BT7 User Manual

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Chapter 1. Introduction

An autonomous instrument control server will mediate interactions of users with hardware, manage data acquisition, and sequence commands for execution. The server is run as an operating system service that can be accessed remotely to control the instrument. In order to address the combined issues of remote operation, measurement continuity, and operating system privileges, a client-server scheme was chosen.

The general design of ICE is divided in three main parts: the ICE server, the ICE client and the device abstraction layer, DALI.

The ICE server is responsible for orchestrating movements of the instrument and measurements. It uses DALI to interact with the devices.

DALI presents the ICE server with abstracted devices having common functionality. This allows ICE to use the same general DALI commands to interact with the hardware without having to know the details of the device drivers.

The ICE client presents the functionality of the ICE server to the user. Client programs incorporating experiment planning tools will be used to compose scans, issue instantaneous commands to be executed by the server, and provide the first layer of live status information. For example, the ICE server will be responsible for managing scan descriptions and executing them. The ICE client will be responsible for giving the user the tools that will allow him to give the ICE server the information that describes scans. Both client and server therefore have to manage scans at a very different level.

Chapter 2. ICE Client Installation

This document contains information on obtaining and running the most recent release version of the ICE client software.

ICE Client System Requirements

To run the Client, you must have Java 5 SE or later installed on your system. Java SE can be obtained from the Java SE download site [http://java.sun.com/javase/downloads/index.jsp]

Getting the ICE Client

The client can be downloaded at the following address: http://www-i.ncnr.nist.gov/proj/index.php?option=com_content&task=view&id=4&Itemid=90

Running the ICE Client

On many systems with Java installed, the client can be run simply by double-clicking the jar file.

To run the client from the command line, type java -jar <Client jar file name >

Chapter 3. ICE Installation/Configuration Document

Linux Installation Instructions

This explains the basics of installing ICE on a machine. One ICE has been installed their is a seperate configuration process which is explained later in the document. If a new version of ICE is installed on a machine which already has a configuration, the new version will use the previous configuration’s settings.

ICE can be configured to run on real hardware or to use fake simulated hardware.

Prerequisites :

- You must have a cvs account on charlotte.
- You must be able to access the super user account on your machine.

Notes:

- <version#> must be an integer > 0.

Actions :

- Open a linux terminal window
- At the command prompt type : mkdir newIceInstall
- Enter the new directory by typing : cd newIceInstall
- Login to the CVS server: cvs -d :pserver:<your user name>@(continued)

charlotte.ncnr.nist.gov:/var/local/cvsroot login

- Enter your cvs password at prompt.
- Checkout DALI from the CVS server :

cvs -d :pserver:<your user name>@(continued)

charlotte.ncnr.nist.gov:/var/local/cvsroot checkout dali

- Checkout ICE from the CVS server :

cvs -d :pserver:<your user name>@(continued)

charlotte.ncnr.nist.gov:/var/local/cvsroot checkout ice

- Copy the template make file to the newIceInstall directory : cp ice/Makefile_v1 ./ Makefile_v<version#>
- Edit Makefile_v<version#> using whatever text editor you like. Its contents look like this:

DALISRC = "dali"

ICESRC = "ice"

DALIVERSION=1

ICEVERSION=1

all: install

clean:

cd $(DALISRC); make clean

cd $(ICESRC); make clean

install:

cd $(DALISRC); make python "version=$(DALIVERSION)"

cd $(ICESRC); make service "version=$(ICEVERSION)"

uninstall:

cd $(ICESRC); make uninstall "version=$(ICEVERSION)"

test: install

cd $(ICESRC); make test

- Change the lines :

DALIVERSION=1

ICEVERSION=1

To :

DALIVERSION=<version#>

ICEVERSION=<version#>

- Become super user by typing the following command at the prompt: su
- Enter your super user password so that you can install the software.
- ICE can be configured to run on real hardware or to use fake simulated hardware. Real hardware installations will need to be configured by reading the configuration section. However, simulated installations can be setup automatically during the installation process. Follow one of the three steps below based on your goal for the ICE system :
  - Real server : make –f Makefile_v<version#>
  - Fake server : make –f Makefile_v<version#> test
  - Fake server with fake analyzer support : make –f Makefile_v<version#> testana

Configuration Instructions

The ICE server needs to be configured before it can run. ICE can either be configured as a test server, which mimics a triple axis system using simulated software motors or as a real instrument control server.

Actions :

- Edit newIceInstall/ice/config/instrument.xml using whatever text editor you like. Its contents look like this :

```
<?xml version="1.0"?>

<!DOCTYPE ICE SYSTEM "ice.dtd">

<ICE>

<Server>

<!-- Location of the Instrument block that contains device definitions -->

<InstrFile>instrument.xml</InstrFile>

<!-- Period of status messages -->

<StatusFreq>1.0</StatusFreq>

<!-- Default period of busy() polling when a device is busy -->

<SleepOnBusy>0.5</SleepOnBusy>

<!-- Default period for read() call on busy devices -->

<UpdateOnBusy>10000000</UpdateOnBusy>

<!-- The following two are obsolete -->

<ScanBckFlg>1</ScanBckFlg>

<Verbose>1</Verbose>

<!-- File containing the DALI definitions -->

<MWFile>bt7dev_test.xml</MWFile>

<!-- File containing the DALI env controller definitions -->

<EnvFile>envdef.xml</EnvFile>

<!-- Location of DALI device drivers -->

<MWLibDir>/usr/local/dali/lib/drivers</MWLibDir>

<!-- Use (1) xpeek server or not (0) -->

<XpeekServer>1</XpeekServer>

<!-- Name of instrument for xpeek data stream (is this send to JICE?) -->

<XpeekName>BT0</XpeekName>
```

<!-- File format name (obsolete)-->

<FileFormat>ICE</FileFormat>

<!-- New directory structure (1), otherwise 0 -->

<DirStruct>0</DirStruct>

<!-- Email address to which to send messages on errors -->

<DbgEmail>doucet@nist.gov</DbgEmail>

<!-- Should be 1 for JICE, 0 for old IDL or pre-JICE clients -->

<NewClient>1</NewClient>

<!-- Sets all DALI devices as dummy devices -->

<Dummy>1</Dummy>

</Instrument>

...

...

</ICE>

- • Copy the template configuration file (instrument.xml) into the working ICE directory (/usr/local/ice/ice_v<version#>):

cp ice/config/instrument.xml (continued)

/usr/local/ice/ice_v<version#>/instrument.xml

Execution Instructions

Prerequisites :

- You must have privileges to run the sudo command.

Actions :

- The most recently installed version of ICE may be started using the following command : sudo startice

- A specific version of ICE may be started with the command :

sudo startice <start version#>

- Ice may be stopped using the following command :

sudo stopice

Overall Installation

- Directory structure
  - Main_script
  - Ice (CVS checkout)
  - Dali (CVS checkout)
  - MessServer (CVS checkout) (now part of Ice)
- Script parameters
  - ICE and DALI version X
- Main script actions
  - Call ICE makefile with version=X as parameter
  - Call DALI makefile with version=X as parameter
  - Write the file:

/usr/local/ice/ice_vX/iceConf.py

with the content:

from pydali_vX import *

from MeasGeo_vX import *

from pycollision_vX import *

from IceFit_vX import *

def getPyCollisionVersion(): return "pycollision_vX"

def getIceFitVersion(): return "IceFit_vX"

def getDaliDir(): return "/usr/local/dali/lib_vY/drivers"

ICE Installation

- Directory structure
  - /usr/local/ice/etc
  - /usr/local/ice/data
  - /usr/local/ice/com
  - /usr/local/ice/log
  - /usr/local/ice/usr
  - /usr/local/ice/ice_vX

- Makefile actions:
  - Install /usr/local/ice/ice_vX
  - Install service “ice” in /etc/init.d
  - Write default version in /usr/local/ice/etc/ice.version
  - Install startice script in /usr/local/bin
  - Install python/site-packages/MeasGeo_vX
  - Install python/site-packages/IceFit_vX
  - Install python/site-packages/PyCollision_vX

ICE Running

- Use startice script with or without a version number:
  - Startice (runs latest; from /usr/local/etc/ice.config)
  - Startice ice X (runs version X)
- ICE will import pydali_vX (from iceConf.py)
- Same thing for MeasGeo_vX
- Same thing for IceFit_vX
- ICE will get libraries from /usr/local/dali/lib_vX/drivers (from iceConf.py)

DALI Installation

- Directory structure
  - /usr/local/dali/lib_vX
- Makefile actions
  - Install /usr/local/dali/lib_vX
  - Install python/site-packages/pydali_vX

Chapter 4. Application Help

The following document contains application help topics. An application help topic provides a description of the components used within a panel or window.

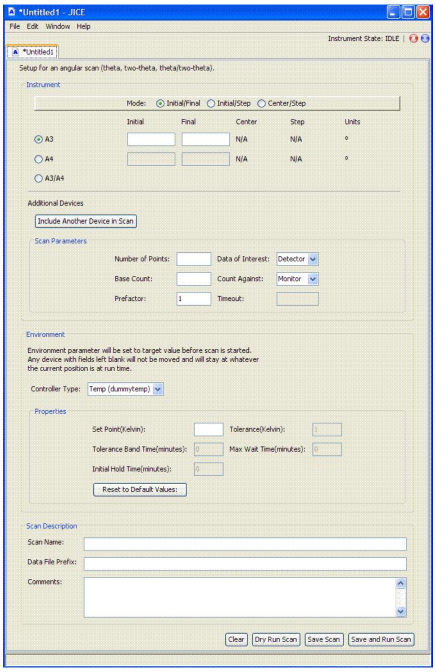
Angle Scan Panel

Introduction

The Angle Scan panel allows a user to scan A3 and/or A4.

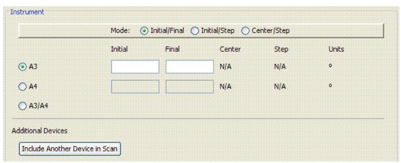
Basic description of functionality

The Angle Scan panel allows a user to define whether A3, A4, or both A3 and A4 devices have to be driven as a part of the scan. For each device the user can set the initial position, step size, center and final destination parameters. The user can include additional devices in the scan.



Components of the Angle Scan Panel

1. **Instrument**



- Mode

  The user may choose between Initial/Final, Initial/Step or Center/Step modes of devices. Each mode requires the user to enter two values. Based on the entered values and a value for the number of points, the other two values for the associated device are calculated and displayed automatically. The default mode is Initial/Final.

  - Given values for the Initial and Final positions, value of the Center position is set at the half distance between Initial and Final. Step is calculated as the difference between Final and Initial positions divided by the number of scan points.

  - Given values for the Initial position and Step, the value for the Final position is set to the Initial position plus Step multiplied by the number of points. The Center is set to the Initial position plus half of Step multiplied by the number of points.

  - Given values for the Center position and Step, the Initial position is set to the Center minus half of the Step multiplied by the number of points. Final position is set to the Center plus half of the Step multiplied by the number of points.

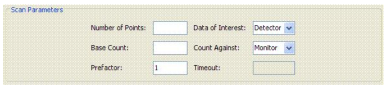
- A3, A4, or A3/A4

  This field allows the user to select whether to define an angle scan in terms of A3, A4, or both A3 and A4. The user checks a radio button for a device which includes it in the scan and enables its associated text fields. The user is required to specify the desired range for chosen devices. The device values have to be numeric.

- Include device

  The user may choose to include another device in a scan by clicking Include Another Device button. Scan panel adds an additional device row. The user has to select the name from the drop down menu and specify the range of the desired device in the mode which was chosen at the previous step. Entered device values have to be numeric. The user may choose to remove the additional device row completely via the corresponding remove button. (Optional)

2. Scan Parameters



- Number of points

  This field specifies the number of points in the angle scan. The entered value has to be a positive integer.

- Base Count

  This field defines the base count parameter of the angle scan. At each point of the scan, the system will count for Base Count multiplied by Prefactor. The entered value has to be a positive integer. The default values is 1.

- Prefactor

  This field defines the prefactor parameter of the angle scan. At each point of the scan, the system will count for Base Count multiplied by Prefactor. The entered value has to be a positive integer. The default value of Prefactor is 1.

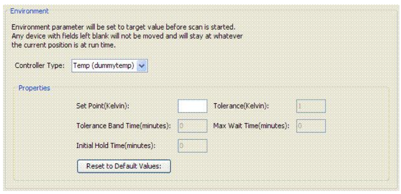
- Data of Interest

  The user selects Detector or Monitor as data of interest to be recorded when run scan is performed.

- Count Against

  The user can choose between Monitor or Time as the device for which Base Count multiplied by Prefactor counts are measured.

3. Environment



- Controller type

  All environment control devices installed on the server will be listed in the drop down menu. The user may choose a controller to be set during scan. Depending on the selected type of the environment controller, different set of input fields will be added to the environment subpanel. (Optional)

- Temperature Controller

  This device has the following parameters that the user is required to enter.

  - Set Point

    Specifies the temperature value which will be set before the scan begins.

  - Tolerance

    Specifies the acceptable tolerance interval around the Set Point for temperature controller.

  - Tolerance Band Time

    Specifies how long (in minutes) the temperature must be continuously within tolerance of the Set Point, before the temperature is considered to have reached the Set Point.

  - Max Wait Time

    Specifies the maximum time (in minutes) that the system will attempt to reach the Set Point. If it does not reach the Set Point within this timeout, the system will issue a warning message to the user and proceed with a scan. For example, if Max Wait Time set to 0, the system will give up attempting to reach the Set Point immediately and proceed with the scan.

  - Initial Hold Time

    Specifies the delay (in minutes) between reaching the Set Point and beginning of the scan. If Max Wait Time has elapsed, the system will still hold for the specified number of minutes before proceeding with the scan. This time should to be sufficient for the whole sample to reach equilibrium.

- Magnet Controller

  - Set Point

    Specifies the magnet value which will be set before the scan begins.

  - Tolerance

    Specifies the acceptable tolerance interval around the Set Point for magnet controller.

  - Initial Hold Time

Specifies the delay (in minutes) between reaching the Set Point and beginning of the scan. This time should to be sufficient for the whole sample to reach equilibrium.

4. **Scan Description**

- Scan name

  This field gives the name the scan.

- Data file prefix

  In this field the user may enter data file prefix. This string will be added to the each data file name. (Optional)

- Comments

  The user may add comments to the angle scan. (Optional)

5. **Controls**

- Clear

  Clicking this button sets all text fields to their default values. Drop down combo boxes are not changed.

- Dry Run

  By clicking this button, the user sends a command to dry run the scan. The server calculates positions of devices for each point of the scan and sends the user a summary of device positions. After dry run is complete, the server deletes the scan description from memory.

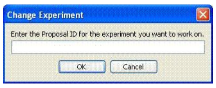
- Save

  By clicking Save, the user sends a command to the server to save the scan definition. The server saves the scan in the data storage.

- Save and Run

  On this command, the server saves the entered scan and executes it. For each point in the scan, the server moves all scanning devices to the specified position and performs a count. After executing the scan, the server sends the user a summary of device positions and counts. Refer to Scan description for further details.

Change Experiment



Introduction

The Change Experiment Panel is for administrators to start a new experiment with a given experiment id number. This id number would override the id number provided by ICE.

Description

Proposal ID

1. The purpose of the proposal ID is to associate an id number with a new experiment. A text field is used to enter the proposal id. This value must be a positive number.

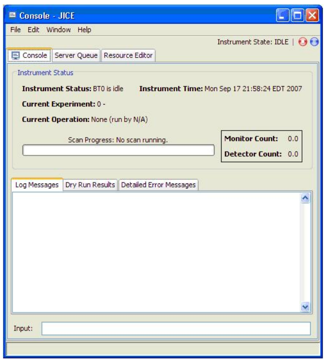
Ok

1. Selecting the "Ok" button allows administrators to start a new experiment with the given value entered for the proposal id. A directory is also creted for all of the experiments files. The Experiment Configuration(Sample Environment [ApplicationHelpSampleEnvironmentPanel.html], Experiment Details [ApplicationHelpExperimentDetailsPanel.html], Device Details [ApplicationHelpDeviceDetailsPanel.html]) window will appear automatically.

Cancel

1. The "Cancel" button closes the Change Experiment Panel with no changes to the proposal id.

Console Panel



Introduction

The Console panel allows you to directly interact with the server by typing commands and directly viewing the server's responses.

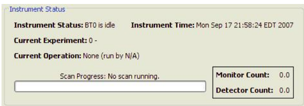
Description

The console panel gives a summary of the instrument status at the top, text display of server communications in the middle of the panel, and an Input box to send commands directly to the server at the bottom.

Text in the tabs can be copied and pasted into the Input box using key commands (Ctrl-C for copyl Ctrl-V for paste).

Components of the Console Panel

1. **Instrument Status.** This section lists key aspects of the state of the instrument.



- **Instrument Status.** Gives the name of the instrument and its current status.
- **Current Experiment.** Gives the number set for the current experiment.
- **Current Operation.** Gives the operation currently being run by the server.
- **Instrument Time.** Gives the current value for server time.
- **Scan Progress.** If a scan is being run, this status bar gives the progress. Otherwise, it will have a message indicating that there is no scan running.
- **Counters.** Gives the current values of the Monitor and Detector counters.

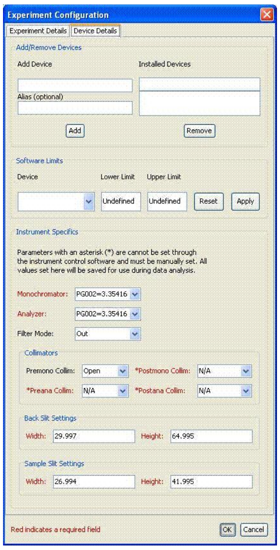
2. **Server Communications.** A tabbed display gives access to the three types of server communication which can be monitored in this panel. When a new message arrives in one of the tabs which is not active, its text will turn red to indicate that there is new information available.

- **Log Messages.** This tab shows the commands sent to the server and responses from the server.

- **Dry Run Results.** This tab shows the information sent from the server describing a dry run of a scan.
- **Detailed Error Messages.** This tab shows the error messages send by the server.

3. **Server Commands.** Send commands to the server by typing them into the Input box and hitting ENTER.

Device Details Panel



Introduction

The Device Details Panel is located within the Experiment Configuration Window. This panel is one of the 3 tabs composing the Experiment Configuration Window. The Add/Remove Devices sub-panel allows users to add and remove devices. The Software Limits sub-panel allows users to set the lower and upper limits of devices. The Instrument Specifics panel allows users to set the properties of the instrument.

Description

Add/Remove Devices

1. The add device text field is used to enter the device name.
2. The alias text field is used to enter the alias name for the device you want to add.
3. Clicking the add button, the system adds the device and it's alias to the system.
4. The installed devices text field is used to enter the name of the device you want to remove.
5. The installed devices text area is used to display the devices currently on the system.
6. Clicking the remove button, the selected device is removed from system.

Software Limits

1. The device drop down menu allows users to select a device. When a device is selected the lower and upper limits values are displayed.
2. The lower limit text field is used to change the lower limit value for the selected device.
3. The upper limit text field is used to change the upper limit value for the selected device.
4. Clicking the reset button changes the upper and lower limit textfields back to the current limits.

5. Clicking the apply button sets the upper and lower limits of the selected device to the values in the field.

Instrument Specifics

1. The monochromator drop down menu allows users to select the monochromator of the instrument. This is a required field.
2. The Analyzer drop down menu allows users to select the analyzer of the instrument. This is a required field.
3. The filter mode drop down menu allows users to select whether the instrument is filtered in or out. The filter mode is represented as a device. When a user selects in, the device is moved to the in state and filters neutrons.
4. The premonochromator collimator drop down menu allows users to select the time it takes to adjust the premonochromator collimator.
5. The postmonochromator collimator drop down menu allows users to select the time it takes to adjust the postmonochromator collimator. This is a required field.
6. The preanalyzer collimator drop down menu allows users to select the time it takes to adjust the preanalyzer collimator. This is a required field.
7. The postanalyzer collimator drop down menu allows users to select the time it takes to adjust the postanalyzer collimator. This is a required field.
8. The back slit width text field allows users to enter a value to set the back slit width of the instrument. This is a required field.
9. The back slit height text field allows users to enter a value to set the back slit height of the instrument. This is a required field.
10. The sample slit width text field allows users to enter a value to set the sample slit width of the instrument. This is a required field.
11. The sample slit height text field allows users to enter a value to set the back slit height of the instrument. This is a required field.

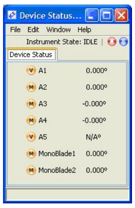
OK

1. The OK button saves any changes made to the device details panel and exits the experiment configuration window.

Cancel

1. The Cancel button does not save any changes made to the device details panel and exits the experiment configuration window.

Device Status Panel



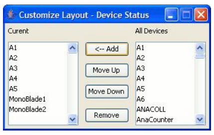
Introduction

The Device Status panel allows a user to directly view the values associated with devices on an instrument.

Description

Panel Columns

- **Device Icons.** : Icons representing devices are generally a letter inside a colored circle. The letter represents the type of the device and the color represents the status of the device.
  - **M.** Motor
  - **V.** Virtual Device – these are non-physical devices which may map to values on multiple other devices. Moving a virtual device will usually also move one or more other devices.
  - **S.**
  - **?**
  - **Green Circle.** The device is currently moving
  - **Orange Circle.** The device is not currently moving
- **Device Name.** Name of device.
- **Current Position.** The last reported position of the device.
- **Customizing the Device Status Panel.**

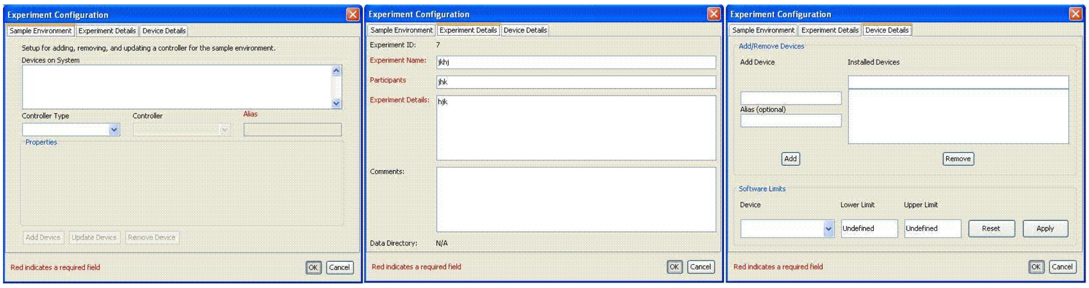
  The instruments shown in the device status panel can be customized using the Edit->Customize menu option, which will bring up the Customized Layout window, as shown above.

  The list on the left is the list of devices shown in the Device Status Window. This list on the right is the list of all devices on the instrument. Multiple items can be selected in either list by holding down the Control key while selecting.

  - **Adding Devices.** To add devices to the Device Status Window, select devices to be added from the list on the right, labeled "All Devices." Click the Add button to add them to the "Current" list, which is the list of devices which will be displayed.

- **Removing Devices.** To remove devices from the Device Status Window, select those devices which you wish to remove from the "Current" list on the left. Click the Remove button to remove them from the list
- **Changing the order of Devices.** To move a device up or down in the list of displayed devices, click the item and click the "Move Up" or "Move Down" buttons to move it up or down in the list, respectively.

Experiment Configuration Window Panel



Introduction

The Experiment Configuration Window contains the Experiment Details, Device Details, and Sample Environment panel. The Sample Environment panel is used to add, remove, and update environment devices to the system. The Experiment Details panel is used to configure the experiment information. The Device Details panel is used to add and remove device, define software limits for devices, and define instrument specifics.

Description

Sample Environment

1. Sample Environment [ApplicationHelpSampleEnvironmentPanel.html]

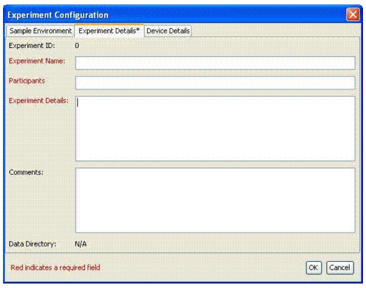
Experiment Details

1. Experiment Details [ApplicationHelpExperimentDetailsPanel.html]

Device Details

1. Device Details [ApplicationHelpDeviceDetailsPanel.html]

Experiment Details Panel



Introduction

The Experiment Details Panel is located within the Experiment Configuration Window. This panel is one of the 3 tabs composing the Experiment Configuration Window. This panel allows users to define the name, participants, details, and comments of an experiment. These items are initially clear when ICE is started and must be defined before an experiment can start.

Description

Experiment Name

1. The Experiment Name text field is used to enter an experiment name to associate the current experiment with. This is a required field.

Participants

1. The Participants text field is used to enter the names of participants the current experiment will have. This is a required field.

Experiment Details

1. The Experiment Details text area is used to enter the details of the current experiment. This is a required field.

Comments

1. The Comments text area is used to enter any additional information for the current experiment.

OK

1. The OK button saves any changes made to the experiment details panel and exits the experiment configuration window.

Cancel

1. The Cancel button does not save any changes made to the experiment details panel and exits the experiment configuration window.

Instrument Selection Panel

Introduction

The instrument selection panel is presented to the user at application startup and allows the user to select which instrument the ICE client will connect to.

Description

Select an Instrument

1. The Instrument drop down menu lists instruments the user can connect to.

Ok

1. Clicking the "Ok" button connects to the instrument selected in the drop down menu.

Cancel

1. The "Cancel" button closes the Instrument Selection Panel and exits the program.

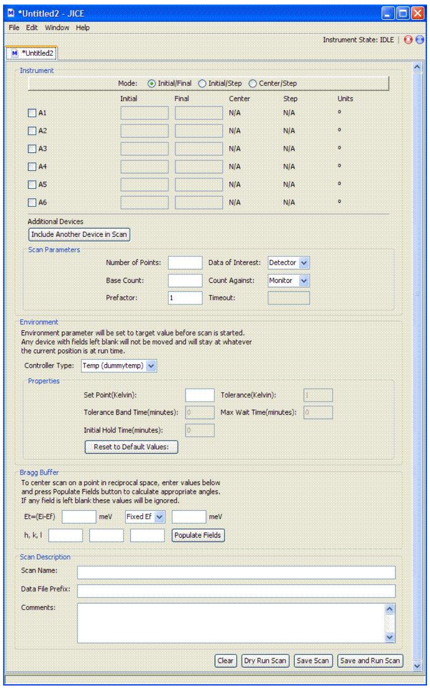
Motor Scan Panel

Introduction

The Motor Scan panel allows a user to scan arbitrary set of devices.

Basic description of functionality

The Motor Scan panel allows a user to define a group of devices to be driven as a part of the scan. For each device the user can set the initial position, step size, center and final destination parameters.



Components of the Motor Scan Panel

1. **Instrument**

- Mode

  The user may choose between Initial/Final, Initial/Step or Center/Step modes of devices. Each mode requires the user to enter two values. Based on the entered values and a value for the number of points, the other two values for the associated device are calculated and displayed automatically. The default mode is Initial/Final.

  - Given values for the Initial and Final positions, value of the Center position is set at the half distance between Initial and Final. Step is calculated as the difference between Final and Initial positions divided by the number of scan points.

  - Given values for the Initial position and Step, the value for the Final position is set to the Initial position plus Step multiplied by the number of points. The Center is set to the Initial position plus half of Step multiplied by the number of points.

  - Given values for the Center position and Step, the Initial position is set to the Center minus half of the Step multiplied by the number of points. Final position is set to the Center plus half of the Step multiplied by the number of points.

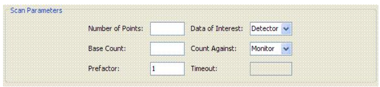
- Select device

  This field allows the user to select which of the A1, A2, A3, A4, A5, and A6 motors to include in the motor scan. The user checks a checkbox for a device which includes it in the scan and enables its associated text fields. The user is then required to enter numeric values into initial, final, center, or step fields of the motor.

- Include device

  The user may choose to include another device in a scan by clicking Include Another Device button. Scan panel adds an additional device row. The user has to select the name from the drop down menu and specify the range of the desired device in the mode which was chosen at the previous step. Entered device values have to be numeric. The user may choose to remove the additional device row completely via the corresponding remove button. (Optional)

2. Scan Parameters



- Number of points

  This field specifies the number of points in the motor scan. The entered value has to be a positive integer.

- Base Count

  This field defines the base count parameter of the motor scan. At each point of the scan, the system will count for Base Count multiplied by Prefactor. The entered value has to be a positive integer. The default values is 1.

- Prefactor

  This field defines the prefactor parameter of the motor scan. At each point of the scan, the system will count for Base Count multiplied by Prefactor. The entered value has to be a positive integer. The default value of Prefactor is 1.

- Data of Interest

  The user selects Detector or Monitor as data of interest to be recorded when run scan is performed.

- Count Against

  The user can choose between Monitor or Time as the device for which Base Count multiplied by Prefactor counts are measured.

3. Environment

- Controller type

  All environment control devices installed on the server will be listed in the drop down menu. The user may choose a controller to be set during scan. Depending on the selected type of the environment controller, different set of input fields will be added to the environment subpanel. (Optional)

- Temperature Controller

  This device has the following parameters that the user is required to enter.

  - Set Point

    Specifies the temperature value which will be set before the scan begins.

  - Tolerance

    Specifies the acceptable tolerance interval around the Set Point for temperature controller.

  - Tolerance Band Time

    Specifies how long (in minutes) the temperature must be continuously within tolerance of the Set Point, before the temperature is considered to have reached the Set Point.

  - Max Wait Time

    Specifies the maximum time (in minutes) that the system will attempt to reach the Set Point. If it does not reach the Set Point within this timeout, the system will issue a warning message to the user and proceed with a scan. For example, if Max Wait Time set to 0, the system will give up attempting to reach the Set Point immediately and proceed with the scan.

  - Initial Hold Time

    Specifies the delay (in minutes) between reaching the Set Point and beginning of the scan. If Max Wait Time has elapsed, the system will still hold for the specified number of minutes before proceeding with the scan. This time should to be sufficient for the whole sample to reach equilibrium.

- Magnet Controller

  - Set Point

    Specifies the magnet value which will be set before the scan begins.

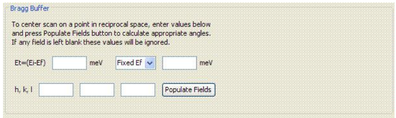
  - Tolerance

    Specifies the acceptable tolerance interval around the Set Point for magnet controller.

  - Initial Hold Time

Specifies the delay (in minutes) between reaching the Set Point and beginning of the scan. This time should to be sufficient for the whole sample to reach equilibrium.

4. Bragg Buffer



The Bragg Buffer subpanel allows the user to define a starting point of the scan in terms of hkl and energy. The panel automates the mapping of the input hkl and energy values into A1-A6 values.

- Et=(Ei-Ef)

  The user enters energy transfer which is the difference between initial and final energy.

- Fixed Ef or Fixed Ei

  The user selects which energy (initial or final) is fixed and inputs the energy value in meV units in the associated text field.

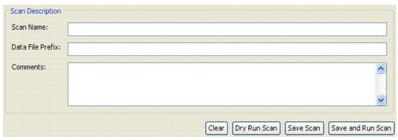
- h, k, l

  The user specifies hkl point.

- Populate fields

  By clicking this button, the user will populate the first field (initial or center, depending on the scan mode) for A1-A6 with values that correspond to the hkl and energy point specified. The user might choose to change these values afterwards. However when doing so, values for hkl and energy transfer have to be cleared from Bragg Buffer subpanel.

5. Scan Description



- Scan name

  This field gives the name the scan.

- Data file prefix

  In this field the user may enter data file prefix. This string will be added to the each data file name. (Optional)

- Comments

  The user may add comments to the motor scan. (Optional)

6. Controls

- Clear

  Clicking this button sets all text fields to their default values. Drop down combo boxes are not changed.

- Dry Run

  By clicking this button, the user sends a command to dry run the scan. The server calculates positions of devices for each point of the scan and sends the user a summary of device positions. After dry run is complete, the server deletes the scan description from memory.

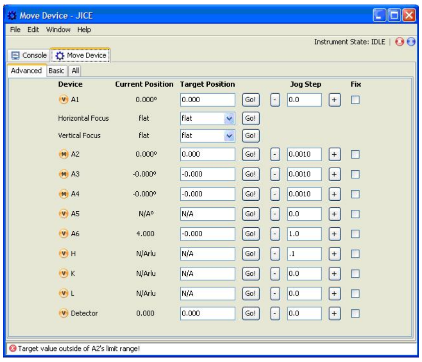
- Save

  By clicking Save, the user sends a command to the server to save the scan definition. The server saves the scan in the data storage.

- Save and Run

  On this command, the server saves the entered scan and executes it. For each point in the scan, the server moves all scanning devices to the specified position and performs a count. After executing the scan, the server sends the user a summary of device positions and counts. Refer to Scan description for further details.

Move Device Panel



Introduction

The “Move Device” panel allows a user to directly view and control device values on an instrument.

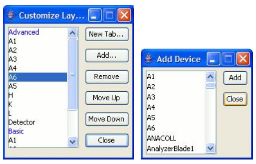
Description

Panel Components

- **View Tabs.** These tabs, located at the top of the panel, allow the user to view only a specific subset of devices on the system. There are 3 standard tabs; Advanced, Basic, and All. Each has its own set of default instruments. The user can edit which instruments are set for each tab, and add additional tabs.

Customizing Tabs

The tabs in the Move Device Panel can be customized using the Customized Layout window, which can be loaded by choosing Edit->Customize. The window is shown below on the left. Note that the tab names are in blue and the devices which appear on a tab appear below the tab name in black.



- **Adding Devices to tabs.** Devices can be added by clicking the item above where the new item is to be placed and clicking the "Add..." button. The Add Device window will appear. The Add Device window is shown above on the right. The list in the Add device window contains all devices which may be added. Select all devices to be added. Multiple devices can be selected by hoding the "Control" while selecting. Click "add" to add the devices, and click "Close" to close the add device window.

- **Adding Tabs.** Tabs are added by clicking the "New Tab" button. When the button is clicked, the user will be asked to provide a name for the new tab. That name will then appear at the bottom of the list and as a tab in the Move Device Panel.

- **Removing Tabs and Devices.** To remove tabs or devices, select those tabs or devices to be removed. Multiple tabs or devices can be selected by holding the "Control" key while selecting. Click the remove button to remove the selected tabs and devices. Devices which are included in a tab which is removed will also be removed. Devices and tabs cannot be removed at the same time. If both devices and tabs are selected, the Remove button will be disabled.

- **Reordering Devices within tabs.** Devices can be moved up or down within a tab by selecting the device and clicking "Move Up" or "Move Down" on the Customize Layout Window. Multiple devices can be selected by holding down the "Control" key while selecting. All selected devices will be moved up or down one position when Move Up or Move Down are clicked, respectively.

Standard Tabs

- **Advanced.** This option shows only the most commonly used devices and virtual devices on the instrument.
- **Basic.** This options shows only the most commonly used devices on the instrument.
- **All.** This option shows all devices on the instrument.

- **Manipulating Devices.** The device status is given in rows, with each row representing a device. The columns represent properties of the device and allow manipulation of those properties. The following actions may be performed on devices:
  - **Setting position.** To move a device to a certain value or position, set the target position control for that device and hit the Go! Button to send a command to the instrument to move the device to the target position.

    After you hit Go! And the instrument becomes idle, you should see the current position match the target position you set. If not, check the bottom of the Move Device panel to see if an error has shown up.
  - **Jogging.** Moving a device position in small increments is called jogging the device. The amount of movement for a jog is set using the Jog Step textboxes. After the Jog Step is set, pressing the “+” or “–“ buttons on either side of the Jog Step textbox will move the instrument by the amount set in the jog step in the positive or negative direction, respectively.

    You can see the results of jogging in the Current Position reading for the device.

    For instruments where jogging does not make sense, the jogging controls will be removed.
  - **Fixing position.** Selecting this checkbox will mean that the device to which it corresponds will not be moved during scans. The device can still be moved directly by setting position, Jogging, or moving a virtual device which contains it.
- **Information Columns for Devices.** The device status is given in rows, with each row representing a device. The columns represent properties of the device and allow manipulation of those properties.
  - **Device Icons.** : Icons representing devices are generally a letter inside a colored circle. The letter represents the type of the device and the color represents the status of the device.
    - **M.** Motor
    - **V.** Virtual Device – these are non-physical devices which may map to values on multiple other devices. Moving a virtual device will usually also move one or more other devices.
    - **S.**
    - **?**
    - **Green Circle.** The device is currently moving
    - **Orange Circle.** The device is not currently moving

- **Device.** Name of device
- **Current Position.** The current position of the device according to the ICE server.
- **Target Position.** Use these controls to set a new position or value for a particular device. See “Setting Position” above.
- **Jog Step.** Values set in these textboxes determines how far an instrument will move when jogged in the positive or negative direction. See “Jogging” above.
- **Fix.** These checkboxes determine whether a particular device is fixed. See “Fixing Position” under the Devices section above.

• **Error Display.** (bottom of panel)

Sometimes an instrument may not be able to move as specified. In such cases, a descriptive error message will be displayed along the bottom of the Move Device window.

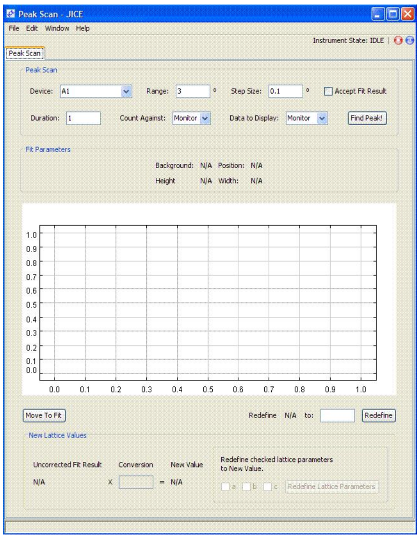
Peak Scan Panel

Introduction

The Peak Scan panel allows the user to find the position of a device which maximizes intensity.

Basic description of functionality

The Peak Scan panel allows a user to scan a device through a range of values. The panel will plot the intensity at each point. It will also fit a Gaussian curve to the data and display the value and position of the curve peak.



Components of the Peak Scan Panel

1. **Peak Scan**

- Device

  The user is required to choose a device for which peak scan is performed.

- Range

  The user specifies the interval of device values, centered at the current device position.

- Step Size

  The user enters step size. The number of points for the scan is calculated as device range divided by the step size.

- Duration

  This field specifies the value till which counting is performed at every point of the peak scan.

- Count Against

  The user selects between Time and Monitor as the device for which Duration counts are measured.

- Data to Display

  The user selects Detector or Monitor as data to be displayed when peak scan is executed.

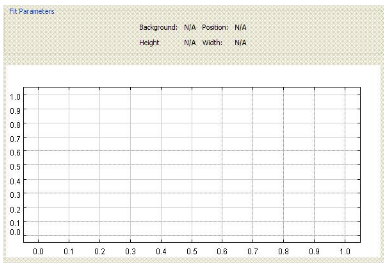
- Accept Fit Result

  If this option is selected, after the peak in the given device range is found, the device will be automatically moved to the position at which this peak was reached.

- Find Peak

  Clicking this button will start a scanning process. Counts vs Position plot will be updated in real time as the scan is progressing.

2. Fit Parameters



- Background, Position, Height, Width

  After scan is finished, the Gaussian curve will be fitted to the count data in order to determine device position (Position) at which maximum count is reached. Background, Height and Width are calculated characteristics of the fitted Gaussian curve.

3. Move to Fit

- Move to Fit

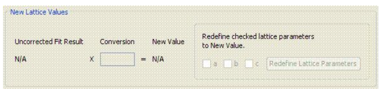
  Clicking Move to Fit button will instruct the server to move the device to the center of the fit.

- Redefine

  Clicking Redefine button will drive a device to the target value given in the associated text field.

4. New Lattice Values

This subpanels refers to the special case when A4 has been chosen as a device in peak scan, and when Ei and Ef are assumed to be equal. In this case, A4 peak position can be used to calculate d-spacing of the sample.



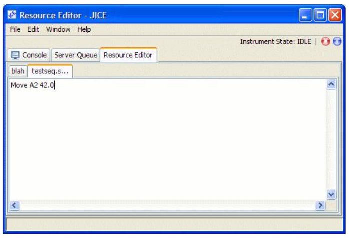
- Uncorrected Fit Result

  Uncorrected fit field displays the value of the d-spacing determined by the peak scan. The user types in a number for the conversion field. This number is multiplied by uncorrected fit value and is displayed in New Value field.

- Redefine Lattice Parameters

User checks a combination of a, b, c boxes. Upon clicking the redefine lattice parameters button, the command to redefine checked parameters of the sample lattice to the New Value is sent to the server. Server redefines the lattice parameters and sends a client a confirmation notice

Resource Editor Panel



Introduction

The Resource Editor Panel allows the user to edit the text description of a scan or sequence stored in ICE .

Description

Resource Editor Functions

- **Opening a file.** Files can be opened for editing from the Server Queue Panel by right clicking on a file and choosing "Edit as Text" from the context menu.

  Each open file will have its own tab in the Resource editor under the main set of panel tabs.

- **Creating a New Sequence File.** A new sequence file can be created by clicking the "File" menu, moving the mouse over "New," and selecting "sequence" at the bottom of the list.

  Choosing another file type from the File->New menu will open an editor for that particular file type.

- **Closing a File.** Files can be closed by right clicking on the tab for that file, and choosing "Close" on the context menu.

- **Saving a file.** Files can be saved by choosing "Save" from the File menu. Users will also be asked if they want to save when closing an unsaved file.

  Files with an asterisk * next to them have not been saved since changes have been made.

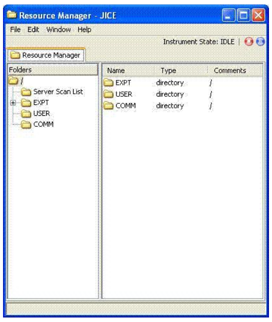
- **Editing a file.** The editor is a simple, minimally-featured text file editor. Users can click at any location in the file to edit at that point.

  - Text can be selected with the mouse and deleted using the Backspace or Delete keys

  - Standard editing key combinations apply, such as Ctrl-C to copy, Ctrl-X to cut, and Ctrl-V to paste.

  - There is no undo, so edit carefully. Users can revert to previously saved versions of files by closing the file and choosing "No" when asked to save.

Resource Manager



Introduction

The resource manager allows the user to manage ICE specific files/resources and scans.

Description

Files

1. The files section shows scans, sequences, and scripts in ICE using a file tree view.

   - **Deleting Files.** Files can be deleted from the files section by right clicking the file and choosing “Delete” from the context menu.

   - **Editing Files.** Files can be edited by right clicking the file and choosing “Edit” or “Edit Scan Parameters” from the context menu. Edit will bring up the appropriate panel for that type of action. Selecting "Edit" will load the appropriate scan panel with its values for the scans properties. Selecting "Edit Scan Parameters" will load the Scan Properties panel. This panel is used to update the selected scan's number of points, base count, prefactor, data of interest, and count against fields.

Server Scan List Folder

1. The Server Scan List folder contains a list of scans saved. Selecting this folder allows the user to view the scans saved.

   - **Name Column.** The Name column displays the name of the file or folder. Clicking the name column sorts the list by name, ascending or descending.

   - **Num Points Column.** The Num Points column displays the number of points for the scan. Clicking the num points column sorts the folder by number of points, ascending or descending. This column is only available for scans.

   - **Count Against Column.** The Count Against column displays the count against for the scan, monitor or time. Clicking the count against column sorts the folder by monitor or time. This column is only available for scans.

   - **Duration Column.** The Duration column displays the duration for the scan. This displays the time it takes to run a scan. Clicking the duration column sorts the folder by duration, ascending or descending. This column is only available for scans.

EXPT Folder

1. The EXPT folder contains a list of files saved for an experiment. Selecting this folder allows the user to view the experiment files saved.

   - **Name Column.** The Name column displays the name of the file or folder. Clicking the name column sorts the list by name, ascending or descending.

   - **Type Column.** The Type column displays the type either file or folder. Clicking the type tab sorts the list by type, ascending or descending.

   - **Comments Column.** The Comments column displays any notes for the folder. Clicking the comments column sorts the folder by comments, ascending or descending.

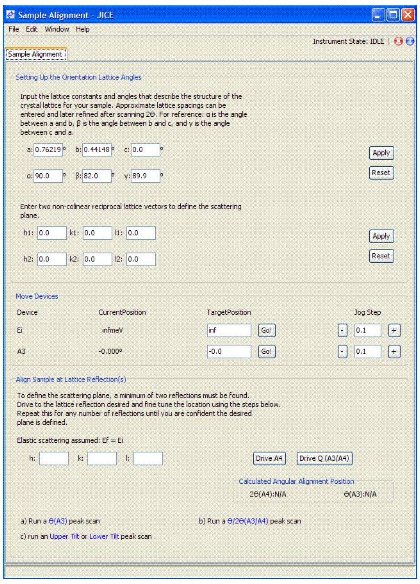
Sample Alignment Panel

Introduction

This panel helps the user to align a sample.

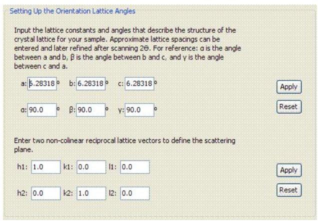
Basic description of functionality

The Sample Alignment panel allows a user to align a sample so that Bragg's Law is satisfied. The user inputs the crystal lattice and the reciprocal lattice and iteratively redefines # and 2# angles.



Components of the Sample Alignment Panel

1. **Setting Up the Orientation Lattice**



- a, b, c

  The user specifies vectors a, b, c that approximate spacings of the crystal lattice of the sample. Default values are 2#.

- alpha, beta, gamma

  The user specifies angles between vectors of the orientation lattice. By default these angles are set to 90 degrees.

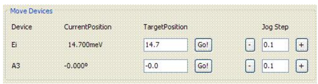
- h1, k1, l1 and h2, k2, l2

  The user enters two non-colinear reciprocal lattice vectors that define the scattering plane.

- Apply/Reset

The user must to press Apply in order for changes to take effect. Pressing Reset button will re-set parameters to previous values.

2. Move Devices



- Device

  The user can move Ei and A3 devices.

- Current Position

  Positions of Ei and A3 are displayed after each iteration.

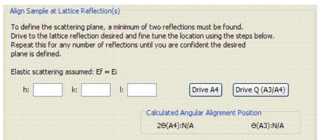
- Target Position

  The user can input new position for Ei and/or A3.

- Jog Step

  The user can move Ei and A3 step-by-step in each direction.

3. Align Sample at Lattice Reflections



- h, k, l

  The user is required to specify the lattice reflection. In order to define the scattering plane, at least two reflections have to be found.

- Drive A4

  The user may choose to drive motor A4 (sample 2# angle) to specified lattice reflection.

- Drive Q (A3/A4)

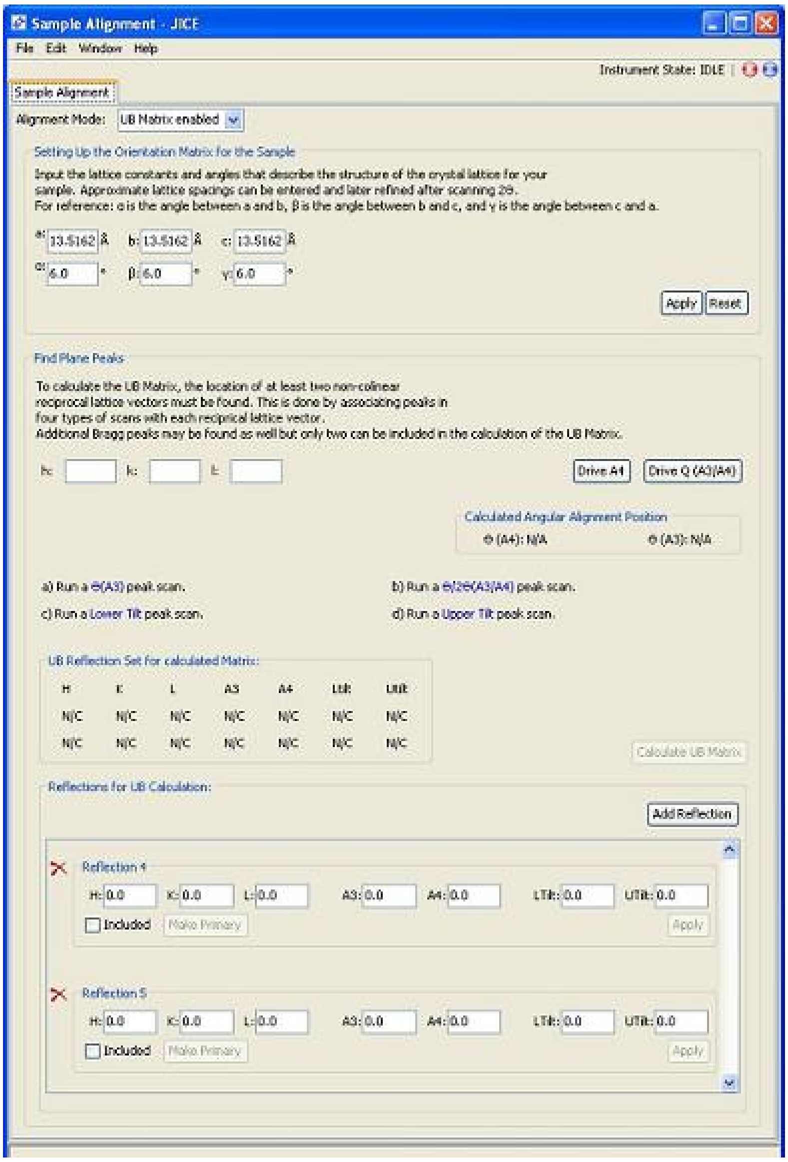
  Alternatively, the user can change values of motors A3 and A4 together by driving vector Q.

- Calculated Angular Alignment Position

  Current sample position as given by values of 2# (or motor A4) and # (or motor A3) are displayed.

UB Sample Alignment Panel

UB Sample Alignment Panel



Introduction

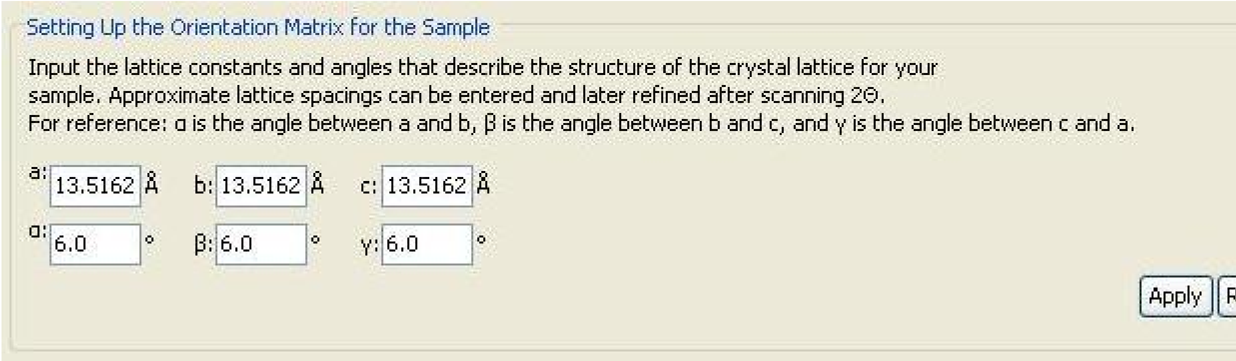
This panel helps the user align a sample in UB Matrix Mode.

Description

Components of the UB Sample Alignment Panel

The Alignment Mode drop down menu must be set to "UB Matrix enabled" to use the Sample Alignment Panel in UB mode.

1. Setting Up the Orientation Lattice



- a, b, c

  The user specifies vectors a, b, c that approximate spacings of the crystal lattice of the sample.

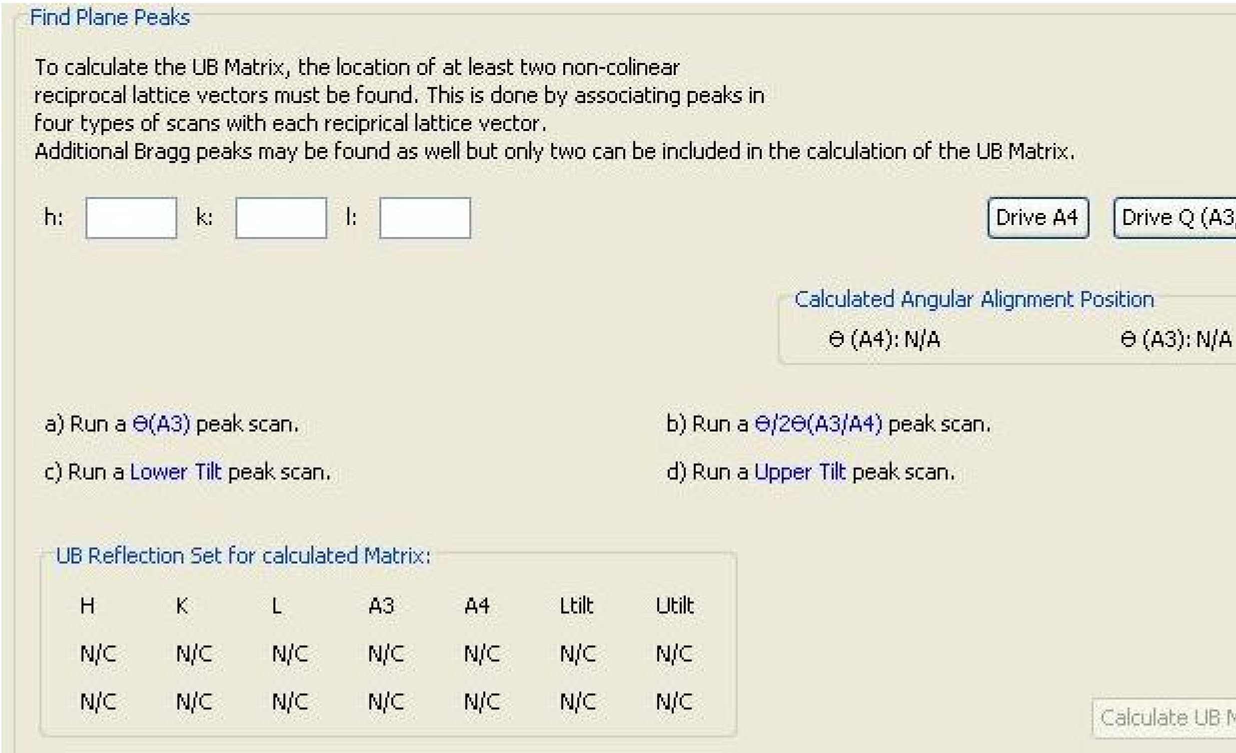
- alpha, beta, gamma

  The user specifies angles between vectors of the orientation lattice. By default these angles are set to 90 degrees.

- Apply/Reset Buttons

  The user must press the Apply button in order for changes to take effect. Pressing the reset button will reset the parameters to its default values.

2. Align Sample at Lattice Reflections



- h, k, l

The user is required to specify the lattice reflection. In order to define the scattering plane, at least two reflections have to be found.

- Drive A4

  The user may choose to drive motor A4 (sample 2theta) to specified lattice reflection.

- Drive Q (A3/A4)

  Alternatively, the user can change values of motors A3 and A4 together by driving vector Q.

- Calculated Angular Alignment Position

  Current sample position as given by values A4 (sample 2theta) abd A3 (sample theta) are displayed.

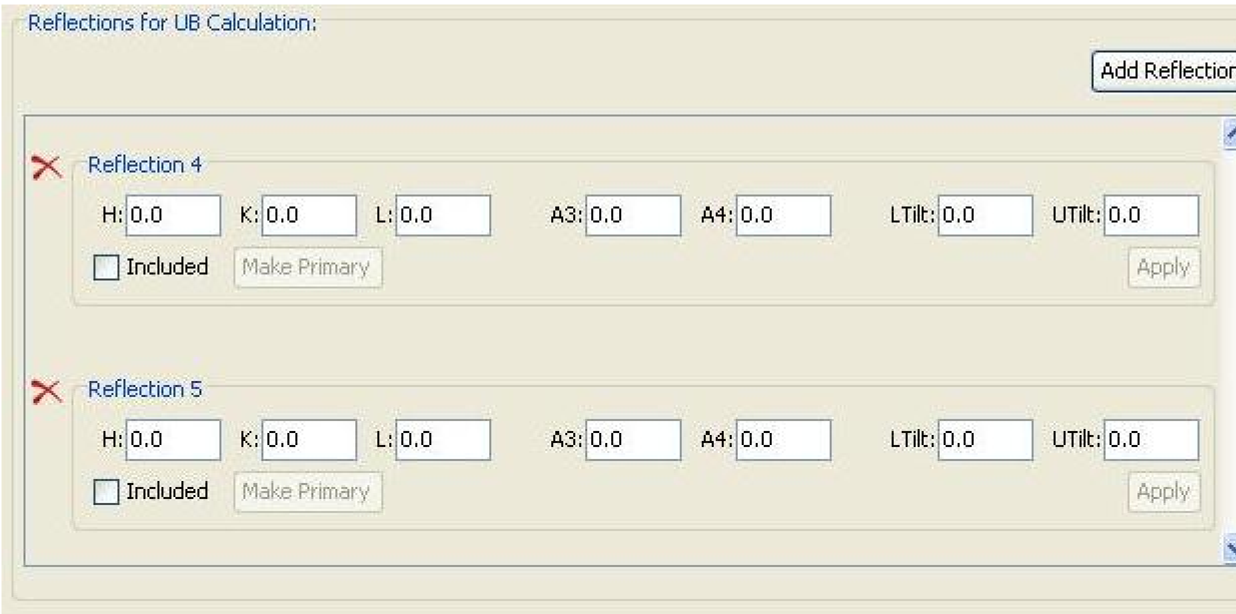
- UB Reflection Set for Calculated Matrix

  Current positions of h, k, l, A3, A4, lower tilt, and upper tilt for Reflection Set.

- Calculate UB Matrix Button

  The user must press the "Calculate UB Matrix" button to update the UB Reflection Set for the Matrix.

3. Reflections for UB Calculation



- Add Reflection Button

  The user can add a reflection by pressing the "Add Reflection" button. A new reflection will appear.

- h, k, l, A3, A4, LTilt, UTilt

  The user may specify the lattice reflection, positions for A3 and A4, and positions for lower tilt and upper tilt.When a lattice reflection value is changed, the field's value is changed.

- Apply Button

The user must press the Apply button in order for changes to take effect.

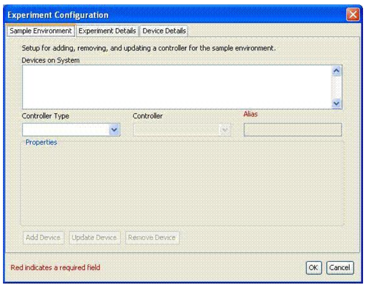
- Included Check Box

  To include a reflection, the Included check box must be checked. This enables the "Make Primary" button.

- Make Primary Button

  To make a reflection primary, click the "Make Primary button". This changes the button label to "Primary".

Sample Environment Panel



Introduction

The Sample Environment Panel is used to add, remove, and update sample environment devices. This panel is one of 3 tabs composing the Experiment Configuration Window. The system limits the user to have no more than one temperature controller and one magnet controller installed. There can be multiple occurences of other devices installed on the system.

Description

Devices on System

1. The Devices on System list box contains the devices currently installed on the system. This information will be provided in the following format: "Alias Name (Device Name)" The alias name followed by the device name. When a user selects an item from the list box the controller type, controller, alias, and properties are updated with information for the device.

Controller Type

1. The Controller Type drop down menu is used to select the type of device. When the controller type is selected the Controller drop down menu is populated with controllers of that controller type.

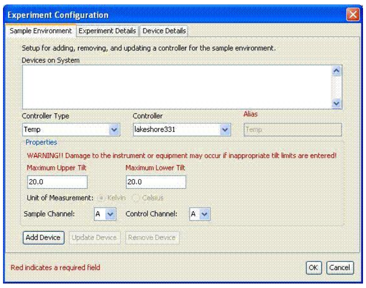
Controller

1. The Controller drop down menu is used to select the device to add, update, or remove. When a magnet or temperature controller is selected, the properties panel updates with components for that controller. The properties panel is updated when a magnet or temperature controller is selected.

Alias

1. The Alias text field is used to enter an alias name to associate with the device selected. This component is enabled only for devices of type "other".

Temperature Properties



1. The maximum upper tilt text field takes an integer value to set the upper tilt on the goniometer. Damage to the instrument or equipment may occur if an inappropriate upper tilt limit is entered.

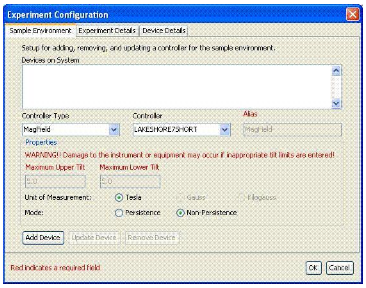
2. The maximum lower tilt text field takes an integer value to set the lower tilt on the goniometer. Damage to the instrument or equipment may occur if an inappropriate lower tilt limit is entered.

3. The user can set the unit of measurement for temperature to Kelvin or Celsius.

4. The sample channel drop down menu allows users to select the channel representing the temperature at which the sensor is located at the sample to record data. The sample channel and control channel can be set to the same sensor. The channels represent characters with 'A' as the first channel representing 0, 'B' as the second channel representing 1, etc.

5. The control channel drop down menu allows users to select the channel representing the temperature at which the sensor is located within the freezer. The control channel and sample channel can be set to the same sensor. The channels represent characters with 'A' as the first channel representing 0, 'B' as the second channel representing 1, etc.

Magnet Properties



1. The maximum upper tilt text field takes an integer value to set the upper tilt on the goniometer. Damage to the instrument or equipment may occur if an inappropriate upper tilt limit is entered.

2. The maximum lower tilt text field takes an integer value to set the lower tilt on the goniometer. Damage to the instrument or equipment may occur if an inappropriate lower tilt limit is entered.

3. The user can set the unit of measurement for magnet to Tesla, Gauss or Kilogauss.

4. The mode for magnet is defined as persistence or non-persistence. Persistence mode is creating a magnetic field with an ending state of no current coming from the magnet power supply. Non-persistence mode is creating a magnetic field using a continuous current coming from the magnet power supply.

Add Device

1. The Add Device button adds the selected controller to the system. This also updates the Devices on System list box by adding the selected controller with its alias to the list box. The Add Device

button becomes disabled, while the Update Device and Remove Device buttons become enabled for the device added.

Update Device

1. The Update Device button updates any changes made to the selected controller's properties.

Remove Device

1. The Remove Device button removes the selected controller from the system. This also updates the Devices on System list box by removing the selected controller with its alias from the list box. The Remove Device and Update Device buttons becomes disabled, while the Add Device button becomes enabled.

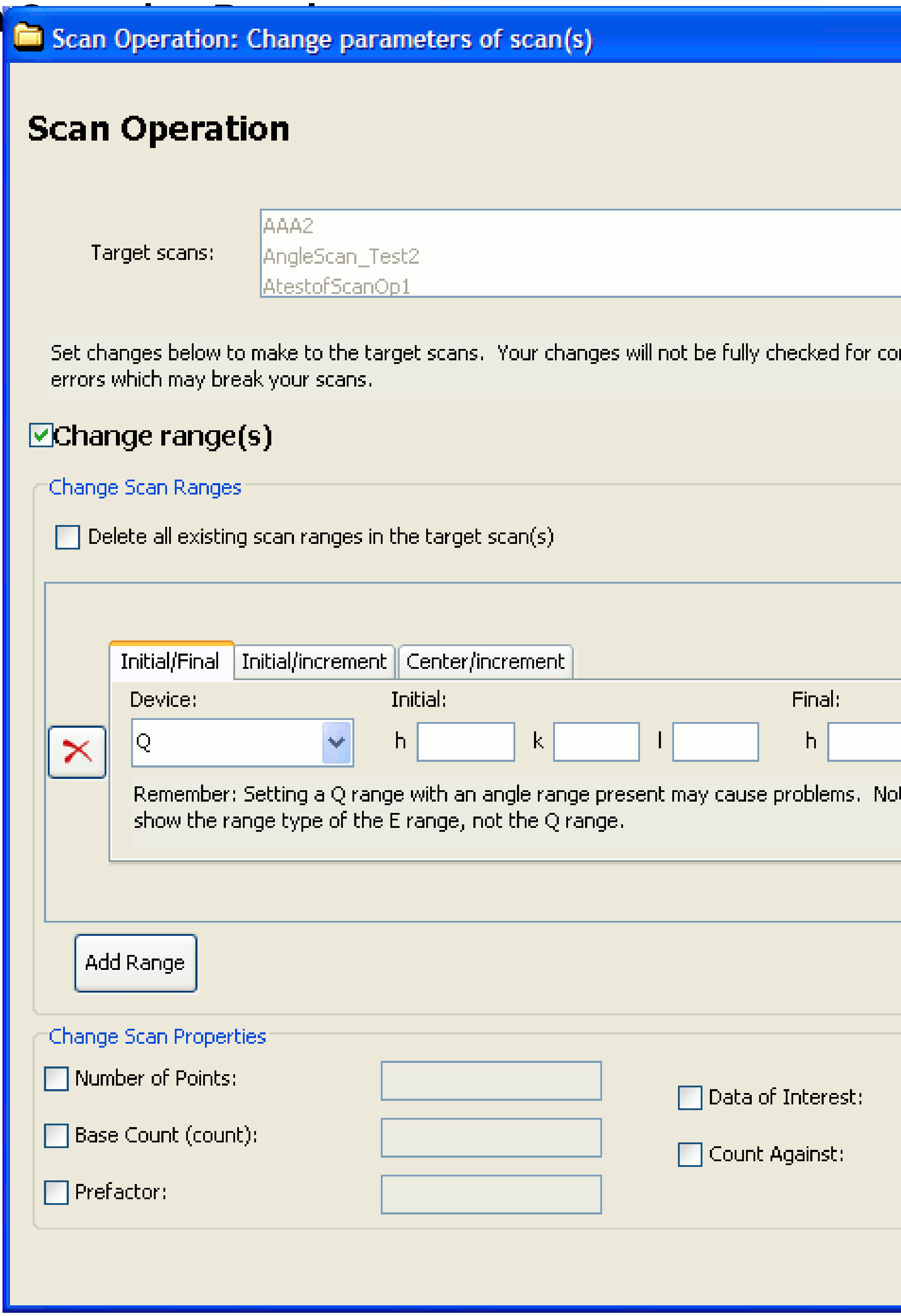
OK

1. The OK button exits the experiment configuration window.

Cancel

1. The Cancel button exits the experiment configuration window.

Scan


Scan Operation: Change parameters of scan(s)
Scan Operation
Target scans:
AAA2
AngleScan_Test2
AtestofScanOp1
Set changes below to make to the target scans. Your changes will not be fully checked for co
errors which may break your scans.
Change range(s)
Change Scan Ranges
Delete all existing scan ranges in the target scan(s)
Initial/Final
Initial/increment
Center/increment
Device:
Initial:
Final:
Q
h
k
l
h
Remember: Setting a Q range with an angle range present may cause problems. No
show the range type of the E range, not the Q range.
Add Range
Change Scan Properties
Number of Points:
Base Count (count):
Prefactor:
Data of Interest:
Count Against:

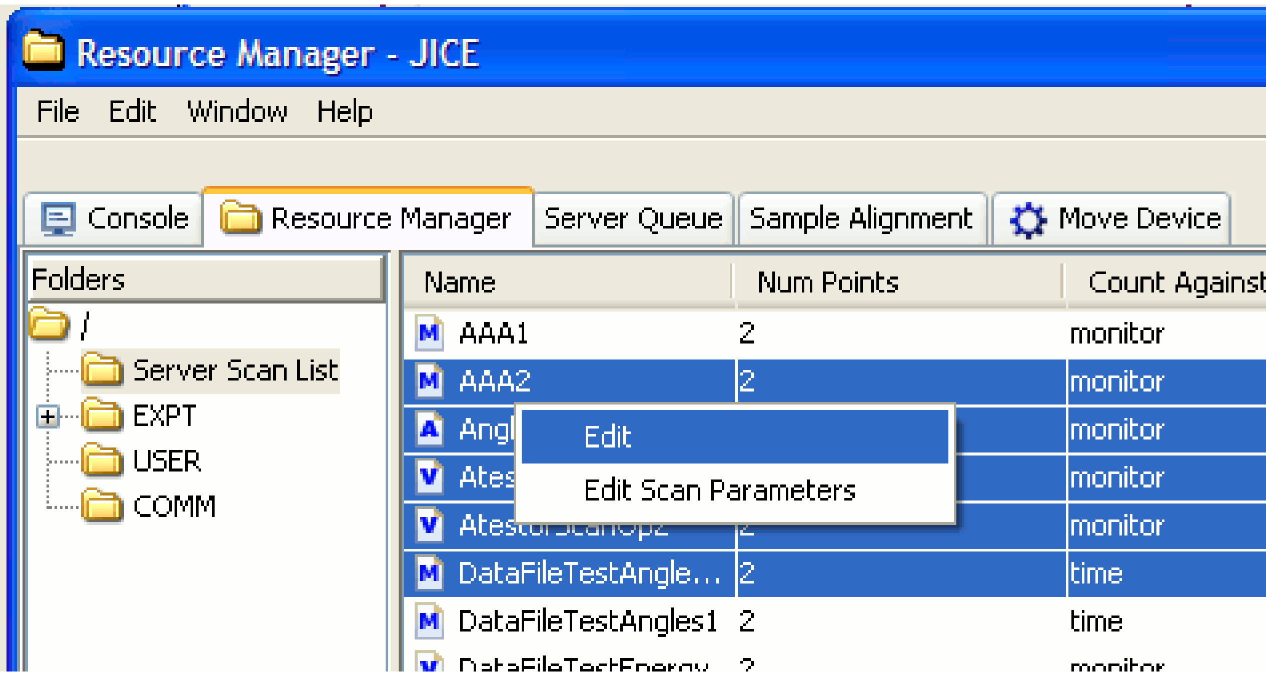
Introduction

The Scan Operation panel replaces the Edit Multiple Scans panel as an interface for editing several scans at once. The panel allows editing of the major parts of a scan description for one of more scans stored on the server.

Note that changes are not rigorously validated or checked to ensure proper functionality. It is therefore up to users to ensure that any changes they are applying will not cause problems with the scans to which the changes are being applied.

Opening the Scan Operation Panel

To open the scan operation panel, go the Resource manage panel by choosing Resource Manager from the Window menu. Select all of the scans you wish to change parameters for by holding Control and selecting them, or holding Shift while dragging the mouse across a continuous list of scans. When you have selected all of the scans to be edited, right click on the list and choose "Edit Scan Parameters," as shown below.



Components of the Scan Operation Panel

1. Target Scans

   At the top of the panel, the target scans for the scan operation are listed. Each of these scans will have the operations specified applied to them. If Q component ranges are specified in the Change Scan Ranges section, then each of these ranges must contain a Q range, or the scan operation will fail.

2. Change Scan Ranges

   In the middle of the Scan operation panel is a set of controls to allow editing of ranges in scan descriptions. To enable operations on ranges, click the checkbox next to “Change Range(s)”.

   If a range is specified for a device which already has a range specified in a target scan description, then that range will be replaced; otherwise a range will be added.

   If you have entered range changes, when you click "OK", some simple validation will be done to make sure that you have entered values for necessary fields. If there are errors, an error message will pop up and no scan operation command will be sent to the user. Note that the validation done is mimimal. Even if no error pops up for a scan operation, the values sent may cause an error with the command which prevents it from being successfully executed, or may cause problems with your scan.

3. Property Changes

   At the bottom of the Scan Operation panel, other fields in the scan description can be changed. To change a field, select the checkbox next to it and put in a new value.

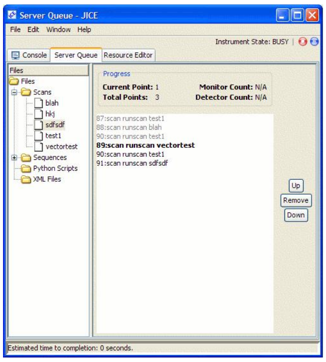
Results of the Scan Operation Command

Results of the command can be viewed in the Console window.

See Also

- Scan Operation Command Documentation
- Scan Description documentation on Command Scan documentation page

Server Queue Panel



Introduction

The Server Queue Panel lets a user view and manipulate which commands, scans, sequences, or scripts are waiting to be run on the server.

Description

The Server Queue panel displays a list of scans and sequences which can be run on the server, and those which have recently completed, are currently running, or are scheduled to run.

Elements of the Server Queue Panel:

1. **Files.** The files section shows scans, sequences, scripts (currently disabled), and xml files stored in ICE using a file tree view. Note that, though scans are referred to as files, they are not actually stored onto the disk unless the SCAN LISTBACKUP command is sent to the server (see Command SCAN documentation).

   - **Deleting Files.** Files can be deleted from the files section by right clicking the file and choosing “Delete” from the context menu.

- **Editing Files.** Files can be edited by right clicking the file and choosing “Edit” or “Edit as Text” from the context menu. Edit will bring up the appropriate panel for that type of action. Edit as Text will load the text of the server command in the file and allow the user to edit that directly.

2. **Progress**

   The progress section lists properties of the current action running on the server. The listed properties include the following:

   - **Current Point.** The current data point being measured by the action.
   - **Total Points.** The total number of data points which will be measured during the action.
   - **Monitor Count.** Current value of the monitor counter.
   - **Detector Count.** Current Value of the detector counter.

3. **Action List**

   The server queue panel displays a list of actions (scans, sequences, scripts, and XML Files) running on the server (right side of panel with white background), formatted to indicate their status, as follows:

   - **Gray text.** Indicates actions which have already been run.
   - **Bold text.** Indicates a running action.
   - **Non-bold black text.** Indicates a queued action waiting to be run.

Manipulating the Server Queue

- **Adding Actions to the Queue.** Actions can be added to the queue by dragging them from the folders in the Files section onto the action list section or by right clicking an action in the Files section and choosing “Add to Queue” from the context menu.
- **Reordering Actions from the Queue.** Actions waiting to be run can be reordered by selecting an action and clicking the up or down buttons to the right of the action list to move the action up or down in the queue.
- **Removing Actions from the Queue.** Actions can be removed from the queue by clicking on the action in the action list and clicking the remove button to the right of the action list.

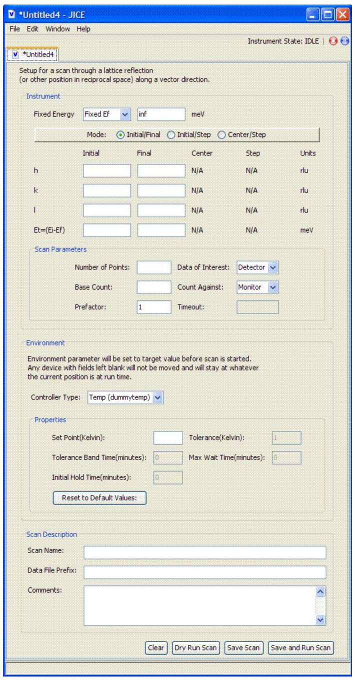
Vector Scan Panel

Introduction

The Vector Scan allows a user to scan h, k, l and energy transfer devices.

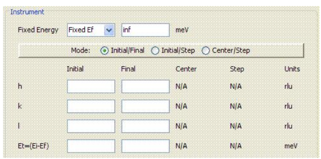
Basic description of functionality

The Vector Scan panel contains h, k, l, and energy transfer devices to be driven as a part of the scan. For each device the user can set the initial position, step size, center and final destination parameters.



Components of the Vector Scan Panel

1. **Instrument**



- Fixed Energy

  This field allows the user to fix either incident (Ei) or final (Ef) energy. The user is required to type the fixed energy value in meV. The energy value has to be positive. By default final energy Ef is fixed.

- Mode

  The user may choose between Initial/Final, Initial/Step or Center/Step modes of devices. The default mode is Initial/Final.

  - Given values for the Initial and Final positions, value of the Center position is set at the half distance between Initial and Final. Step is calculated as the difference between Final and Initial positions divided by the number of scan points.

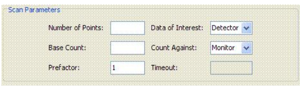
    - Given values for the Initial position and Step, the value for the Final position is set to the Initial position plus Step multiplied by the number of points. The Center is set to the Initial position plus half of Step multiplied by the number of points.

    - Given values for the Center position and Step, the Initial position is set to the Center minus half of the Step multiplied by the number of points. Final position is set to the Center plus half of the Step multiplied by the number of points.

- h, k, l, and Energy transfer (Et)

  Device ranges for devices h, k, l, and Et have to be specified with two values chosen by the scan mode. Based on these entered values and a value for the number of points, the other two values for the associated device are calculated and displayed automatically.

2. **Scan Parameters**



- Number of points

  This field specifies the number of points in the vector scan. The entered value has to be a positive integer.

- Base Count

  This field defines the base count parameter of the vector scan. At each point of the scan, the system will count for Base Count multiplied by Prefactor. The entered value has to be a positive integer. The default values is 1.

- Prefactor

  This field defines the prefactor parameter of the vector scan. At each point of the scan, the system will count for Base Count multiplied by Prefactor. The entered value has to be a positive integer. The default value of Prefactor is 1.

- Data of Interest

  The user selects Detector or Monitor as data of interest to be recorded when run scan is performed.

- Count Against

  The user can choose between Monitor or Time as the device for which Base Count multiplied by Prefactor counts are measured.

3. **Environment**

- Controller type

  All environment control devices installed on the server will be listed in the drop down menu. The user may choose a controller to be set during scan. Depending on the selected type of the environment controller, different set of input fields will be added to the environment subpanel. (Optional)

- Temperature Controller

  This device has the following parameters that the user is required to enter.

  - Set Point

    Specifies the temperature value which will be set before the scan begins.

  - Tolerance

    Specifies the acceptable tolerance interval around the Set Point for temperature controller.

  - Tolerance Band Time

    Specifies how long (in minutes) the temperature must be continuously within tolerance of the Set Point, before the temperature is considered to have reached the Set Point.

  - Max Wait Time

    Specifies the maximum time (in minutes) that the system will attempt to reach the Set Point. If it does not reach the Set Point within this timeout, the system will issue a warning message to the user and proceed with a scan. For example, if Max Wait Time set to 0, the system will give up attempting to reach the Set Point immediately and proceed with the scan.

  - Initial Hold Time

    Specifies the delay (in minutes) between reaching the Set Point and beginning of the scan. If Max Wait Time has elapsed, the system will still hold for the specified number of minutes before proceeding with the scan. This time should to be sufficient for the whole sample to reach equilibrium.

- Magnet Controller

  - Set Point

    Specifies the magnet value which will be set before the scan begins.

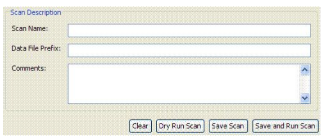
  - Tolerance

    Specifies the acceptable tolerance interval around the Set Point for magnet controller.

  - Initial Hold Time

    Specifies the delay (in minutes) between reaching the Set Point and beginning of the scan. This time should to be sufficient for the whole sample to reach equilibrium.

4. Scan Description



- Scan name

  This field gives the name the scan.

- Data file prefix

In this field the user may enter data file prefix. This string will be added to the each data file name. (Optional)

- Comments

  The user may add comments to the vector scan. (Optional)

5. **Controls**

- Clear

  Clicking this button sets all text fields to their default values. Drop down combo boxes are not changed.

- Dry Run

  By clicking this button, the user sends a command to dry run the scan. The server calculates positions of devices for each point of the scan and sends the user a summary of device positions. After dry run is complete, the server deletes the scan description from memory.

- Save

  By clicking Save, the user sends a command to the server to save the scan definition. The server saves the scan in the data storage.

- Save and Run

  On this command, the server saves the entered scan and executes it. For each point in the scan, the server moves all scanning devices to the specified position and performs a count. After executing the scan, the server sends the user a summary of device positions and counts. Refer to Scan description for further details.

Chapter 5. Commands

The following document contains commands. Each command provides a brief description, full command path, positional arguments, keyword arguments, switch arguments, and sub-commands.

AcceptCal

Brief Description

Apply results of calibration to instrument by changing A2 and A4 offsets.

Full Command Path

Usage: AcceptCal

AcceptFindPeak

Brief Description

Moves the [Device] used by FindPeak to the peak position.

Full Command Path

Usage: AcceptFindPeak

AcceptLattice

Brief Description

Accepts the calculated lattice constant from the last findpeak if available .

Full Command Path

Usage: AcceptLattice [h] [k] [l]

Usage: AcceptLattice A B C

Positional Arguments

[h] [k] [l] are the hkl values. Parameters of the sample lattice will be set as follows:

- A will be set equal to [h]*[lattice constant]/[length]
- B will be set equal to [k]*[lattice constant]/[length]
- C will be set equal to [l]*[lattice constant]/[length]
- [length] is the square root of the sum of squares of [h], [k], and [l]

Alternatively, the user specify combination of symbols A, B and C as parameter of AcceptLattice. A B C refer to lattice vectors A, B and C. The corresponding parameter(s) of the sample lattice will be redefined to the lattice constant determined by the last findpeak command.

ArmDevice

Brief Description

Arms a counter device. In the case of a detector, it starts accumulating. Similar to count, but without a preset. Since we do not wait for the armed device, the state machine does not become BUSY.

Full Command Path

Usage: ArmDevice [device]

Usage: ArmDevice [device] [reset]

Positional Arguments

[device] is the counter device to arm.

An optional argument [reset], if equals 1, instructs the server to reset the counter before arming.

Ask Command

Brief Description

Command that wraps another command but allows communication with handshaking

Full Command Path

Ask [Command]

Positional Arguments

Command is a valid command.

CalcLattice

Brief Description

Calculate lattice constant from the last findpeak if available. Assumes a cubic lattice.

Full Command Path

CalcLattice

Caldfm

Full Command Name

Instrument Action CalDFM

Calibrate

Brief Description

Command to perform wavelength calibration for triple axis instruments. Given the user's selection of the standard to be used, the calibration routine calculates the expected peak positions of the Bragg peaks from known d-spacings and the approximate wavelengths. The detector arm is then driven to each estimated position TwoTheta_i and the short scan is performed there to locate the Bragg peak. The system will determine the A4 offset and the wavelength correction based on the peak data set.

Full Command Path

Usage: Calibrate [std] [twotheta_lo] [twotheta_hi] -COLL [alpha_mi, alpha_mf, alpha_ai, eta_m] -STEPSIZE [s] -TIME [t] -ACCEPT -SIM [A2offset, A4offset]

Positional Arguments

[std] specifies calibration standard. The following standards are valid: AL203, CU, SIFILT, SILAM2.

[twotheta_lo] specifies the minimum value that A4 will be moved to during the scan. By default, twotheta_lo is equal to the A4 lower limit if it is greater than zero, zero otherwise.

[twotheta_hi] specifies the maximum value that A4 will be moved to during the scan. By default, twotheta_hi is equal to the A4 upper limit.

Keyword Arguments

-COLL [alpha_mi, alpha_mf, alpha_ai, eta_m] specifies working monochromator incident, monochromator final, analyzer incident collimations and monochromator mosaic, resprectively.

-STEPSIZE [s] provides an A4 step size. If this parameter is not specified by the user, the system uses Cooper-Nathans resolution function to automatically estimate the step size at each TwoTheta_i such that there will be at least five points traversing the peak. (Optional)

-TIME [t] specifies a count time. [t] must be an integer. By default, the value of t=1 is used. (Optional)

-ACCEPT ensures that adjustments of the current scattering angle and the current wavelength are applied to the instrument. (Optional)

-SIM [A2offset, A4offset] creates fake data for testing using the A2offset and A4offset simulation offsets.

CheckFit

Brief Description

Performs curve fitting to the specified data file.

Full Command Path

Usage: CheckFit [FILE]

[FILE] is a two-column data file.

Comment

Brief Description

Appends a comment to a current data file.

Full Command Path

Usage: Comment [comment]

[comment] is a string that contains information that has to be written into a data file.

CorrectLattice

Brief Description

Redefines lattice parameters a,b and/or c based on the results of the last peak scan on A4 or A3/A4. Typically this command is queued right after a peak scan is initiated to automatically changed the lattice constants. NOTE: At least one peak scan on A3 or A3/A4 must have been run since the server started or else this command will fail.

Full Command Path

Usage: Correct Lattice [Coefficient] -a -b -c

Positional Arguments

[Coefficient] scales the value to which the lattice parameters are redefined.

Keyword Arguments

-a If present, lattice parameter a will be redefined (Optional)

-b If present, lattice parameter a will be redefined (Optional)

-c If present, lattice parameter a will be redefined (Optional)

Count

Brief Description

Performs count using the given counter device.

Full Command Path

Usage: Count [device] [counts] -timeout [timeout_device] [timeout_counts] -start [start_device] -p

Positional Arguments

[device] is the device to count.

[counts] is the number the device is going to count.

Switch Arguments

Optional -timeout flag, [timeout_device] and [timeout_counts] parameters set a counter device that will timeout after a given number of counts. If [timeout_device] timeouts, counting will be interrupted and counter [device] will be disarmed.

Optional -start flag and [start_device] parameter specify the device that will be armed before counting begins. This device will be disarmed after counting is finished.

Optional -p flag instructs the server to print values of all counter devices in the system after counting.

CountAndPrint

Brief Description

Count and print.

Full Command Path

Usage: CountAndPrint

ct

Full Command Name

CountAndPrint

Data

Brief Description

Writes the current value/position of all the devices to disk.

Full Command Path

Usage: Data

DefineBragg

Brief Description

Sets the position of the [ThetaDevice] so that it is equal to half of the position of the [TwoThetaDevice].

Full Command Path

Usage: DefineBragg [TwoThetaDevice] [ThetaDevice]

Positional Arguments

[TwoThetaDevice] is the value set the Two Theta device to.

[ThetaDevice] is the value set the Theta device to.

DelFlipper

Brief Description

Removes flippers for Ei or Ef.

Full Command Path

Usage: DelFlipper [Ei|Ef]

dr

Full Command Name

Move

Device Action

Brief Description

Calls the specified DALI action on a device.

Full Command Path

Usage: Device Action [device] [command]

Positional Arguments

[device] is the name of the device.

[command] is the action to perform on a device.

Device Add

Brief Description

Adds a DALI representation of a device. When adding an Alias, the parent device must also be supplied: Example: Device Add Alias [parent device name]

Full Command Path

Usage: Device Add [type] [name]

Positional Arguments

[type] is the type of device to add.

[name] is the name of device to add.

Device Arm

Brief Description

Arms the device [device]. In the case of a counter, it would start counting. In the case of a detector, it would start accumulating. The state machine does not become BUSY.

Full Command Path

Usage: Device Arm [device]

Positional Arguments

[device] is the name of the device.

Device Busy

Brief Description

Check whether the specified device is busy.

Full Command Path

Usage: Device Busy [device]

Positional Arguments

[device] is the name of the device.

Device Components

Brief Description

Returns the values of the devices that make a virtual device. Example: Device Components Ei 14.7

Full Command Path

Usage: Device Components [device] [value]

Positional Arguments

[device] is the device to get the parameter from.

[value] is the value to return.

Device Configure

Brief Description

Configures a device.

Full Command Path

Usage: Device Configure [device]

Positional Arguments

[device] is the name of the device.

Device Destroy

Brief Description

Destroys the DALI representation of the device.

Full Command Path

Usage: Device Destroy [device]

Positional Arguments

[device] is the name of the device.

Device Disarm

Brief Description

Disarms the device [device].

Full Command Path

Usage: Device Disarm [device]

Positional Arguments

[device] is the name of the device.

Device Enable

Brief Description

Enables a device.

Full Command Path

Usage: Device Enable [device]

Positional Arguments

[device] is the name of the device.

Device Fix

Brief Description

Fixes a device. When a device is fixed, it cannot be moved during a scan. When not in a scan, the fixed device can still be moved.

Full Command Path

Usage: Device Fix [device]

Positional Arguments

[device] is the name of the device.

Device Free

Brief Description

Frees a fixed device.

Full Command Path

Usage: Device Free [device]

Positional Arguments

[device] is the name of the device.

Device GetDirection

Brief Description

Returns the direction (parity) of a device.

Full Command Path

Usage: Device GetDirection [device]

Positional Arguments

[device] is the name of the device.

Device Getlimits

Brief Description

Returns the lower and upper limits of a device.

Full Command Path

Usage: Device GetLimits [device]

Positional Arguments

[device] is the name of the device.

Device GetOverhead

Brief Description

Returns the value of the time overhead constant currently set for the device.

Full Command Path

Usage: Device GetOverhead [device]

Positional Arguments

[device] is the device to get the overhead for.

Device GetParam

Brief Description

Returns the value of an ICE parameter for the specified device.

Full Command Path

Usage: Device GetParam [device] [param]

Positional Arguments

[device] is the device to get the parameter from.

[param] is the parameter to receive.

Device GetParent

Brief Description

Returns the name of the parent device of an alias.

Full Command Path

Usage: Device GetParent [device]

Positional Arguments

[device] is the device to get its parent.

Device GetPreset

Brief Description

Returns the preset of a device.

Full Command Path

Usage: Device GetPreset [device]

Positional Arguments

[device] is the name of the device.

Device GetRaw

Brief Description

Returns the raw position of a device.

Full Command Path

Usage: Device GetRaw [device] [value]

Positional Arguments

[device] is the name of the device.

[value] is the value of the device.

Device GetSwitch

Brief Description

Returns the available labeled position of a switch-type device.

Full Command Path

Usage: Device GetSwitch [device]

Positional Arguments

[device] is the name of the device.

Device GetSwitch

Brief Description

Returns the available labeled position of a switch-type device.

Full Command Path

Usage: Device GetSwitch [device]

Positional Arguments

[device] is the name of the device.

Device GetTolerance

Brief Description

Returns the tolerance of a device.

Full Command Path

Usage: Device GetTolerance [device]

Positional Arguments

[device] is the device to lookup for the tolerance.

Device GetZero

Brief Description

Returns the zero offset of a device.

Full Command Path

Usage: Device GetZero [device]

Positional Arguments

[device] is the name of the device.

Device MoveHard

Brief Description

Moves a device by specifying the hardware destination.

Full Command Path

Usage: Device MoveHard [device] [value]

Positional Arguments

[device] is the name of the device.

[value] is the value of the device.

Device Preset

Brief Description

Presets the specified counter.

Full Command Path

Usage: Device Preset [device] [value] [channel]

Positional Arguments

[device] is the name of the device.

[value] is the value to set the counter to.

[channel] is the channel of the device.

Device Read

Brief Description

Reads the specified device.

Full Command Path

Usage: Device Read [device]

Positional Arguments

[device] is the name of the device.

Device Reset

Brief Description

Resets the specified counter.

Full Command Path

Usage: Device Reset [device]

Positional Arguments

[device] is the name of the device.

Device Roi

Brief Description

Creates a region of interest device [roi name] for [device].

Full Command Path

Usage: Device Roi [roi name] [device] [x1] [x2] [y1] [y2]

Positional Arguments

[roi name] is the name of the roi.

[device] is the name of the device.

[x1] is the value of x1.

[x2] is the value of x2.

[y1] is the value of y1.

[y2] is the value of y2.

Device Set

Brief Description

Sets the software value.

Full Command Path

Usage: Device Set [device] [value]

Positional Arguments

[device] is the name of the device.

[value] is the value to set the software value to.

Device SetHard

Brief Description

Sets the hardware value.

Full Command Path

Usage: Device SetHard [device] [value]

Positional Arguments

[device] is the name of the device.

[value] is the value to set the software value to.

Device SetLowerLimit

Brief Description

Sets the lower software limit of a device.

Full Command Path

Usage: Device SetLowerLimit [device] [value]

Positional Arguments

[device] is the name of the device.

[value] is the value to set the offset value to.

Device GetParam

Brief Description

Sets the time overhead constant for a device. The time overhead constant is used to calculate how long scans involving the device will run.

Full Command Path

Usage: Device GetParam [device] [overhead value]

Positional Arguments

[device] is the device for which the overhead will be set.

[overhead value] is time constant, in seconds, to set for the overhead for device.

Device SetParam

Brief Description

Sets the value of an ICE parameter for the specified device.

Full Command Path

Usage: Device SetParam [device] [param]

Positional Arguments

[device] is the device to set the parameter to.

[param] is the parameter to set.

Device SetProperty

Brief Description

Sets the specified DALI property of a device.

Full Command Path

Usage: Device SetProperty [device] [property] [value]

Positional Arguments

[device] is the name of the device.

[property] is the name of the property of the device.

[value] is the value of the device's property to set.

Device SetRaw

Brief Description

Sets the raw position of a device.

Full Command Path

Usage: Device SetRaw [device] [value]

Positional Arguments

[device] is the name of the device.

[value] is the value of the device.

Device SetUpperLimit

Brief Description

Sets the upper software limit of a device.

Full Command Path

Usage: Device SetUpperLimit [device] [value]

Positional Arguments

[device] is the name of the device.

[value] is the value to set the offset value to.

Device SetZero

Brief Description

Set the zero offset of a device.

Full Command Path

Usage: Device SetZero [device] [value]

Positional Arguments

[device] is the name of the device.

[value] is the value to set the offset value to.

DIE

Brief Description

This command causes the ICE server to exit immediately.

Full Command Path

DIE

DisableUBMode

Brief Description

Disables UB Matrix mode.

Full Command Path

Usage: DisableUBMode

No arguments.

DisarmDevice

Brief Description

Disarms a device.

Full Command Path

Usage: DisarmDevice [device]

Usage: DisarmDevice [device] [reset]

Positional Arguments

[device] is the device to disarm.

An optional argument [reset], if equals 1, instructs the server to reset the device after disarming.

DispStatus

Brief Description

Obsolete. Causes the server to dispatch a status message.

Full Command Path

DispStatus

DvScan

Brief Description

Start an increment scan assuming that we count for Monitor and measure the Detector counts.

Full Command Path

DvScan [device name] [initial] [final] [monitor preset] [step size]

EnableUBMode

Brief Description

Enables UB Matrix mode.

Full Command Path

Usage: EnableUBMode

No parameters.

Expt Get

Brief Description

The Expt Get command returns the current experiment id number.

Full Command Path

Usage: Expt Get

Expt Set

Brief Description

The Expt Set command sets the experiment id number and clears the name, participants, details, comments, and info properties.

Full Command Path

Usage: Expt Set [id value]

Positional Arguments

[id value] is the id number used to reference the experiment.

Expt SetComment

Brief Description

The Expt SetComment command sets any additional comments for the current experiment.

Full Command Path

Usage: Expt SetComment [comments]

Positional Arguments

[comments] is any additional information about the experiment. This value accepts a multi-line field if necessary. Use double quotes "" to input a multi-line comment.

Expt SetDetails

Brief Description

The Expt SetDetails command sets any details about the experiment.

Full Command Path

Usage: Expt SetDetails [details of experiment]

Positional Arguments

[details of experiment] is any specific information about the experiment. This value accepts a multi-line field if necessary.

Expt SetName

Brief Description

The Expt SetName command sets the name of the current experiment.

Full Command Path

Usage: Expt SetName [name of experiment]

Positional Arguments

[name of experiment] is the name given to the current experiment.

Expt SetParticipants

Brief Description

The Expt SetParticipants command sets the list of participants for the current experiment.

Full Command Path

Usage: Expt SetParticipants [list of participants]

Positional Arguments

[list of participants] is the list of names of the people participating in the current experiment. The names of participants should be separated with spaces.

File Copy

Brief Description

Copy a file. Ex.: File Copy EXPT:scanlist.txt USER:scanlist.txt

Full Command Path

Usage: File Copy [source] [destination]

Positional Arguments

[source] is the source file to copy.

[destination] is the destination file to copy to.

File Delete

Brief Description

Delete a file. Ex.: File Delete EXPT:scanlist.txt

Full Command Path

Usage: File Delete [file path]

Positional Arguments

[file path] is the location of the file to delete.

File Dir

Brief Description

Get a list of the files in a directory Ex.: File Dir EXPT:

Full Command Path

Usage: File Dir [path]

Positional Arguments

[path] is the location of the directory of files.

File Get

Brief Description

Get the content of a file. Ex.: File Get EXPT:scanlist.txt

Full Command Path

Usage: File Get [filename]

Positional Arguments

[file name] is the name of the file.

File Move

Brief Description

Move a file. The source will be deleted. Ex.: File Copy EXPT:scanlist.txt USER:scanlist.txt

Full Command Path

Usage: File Move [source] [destination]

Positional Arguments

[source] is the source file to move.

[destination] is the destination to move to.

FindPeak

Brief Description

Scans a device over a given range to find device position at which maximum intensity is reached. A number of options can be specified to facilitate curve fitting to data and device positioning at the center of the fit.

Full Command Path

Usage: FindPeak [Device] [Range] [Step size] [Counter] [Preset] [Monitor] -lattice [CORRECTION] -accept -t [TOLERANCE] -f [FLIPPER] -off [FLIPPERVALUE] -func [FUNTYPE] -bragg [BRAGGMOTOR]

Usage: FindPeak [Device] [StartRange] [StopRange] [Step size] [Counter] [Preset] [Monitor] -start -lattice [CORRECTION] -accept -t [TOLERANCE] -f [FLIPPER] -off [FLIPPERVALUE] -func [FUNTYPE] -bragg [BRAGGMOTOR]

Positional Arguments

[Device] is a device selected for the scan.

[Range] is the device range centered at current device position. Option -start allows to specify a range using two values [StartRange] and [StopRange] corresponding to the beginning and end of the range, respectively.

[Step size] is the length between two adjacent device positions in the scan. The number of points in the scan will be set to [Range]/[Step size].

[Counter] allows to select Time or Monitor as a device for which [Preset] counts are measured.

[Preset] is a duration in seconds (if Time is a counter) or number of counts (if Monitor is a counter) till which count is performed at every device position.

[Monitor] allows to select Monitor or Detector as a device whose values are plotted.

Keyword Arguments

-start option allows the range to be supplied using two numeric values [StartRange] and [StopRange], for the start and the end points of the interval. (Optional)

-lattice [CORRECTION] DEPRECATED, use the CorrectLattice Command. Calculates d-spacing of the sample as a product of fit result and [CORRECTION]. If [CORRECTION] is not specified, 1 is used by default. Use command AcceptLattice to redefine sample lattice parameters using calculated value. (Optional)

-accept instructs the server to automatically drive the selected device to the position where maximum intensity is reached, after the scan is completed. (Optional)

-t [TOLERANCE] specifies tolerance of the target device position. This option can be given only with -accept option. (Optional)

-f [FLIPPER] specifies a valid flipper (Optional)

-off [FLIPPERVALUE] specifies flipper off value. (Optional)

-func [FUNTYPE] specifies the function type that will be fitted to the scan data. Possible functions: Gauss, GaussLinear, GaussQuadratic, POLY, POLY0, POLY1, POLY2, POLY3 (0-, 1-, 2-, 3-degree polynomial). By default, Gaussian curve is fitted. (Optional)

-bragg [BRAGGMOTOR] specifies a bragg motor that moves together with the device [Device] with a step size half of that of [Step size]. (Optional)

FindPeakSetPos

Brief Description

Sets the current position to the initial position of the last FindPeak command. Should be executed adter AcceptFindPeak.

Full Command Path

Usage: FindPeakSetPos

FindUser

Brief Description

Returns user ID.

Full Command Path

Usage: FindUser [username]

Looks up the ID of the user with the name [username]. Returns user ID if available.

FixDevice

Brief Description

Fix a device. When a device is fixed, it cannot be moving during a scan. When not in a scan, the fixed device can still be moved.

Full Command Path

Usage: FixDevice [device] [1/0]

Positional Arguments

[device] is the device to be fixed.

[1/0] is the value given to fix(1) or not fix(0).

FlipperOff

Brief Description

Stops flippers for Ei or Ef.

Full Command Path

Usage: FlipperOff [Ei|Ef]

FlipperOn

Brief Description

Activates flippers for Ei or Ef. Flipper current will follow the specified energy device.

Full Command Path

Usage: FlipperOn [Ei|Ef]

FlipRat

Brief Description

Measures the flipping ratio for a given flipper, measured over a given amount of time.

Full Command Path

FlipRat [flipper] [time in seconds] -m

Positional Arguments

- **flipper.** is the flipper whose ratio should be returned.
- **time in seconds.** is the time of the measurement used to calculate flipping rate.
- **-m.** option allows to specify Monitor as a count against device. Otherwise, Detector counts are considered.

FlushStack

Brief Description

Flushes the contents of the stack.

Full Command Path

FlushStack

FreeDetMove

Brief Description

Sets the flag to allow detector carriages to move regardless of the detector mode. This command can only be called by administrator.

Full Command Path

Usage: FreeDetMove [flag]

[flag] equals to 0 or 1. By default the flag is 1.

GetActiveBlades

Brief Description

Retrieves the number of active analyzer blades.

Full Command Path

Usage: GetActiveBlades

No arguments.

GetAnalyzerMode

Brief Description

Retrieves current analyzer (A5) mode.

Full Command Path

Usage: GetAnalyzerMode

No arguments.

GetCollMode

Brief Description

Retrieves analyzer collimator mode.

Full Command Path

Usage: GetCollMode

No arguments.

GetDetMode

Brief Description

Retrieves current detector (A6) mode.

Full Command Path

Usage: GetDetMode

No arguments

GetFlipper

Brief Description

Retrieves information about existing Ei or Ef flippers, including their ON/OFF status and calibration points.

Full Command Path

Usage: GetFlipper [Ei|Ef]

Device GetHard

Brief Description

Returns the hardware value.

Full Command Path

Usage: Device GetHard [device]

Positional Arguments

[device] is the name of the device.

GetNewLattice

Brief Description

Returns FindPeak lattice conversion value. Values lesser than zero indicate that lattice parameter has not been set.

Full Command Path

Usage: GetNewLattice

No arguments.

GetSollerOffset

Brief Description

Returns the offset of the soller collimator position relative to position 50.

Full Command Path

Usage: GetSollerOffset [10|25|50|OPEN]

GiveUp

Brief Description

Forces one or several devices to go Idle

Full Command Path

GiveUp [device] [ALL]

Positional Arguments

- **device.** is a device or list of devices to force to go idle.
- **ALL.** indicates that all devices should go idle.

Help

Brief Description

Display help information for server commands.

Full Command Path

Help

Help [command]

Positional Arguments

command is the command for which help information will be displayed. If no command is given, a list of commands, grouped by type, will be displayed.

hf

Full Command Name

Instrument Action Horizfocus

Hold

Brief Description

The Hold command allows users to place a delay in the server queue stack.

Full Command Path

Usage: Hold [number of seconds]

Positional Arguments

[number of seconds] is the number of seconds to wait

Home

Full Command Name

Instrument Action Home

HomeAnalyzerBlades

Brief Description

Homes all the analyzer blades by moving blades simultaneously to zero.

Full Command Path

Usage: HomeAnalyzerBlades

No arguments.

Expt Info

Brief Description

The Expt Info command returns a message with all the information including id, name, participants, details, and comments about the current experiment.

Full Command Path

Usage: Expt Info

Instrument Action Calc Angle

Brief Description

Compute the scattering angle.

Full Command Path

Usage: Instrument Action Calc Angle [D-Spacing] [WaveLength]

Positional Arguments

[D-Spacing] is the d-spacing value.

[WaveLength] is the wavelength value.

Instrument Action Calc D

Brief Description

Compute the d-spacing.

Full Command Path

Usage: Instrument Action Calc D [Theta] [WaveLength]

Positional Arguments

[Theta] is the theta value.

[WaveLength] is the wavelength value.

Instrument Action Calc E2WL

Brief Description

Compute the wavelength in A from and energy in meV.

Full Command Path

Usage: Instrument Action Calc E2WL [Energy in meV]

Positional Arguments

[Energy in meV] is the meV energy value.

Instrument Action Calc K

Brief Description

Compute the q length.

Full Command Path

Usage: Instrument Action Calc K [Theta] [WaveLength]

Positional Arguments

[Theta] is the theta value.

[WaveLength] is the wavelength value.

Instrument Action Calc WL

Brief Description

Compute the wavelength.

Full Command Path

Usage: Instrument Action Calc WL [D-Spacing] [Theta]

Positional Arguments

[D-Spacing] is the d-spacing value.

[Theta] is the theta value.

Instrument Action Calc WL2E

Brief Description

Compute energy from the wavelength.

Full Command Path

Usage: Instrument Action Calc WL2E [WaveLength]

Positional Arguments

[WaveLength] is the wavelength value.

Instrument Action CalDFM

Brief Description

Sets DFM.

Full Command Path

Usage: Instrument Action CalDFM [pos] -H [horizfocus] -V [vertifocus]

Positional Arguments

[pos] specifies DFM position.

Keyword Arguments

-H [horizfocus] specifies horizontal focus. By default, sets horizontal focus to FLAT.

-F [vertifocus] specifies vertical focus. By default, sets vertical focus to FLAT

Instrument Action Home

Brief Description

Homes DFM together with all of its subdevices.

Full Command Path

Usage: Instrument Action Home

Positional Arguments

No arguments.

Instrument Action Horizfocus

Brief Description

Set horizontal focus of the DFM.

Full Command Path

Usage: Instrument Action Horizfocus [ENERGY | VENETIAN | FLAT | POINT]

Positional Arguments

Focus type ENERGY, VENETIAN, FLAT or POINT.

Instrument Action Orient Angles

Brief Description

Calculates the angles corresponding to given values of Q and E.

Full Command Path

Usage: Instrument Action Orient Angles [Ei] [Ef] [h] [k] [l]

Positional Arguments

[Ei] is the Ei value.

[Ef] is the Ef value.

[h] is the h value.

[k] is the k value.

[l] is the l value.

Instrument Action Orient Calc

Brief Description

Calculates the UB matrix. This command must be called before using the Angles and HKL commands.

Full Command Path

Usage: Instrument Orient Calc

Instrument Action Orient HKL

Brief Description

Calculates the H, K, and L for given angle values.

Full Command Path

Usage: Instrument Action Orient HKL [A2] [A3] [A4] [A6] [SGL] [SGU]

Positional Arguments

[A2] is the angle value of A2.

[A3] is the angle value of A3.

[A4] is the angle value of A4.

[A6] is the angle value of A6.

[SGL] is the sample lower tilt value of SGL.

[SGU] is the sample upper tilt value of SGU.

Instrument Action Orient Info

Brief Description

Returns information about the reflections and the UB matrix.

Full Command Path

Usage: Instrument Action Orient Info

Instrument Action Orient Reflection

Brief Description

Set a reflection. Example: action orient reflection 1 14.7 14.7 1 0 0 0 21.6392 0 0

Full Command Path

Usage: Instrument Action Orient Reflection [#] [Ei] [Ef] [h] [k] [l] [A3] [A4] [SGL] [SGU]

Positional Arguments

[#] is the reflection ID number (1 or 2)

[Ei] is the Ei value.

[Ef] is the Ef value.

[h] is the h value.

[k] is the k value.

[l] is the l value.

[A3] is the A3 value.

[A4] is the A4 value.

[SGL] is the sample lower tilt value.

[SGU] is the sample upper tilt value.

Instrument Action Orient UseUB

Brief Description

Sets the flag to use the UB matrix.

Full Command Path

Usage: Instrument Action Orient UseUB [1 | 0]

Positional Arguments

[1 | 0] is the value determining whether the UB matrix is on(1) or off(0).

Instrument Action Vertifocus

Brief Description

Set vertical focus of the DFM.

Full Command Path

Usage: Instrument Action Vertifocus [FLAT | SAGITTAL]

Positional Arguments

Focus type FLAT or SAGITTAL.

Instrument AddGroupEntry

Brief Description

Instrument AddGroupEntry [Device] [Group] [Position]. Adds [Device] to the group [Group], at position [Position]. If [Position] is not defined, the device will be appended.

Full Command Path

Usage: Instrument AddGroupEntry [Device] [Group] [Position]

Positional Arguments

[Device] is the device to be added to the device group.

[Group] is the group name used to define the list of devices.

[Position] is the location to place the device in the device list.

Instrument DelGroups

Brief Description

Deletes the specified group of devices. The devices will not be destroyed.

Full Command Path

Usage: Instrument DelGroups

Instrument DelGroupEntry

Brief Description

Removes [Device] from the [Group] group.

Full Command Path

Usage: Instrument DelGroupEntry [Device] [Group]

Positional Arguments

[Device] is the device to be removed from the device group.

[Group] is the group name used to define the list of devices.

Instrument GetAliases

Brief Description

Gets the list of all aliases defined on the instrument.

Full Command Path

Usage: Instrument GetAliases

Instrument GetAna

Brief Description

Gets the analyzer information for the instrument.

Full Command Path

Usage: Instrument GetAna

Instrument GetCounters

Brief Description

Gets the list of all counters available on the instrumnet.

Full Command Path

Usage: Instrument GetCounters

Instrument GetEnvs

Brief Description

Gets the list of all environment controllers on the instrument.

Full Command Path

Usage: Instrument GetEnvs

Instrument GetGroups

Brief Description

Gets the list of all groups of devices defined on the instrument.

Full Command Path

Usage: Instrument GetGroups

Instrument GetMono

Brief Description

Gets the monochromator information for the instrument.

Full Command Path

Usage: Instrument GetMono

Instrumnet GetMonoSpacing

Brief Description

Gets the monochromator d-spacing [Angstrom].

Full Command Path

Usage: Instrument GetMonoSpacing

Instrument Getmotors

Brief Description

Gets the motors available on the instrument.

Full Command Path

Usage: Instrument Getmotors

Instrument GetVirtuals

Brief Description

Gets the list of all virtual devices on the instrument.

Full Command Path

Usage: Instrument GetVirtuals

Instrument ListDevices

Brief Description

Returns a list of all available device drivers for this instrument.

Full Command Path

Usage: Instrument ListDevices

Instrument ListEnvs

Brief Description

Returns a list of all available environment controller drivers for this instrument.

Full Command Path

Usage: Instrument ListEnvs

Instrument ListInterfaces

Brief Description

Returns a list of all available interface drivers for the instrument.

Full Command Path

Usage: Instrument ListInterfaces

Instrument ReadZeros

Brief Description

Reads the device zeros from a file.

Full Command Path

Usage: Instrument ReadZeros [filename]

Positional Arguments

[filename] is the file name containing the device zeros.

Instrument Restore

Brief Description

USE WITH CARE! Restores the hardware values from a specified file. If no file is specified, that last saved hardware configuration will be restored.

Full Command Path

Usage: Instrument Restore [filename]

Positional Arguments

[filename] is the file name containing the hardware values to restore to. If this field is not used, the last saved hardware configuration will be restored.

Instrument SetAnaSpacing

Brief Description

Sets the analyzer d-spacing [Angstrom].

Full Command Path

Usage: Instrument SetAnaSpacing [value]

Positional Arguments

[value] is the number to be set for the analyzer d-spacing

Instrument SetGroup

Brief Description

Defines a new group of devices.

Full Command Path

Usage: Instrument SetGroup [Group] [List of Devices]

Positional Arguments

[Group] is the group name used to define the list of devices.

[List of Devices] is the list of devices to be added to the group name.

Instrument SetMonoSpacing

Brief Description

Sets the monochromator d-spacing [Angstrom].

Full Command Path

Usage: Instrument SetMonoSpacing [value]

Positional Arguments

[value] is the number to be set for the monochromator d-spacing.

Instrument WriteZeros

Brief Description

Writes the device zeros to a file.

Full Command Path

Usage: Instrument WriteZeros [filename]

Positional Arguments

[filename] is the file name to write to.

Interface

Brief Description

Open or close an interface.

Full Command Path

Usage: Interface

Kill

Brief Description

Kills the execution of the current command.

Full Command Path

Kill

KillAndPause

Brief Description

Kills the current scan and pauses

Full Command Path

KillAndPause

ListStack

Brief Description

Returns a list of the commands presently in the stack.

Full Command Path

ListStack

Log

Brief Description

Returns the last entry in the log file for messages of a specific type.

Full Command Path

Log [Type]

Positional Arguments

[Type] can take the following values: Messages, Errors, User, Data, Debug.

Login

Brief Description

Logs the user in as Administrator.

Full Command Path

Login Admin [password]

Positional Arguments

password is the administrator password for the server.

Logout

Brief Description

Logs the user out as Administrator.

Full Command Path

Logout Admin

Message

Brief Description

Sends a dispatcher message to recipient [Recipient]. The content of the message is given by [Message].

Full Command Path

Usage: Message [Recipient] [Message]

Positional Arguments

[Recipient] is the name of the recipient.

[Message] is the content of the message.

Move

Brief Description

Move [Part] [Position] [Part2] [Position2] [-relative] Moves the part [Part] at the position [Position]. Several devices and positions can be appended. Use the [-relative] for a relative move.

Full Command Path

Usage: Move [part] [value]

Positional Arguments

[part] is the device to be moved.

[value] is the value the device is going to move to.

MoveBragg

Brief Description

The MoveBragg command moves two devices and conserves the Bragg condition.

Full Command Path

Usage: MoveBragg [TwoThetaDevice] [TwoThetaValue] [ThetaDevice]

Positional Arguments

[TwoThetaDevice] is a placeholder representing the two-theta device.

[TwoThetaValue] is a decimal value representing the two-theta value.

[ThetaDevice] is a placeholder representing the theta device.

NewRun

Brief Description

Starts a new run (increments the current run number by one).

Full Command Path

Usage: NewRun

Pause

Brief Description

Puts the control executive in the PAUSE state.

Full Command Path

Pause

PreCountStart

Brief Description

Executes the PreCountStart command.

Full Command Path

Usage: PreCountStart

Positional Arguments

PreCountStop

Brief Description

Executes the PreCountStop command.

Full Command Path

Usage: PreCountStop

Positional Arguments

Print

Brief Description

Print specified server information

Full Command Path

Print [Angles|SoftAngles|HardAngles|Limits|Zeros|Fixed|Counters]

Positional Arguments

##positional arguments##

Q

Brief Description

The Q command takes energy values and transforms h, k, and l values to move to a given position.

Full Command Path

Usage: Q [E] ["i" OR "f"] [Efixed] [h] [k] [l]

Usage: Q [h] [k] [l] This command uses the current initial and final energy.

Positional Arguments

[E] is a value for the current energy transfer coming in before it hits the sample.

["i" OR "f"] specifies whether you want to fix initial[i] or final[f] energy values.

[Efixed] a value for initial or final energy.

[h] is a value defining a point in reciprocal space.

[k] is a value defining a point in reciprocal space.

[l] is a value defining a point in reciprocal space.

Qscan

Brief Description

Start a Q scan, keeping current Ei and Ef as they are

Full Command Path

Usage: QScan [h_i] [k_i] [l_i] [h_f] [k_f] [l_f] [monitor counts] [h step] [k step] [l step]

Positional Arguments

- **[h_i], [k_i], and [l_i] .** are the initial reciprocal lattice points for the scan.
- **[h_f], [k_f], and [l_f] .** are the final reciprocal lattice points for the scan.
- **[monitor counts] .** is the number of monitor counts to count per point.
- **[h step], [k step], and [l step] .** are the step sizes in each reciprocal lattice direction for the scan.

QueueSetPersistenceMode

Brief Description

QueueSetPersistenceMode [OnOff] Queues a command to change the magnet's persistence mode. If parameter OnOff is 0 it will turn off persistence mode and if OnOff is 1 it will turn on persistence mode.

Full Command Path

Usage: QueueSetPersistenceMode [OnOff]

Positional Arguments

[OnOff] Whether to turn persistence mode on or off: 0 - off, 1 - on.

Rate

Brief Description

The Rate command will measure the monitor rate for the number of seconds supplied. If no argument is supplied, it will count for 5 seconds. ICE will store the measured monitor rate and the value of an instrument-specific device (A2 on triple-axes) at the time of the measurement. This command must be called before using Scan HowLong and Scan Automon.

Full Command Path

- Usage: Rate [time to count]
- Alt Usage: Rate [Monitor device] [timer device] [Time to count]

Positional Arguments

[time to count] is the value to count against time.

Register

Brief Description

Registers a client: gets all the necessary information to know which permission to give it.

Full Command Path

##full command path##

Positional Arguments

##positional arguments##

Resume

Brief Description

Puts the control executive in the state is was in before being paused.

Full Command Path

Resume

Run

Full Command Name

Scan Run

Sample GetDescr

Brief Description

Retrieves sample description if it is available.

Full Command Path

Usage: Sample GetDescr

No arguments.

Sample GetLattice

Brief Description

Displays parameters of the crystal lattice of the sample in the console.

Full Command Path

Usage: Sample GetLattice

No agruments.

Sample GetOrient

Brief Description

Displays the current orientation vectors in the console.

Full Command Path

Usage: Sample GetOrient

No arguments.

Sample Info

Brief Description

Display in the console the information about sample including sample orientation, lattice and description.

Full Command Path

Sample Info

No arguments.

Sample SetDescr

Brief Description

Sets sample description.

Full Command Path

Usage: Sample SetDescr [description]

Sets sample description to [description].

Positional Arguments

[description] is a string describing a sample.

Sample SetLattice

Brief Description

Sets or modifies parameters that determine the structure of the crystal lattice of the sample.

Full Command Path

Usage: Sample SetLattice -A [A] -B [B] -C [C] -Alpha [Alpha] -Beta [Beta] -Gamma [Gamma]

Takes six optional keyword arguments. If certain keywords are ommitted from command parameters, respective lattice parameters remain unchanged.

Keyword Arguments

[A], [B] and [C] specify lattice constants.

[Alpha], [Beta] and [Gamma] specify angles between lattice vectors.

Sample SetOrient

Brief Description

Sets or modifies the sample orientation vectors which define the scattering plane.

Full Command Path

Usage: SetOrient [h1] [k1] [l1] [h2] [k2] [l2]

Positional Arguments

[h1], [k1], [l1] describe the first Q-vector, and [h2], [k2], [l2] describe the second Q-vector defining the scattering plane.

Scan Command

Brief Description

Scans are described as a sequence of instrument states at which measurements are made. Virtual devices can be used in scan description just like any other device.

A string describing a scan is used to transfer the scan information between processes. This string is parsed and translated into a sequence of instrument states.

In some cases, additional parameters might be needed for the scan description to be complete. For example, when defining a scan in terms of Q and E, the following parameters have to be included in the description:

1. Choice of fixed energy: initial (monochromator) or final (analyzer)
2. Value of fixed energy [meV]
3. Energy transfer list or initial value (the convention is E = Einitial – Efinal) [meV]
4. H, K and L list or initial value

In addition, some scans might require server parameters to be set. For example, a scan defined in terms of Q and E will require the following server parameters to be set already:

1. Monochromator and analyzer d-spacings [Å]
2. Two orientation vectors
3. Lattice parameters (a, b, c, #, #, #)

Example: Scan:Title=”QA4”:Fixed=0:FixedE=14.7:CountType=Time:Counts=10: Npts=5:Range=E=0.1 0:Range=Q=1~0~0 0~0.1~0:Range=A4= 21 1

Scan Descriptions

The description string should always start with the word Scan. Colons separate tokens and values in a list are separated by a space. Each token is made of a field descriptor following by an equal (=) sign and one or several values. The list of available field descriptors is:

1. **Title:** Title of the scan.
2. **Type:** Scan type. Can be supplied as an integer or a string. See below for discussion.
3. **Fixed:** Sets the energy to fix: 0=monochromator, 1=analyzer.
4. **FixedE:** Sets the value of the fixed energy [meV].
5. **Counts:** The number of counts for the point.
6. **CountType:** The device that will be used to count.
7. **DetectorType:** The device that will be used to accumulate the data. This tag only needs to be supplied to select the data to be sent to Xpeek and to specify meta data in the data file. No information will be lost by omitting this tag.
8. **Prefac:** Gives a multiplication factor for the number of counts.
9. **Npts:** The number of points in the scan.

10. **Range:** The functional relation between the scan points for a given device. The format is Range=[device name]=[central position] [increment]. Alternatively, it is possible to define a scan range the following way: Range=[device name]=[start] [stop] S. An “S” at the end of the string indicates that we are using start and stop positions. An I at the end means that the scan specifies initial, step, number of points.

    The Range token can be used to specify any value, including Q and E. Values that are constant throughout the scan can also be specified with a zero increment.

11. **Dev:** As an alternative to Range, the complete list of values to be visited can be supplied: Dev=[device name]=value1 value2 value3…

12. **Timeout:** Time after which the preset counter will be stopped regardless of whether it has reached its preset value.

13. **HoldPoint:** Holding time before the preset counter is started at each point.

14. **HoldScan:** Holding time before the preset counter is started for the first point of a scan.

15. **Npts2:** Number of points of the second dimension in a 2D scan.

16. **Range2:** The functional relation between the scan points for a given device used in the second dimension of a 2D scan.

17. **Comment:** The user can enter a comment here.

18. **Filename:** Specifies a string to be added at the beginning of the data file name.

Any additional tokens can be appended to the scan description as meta data. These additional tokens must be separated by colons.

The Scan List

Scans in ICE are stored in a list in memory. The scan descriptions contained in the list are available to users to run on an instrument. In order to save scans for repeated uses over time, the scan list must be backed up to disk. Several commands exist for manipulating the scan list and moving its contents to and from disk.

Scan Appendlist Command

Brief Description

Append a scan list from an XML file.

Note that this can lead to entries in the current scanlist being overwritten. Use Scan ChkOverwrite to see which scans would be overwritten.

Full Command Path

Scan AppendList [-K] [filename]

Positional Arguments

[filename] is the name of the file to append into the scan list.

Keyword Arguments

the -K flag will prevent scans from being overwritten.

Scan Automon Command

Brief Description

The command will estimate the number of monitor counts needed to make the scan run for a given amount of time. This function uses SCAN HOWLONG and scales the monitor counts according to the desired running time.

The Rate command should be used first.

Full Command Path

- Scan AUTOMON [duration] [scan_name]
- Scan AUTOMON [duration] –i [scan_index]

Positional Arguments

- [duration] is a whole number of hours
- [scan_name] is a name in the scan list
- [scan_index] is an integer representing the position in the scan list

Keyword Arguments

[-s] will cause the result to be basaed on a time in seconds.

Keyword Arguments

[-o] [overhead] will set a default overhead to add to the time for each point. The overhead is in hours, unless the -s option is set. If there is a device with a higher overhead than the specified overhead, then that device's overhead will be added instead.

Scan ChkOverwrite Command

Brief Description

Return the list of scans which would be overwritten by loading a list of scan from a file.

Full Command Path

Scan ChkOverwrite [filename]

Positional Arguments

[filename] is the name of the file to check for conflicts which would overwrite the current scan list.

Scan Clearlist Command

Brief Description

Clears out all scans currently in the scan list. If those scans have not been backed up, they will be lost.

Full Command Path

Scan ClearList

Scan Currenttolist Command

Brief Description

Puts the present scan description in the server list of scans under a specified name.

Full Command Path

Scan CURRENTTOLIST [name]

Positional Arguments

[name] is the name to which the scan should be stored

Scan Delete Command

Brief Description

Deletes the scan [name] from the server's list of scans.

Full Command Path

Scan DELETE [name]

Positional Arguments

[name] is the name of the scan in the scan list which is to be deleted.

Scan Deleteindex Command

Brief Description

Deletes the scan list entry at a given list index position

Full Command Path

Scan DELETEINDEX [index]

Positional Arguments

[index] is an integer representing the location of the item to be deleted in the scan list.

Scan Descr Command

Brief Description

Returns the current scan description. If a filename [filename] is specified, the scan description will be written to this file in XML format.

Full Command Path

Scan DESCR [filename]

Positional Arguments

[filename] is the name of the file in which to save the current description.

Scan Descrtolist Command

Brief Description

Put a given scan description into the scan list, under the given name.

Full Command Path

Scan DESCRTOLIST [scanname] [scandescr]

Positional Arguments

- [scanname] is the name to use for the scan.
- [scandescr] is a scan description.

Scan Dryrun Command

Brief Description

Dry run the current scan or a scan in the scan list if a parameter is given. A dry run calculates the points in a scan and produces parameters describing them.

Full Command Path

Scan DRYRUN [arguments]

Positional Arguments

[arguments]

Scan Fromfile Command

Brief Description

Runs a scan taken from an already existing data file. The scan description stored in the data file is loaded and run.

The user can specify a new name for the scan; otherwise the scan will have the same name as in the data file.

Full Command Path

Scan FROMFILE [data file name] [new title] [-f] [-n] [-d]

Positional Arguments

- [data file name] is the name of the data file to read.
- [new title] is the name to give the scan when loaded.

Keyword Arguments

- [-f] is a flag to force files to be overwritten.
- [-n] is a flag to cause the scan to be stored on the server without being run.
- [-d] will dryrun the scan (and set it to the current scan).

Scan Howlong Command

Brief Description

The command will compute how long a scan will run. It uses the stored information about the monitor rate. It uses a 3rd degree polynomial parameterization of the monitor rate as a function of an instrument-specific device (A2 for triple axes) to estimate the rate at each point of the scan. The monitor rate predicted by the parameterization is scaled according to the stored monitor rate and the value of A2 it was measured at.

The SCAN RATE command should be run before SCAN HOWLONG.

Full Command Path

Scan HOWLONG [name] [-s] [-o] [overhead]

Positional Arguments

[name] is the name of a scan to run the command on.

Keyword Arguments

[-s] will cause the result to be in seconds.

Keyword Arguments

[-o] [overhead] will set a default overhead to add to the time for each point. The overhead is in hours, unless the -s option is set. If there is a device with a higher overhead than the specified overhead, then that device's overhead will be added instead.

Scan Initscan Command

Brief Description

Initializes the current scan and sets it to its first point.

If the scan is already running, it will be stopped and re-initialized.

Full Command Path

Scan INITSCAN

Scan List Command

Brief Description

Returns the server’s list of scans

Full Command Path

Scan LIST

Scan Listbackup Command

Brief Description

Save scan list to a file.

Full Command Path

Scan LISTBACKUP [file]

Positional Arguments

[file] is a filename in which to save the file.

Scan Listcopy Command

Brief Description

Copy an entry in the scan list to another entry in the list

Full Command Path

Scan LISTCOPY [name1] [name2]

Positional Arguments

- [name1] is the name of the scan to be copied.
- [name2] is the name to copy the scan into.

Scan Listdescr Command

Brief Description

Returns the description of the scan named [name] in the server's scan list.

Full Command Path

Scan LISTDESCR [name]

Positional Arguments

[name] the name of the scan to look for in the scan list.

Scan Load Command

Brief Description

Makes the specified scan the current scan.

Full Command Path

Scan LOAD [name]

Positional Arguments

[name] is the name of the scan to load as the current scan.

Scan Modify Command

Brief Description

Modifies the current scan description using the arguments. This command is similar to Set, but it keeps the current description instead of replacing it.

Full Command Path

Scan MODIFY [arguments]

Positional Arguments

[arguments]

Scan Nocount Command

Brief Description

Sets the number of counts for point [point] to [value]

Full Command Path

Scan SETNOCOUNT [point] [value]

Positional Arguments

- [point] is the index of the point in the list of scan points.
- [value] is the count value that the scan point will be set to.

Scan Progress Command

Brief Description

Return the progress percentage for the current scan

Full Command Path

Scan Progress

Scan Resume Command

Brief Description

Tells the control executive that it is allowed to continue the scan on a NextPoint command.

Full Command Path

Scan RESUME

Scan Run

Brief Description

Runs the current scan, or a scan specified by arguments

The command syntax Scan Runscan is equivalent to Scan Run.

Full Command Path

- Scan RUN
- Scan RUN [scan_name]
- Scan RUN –i [index]

Positional Arguments

- [scan_name] is the name of a scan in the scan list to run. The default is the current scan.
- [index] is the index number of the scan to run in the scan list.

Keyword Arguments

-i indicates that a scan index should be used instead of a scan name.

Scan Scanon Command

Brief Description

Turn the scan flag on or off.

Full Command Path

Scan SCANON [0|1]

Positional Arguments

[0|1] sets whether the scan flag is set to on (1) or off (0).

Scan Set Command

Brief Description

Sets a scan from a description.

This command cannot be run if there is a scan in progress.

Full Command Path

Scan SET [descr]

Positional Arguments

[descr] is a properly formatted scan description.

Scan Setpoint Command

Brief Description

Sets the current scan point to [value].

Full Command Path

Scan SETPOINT [value]

Positional Arguments

[value] is the index of a scan point in the list of scan points for the current scan.

Scan Stop Command

Brief Description

Schedules to stop the scan after the current point. SCAN NEXTPOINT will no longer work, unless a SCAN RESUME command is issued beforehand.

Full Command Path

Scan STOP

SetActiveBlades

Brief Description

Sets the number of active analyzer blades.

Full Command Path

Usage: SetActiveBlades [number]

[number] is an integer that stands for the number of active analyzer blades.

Sequnce Howlong

Brief Description

Estimates the time it will take to run a sequence file.

Full Command Path

Usage: Sequence Howlong [filename] [-s]

Positional Arguments

[filename] is the name of a sequence file in the experiment directory. The filename should contain the full extension .seq.txt.

Switch Arguments

- [-s] indicates that the results should be returned in seconds (the default is hours).
- [-o movementOverhead] tells ICE to use the specified overhead as a minimum overhead per point for instrument movement. The overhead is in hours, unless the -s option is set. If a device is set with a larger overhead, then that overhead will be used.

SetAnalyzerMode

Brief Description

Modifies analyzer (A5) mode.

Full Command Path

Usage: SetAnalyzerMode [FLAT|ENERGY]

SetCollMode

Brief Description

Sets analyzer collimator mode.

Full Command Path

Usage: SetCollMode [OUT|RC|10|25|50|OPEN]

Possible collimator modes are: OUT, RC, 10, 25, 50 and OPEN.

Missing Xinclude CommandSetcomment.xml

SetDetMode

Brief Description

Modifies detector mode (A6). This may imply several sub-moves of detector and collimator.

Full Command Path

Usage: SetDetMode [SD|DD|PSD] [NOMOVE]

Positional Arguments

[SD|DD|PSD] Choose one of these to set which detector mode will be activated

[NOMOVE] will prevent the instrument from going into a busy state while it moves into the chosen mode.

SetFlipper

Brief Description

This command allows the user to associate power supplies with an Ei or Ef flipper. When associating a power supply with a flipper the user must provide values for its calibration energy and calibration current.

Full Command Path

Usage: SetFlipper [Ei|Ef] [flipper name] [calibration energy|CONST] [calibration current]

[flipper name] specifies the name of the flipper device.

[calibration energy|CONST] defines the power supply's calibration energy. When the user provides a calibration energy value, the power supply is treated as a flipping current. When the user provides the string "CONST", the power supply is treated as a compensation current.

[calibration current] defines the power supply's calibration current.

SetSollerOffset

Brief Description

Sets the offset for the given soller collimator position.

Full Command Path

Usage: SetSollerOffset [10|25|OPEN]

Settings GetDataDir

Brief Description

Gets the data directory.

Full Command Path

Usage: Settings GetDataDir

Settings Print

Brief Description

Prints the current settings.

Full Command Path

Usage: Settings Print

Settings SetDataDir

Brief Description

Sets the data directory to the directory specified.

Full Command Path

Usage: Settings SetDataDir [Directory]

Positional Arguments

[Directory] is the directory to set the data directory to.

Settings SetStatusFreq

Brief Description

Sets the frequency of the status broadcasts.

Full Command Path

Usage: Settings SetStatusFreq [value]

Positional Arguments

[value] is the number of times the status broadcasts.

Settings SetVerbose

Brief Description

Sets the verbose value.

Full Command Path

Usage: Settings SetVerbose [value]

Positional Arguments

[value] is the number to set the verbose to.

Device SetTolerance

Brief Description

Sets the tolerance of a device.

Full Command Path

Usage: Device SetTolerance [device] [value]

Positional Arguments

[device] is the device to set the tolerance.

[value] is the value to set the tolerance to.

Stack AppendFile

Brief Description

Appends the content of a file to the command queue.

Ex.: Stack AppendFile EXPT:mySequence.seq.txt

Full Command Path

Stack AppendFile [file path]

Positional Arguments

[file path] is the path to the file which will be appended to the command queue.

Stack DeleteID

Brief Description

Deletes the command with identifier [id] from the stack.

Positional Arguments

[ID] is the id of the element to delete.

Stack DeleteIndex

Brief Description

Deletes the command at index [index] from the stack.

This command is being phased out. Use Stack Delete instead.

Positional Arguments

[index] is the index of the element to delete.

Stack DryRun

Brief Description

Dry runs the content of a file.

Ex.: Stack DryRun EXPT:mySequence.seq.txt

Full Command Path

Stack DryRun [file path]

Positional Arguments

[file path] is the path to the file for which the dry run will be performed.

Stack Flush

Brief Description

Flushes the command queue.

Full Command Path

Stack Flush

Stack HowLong

Brief Description

Returns the number of hours needed to execute the commands currently in the queue.

Full Command Path

Stack Howlong [-s] [-i ID]

Switch Arguments

- **[-s].** If the -s option is supplied, the command will return time in seconds.
- **[-i ID].** If the -i and an ID number is supplied, the command will return the time needed to execute the command specified by the given ID number.
- **[-o movementOverhead].** The -o argument tells ICE to use the specified overhead as a minimum overhead per point for instrument movement. The overhead is in hours, unless the -s option is set. If a device is set with a larger overhead, then that overhead will be used.

Stack Insert

Brief Description

Inserts a command to be executed just before the command having ID=[id]

Full Command Path

Stack Insert [id] [command]

Positional Arguments

- **[id].** The id of the command before which the new command should be inserted.
- **[command].** The command which is to be inserted.

Stack Insert Index

Brief Description

Inserts the command [command] at index [index] in the stack.

This command is being phased out: use Stack Insert

Full Command Path

Stack InsertIndex [index] [command]

Positional Arguments

- **[index].** The location in the stack where the command should be inserted.
- **[command].** The command to be inserted into the stack.

Stack Move

Brief Description

Moves commands to be executed just before the command having ID=[id].

Full Command Path

Stack Move [id1, id2, id3...] [id_dest]

Positional Arguments

- **[id].** The ids are the commands to move within the stack
- **[id_dest].** The command id behind which the moved commands will be placed.

State

Brief Description

Returns the state machine state.

Full Command Path

State

Status

Brief Description

Returns the status of the instrument

Full Command Path

Status

StopAll

Brief Description

Executes a Kill command and flushes the buffer.

Full Command Path

StopAll

StopScan

Brief Description

Stops the execution of a scan. To be used with RunScan, when the command stack is not accessible.

Full Command Path

StopScan

Talk

Brief Description

Writes to an interface.

Full Command Path

Usage: Talk

TestAction

Brief Description

Sends a message to the dispatcher.

Full Command Path

Usage: TestAction [message]

[message] is sent to the internal ICE dispatcher. The dispatcher delivers the message back to the client.

TestBT7Action

Brief Description

Sends a message to the dispatcher.

Full Command Path

Usage: TestBT7Action [message]

[message] is sent to the internal ICE dispatcher. The dispatcher delivers the message back to the client.

Transfer

Brief Description

Transfer is used by the ICE client to transfer a file to the server.

Full Command Path

Usage: Transfer [file path] [file content]

Positional Arguments

[file path] is the path of the file.

[file content] is the content of the file.

UB AddPeakSet

Brief Description

Adds a new peak set to the UB Matrix.

Full Command Path

Usage: UB AddPeakSet [h] [k] [l] [a3] [a4] [ltilt] [utilt]

Return value is the ID by which the user may further refer to the submitted peak.

UB CalcDestination

Brief Description

Determines the UB Matrix motor values for a given hkl.

Full Command Path

Usage: UB CalcDestination [h] [k] [l]

UB CalcHKL

Brief Description

Back calculates HKL position from user specified positions of Sample Theta (A3), Sample Two Theta (A4) and both sample tilts.

Full Command Path

UB CalcHKL [A3] [A4] [LTilt] [UTilt]

Positional Arguments

A3: The hypothetical position of sample theta from which to calculate HKL. A4: The hypothetical position of sample two theta from which to calculate HKL. LTilt: The hypothetical position of lower sample tilt from which to calculate HKL. UTilt: The hypothetical position of upper sample tilt from which to calculate HKL.

UB Calculate

Brief Description

Calculates UB Matrix from input parameters.

Full Command Path

Usage: UB Calculate

No arguments.

UB DeletePeakSet

Brief Description

Removes a peak set with the given id.

Full Command Path

Usage: UB DeletePeakSet [peakset id]

UB ExcludePeakSet

Brief Description

Marks a peak set with a given ID for exclusion from future calculations.

Full Command Path

Usage: UB ExcludePeakSet [peakset id]

UB GetEnergyTolerance

Brief Description

Returns the tolerance for difference between Ei and Ef to calculate UB Matrix. If Ei and Ef differ by more than this tolerance, the UB Matrix cannot be calculated.

Full Command Path

Usage: UB GetEnergyTolerance

UB IncludePeakSet

Brief Description

Marks a peak set with a given ID for inclusion in future calculations.

Full Command Path

Usage: UB IncludePeakSet [peakset id]

UB InvalidatePrimary

Brief Description

Sets the primary peak set to nothing.

Full Command Path

Usage: UB InvalidatePrimary

No arguments.

UB ModifyPeakSet

Brief Description

Modifies an existing peak set.

Full Command Path

Usage: UB ModifyPeakSet [peakset id] -h [h] -k [k] -l [l] -a3 [a3] -a4 [a4] -ltilt [ltilt] -utilt [utilt]

UB Print

Brief Description

Prints an XML string which contains all UB settings, including sample lattice and peak sets.

Full Command Path

Usage: UB Print

UB PrintUBMatrix

Brief Description

Prints the UB Matrix and peakset information currently being used by the server. If no UB Matrix has been computed, then only peakset information is printed.

Full Command Path

Usage: UB PrintUBMatrix

UB SetEnergyTolerance

Brief Description

Sets the tolerance for difference between Ei and Ef to calculate UB Matrix. If Ei and Ef differ by more than this tolerance, the UB Matrix cannot be calculated.

Full Command Path

Usage: UB GetEnergyTolerance [tolerance]

tolerance is a floating point number which will be set as the new energy tolerance.

UB SetLatticeFixed

Brief Description

Sets the status of lattice parameters as fixed or estimated.

Full Command Path

Usage: UB SetLatticeFixed -a [f | e] -b [f | e] -c [f | e] -alpha [f | e] -beta [f | e] -gamma [f | e]

UB SetPrimary

Brief Description

Sets the primary peak set.

Full Command Path

Usage: UB SetPrimary [peakset id]

UB SetRefPlane

Brief Description

Sets the reference plane.

Full Command Path

Usage: UB SetRefPlane [a|b]

[a] is a plane of the first two reflections.

[b] is a plane which minimizes the tilts.

UpdateStatus

Brief Description

Updates the Value/Position field of one or all the devices

Full Command Path

UpdateStatus [list]

Positional Arguments

list is a (possibly empty) list of devices to update. If the list is empty, all devices are updated.

ValidFlipper

Brief Description

Indicates whether flipper can be set for a specified device.

Full Command Path

Usage: ValidFlipper [device]

In current implementation, validflipper is true only for Ei and Ef devices.

Version

Brief Description

Prints version information for all files in the main ice directory. This information includes CVS version number, last modification time, and the user who committed the last modification.

Full Command Path

Usage: Version

No arguments.

vf

Full Command Name

Instrument Action Vertifocus

WAIT

Brief Description

WAIT is used to cause the server to wait a set number of seconds before processing another command.

Full Command Path

Usage: WAIT [s]

The Server will go into the BUSY state for at least s seconds before continuing operations.

Positional Arguments

[s] is an integer number of seconds.

XPeek

Brief Description

Sends information about the current system scan to XPeek server.

Full Command Path

Usage: XPeek

No arguments.

Chapter 6. Commonly Used ICE Command Examples

The following document contains a description and example of each command commonly used in the system.

Move incident or final energy

Brief Description

This moves ei (incident energy) or ef (final energy) to 14.7 meV

Example

Move ei 14.7 OR Move ef 14.7

Setting monochromator mode

Brief Description

Sets monochromator horizontal and vertical focus to different modes.

Example

hf energy

hf flat

vf flat

vf sagittal

“hf energy” set monochromator to horizontal energy focusing mode

“hf flat” set monochromator to horizontal flat mode

“vf flat” set monochromator to vertical flat mode

“vf sagittal” set monochromator to vertical sagittal focusing mode

Move in-pile filter (this filter is before the monochromator)

Brief Description

This moves in pile filter in and out of beam

Example

move filtran in or move filtran out

set the collimator before monochromator

Brief Description

This moves collimation before monochromator to open, 50 minute, 25 minute, and 10 minute.

Example

move premonocoll open

move premonocoll 50min

move premonocoll 25min

move premonocoll 10min

Monitor rate

Brief Description

This command gives the monitor rate/second and monitor rate per minute.

Example

rate

Move a motor

Brief Description

This moves A4 to 50 degrees. The destination is usually in degrees, but it is motor specific (the slits for example are in mm).

Example

Move A4 50.0

Read a motor position or sample environment variable

Brief Description

This reads and prints motor positions and sample environment variables.

Example

Print A4 or Device read A4

Print temp or device read temp

Print magfield or device read magfield

Update all motor or a particular motor position

Brief Description

this comand will interrogate server to update all motor position or a particular motor position (for example, a4)

Example

update or update a4

Move a motor relative to its current position

Brief Description

This moves A4 5 degrees in the positive direction from its current position. The destination is usually in degrees, but it is motor specific (the slits for example are in mm).

Example

Move A4 -relative 5

Fix or Free a motor

Brief Description

This fix or free motor a3. When a3 is fixed, if you run a scan, a3 will not move. However, “move a3 ” command will move a3.

Example

device fix a3

device free a3

Redefine the software position of a motor

Brief Description

The changes the zero of A3 such that the software position of A3 is now 20. This does NOT change the hardware position of A3. Caution: make sure you do not use this command on A1,A2,A4,A5, A6 without checking with instrument scientist.

Example

Device set A3 20

How to HOME slits

Brief Description

This will HOME (rezero) the width and height of slits before (smplwdth and smplhght) and after (bkslitwdth and bkslthght)sample.

Example

device action smplwdth HOME

device action smplhght HOME

device action bksltwdth HOME

device action bkslthght HOME

Change a sample’s temperature

Brief Description

This changes a temperature to 150.7 degrees Kelvin

Example

Move temp 150.7

Set properties of temperature/magnetic controller

Brief Description

This will set the tolerance for temperature or magnetic field.

Example

device setproperty temp tolerance 0.1

device setproperty Magfield tolerance 0.1

Get properties of temperature/magnetic controller

Brief Description

This will get the tolerance for temperature or magnetic field

Example

device getproperty temp tolerance

device getproperty magfield tolerance

Change the magnetic field to which the sample is exposed

Brief Description

This changes a magnetic field to 2.5 Tesla.

Example

Move magfield 2.5

Turn on or off persistance mode

Brief Description

This turn off (0) and on (1) for persistence mode for superconducting magnet (Oxford11T)

Example

device setproperty Magfield persistenceflag 0

device setproperty Magfield persistenceflag 1

Perform a count against time

Brief Description

Either of these commands counts for 100 seconds. Monitor and detector counts are printed. It is also often used as a “waiting” command (for example, use this command to wait for 100 seconds).

Example

Ct/t 100

CountAndPrint time 100

Perform a count against the number of monitor counts

Brief Description

##purpose of command##

Example

Ct/m 10000

CountAndPrint monitor 10000

Activate or deactivate the PSD detector

Brief Description

This will cause the PSD detector to be used/not used when performing a count. Deactivating the PSD detector will make scans run faster, but it will not collect any data.

Example

Device activate PSDCounter

Device deactivate PSDCounter

Setting the detector mode

Brief Description

This sets the detector mode to DD. The other available detector modes are: SD and PSD.

Example

Setdetmode DD

Getting the detector mode

Brief Description

This gets the detector mode. The modes are DD, SD, PSD

Example

Getdetmode

Setting the analyzer mode

Brief Description

The other available mode is: energy

Example

Setanalzyermode flat

Getting the analyzer mode

Brief Description

This returns the current analyzer mode. The available modes are: flat and energy.

Example

Getanalzyermode

Setting the collimator (inside analyzer house) mode

Brief Description

This sets the collimator's mode to OPEN. The other available modes are: OUT, RC, 50, 25 and 10.

Example

Setcollmode OPEN

Getting the collimator (inside analyzer house) mode

Brief Description

This returns the current collimator mode. The available modes are OPEN, OUT, RC, 50, 25 and 10.

Example

Getcollmode

Parking positions for PSD-2axis mode with radial collimator

Brief Description

Parking positions for PSD-2axis mode with radial collimator

Example

move collsoller 63

move collrc 260

Parking positions for SD-3axis energy focusing mode with radial collimator

Brief Description

Parking positions for SD-3axis energy focusing mode with radial collimator

Example

move diffdet 205 (only “superuser” can do it)

move collrc 260

Running a peak scan

Brief Description

Running a peak scan

Example

findpeak A3 5 1 Monitor 5000 Detector -accept

This performs a peakscan around the current position of A3. It will scan 5 degrees in both directions with a step size of 1. At each point it will count for 5000 monitor counts and use the detector reading to determine the fit. The -accept option causes the instrument to drive to position of the calculated peak when the scan concludes.

findpeak A3 5 1 Time 5 Monitor –accept –t 0.1 –func POLY3

This performs a peakscan around the current position of A3. It will scan 5 degrees in both directions with a step size of 1. At each point it will count for 5 seconds and use the monitor reading to determine the fit. The -accept option causes the instrument to drive to position of the calculated peak when the scan concludes. The –t 0.1 option causes the software position of A3 to be set to its initial position before the scan, after A3 has been moved to the calculated peak. This affectively changes the zero of A3 so that it now measures the original software position while being at the peak position. The -func POLY3 causes the fitting function to be changed from the default Gaussian fit to a 3rd order polynomial fit.

findpeak A4 5 1 Time 5 Detector –bragg A3 -lattice 1

This will perform a theta-2theta scan and calcuate d-spacing using the fitted peak position.

Running a scan

Brief Description

This command will run the scan named “scanname”. For example, scan runscan E200 (or run E200) will run scan named “E200”.

Example

scan runscan scanname

run scanname

Dryrun a scan

Brief Description

This will dryrun scan maed “E200”. It will calculate all the motor positions for each point in scan. No motor is moved.

Example

scan dryrun E200

Delete all the scans in server queue

Brief Description

This will delete all the scans.

Example

scan clearlist

Delete one scan

Brief Description

This will delete one scan.

Example

scan delete scanname

Change the order in the queue

Brief Description

This command changes the order in the queue. It will move the command associated with ID 443 before the command associated with ID 438.

Example

stack move xxx yyy

stack move 443 438

Chapter 7. Troubleshooting

A Troubleshooting Page provides users with a solution guide to common problems encountered while using ICE software.

What to Do First

If you are having problems, try the following:

- If you cannot see an Action panel containing Stop! and Pause buttons on top of your screen, the ICE client is not running on your system. You have to restart the ICE client. Go to installation help page for further instructions.
- If you see an Action panel on the top of your screen, your client is set to communicate with the ICE server. If you are not receiving the desired outcome, refer to ICE help pages for description of both syntax and semantics of commands and panels you are using. Make sure you are passing correct parameters.
- If you are receiving an error message, check Error Messages section of this help page.

Error Messages

The following are the error messages you could receive from our software, and suggestions for fixing them:

Command [command] not recognized for Local/Remote client [client]
Check whether the command with such name exists by looking in command help pages or by typing "help [command]" (which displays information about the given command) or "help" (which lists all currently supported commands). Make sure that the command is supported by Local/Remote client. If you have specified a subcommand name, make sure that this subcommand is supported as well.
Could not find part [Device] or **Part [Device] not found**
Check whether [Device] is a correct name or alias of the device installed in the system.
Value given outside of soft limits [Device = Value]
Device destination lies outside the soft limits. Soft limits are set to protect different parts of the instrument from colliding with each other and outside objects. Soft limits can be checked using command Device GetLimits. To reset soft limits, use Device SetLowerLimit and Device SetUpperLimit.
Device [Device] hit a limit
Device destination lies outside the hard limits. Hard limits are hardware properties set to protect instrument parts from colliding with each other and with external obstacles. ICE software is not responsible for setting hard limits. Check with hardware group if you think there is a problem with device hard limits.

Frequently Asked Questions

The following are questions asked on a regular basis, and answers

1. **I encountered an error message that is not listed in the category Error Messages above. What should I do?**

   If the error is critical and needs immediate attention, you can contact a member of Software Development Team. If the error is not critical and does not prevent you from using software on the instrument, you can report an error using our bug tracking system.

2. **How do I submit a bug/feature request?**

Our bug tracking system is available at http://rt.ncnr.nist.gov/. You are required to have an RT account in order to access it. If you do not currently have an account, you can submit a bug ticket at http://www-i.ncnr.nist.gov/RT. Please be as specific as possible while describing the problem to help us solve it.

Chapter 8. About: Instrument Control Environment

Instrument Control Environment
NCNR
Department of Commerce

Contact Information

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Project Website

More information about the ICE project can be found at the project website [http://www-i.ncnr.nist.gov/proj/index.php?option=com_content&task=section&id=6&Itemid=17].

Issue Reporting

Plese report all issues with the ICE software using the NCNR request tracker at http://www-i.ncnr.nist.gov/proj/index.php?option=com_content&task=view&id=122&Itemid=167 [http://www-i.ncnr.nist.gov/proj/index.php?option=com_content&task=view&id=122&Itemid=167]

Legal

ICE is a project of the NIST Center for Neutron Research [http://ncnr.nist.gov], a part of the National Institute of Standards in Technology [http://www.nist.gov].

Chapter 9. Keyboard Shortcuts

Keyboard shortcuts provide advanced user keyboard combinations to interact with the software at a much faster rate. The following is a list of keyboard shortcuts applicable to BT7.

Ctrl+X - cut text selection.

Ctrl+C - copy text selection.

Ctrl+V - paste text selection.

Ctrl+A - select all.

Upper Arrow - retrieve command from history when used in the console.

Alt+F12 - emergency stop that immediately stops execution of the current command and clears command queue.

Chapter 10. Glossary

A Glossary provides a list of terms in a subject with their definitions. The following is a list of terms and definitions commonly used by NCNR's scientists.

Neutron - in physics, the neutron is a subatomic particle with no net electric charge and a mass slightly larger than a proton.

Proton - is a subatomic particle with an electric charge.

Polarizer - is a device that converts an unpolarized or mixed-polarization beam of electromagnetic waves (e.g., light) into a beam with a single polarization state (usually, a single linear polarization).

Energy - in physics and other sciences, energy is a scalar physical quantity that is a property of objects and systems which is conserved by nature.

Nuclear Fission - is the splitting of the nucleus of an atom into parts (lighter nuclei) often producing photons (in the form of gamma rays), free neutrons and other subatomic particles as by-products.

Nuclear Fusion - is the process by which multiple atomic particles join together to form a heavier nucleus.

Chapter 11. External Information

External Information provides resources outside of the user manual to the user. Click on the resources link to display its page.

National Institue of Standards and Technology [http://www.nist.gov/] - Founded in 1901, NIST is a non-regulatory federal agency within the U.S. Department of Commerce. NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.

NIST Center for Neutron Research [http://www.ncnr.nist.gov/] - The NCNR is part of the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland. Its activities focus on providing neutron measurement capabilities to the U.S. research community.