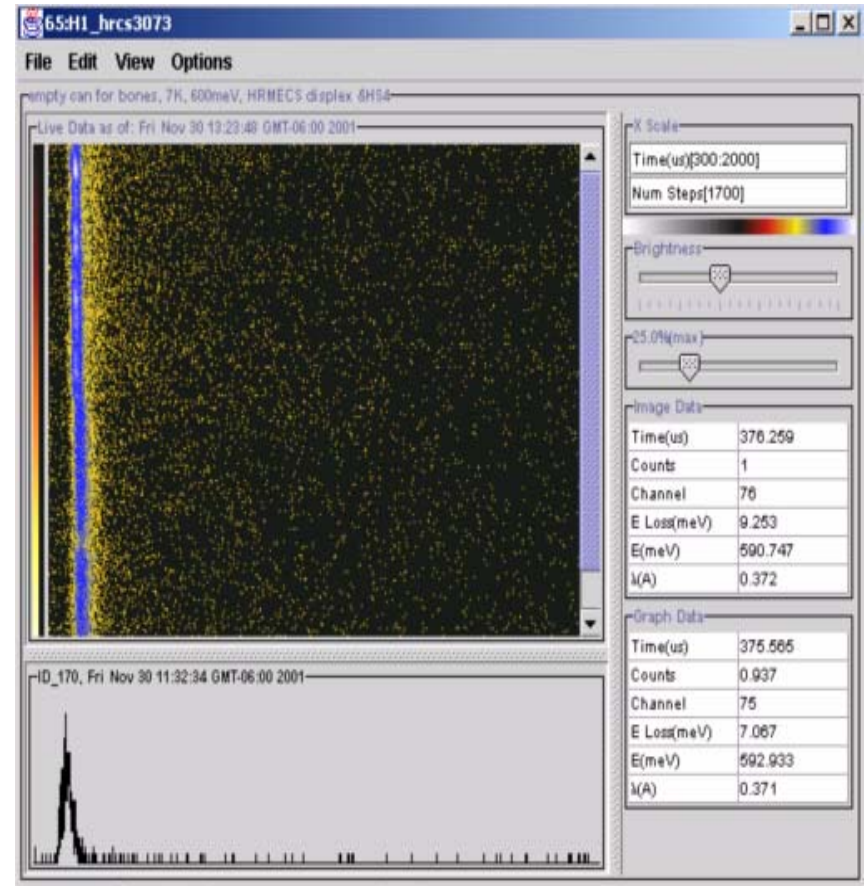
Connect to live data server

- From the ISAW menu bar, select File, Load Data, Live, HRMECS.
- Select the tab labeled "zeus.pns.anl.gov"
- Click the "Show" button on dataset #1.



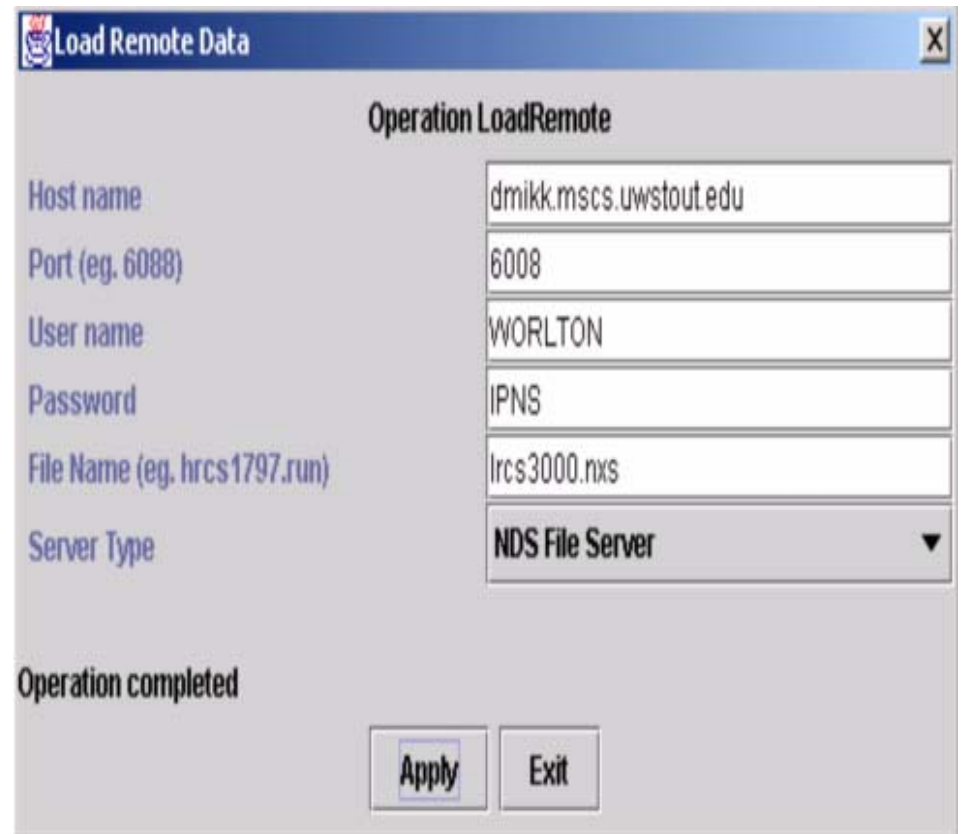
View Live Data

- When the show or auto buttons are clicked on the live data server panel, an image view is generated.
- To save the live data set in the tree, click "Record"

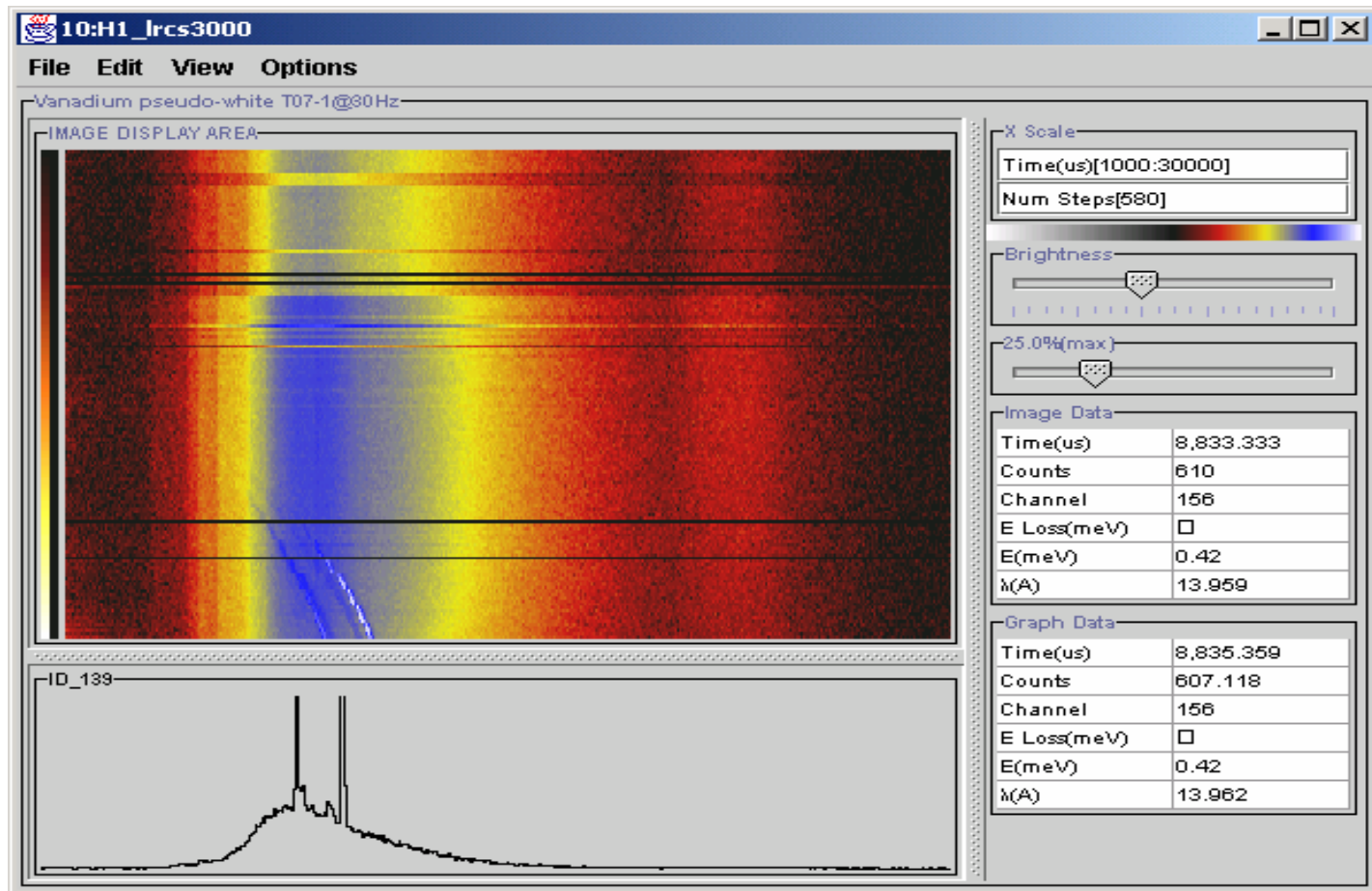


Load Remote NeXus File

- From the ISAW menu bar, select File, Load Data, Remote, Test(dmikk-Isaw)
- Enter file name lrcs3000.nxs.
- Wait for "Operation completed" message
- Exit "LoadRemote" Operation and view dataset H1_lrcs3000
- NeXus files can also be loaded through an NDS server, but this is much slower.



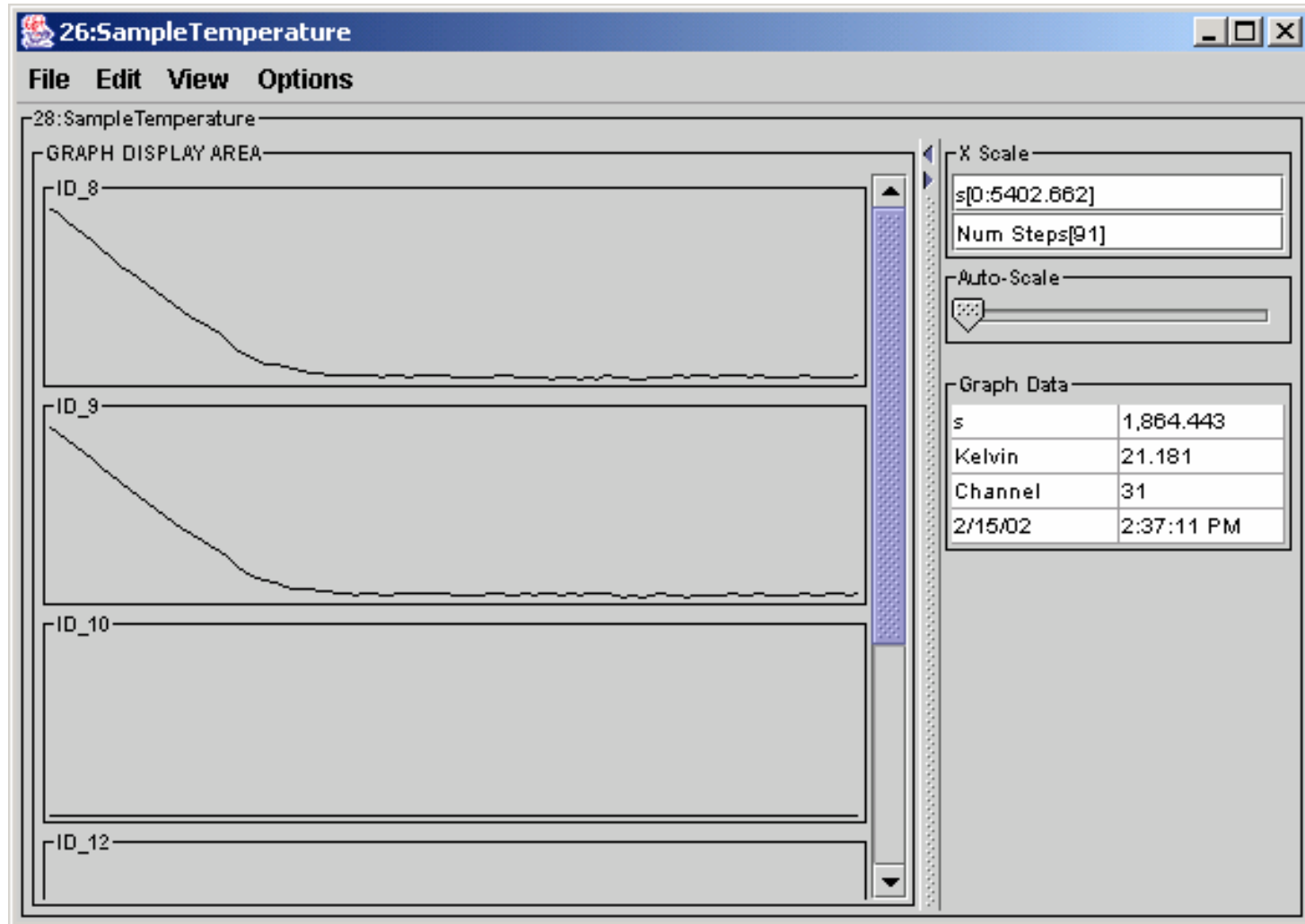
LRCS3000 from Remote NeXus File



View a Log File

- Load the file hrcs3118.sdds
 - (you will have to change the file filter in the file chooser to allow seeing sdds files)
- Expand the tree node for the file and select the sample temperature dataset
- Create an image view or scrolled graph view of the dataset
- Drag the cursor over the plot and notice the readout of temperature versus time

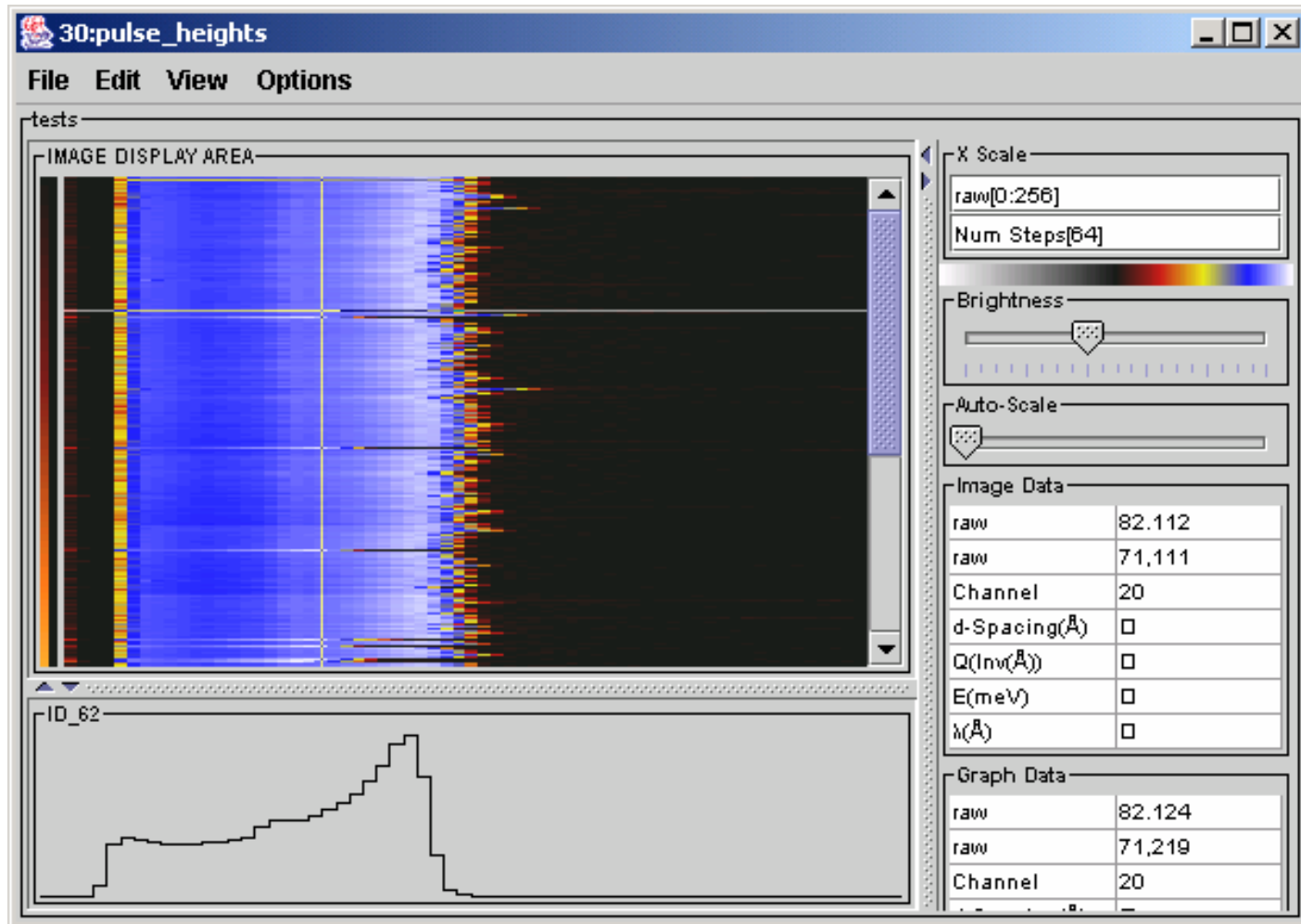
An IPNS temperature log file



View Pulse Height Spectra

- Load the file `new_smarts-o4.12.o2.nxs`
- Expand the tree view to show the datasets included in the file
- Click on the DataSet “pulse_heights”
- Create an image view of the specified dataset
- Notice the typical pulse height shape of the spectra
- Also notice that this is data from LANSCE!

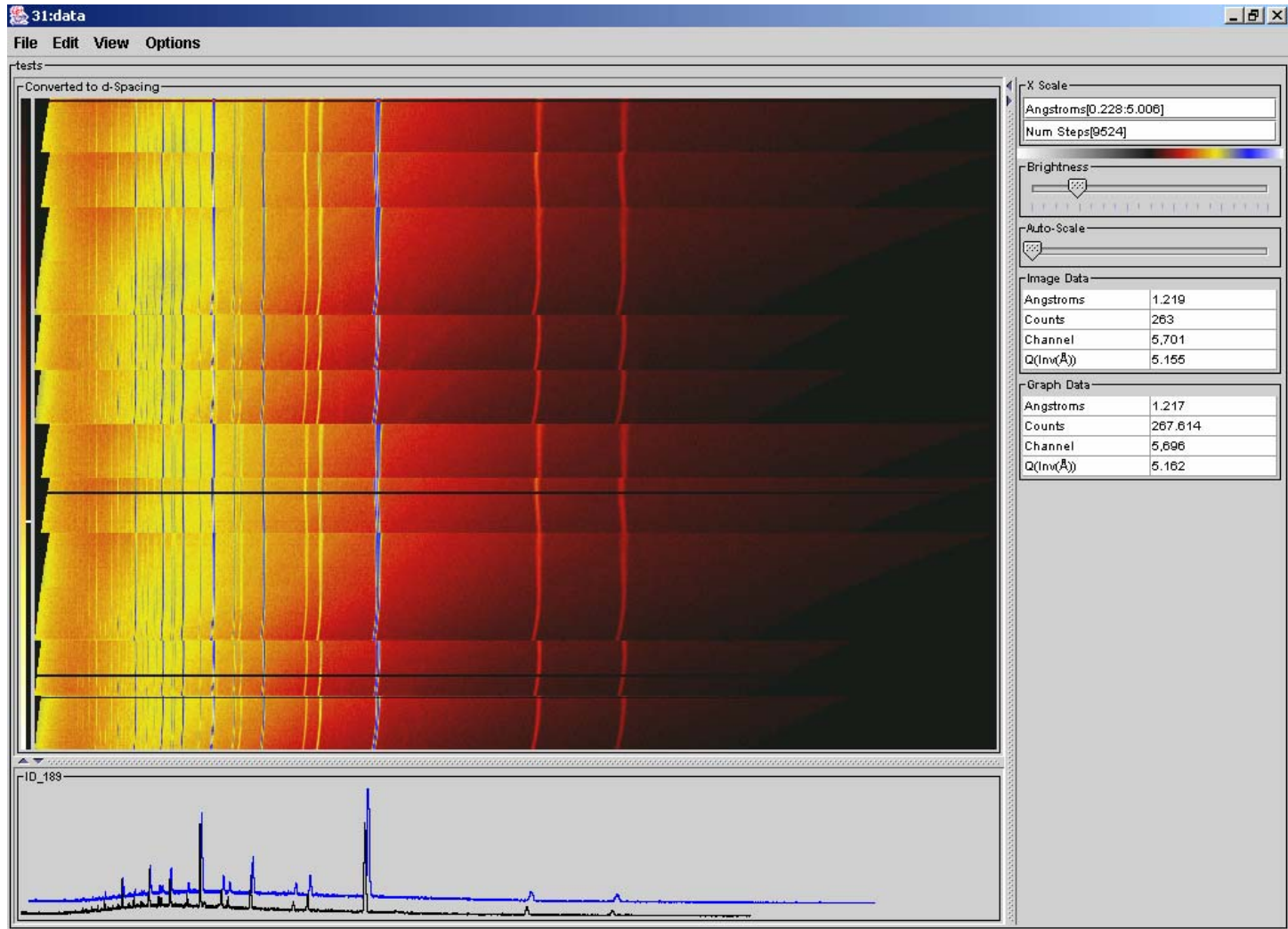
Pulse Height data from LANSCE



View LANSCE SMARTS Data

- Click on the “data” smarts DataSet
- Create an image view
- This is data from the SMARTS instrument at LANSCE (Los Alamos).
- Choose “View”, “Axis Conversions”, “d-value”
- By looking at all spectra you can see that the lines are curved--indicating a calibration problem, but this is their first data file in this format.

SMARTS Data



View Area Detector Data

- Load file SCD06530.RUN
- Select DataSet H1_SCD06530
- Create a Contour View
- Cursor interaction does not work the same way on this view as the other views
- Click on a point for cursor readout
- Dragging the cursor with the left button down selects a zoom region
- Shift plus click of the center mouse button unzooms
- Forward and backwards buttons step through time-slices either one at a time (>) or continuously (>>)

Area Detector View

