Analysis

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Note: These instructions reflect current procedures in our lab on our Cameca SX50 only.

Analysis

Contents

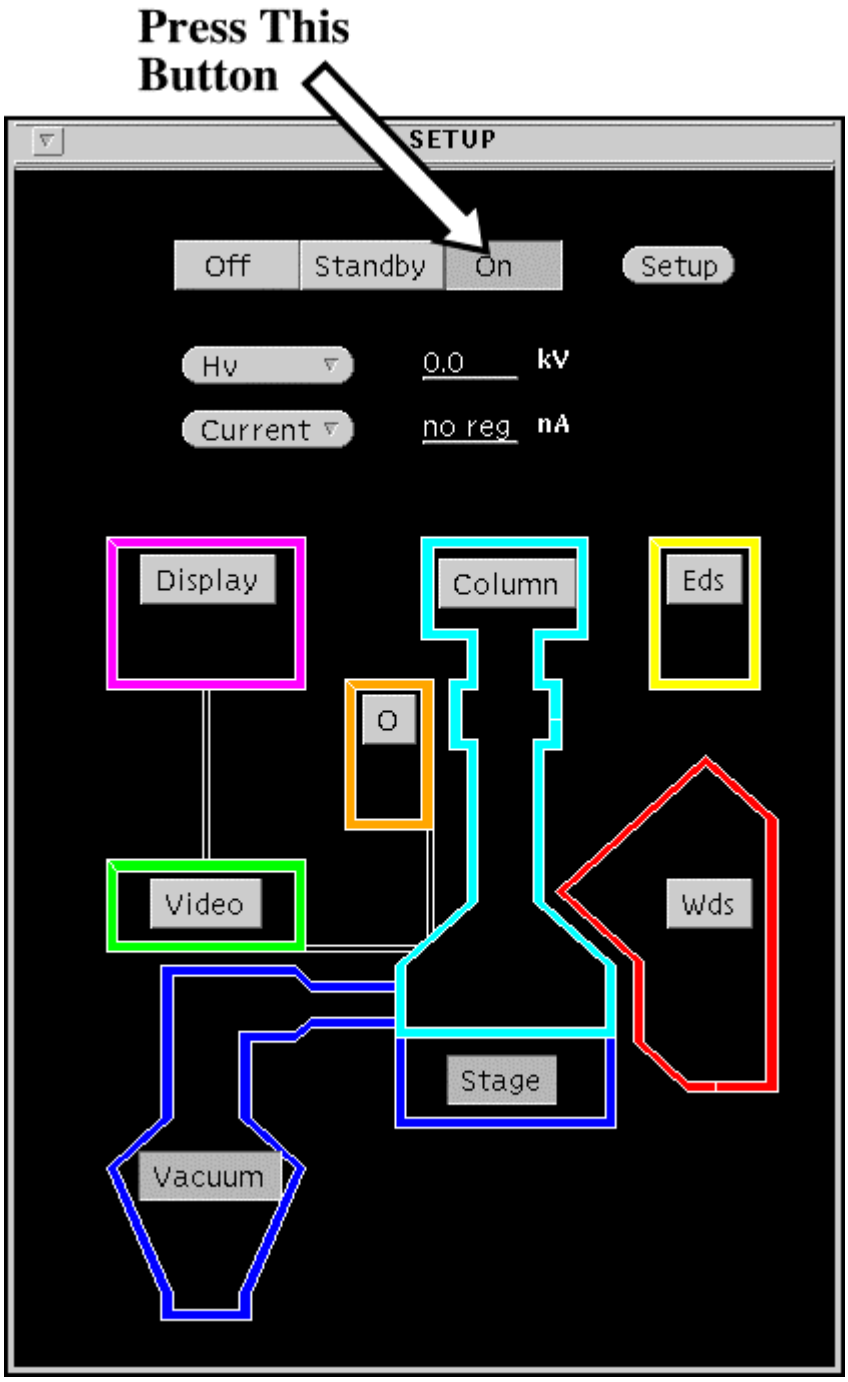
Analysis: Instruction Set 1

Start Up Procedure

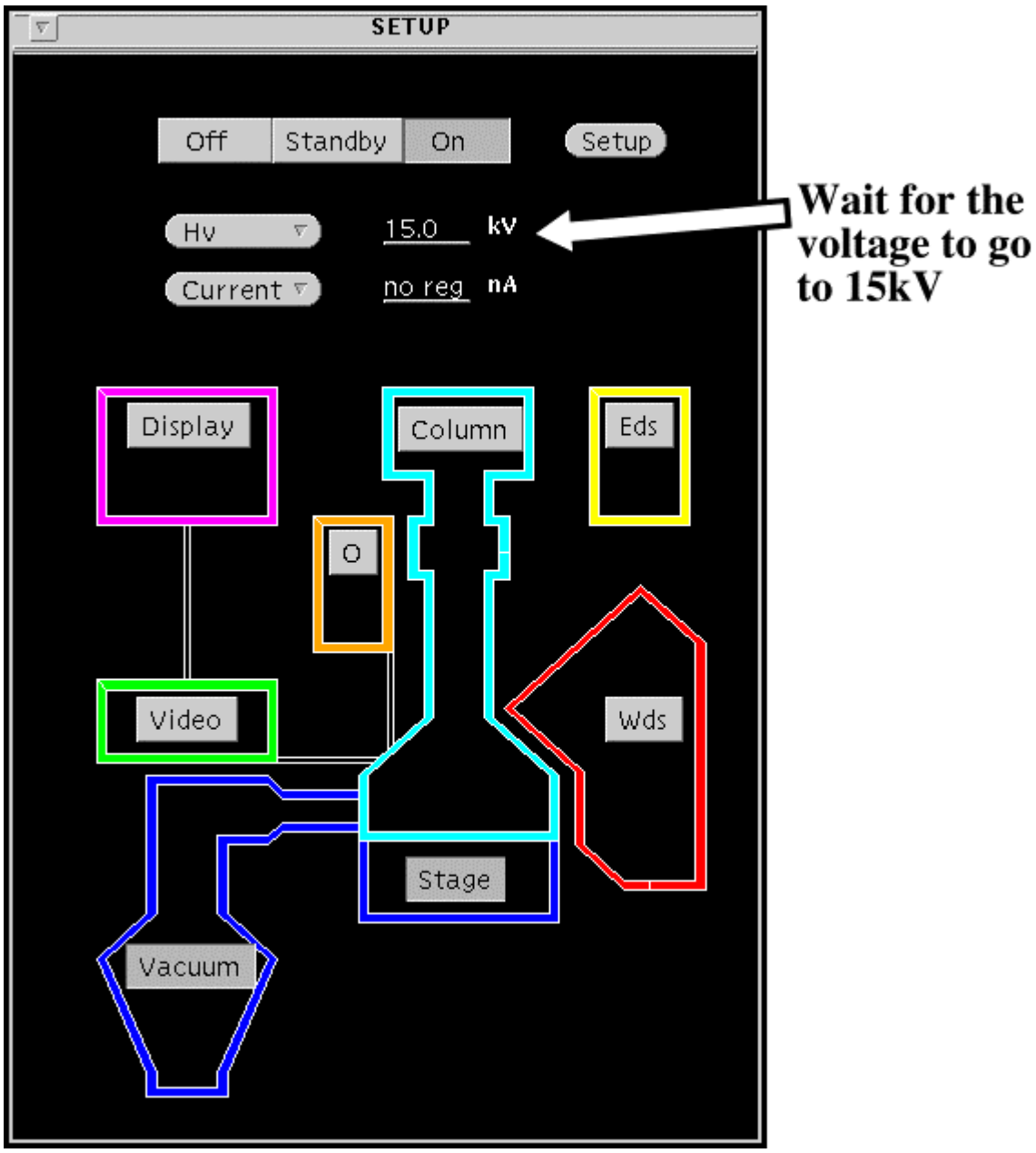
TOP

1: Start the Beam

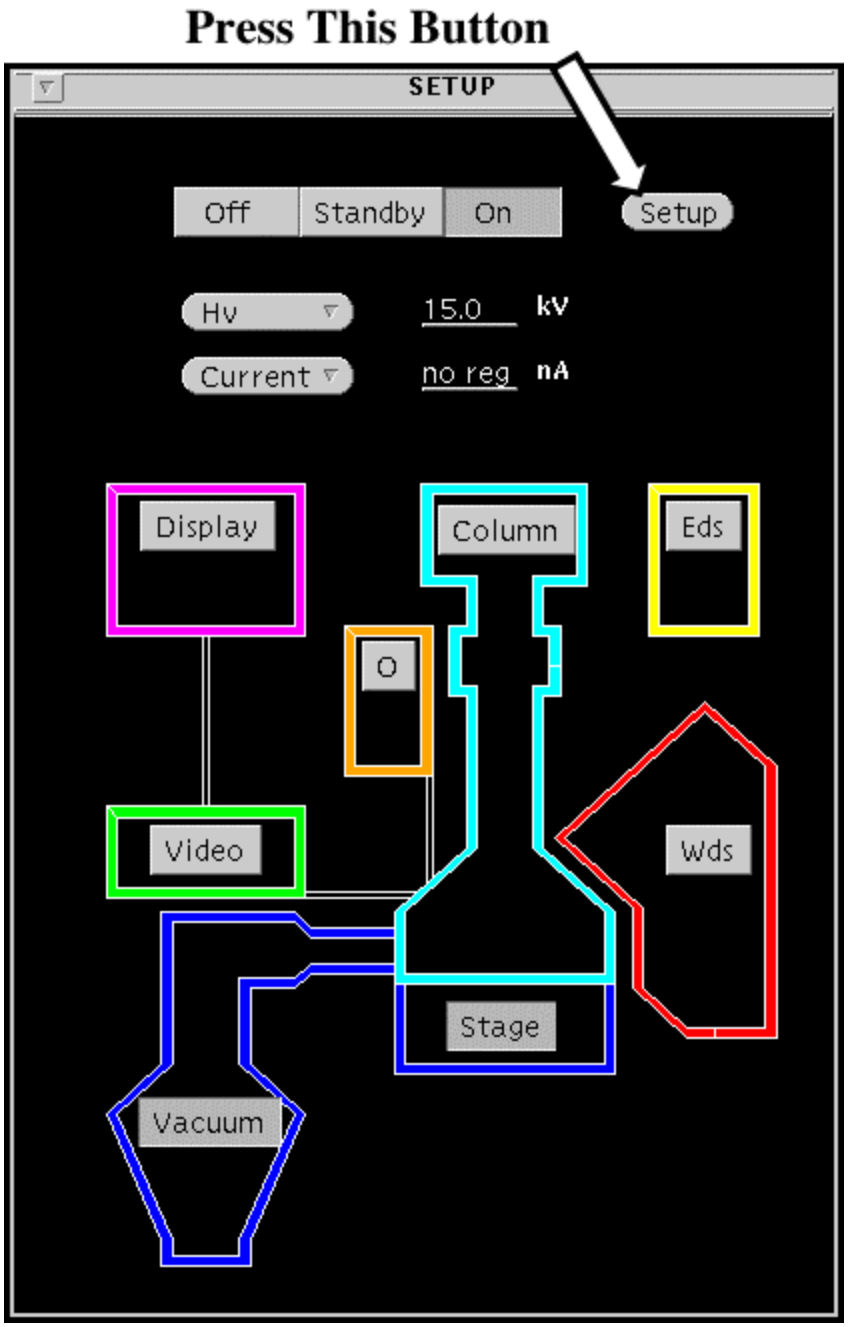
Step 1


Press This Button
SETUP
Off
Standby
On
Setup
Hv
0.0
kV
Current
no reg
nA
Display
Column
Eds
O
Video
Wds
Stage
Vacuum

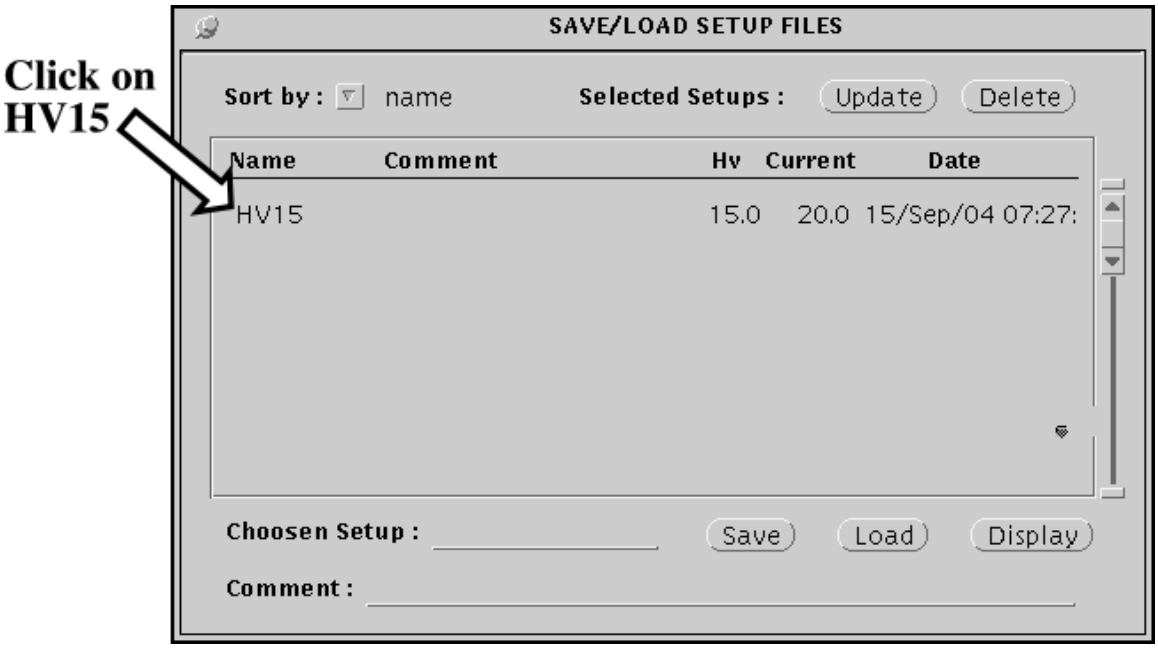
Step 2


SETUP
Off
Standby
On
Setup
Hv
15.0
kV
Current
no reg
nA
Wait for the voltage to go to 15kV
Display
Column
Eds
O
Video
Wds
Stage
Vacuum

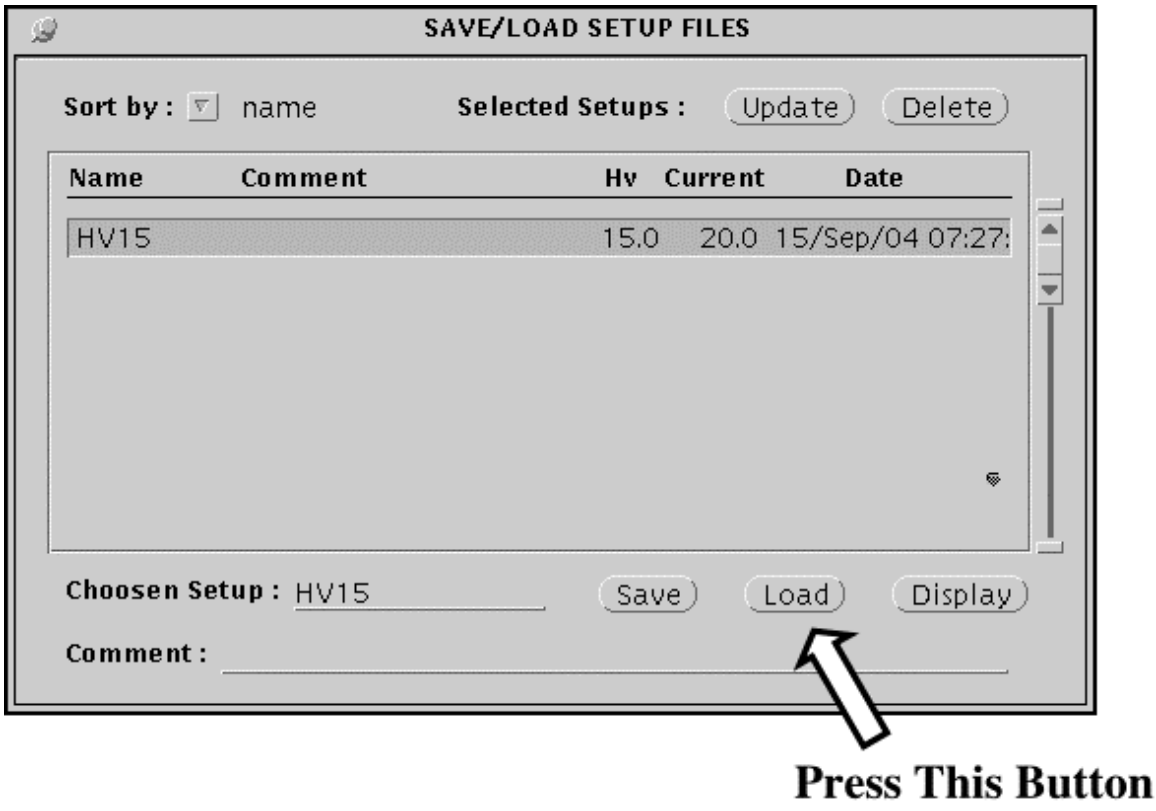
Step 3


Press This Button
SETUP
Off
Standby
On
Setup
Hv
15.0
kV
Current
no reg
nA
Display
Column
Eds
O
Video
Wds
Stage
Vacuum

Step 4


Click on
HV15
SAVE/LOAD SETUP FILES
Sort by :
name
Selected Setups :
Update
Delete
Name
Comment
Hv
Current
Date
HV15
15.0
20.0
15/Sep/04 07:27:
Choosen Setup :
Save
Load
Display
Comment :

Step 5

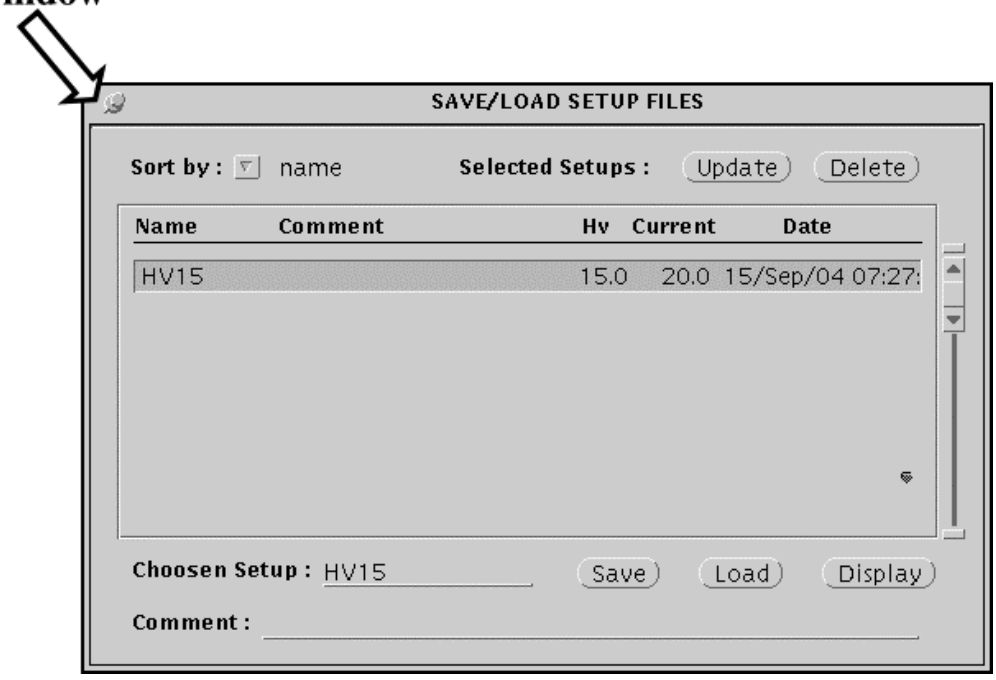

SAVE/LOAD SETUP FILES
Sort by :
name
Selected Setups :
Update
Delete
Name
Comment
Hv
Current
Date
HV15
15.0
20.0
15/Sep/04 07:27:
Choosen Setup :
HV15
Save
Load
Display
Comment :
Press This Button

Step 6

Wait for this message to appear.

Step 7

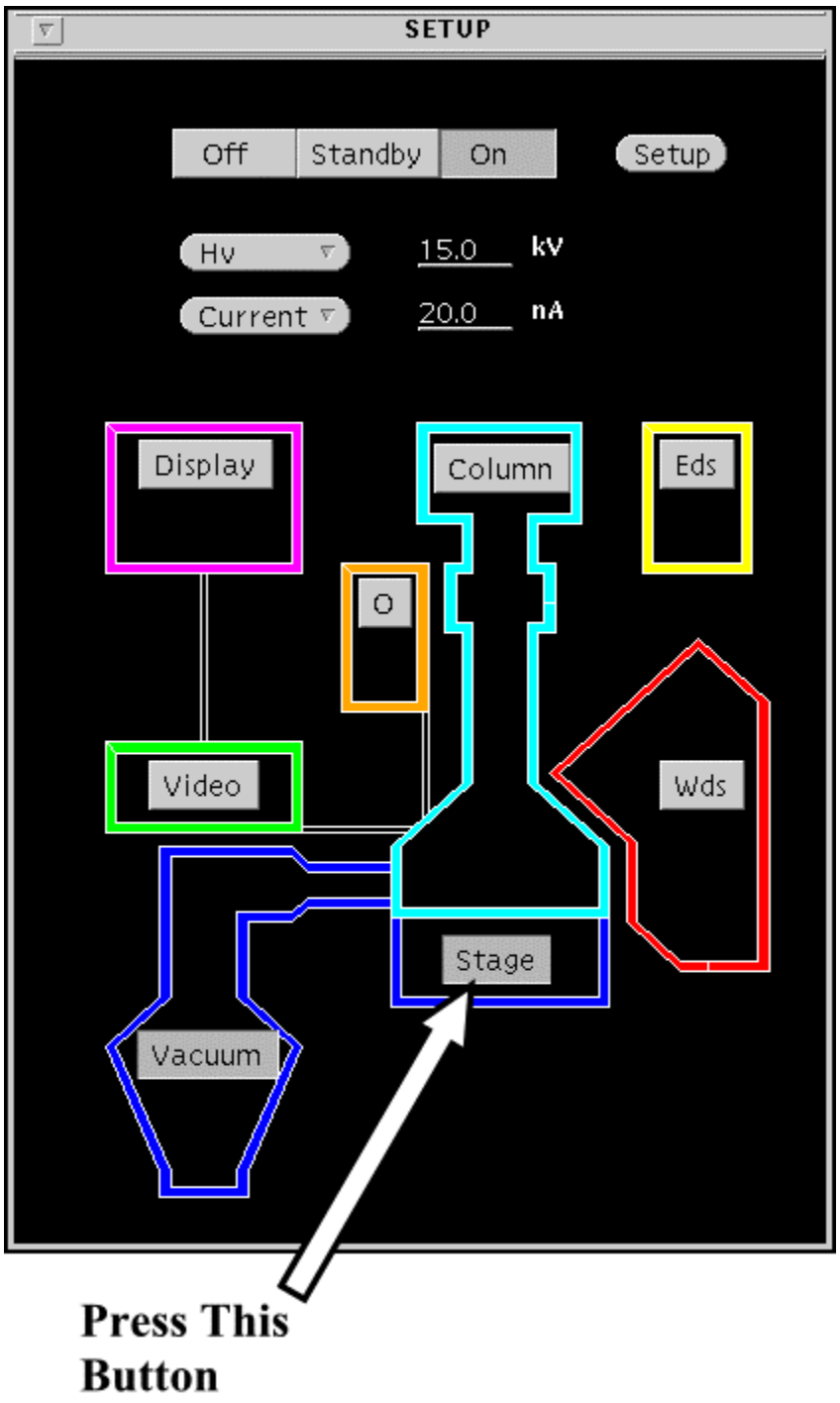
Click this pin to close window



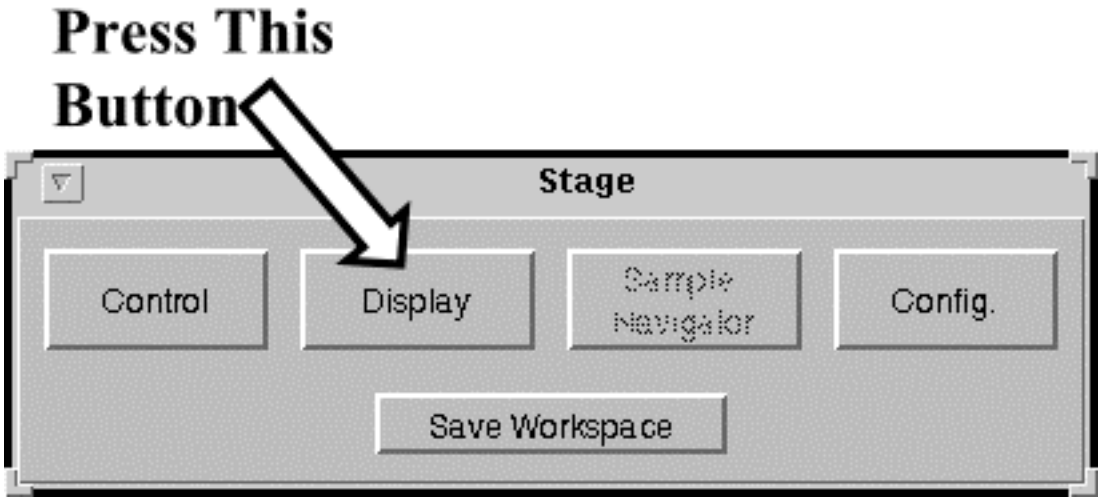
2: Move to the Sample and Focus

Step 1

If the Stage window is not already open:

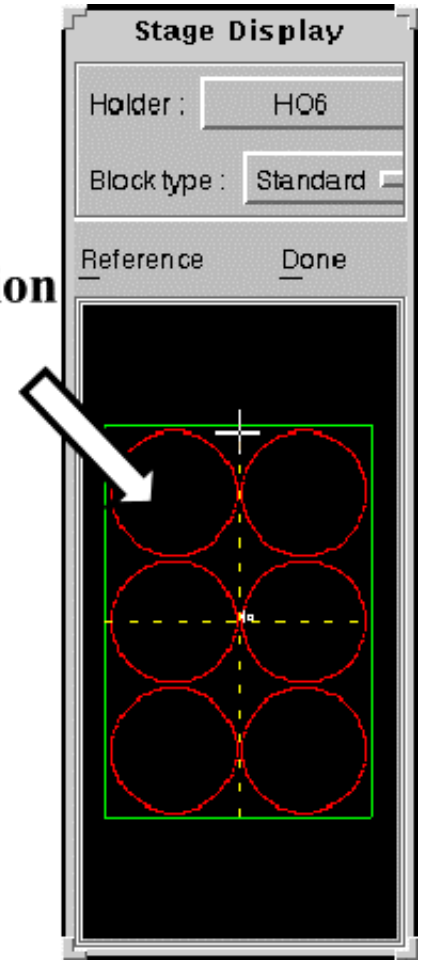


Step 2


Press This Button
Stage
Control
Display
Sample Navigator
Config.
Save Workspace

Step 3

L-Click on the position on the shuttle where your sample is.



The Stage will move to the chosen position.

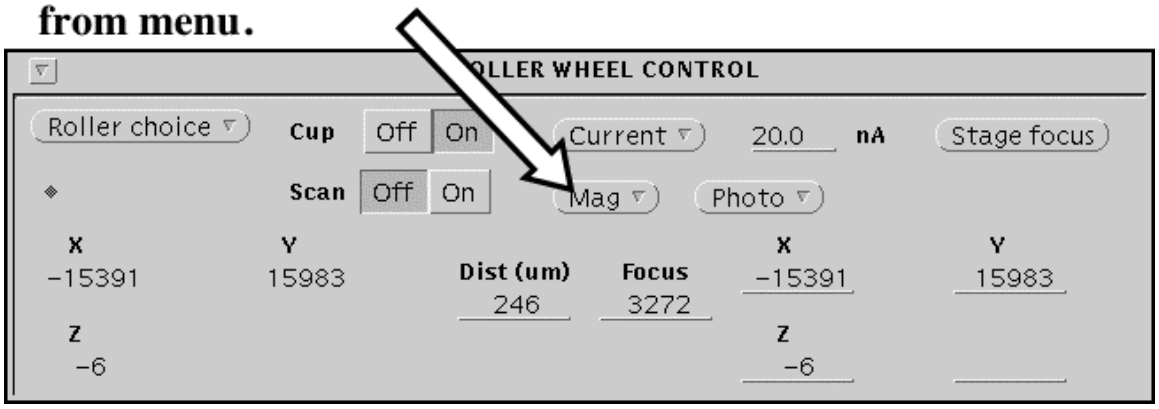
Step 4

Optically focus the reflected light image using the Z roller wheel.

3: Turn On Backscattered Electron Imaging (If not already on)

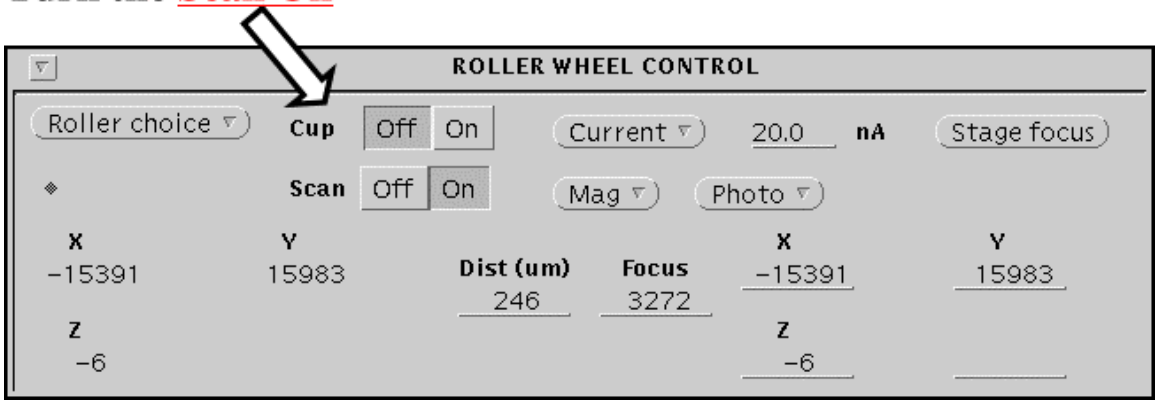
Step 1

R-Click and select MIN from menu.

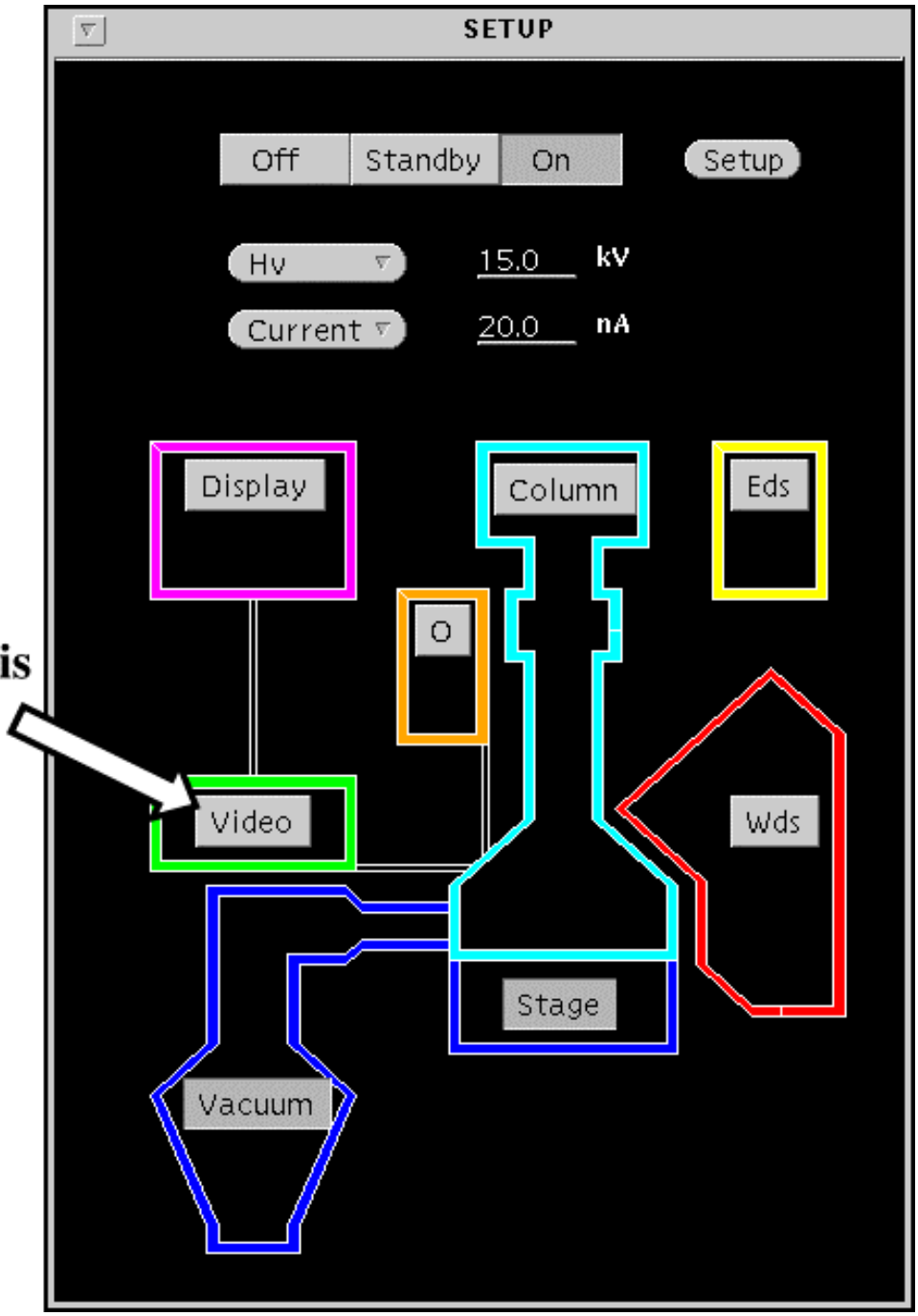


Then:

Turn the Cup Off and Turn the Scan On

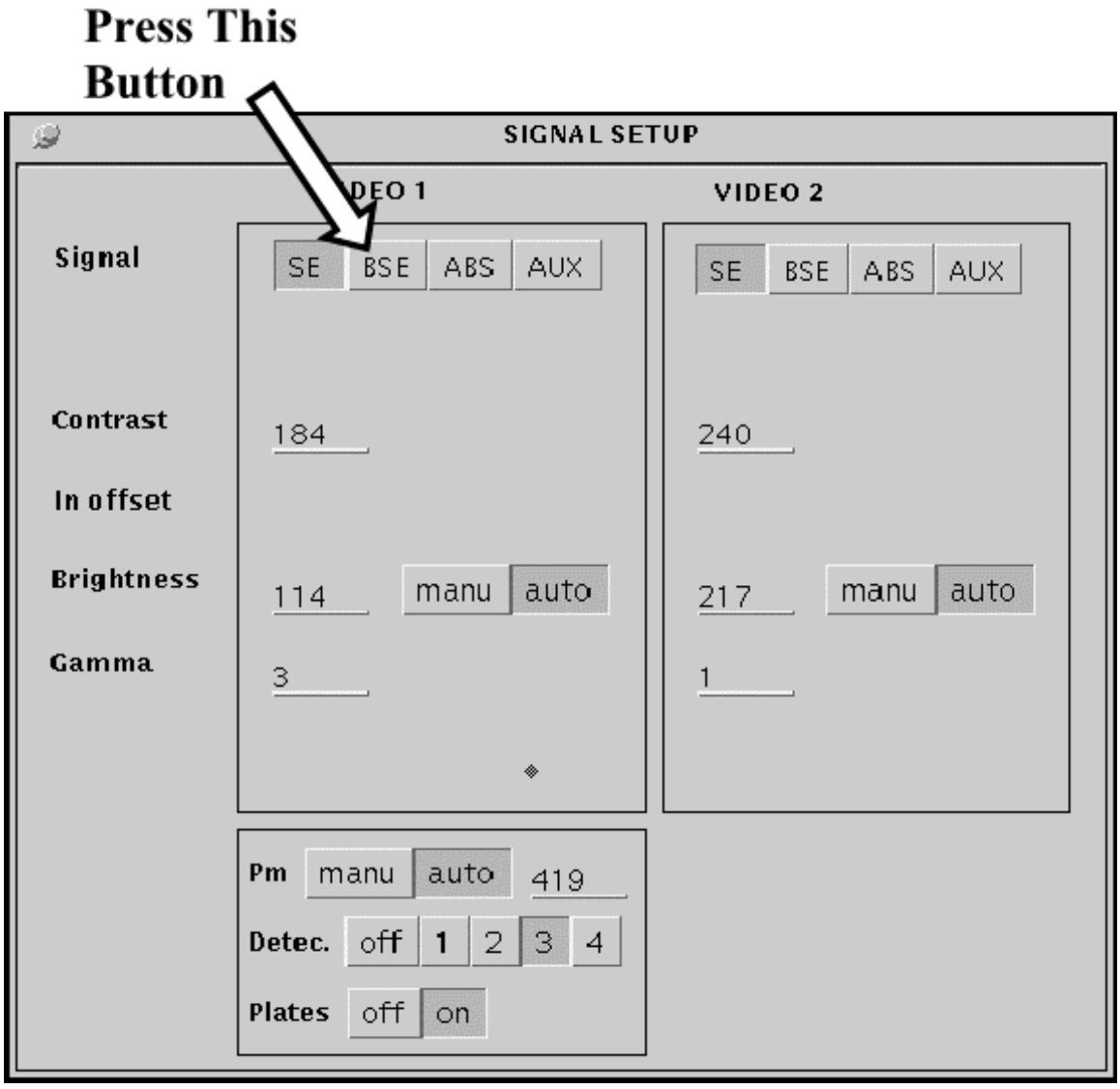


Step 2



Press This Button

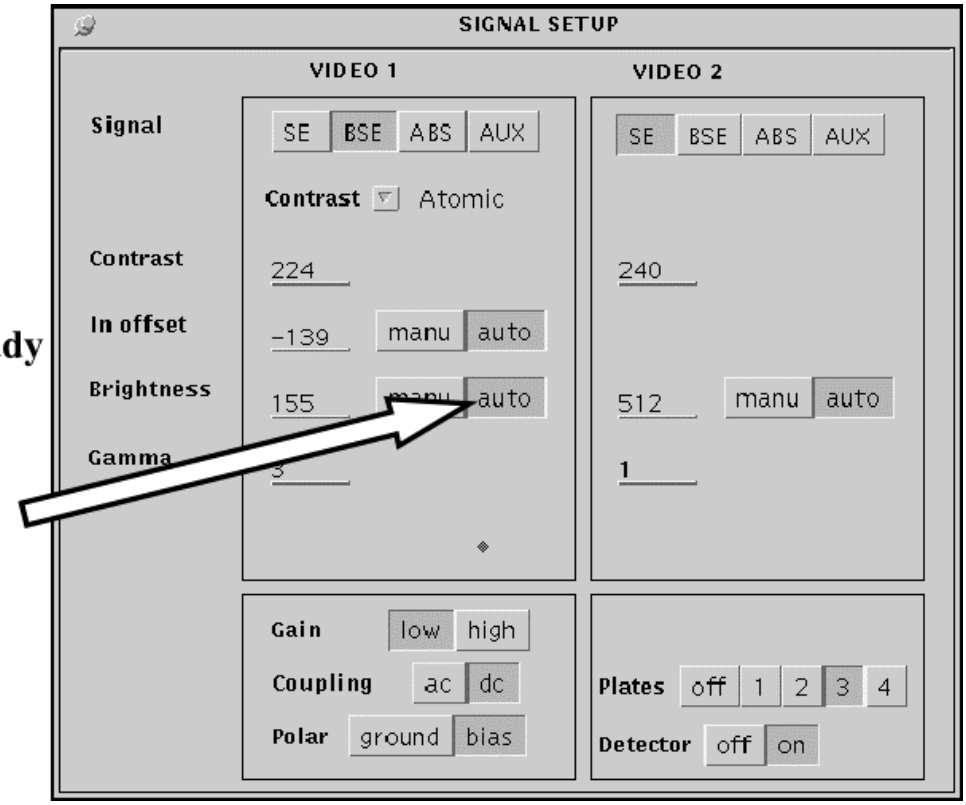
Step 3


Press This Button
SIGNAL SETUP
VIDEO 1
VIDEO 2
Signal
SE
BSE
ABS
AUX
SE
BSE
ABS
AUX
Contrast
184
240
In offset
Brightness
114
manu
auto
217
manu
auto
Gamma
3
1
Pm
manu
auto
419
Detec.
off
1
2
3
4
Plates
off
on

Step 4

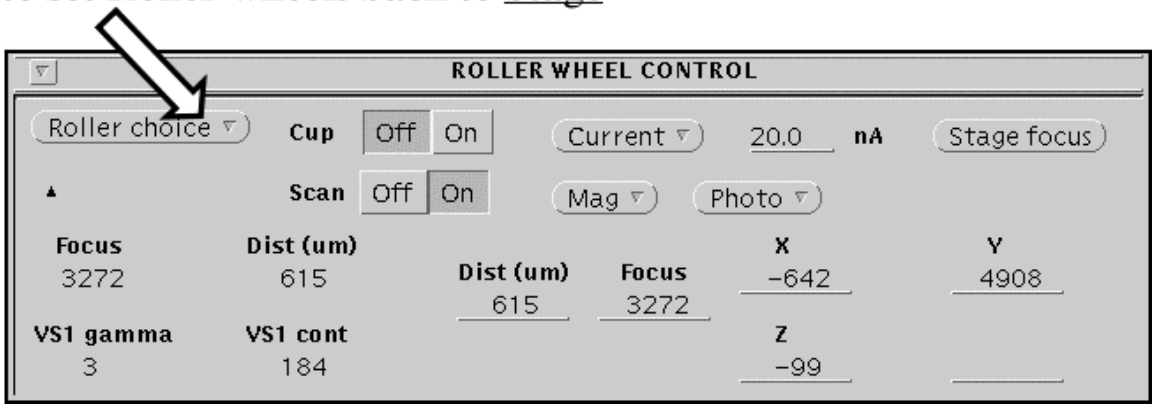
If not already on:

Press This Button



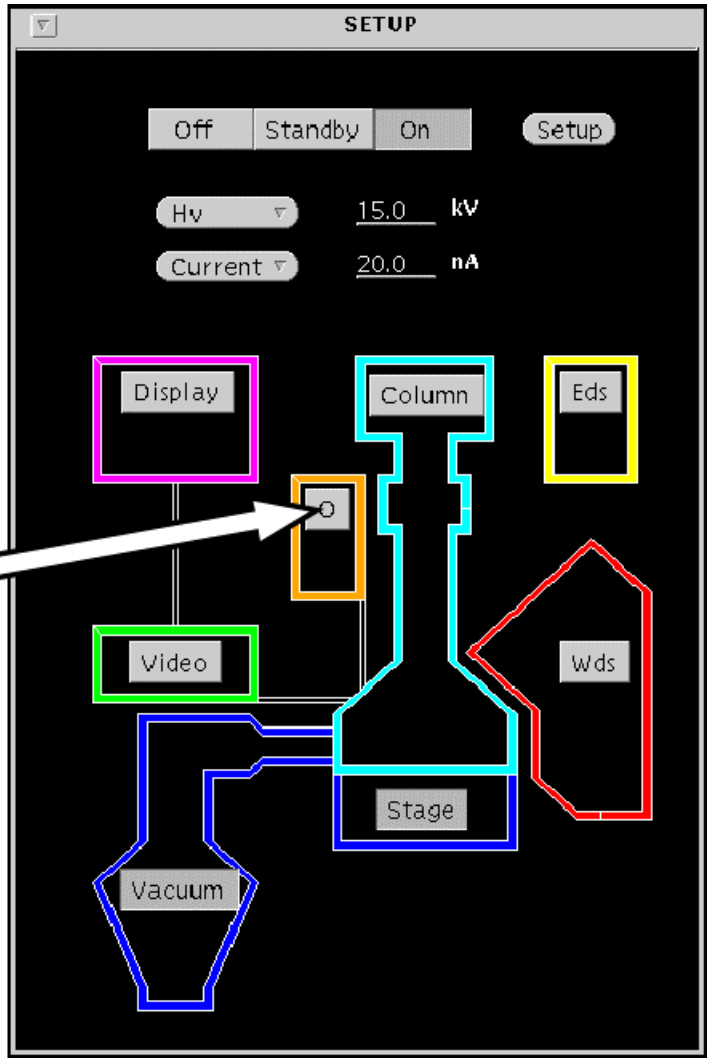
Step 5

L-Click this button
to set Roller wheels back to Stage



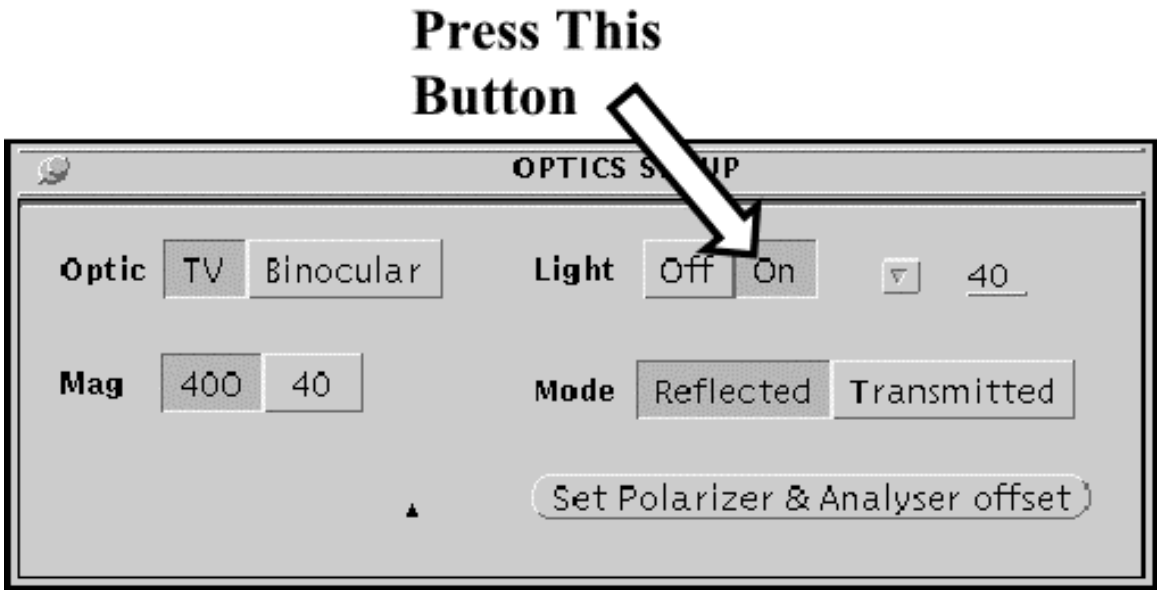
Step 6

The light on the reflected light image will probably go out. If it does and the Optics Setup window is not already open, then:



Press This Button

Step 7


Press This
Button
Optic
TV
Binocular
Light
Off
On
40
Mag
400
40
Mode
Reflected
Transmitted
Set Polarizer & Analyser offset

Next Step

Go to either:

Analysis Instruction Set 2a – Individual Point Analysis (p. 26)

Analysis Instruction Set 2b – Multi Point Analysis (p. 35)

Analysis Instruction Set 2c – Stage Line Scan Analysis (p. 51)

Analysis Instruction Set 3 - Taking BSE Pictures (p. 66)

or

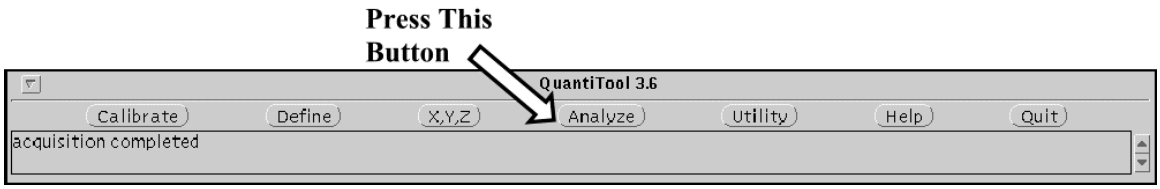
Analysis Instruction Set 4 - Taking EDS Spectra (p. 89)

Analysis: Instruction Set 2a

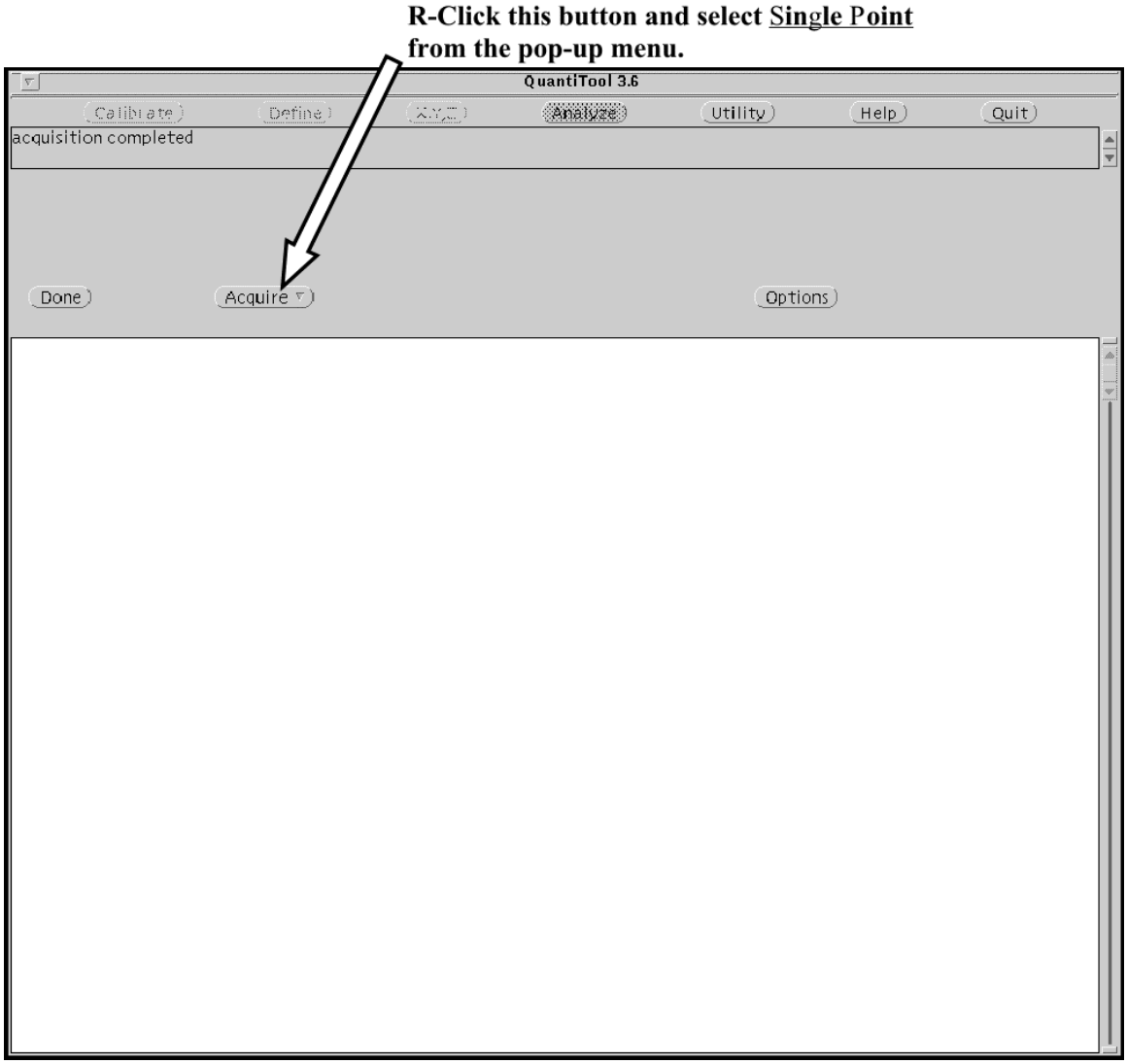
Analyzing Individual Points

TOP

Step 1

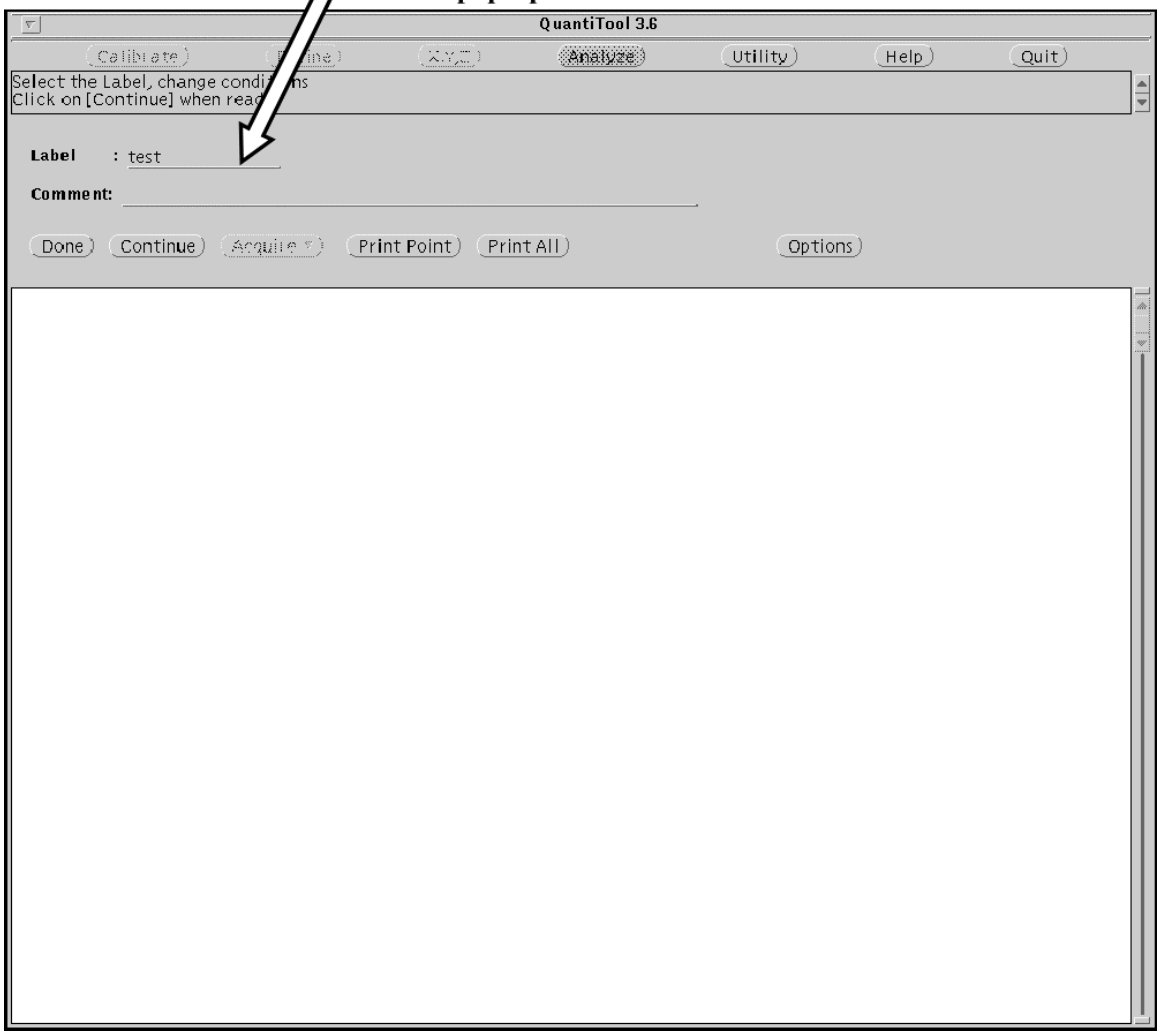

Press This
Button
QuantiTool 3.6
Calibrate
Define
X,Y,Z
Analyze
Utility
Help
Quit
acquisition completed

Step 2


R-Click this button and select Single Point from the pop-up menu.
QuantiTool 3.6
Calibrate
Define
XYZ
Analyze
Utility
Help
Quit
acquisition completed
Done
Acquire
Options

Step 3

R-Click this line and select <u>your Define File name</u> from the pop-up menu.



Step 4


Type in a comment on this line
that will help youidentify this analysis later.
QuantiTool 3.6
Calibrate
Analyze
Utility
Help
Quit
Select the Label, change conditio
Click on [Continue] when ready
Label : test
Comment:
Done
Continue
Print Point
Print All
Options

Step 5

Note the Continue button needs to be pressed at least twice (for all analyses after the first one).
The Continue button needs to be pressed three times for the first analysis with a define file containing one beam condition and four times for the first analysis with a define file containing two beam condition.

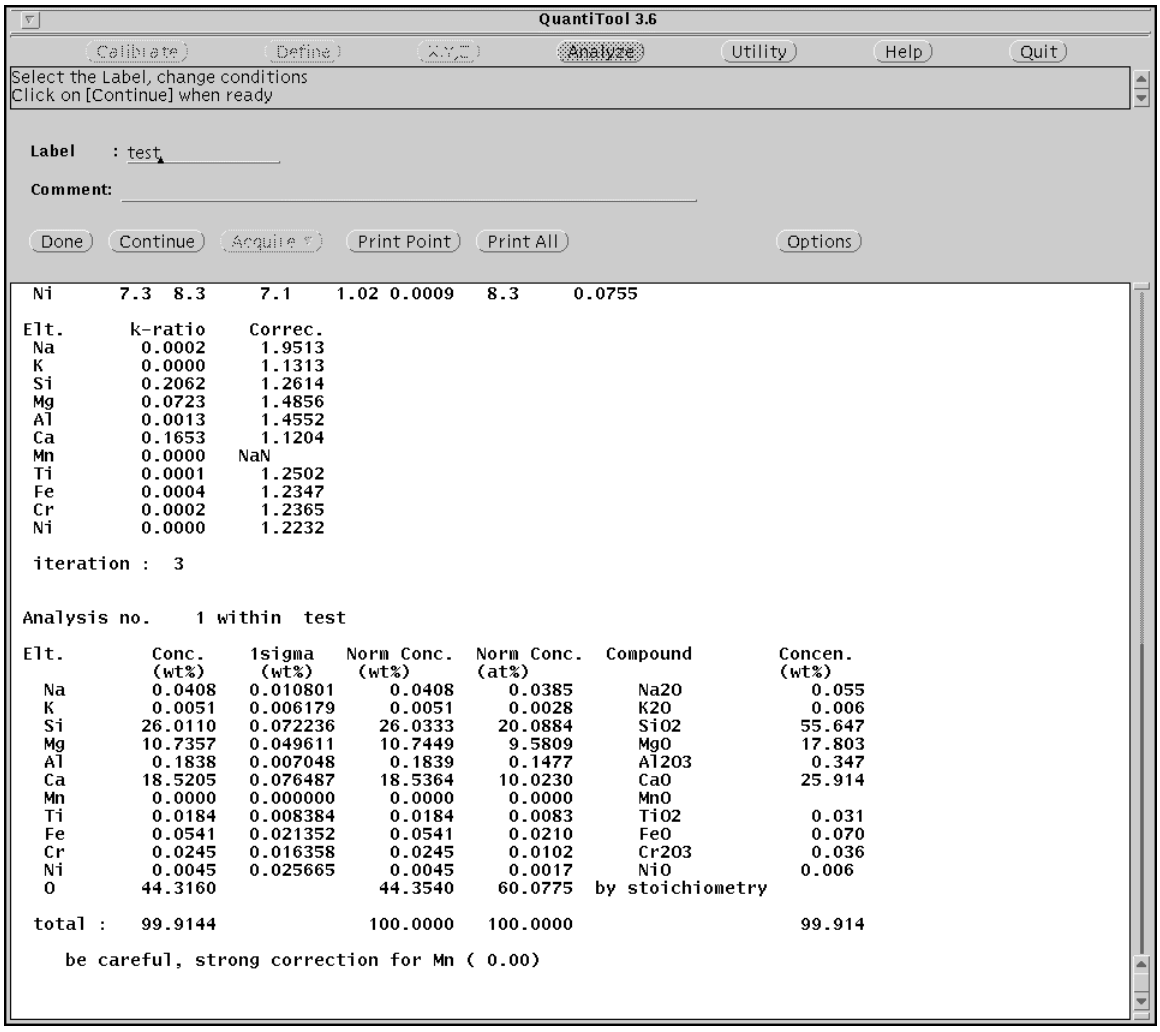
Step 6

The spectrometer motors will begin to move and the analysis will start.

Note: If the analysis screen disappears at this point , follow the directions given in Appendix 1 p. 101.

Step 7

When the analysis is done, the computer will beep and the results will appear on the screen.



Step 8

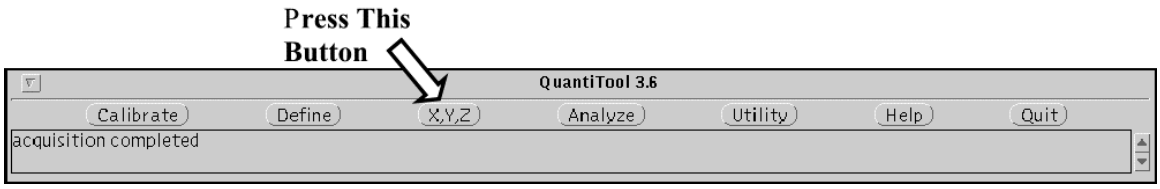
REPEAT STEPS 4 – 7 for each analysis.

Analysis: Instruction Set 2b

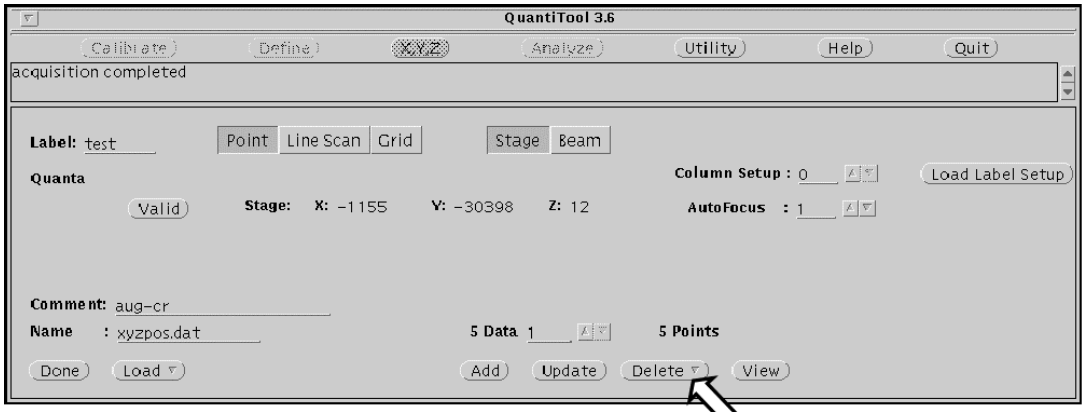
Multi Point Analysis

TOP

Step 1

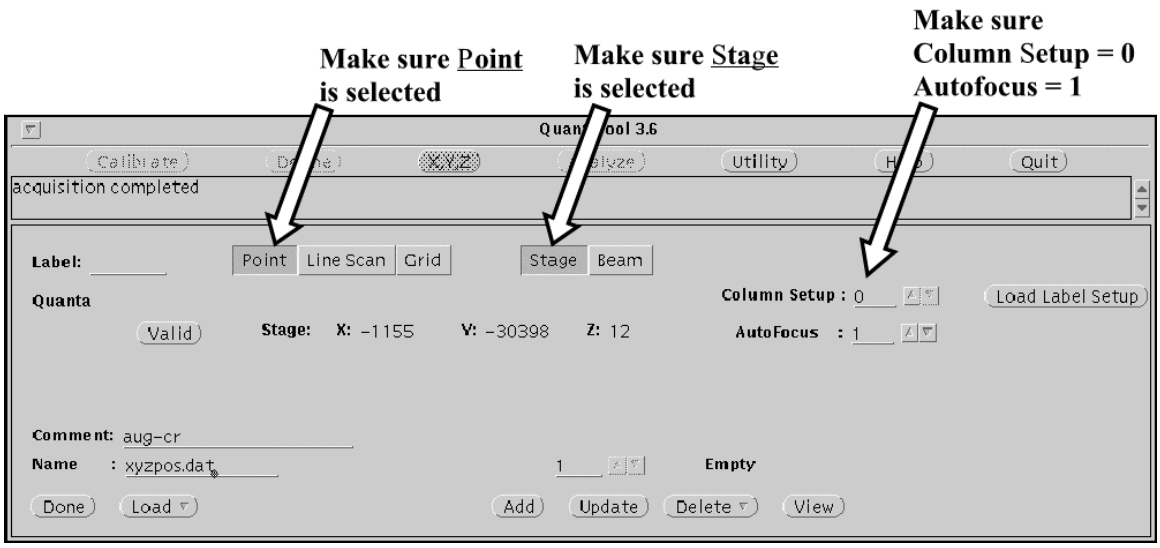

Press This
Button
QuantiTool 3.6
Calibrate
Define
X,Y,Z
Analyze
Utility
Help
Quit
acquisition completed

Step 2



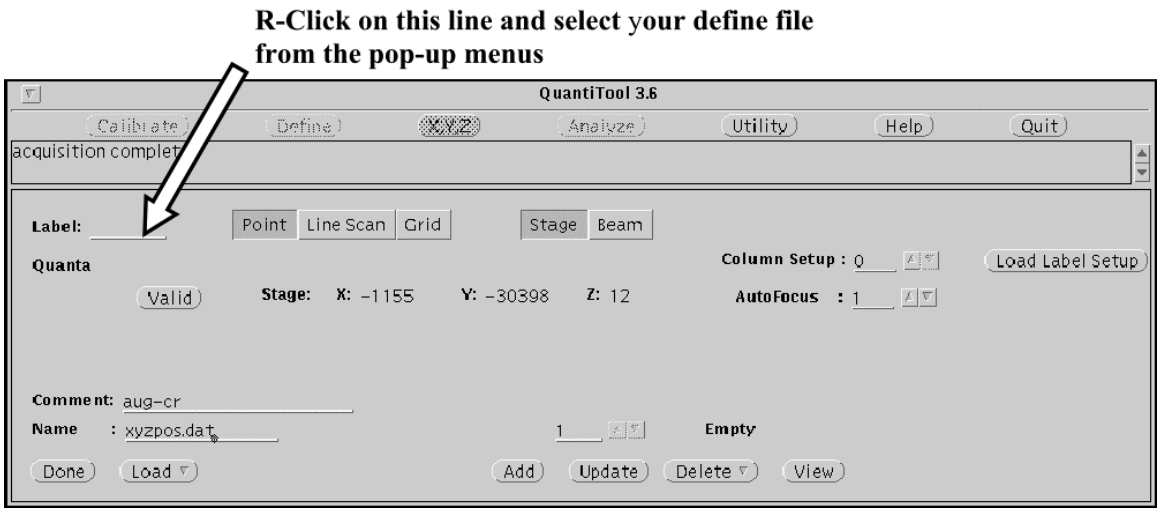
R-Click this button and select Delete All from the pop-up menu.

Step 3



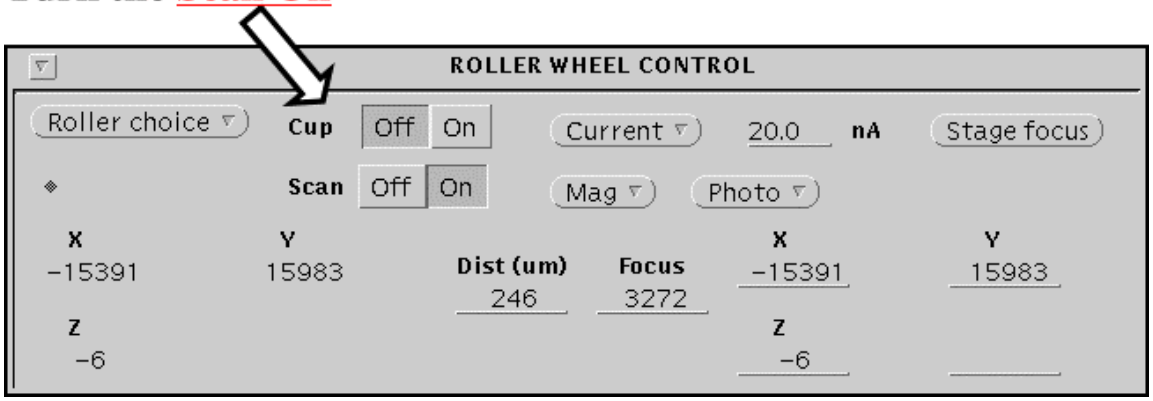
Note: If you needed to change from Line Scan to Point you will need to reset the probe marker. See Appendix 2 on p. 102 for instructions.

Step 4


R-Click on this line and select your define file from the pop-up menus
QuantiTool 3.6
Calibrate
Define
XYZ
Analyze
Utility
Help
Quit
acquisition complet
Label:
Point
Line Scan
Grid
Stage
Beam
Quanta
Column Setup : 0
Load Label Setup
Valid
Stage: X: -1155 Y: -30398 Z: 12
AutoFocus : 1
Comment: aug-cr
Name : xyzpos.dat
1
Empty
Done
Load
Add
Update
Delete
View

Step 5

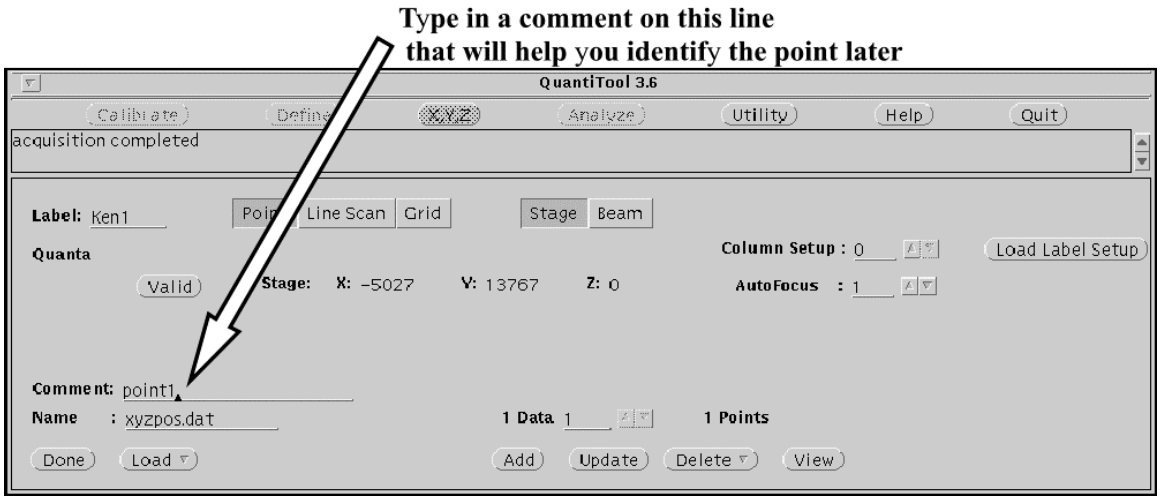
Turn the Cup Off and
Turn the Scan On



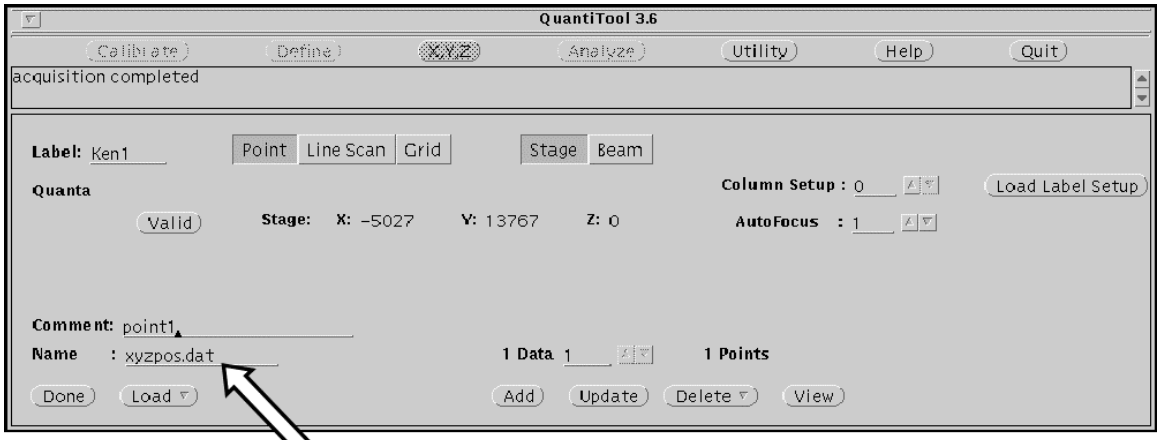
Step 6

Move to the first spot that you want to analyze and focus the optical image.

Then:



Step 7

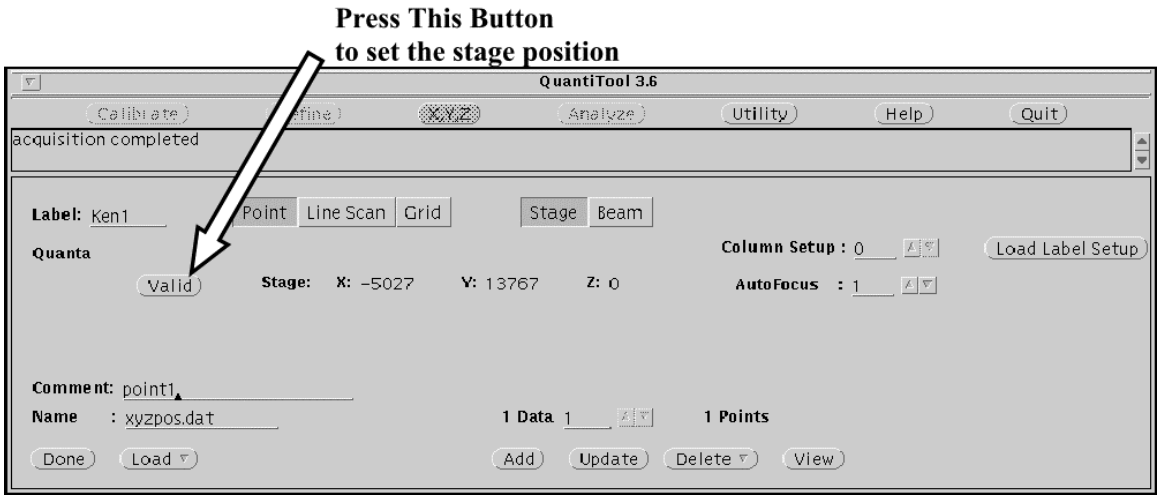


VERY IMPORTANT!

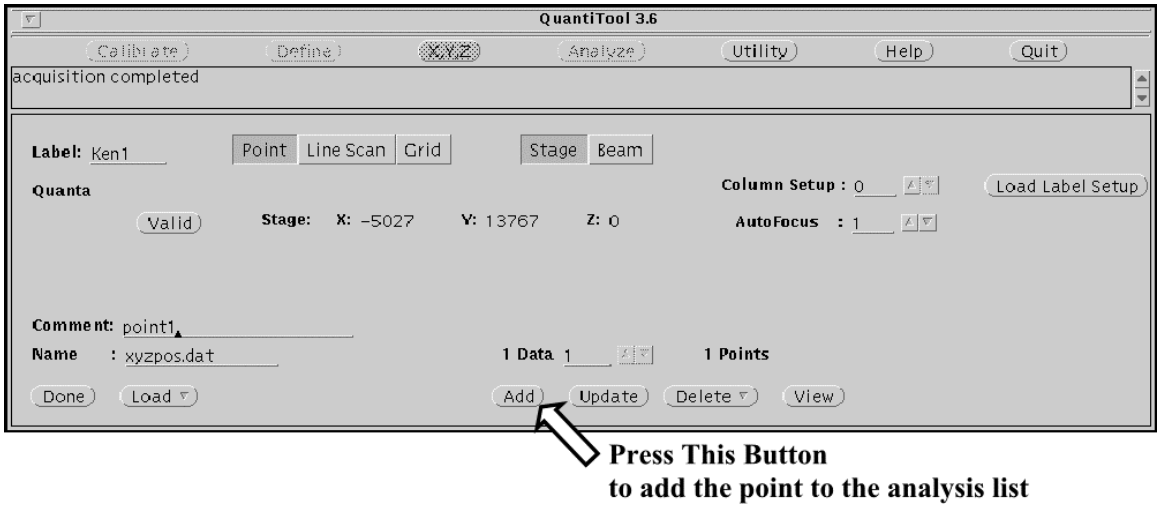
DO NOT **change the entry on this line.**

If you do be sure to change it back to xyzpos.dat before doing anything else.

Step 8


Press This Button
to set the stage position
QuantiTool 3.6
Calibrate
Define
XYZ
Analyze
Utility
Help
Quit
acquisition completed
Label: Ken1
Point
Line Scan
Grid
Stage
Beam
Quanta
Column Setup : 0
Load Label Setup
Valid
Stage: X: -5027 Y: 13767 Z: 0
AutoFocus : 1
Comment: point1
Name : xyzpos.dat
1 Data 1
1 Points
Done
Load
Add
Update
Delete
View

Step 9

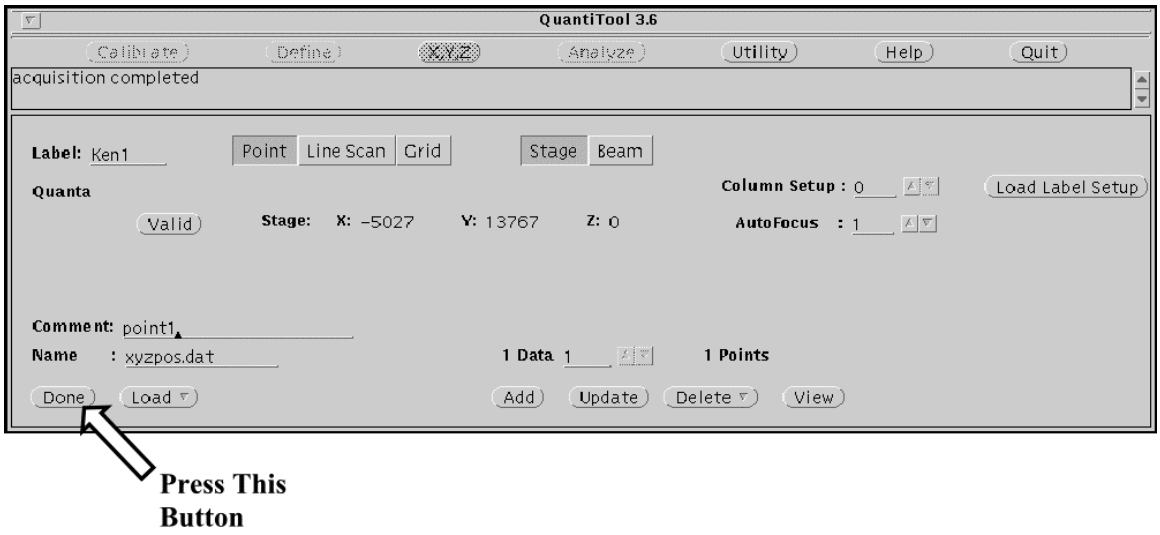

QuantiTool 3.6
Calibrate
Define
XYZ
Analyze
Utility
Help
Quit
acquisition completed
Label: Ken1
Point
Line Scan
Grid
Stage
Beam
Quanta
Column Setup : 0
Load Label Setup
Valid
Stage: X: -5027 Y: 13767 Z: 0
AutoFocus : 1
Comment: point1
Name : xyzpos.dat
1 Data 1
1 Points
Done
Load
Add
Update
Delete
View
Press This Button
to add the point to the analysis list

Step 10

REPEAT STEPS 6 – 9 for each analysis point.

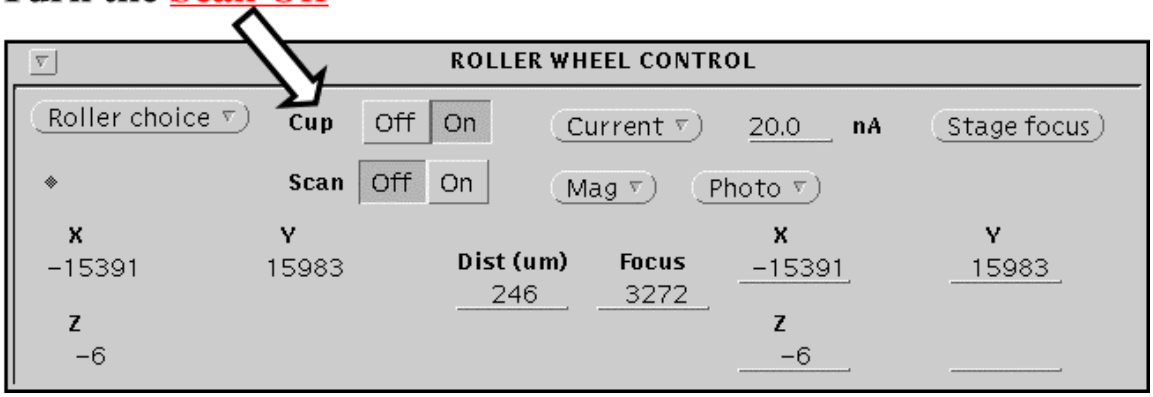
Step 11

When you're finished setting up points:

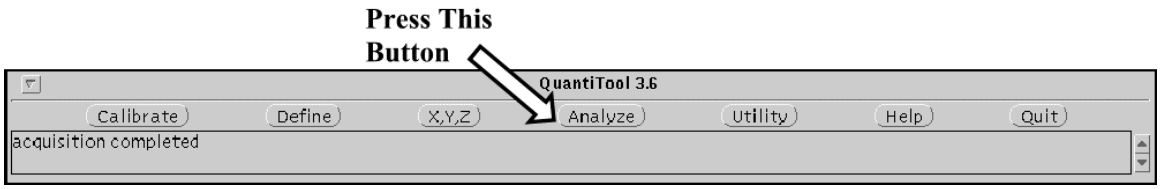


Step 12

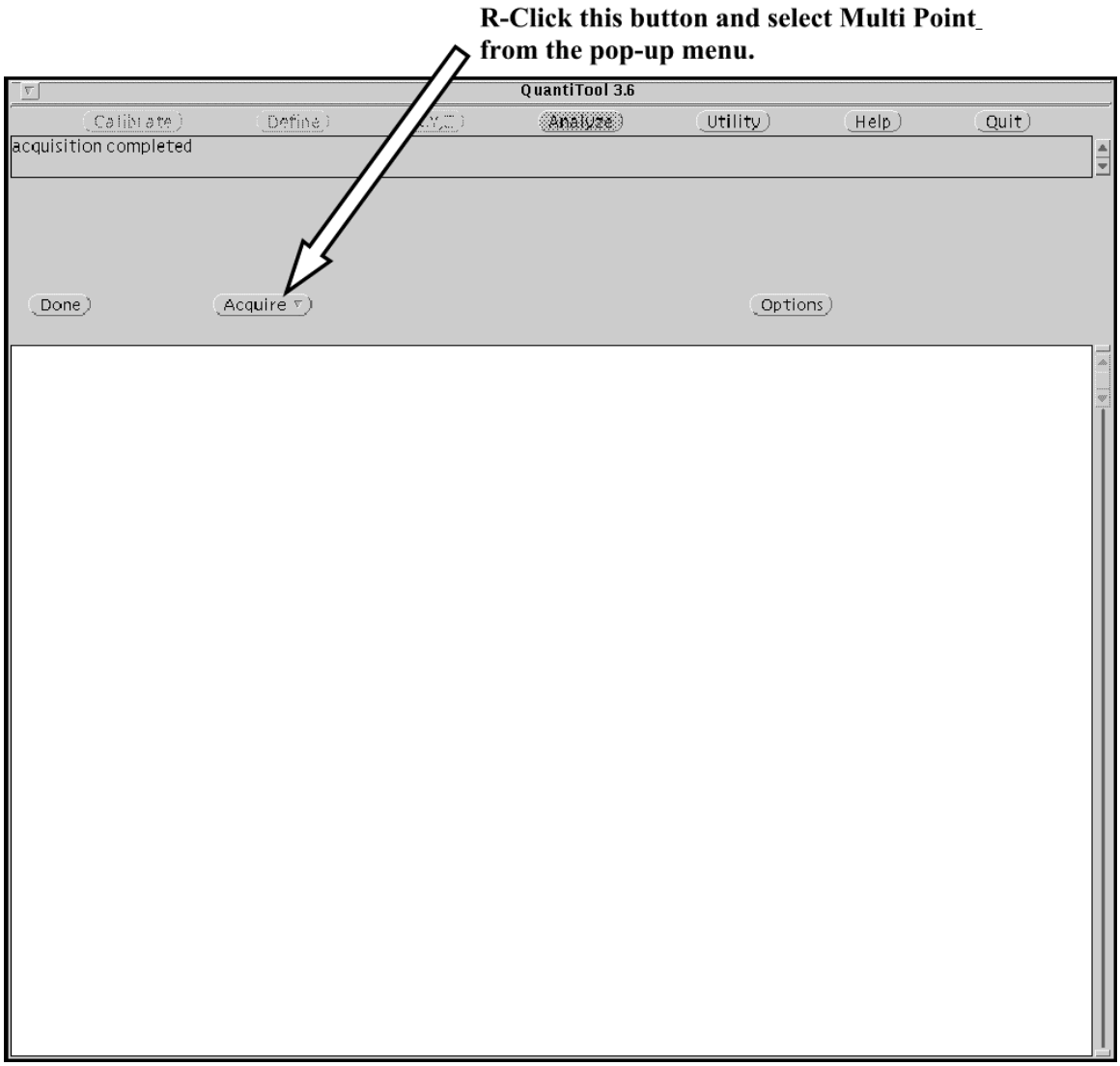
Turn the Cup On and
Turn the Scan Off



Step 13


Press This
Button
QuantiTool 3.6
Calibrate
Define
X,Y,Z
Analyze
Utility
Help
Quit
acquisition completed

Step 14


R-Click this button and select Multi Point from the pop-up menu.
QuantiTool 3.6
Calibrate
Define
Analyze
Utility
Help
Quit
acquisition completed
Done
Acquire
Options

Step 15

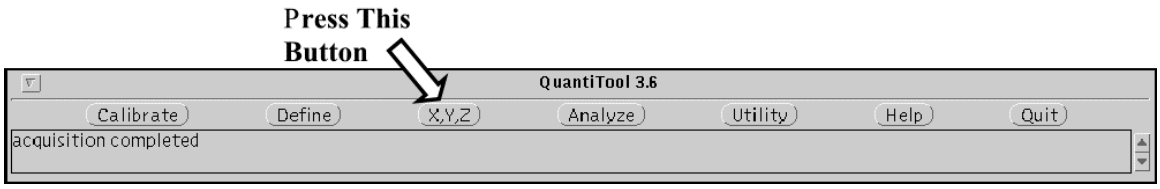
The analysis list will run. Watch the first point or two to make sure things are working the way you want.

Analysis: Instruction Set 2c

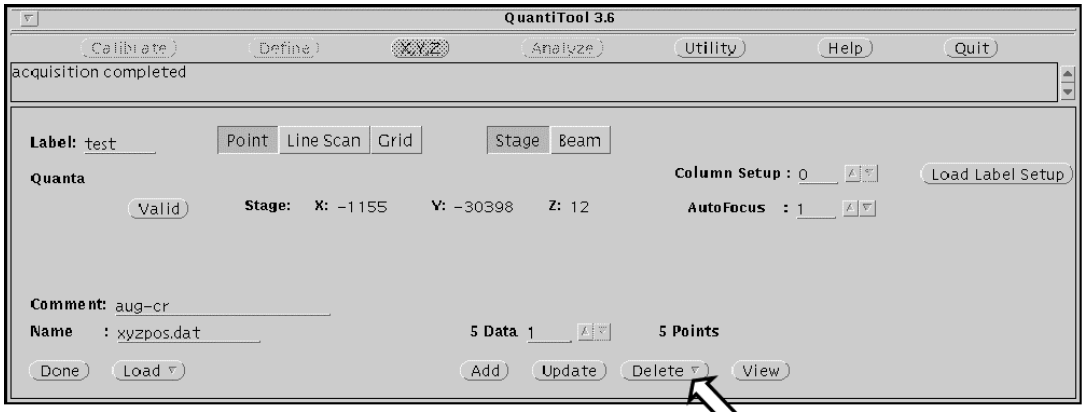
Stage Line Scan Analysis

TOP

Step 1

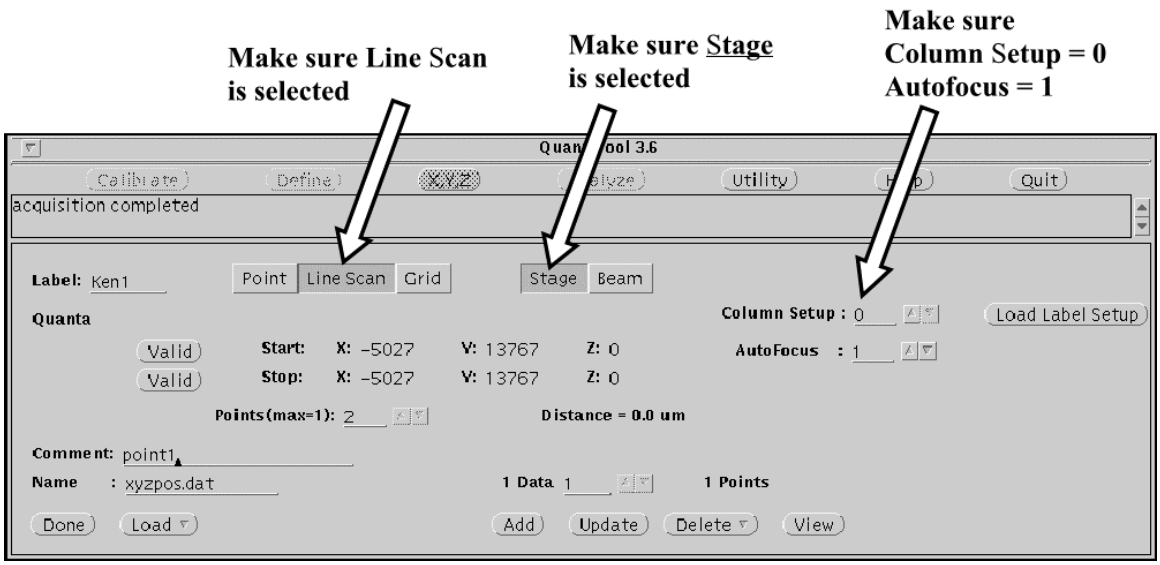

Press This
Button
QuantiTool 3.6
Calibrate
Define
X,Y,Z
Analyze
Utility
Help
Quit
acquisition completed

Step 2



R-Click this button and select Delete All from the pop-up menu.

Step 3

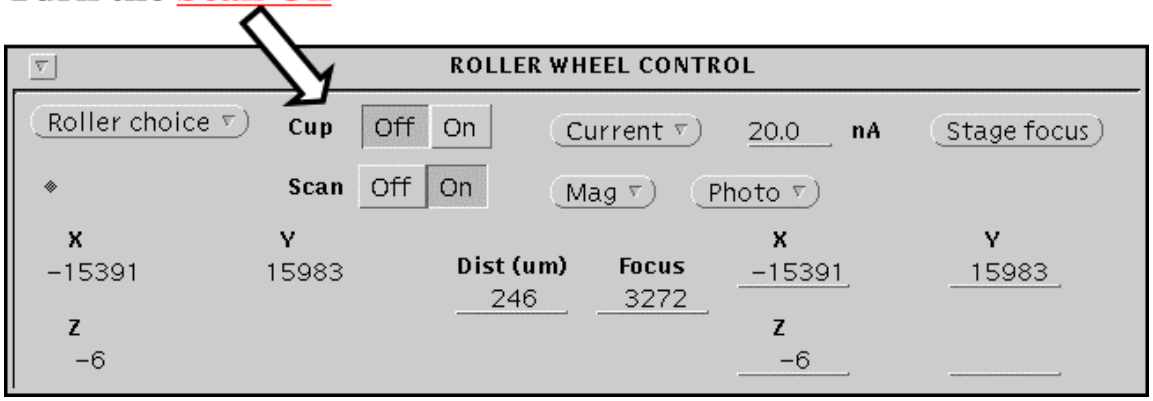


Note 1: If you needed to change from Point to Line Scan you will need to reset the probe marker. See Appendix 2 on p. 102 for instructions.

Note 2: If you see more than one number after the word Distance - Press Done and start again with Step 1.

Step 4

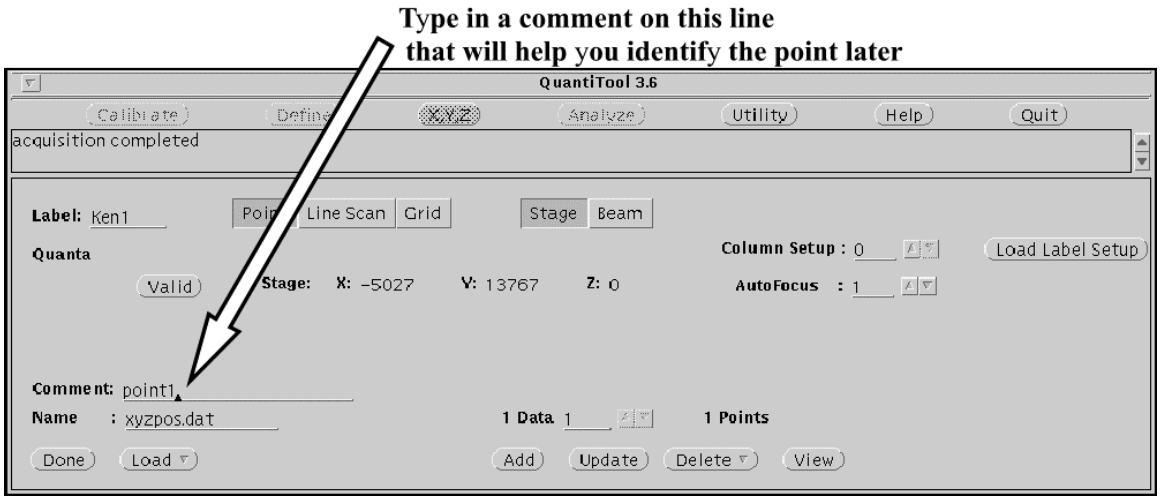
Turn the Cup Off and
Turn the Scan On



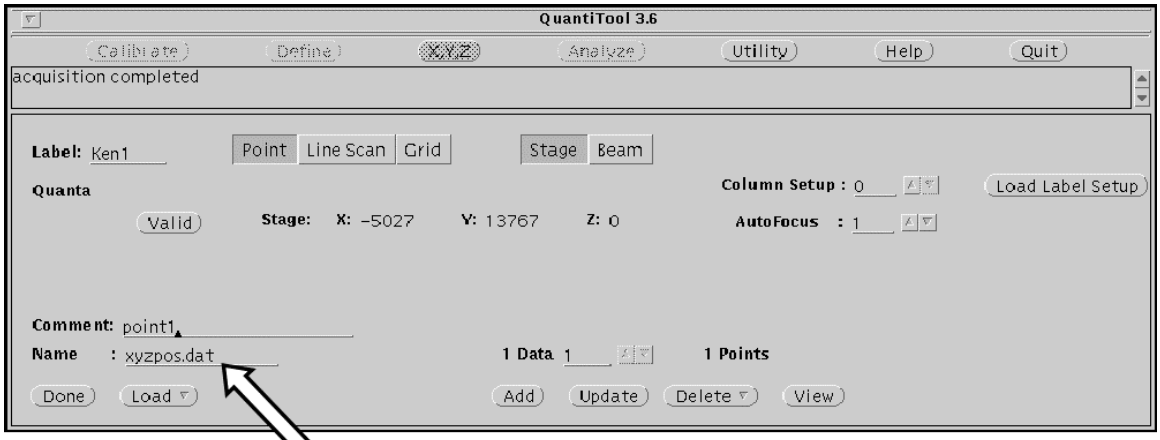
Step 5

Move to the first spot that you want to analyze and focus the optical image.

Then:



Step 6

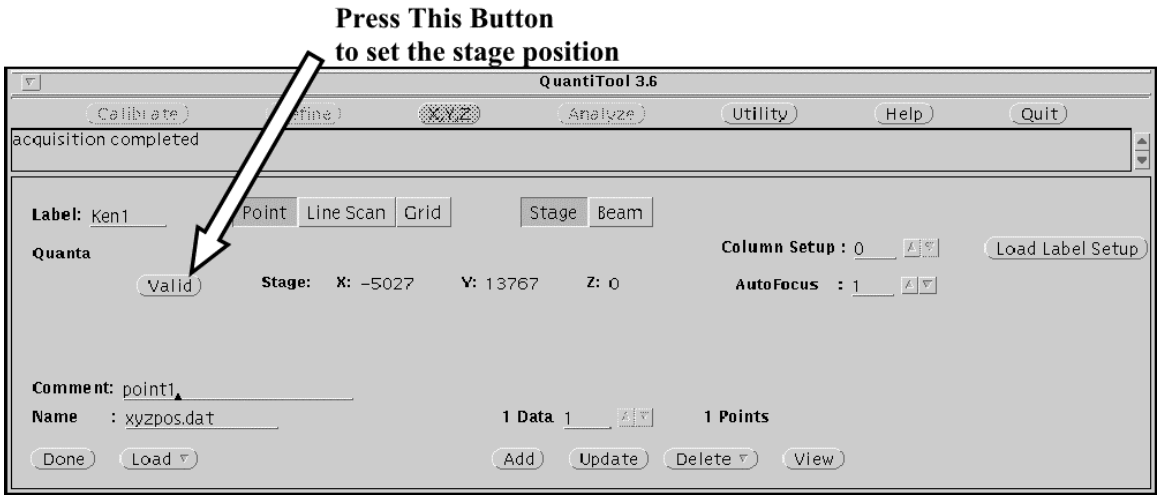


VERY IMPORTANT!

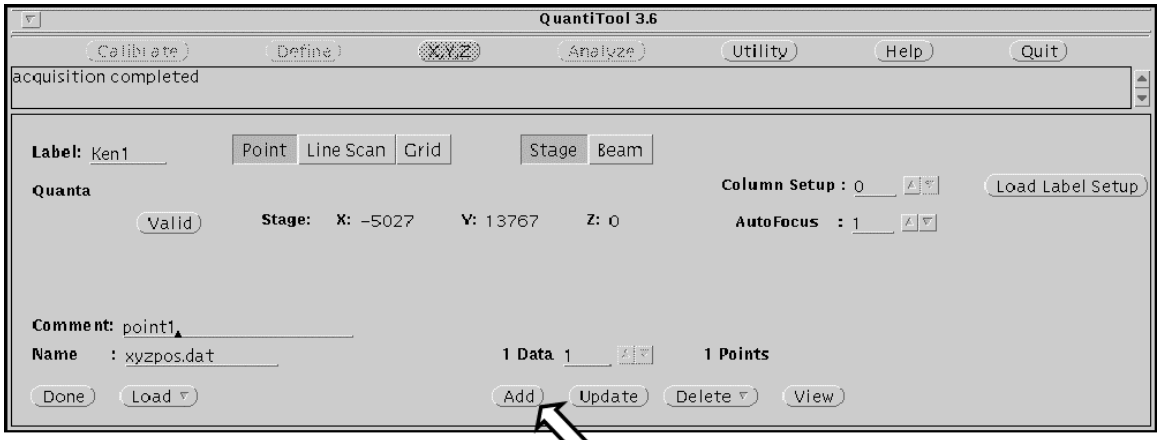
DO NOT **change the entry on this line.**

If you do be sure to change it back to xyzpos.dat before doing anything else.

Step 7


Press This Button
to set the stage position
QuantiTool 3.6
Calibrate
Define
XYZ
Analyze
Utility
Help
Quit
acquisition completed
Label: Ken1
Point
Line Scan
Grid
Stage
Beam
Quanta
Column Setup : 0
Load Label Setup
Valid
Stage: X: -5027 Y: 13767 Z: 0
AutoFocus : 1
Comment: point1
Name : xyzpos.dat
1 Data 1
1 Points
Done
Load
Add
Update
Delete
View

Step 8

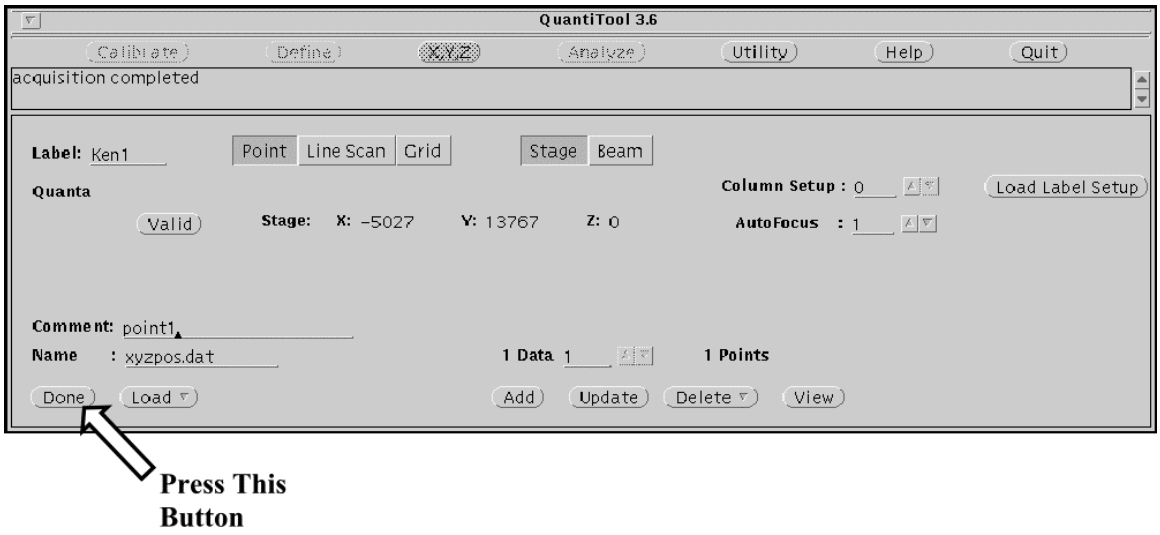

QuantiTool 3.6
Calibrate
Define
XYZ
Analyze
Utility
Help
Quit
acquisition completed
Label: Ken1
Point
Line Scan
Grid
Stage
Beam
Quanta
Column Setup : 0
Load Label Setup
Valid
Stage: X: -5027 Y: 13767 Z: 0
AutoFocus : 1
Comment: point1
Name : xyzpos.dat
1 Data 1
1 Points
Done
Load
Add
Update
Delete
View
Press This Button
to add the point to the analysis list

Step 9

REPEAT STEPS 5 – 8 for each analysis point.

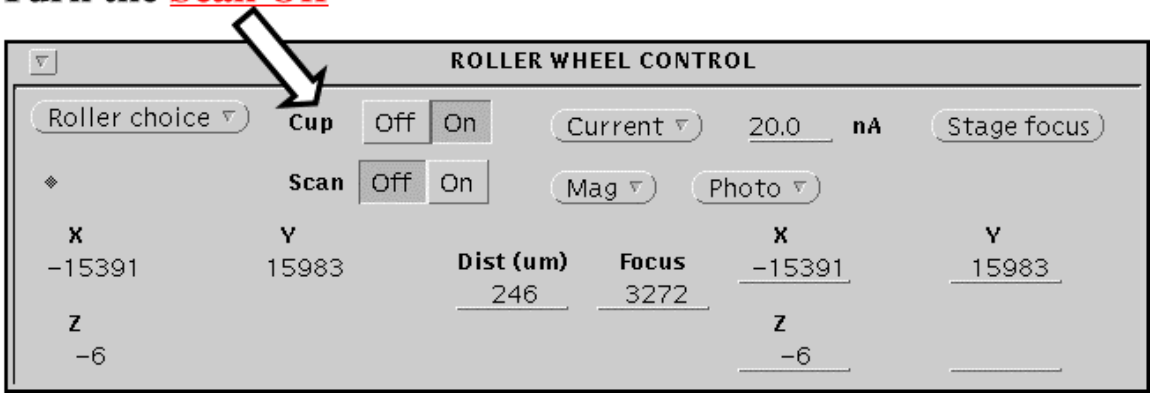
Step 11

When you're finished setting up points:

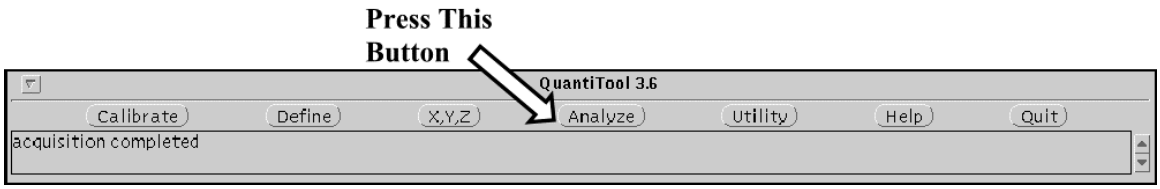


Step 12

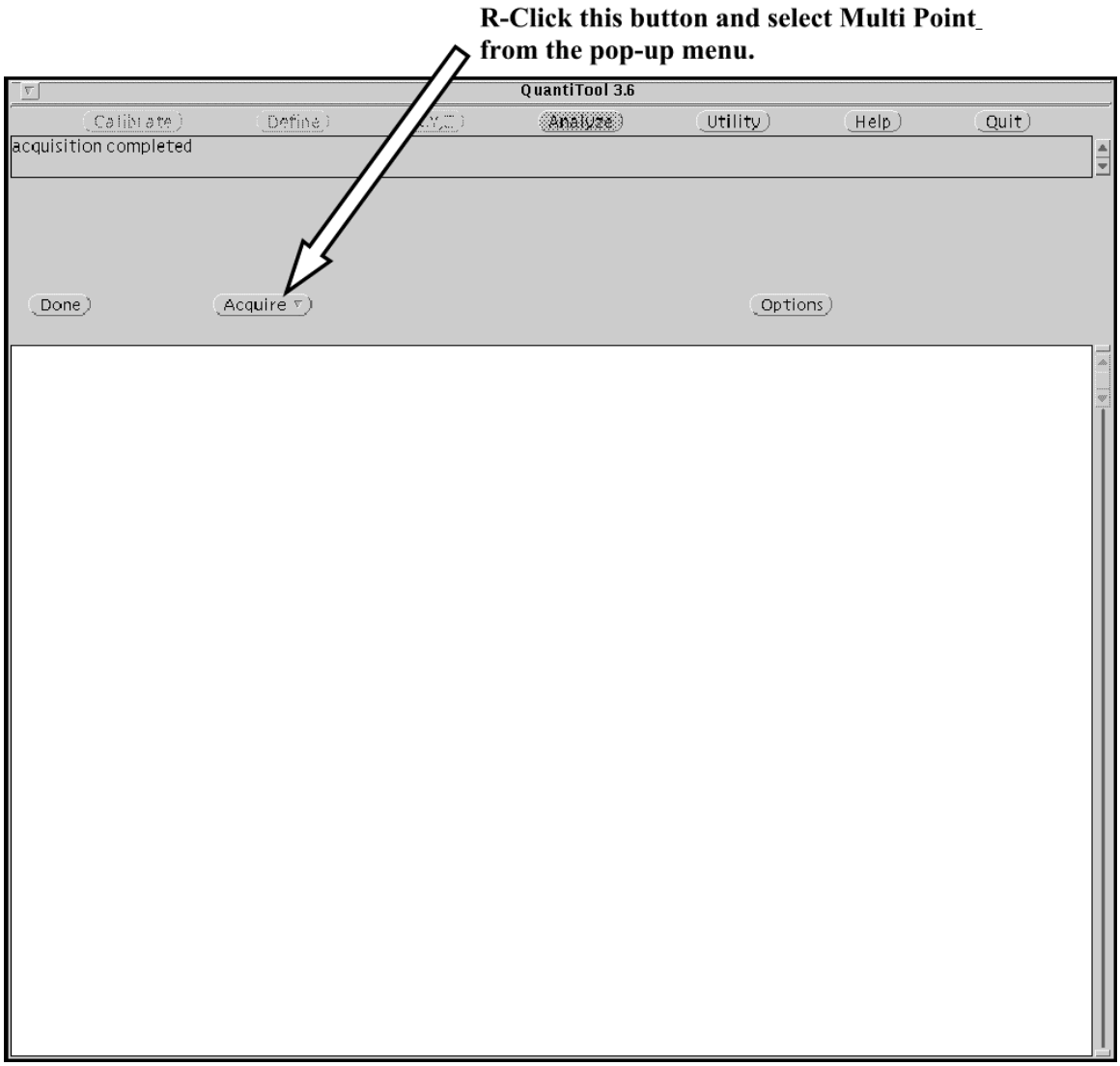
Turn the Cup On and
Turn the Scan Off



Step 13


Press This
Button
QuantiTool 3.6
Calibrate
Define
X,Y,Z
Analyze
Utility
Help
Quit
acquisition completed

Step 14


R-Click this button and select Multi Point from the pop-up menu.
QuantiTool 3.6
Calibrate
Define
Analyze
Utility
Help
Quit
acquisition completed
Done
Acquire
Options

Step 15

The analysis list will run. Watch the first point or two to make sure things are working the way you want.

Analysis: Instruction Set 3

Taking BSE Pictures

TOP

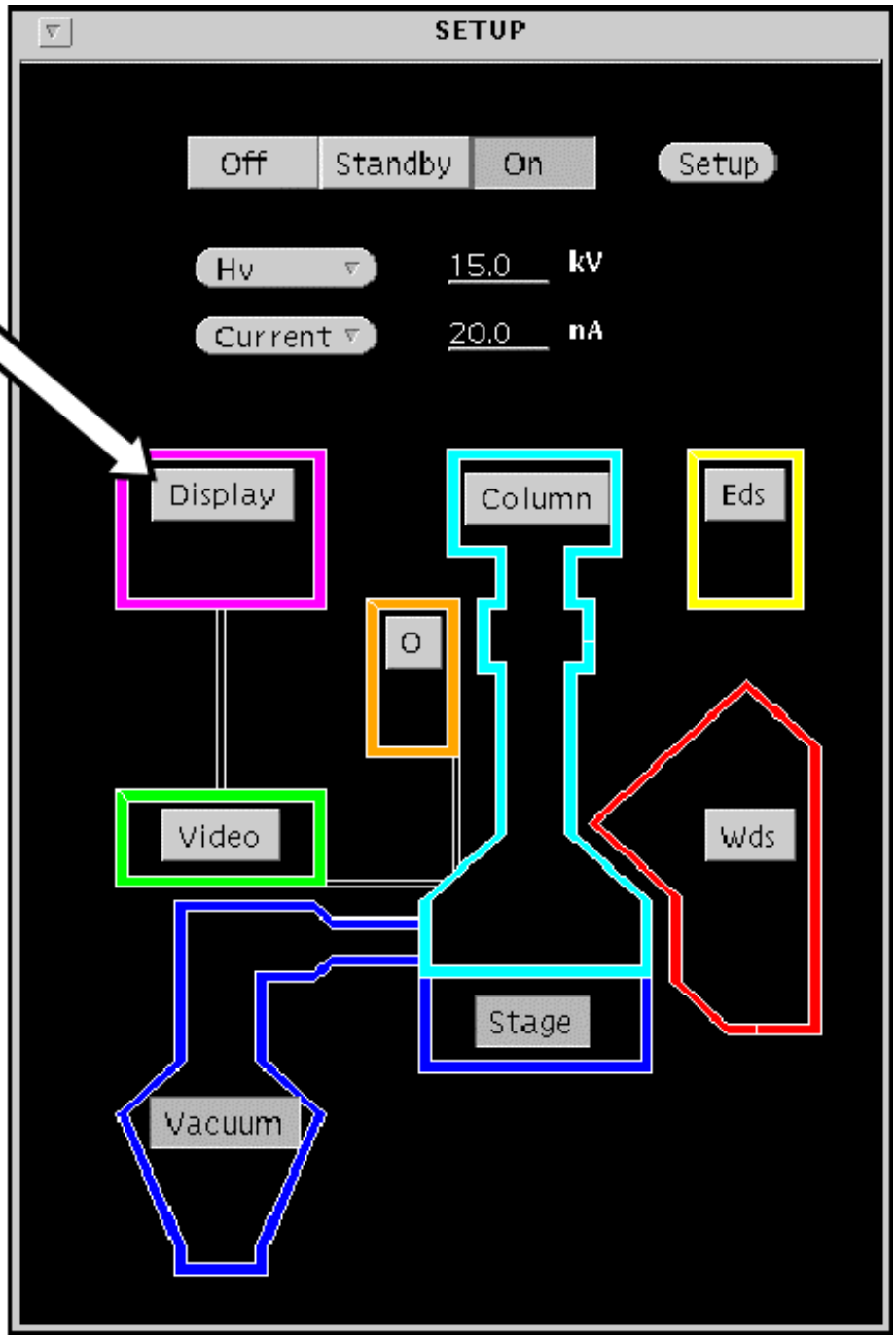
1: Obtain the Image

Step 1

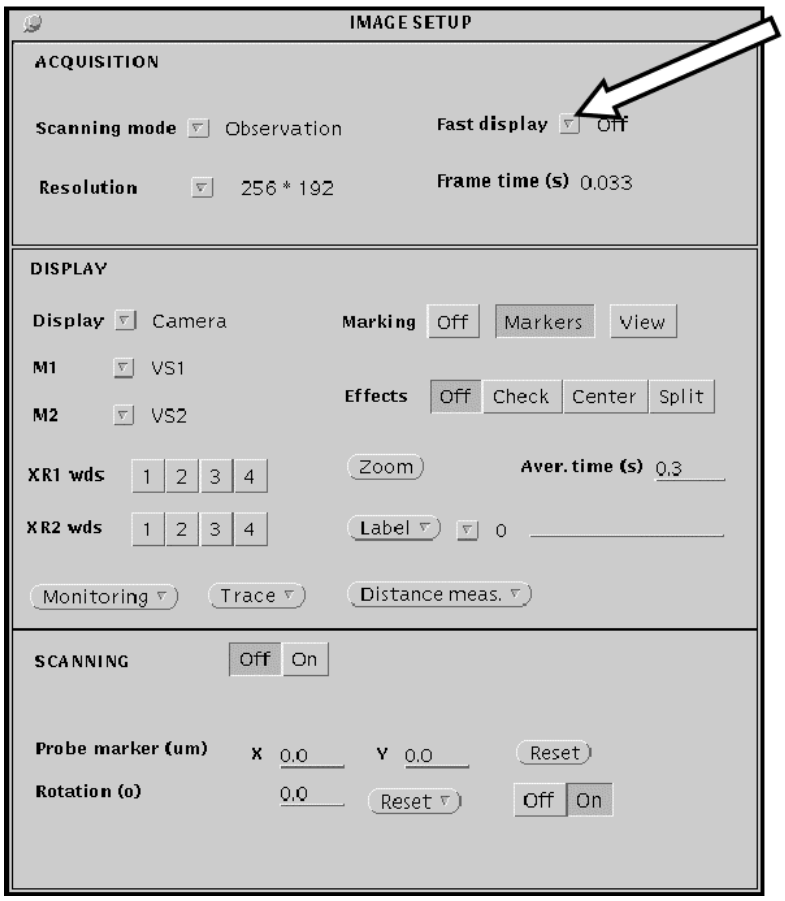
Get the image you want to take a picture of on the BSE monitor screen.

Step 2

Press This Button



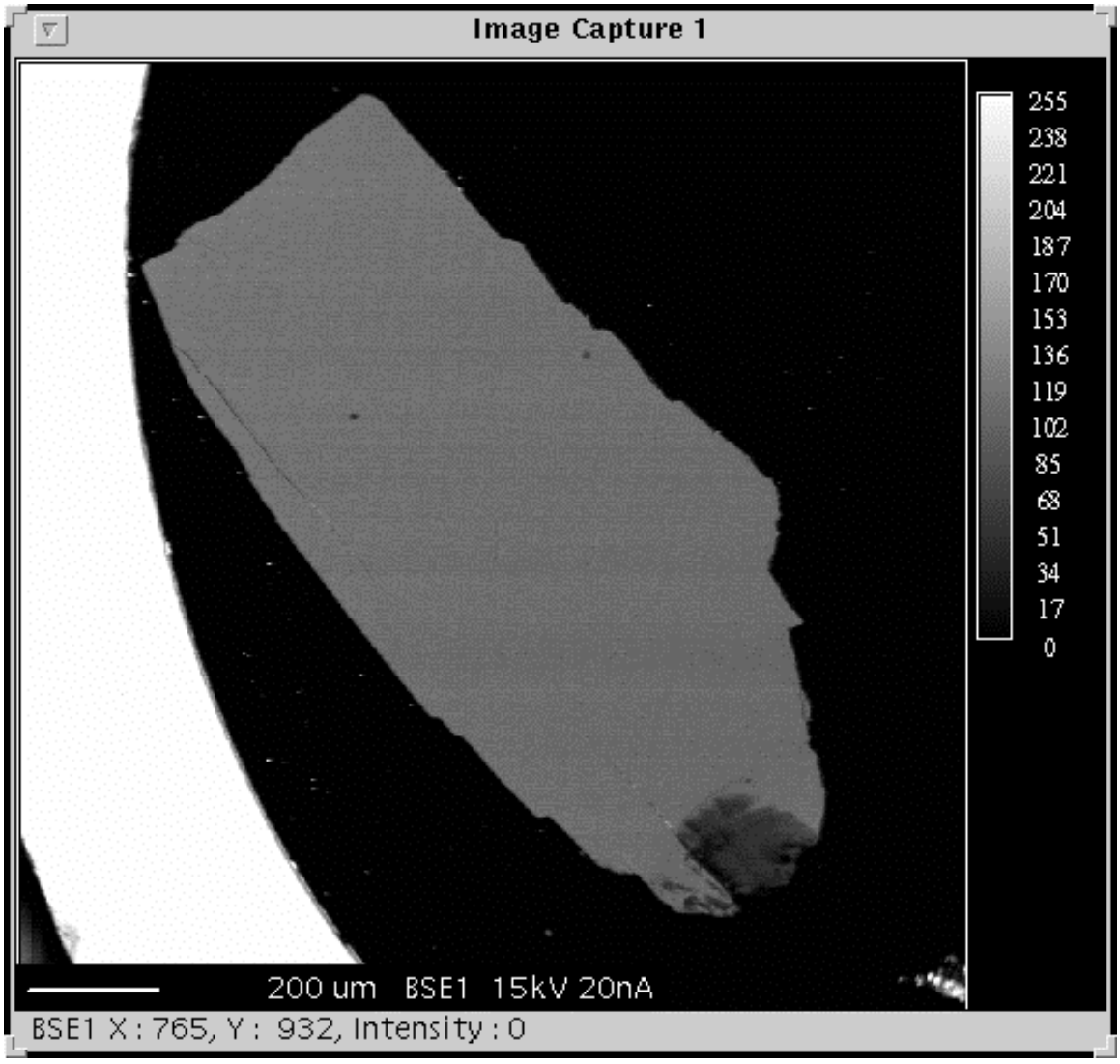
Step 3



R-Click this button and select <u>On</u> from the pop-up menu.

Step 4

The picture will appear on the Sun computer screen.



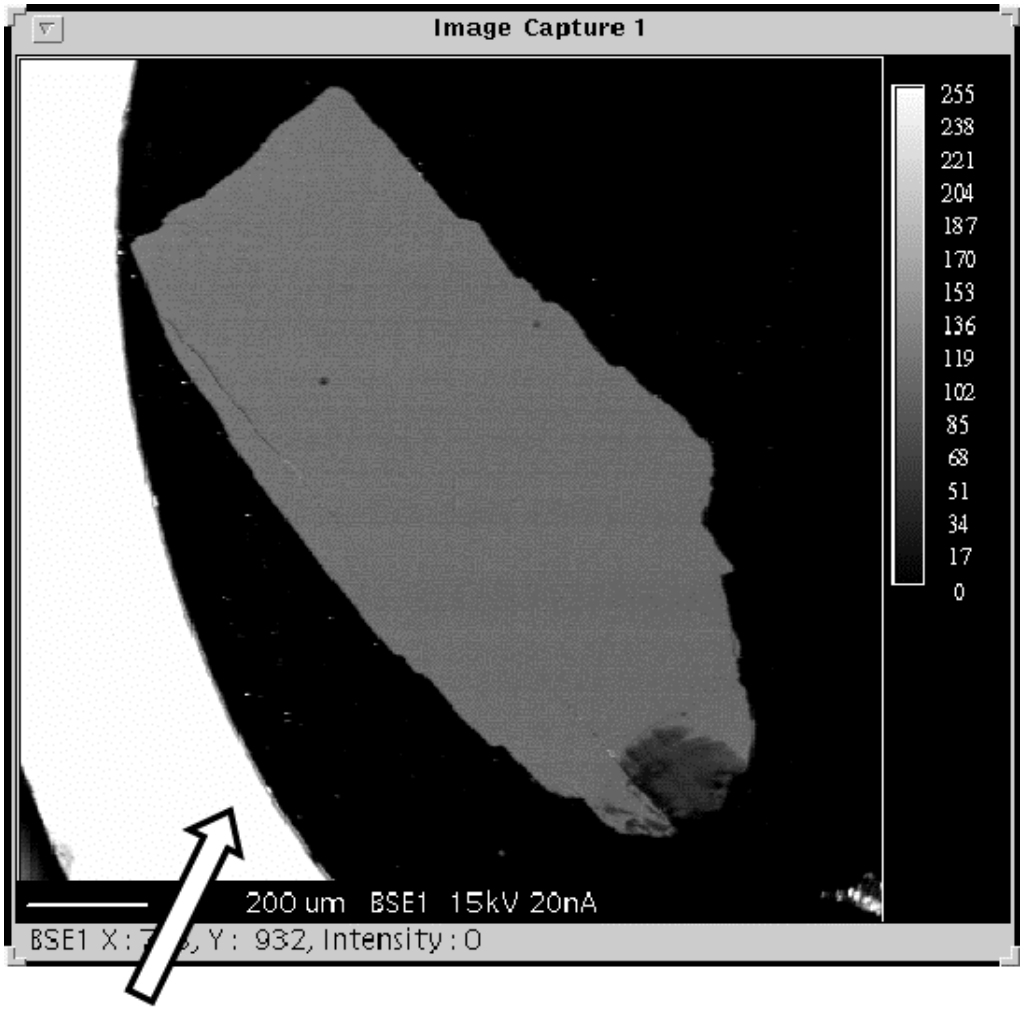
Step 5

If you need to adjust the brightness or contrast of the image follow the instructions in Appendix 3.

2: Save the Image as a tif file

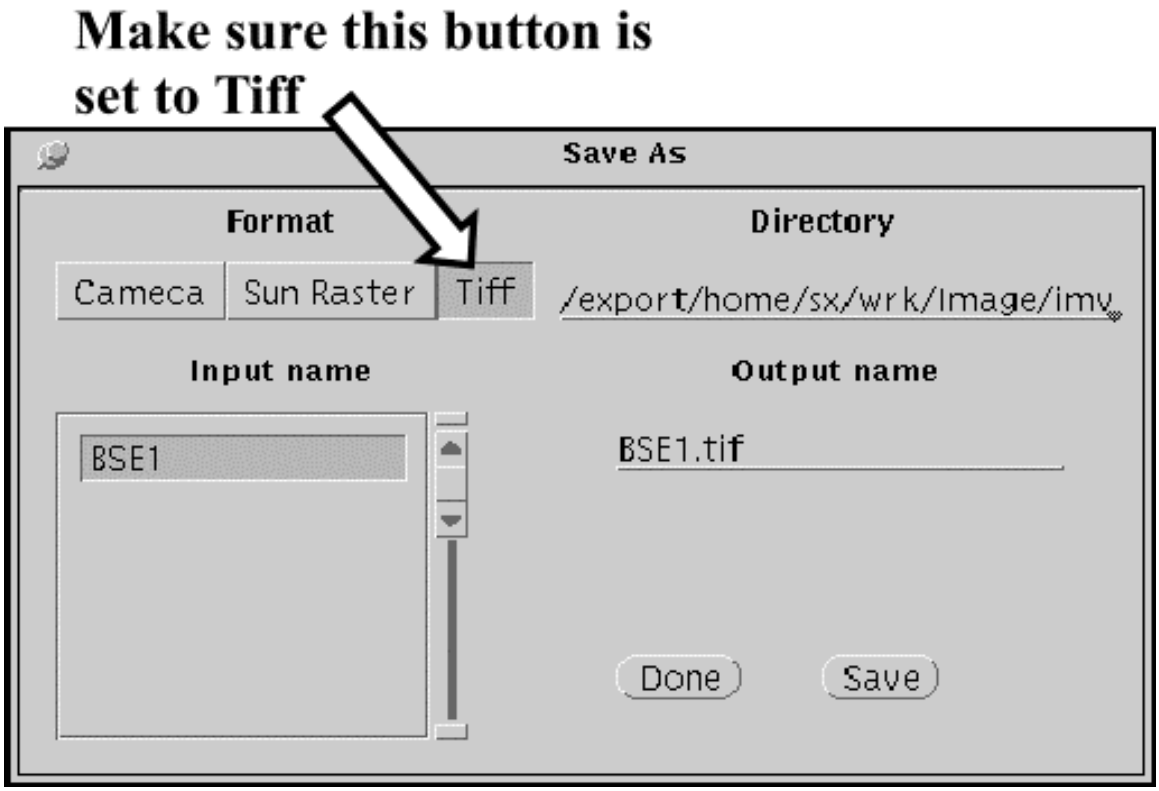
Step 1

When you are ready to save the picture as a tiff file:



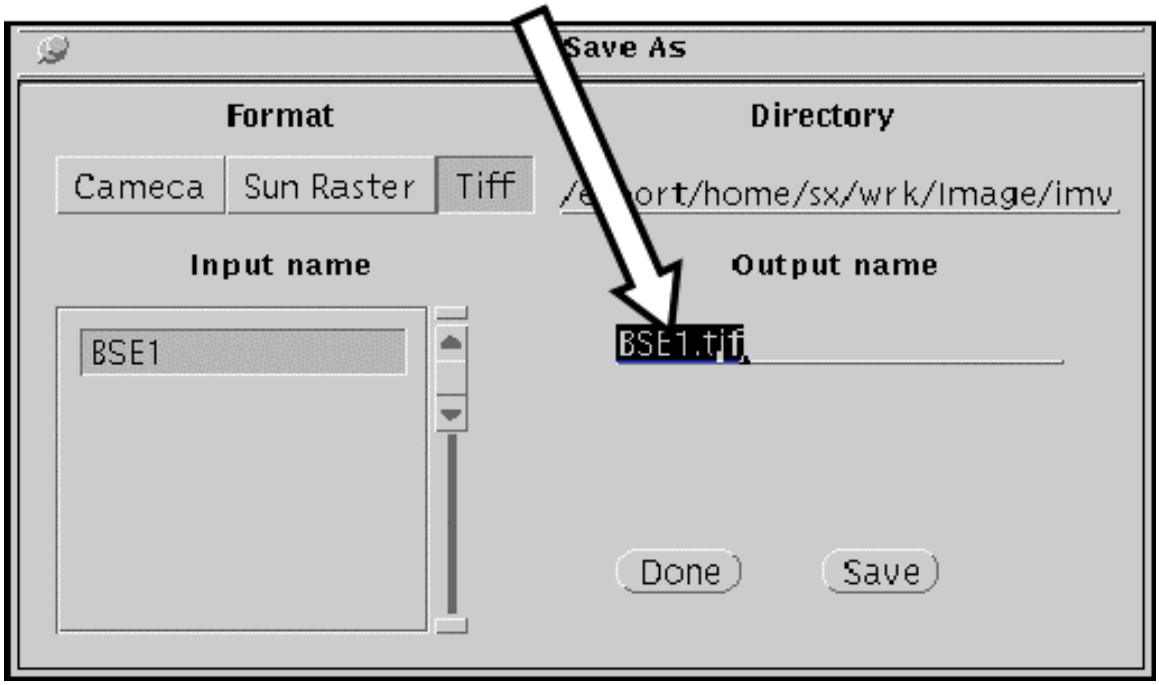
R-Click on the picture and select Save As from the pop-up menu.

Step 2


Make sure this button is set to Tiff
Save As
Format
Directory
Cameca
Sun Raster
Tiff
/export/home/sx/wrk/Image/imv
Input name
Output name
BSE1
BSE1.tif
Done
Save

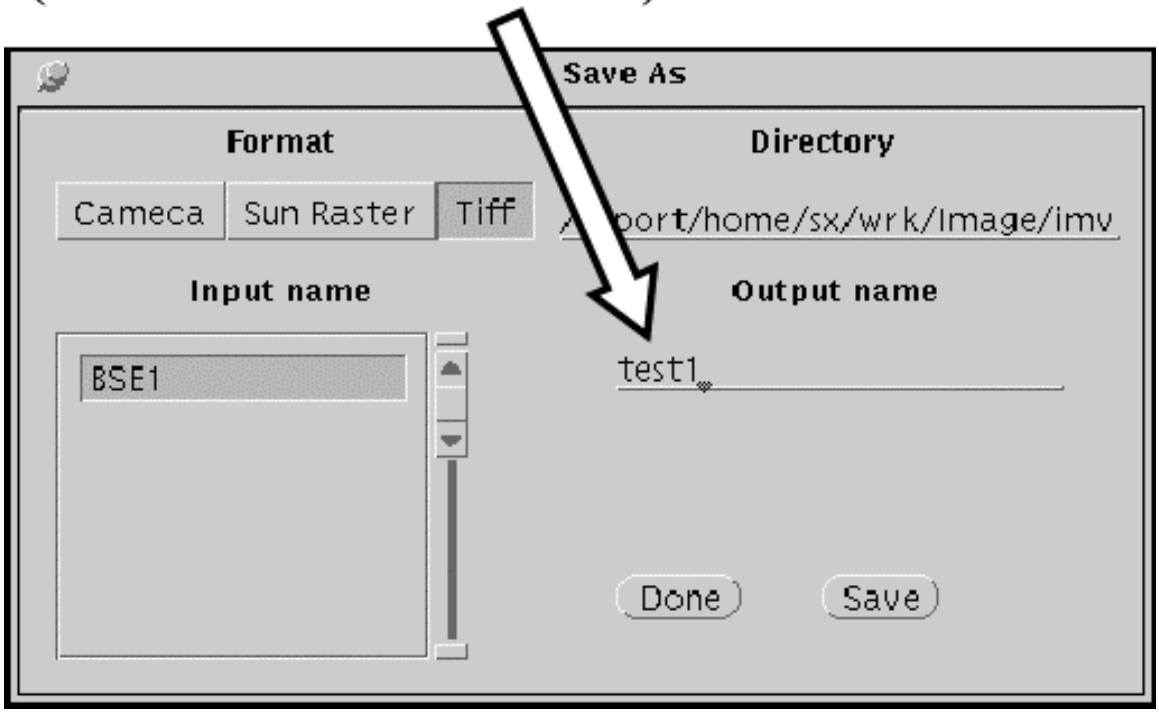
Step 3

Hold down the left mouse button and highlight this line. Then press the backspace key to delete it.

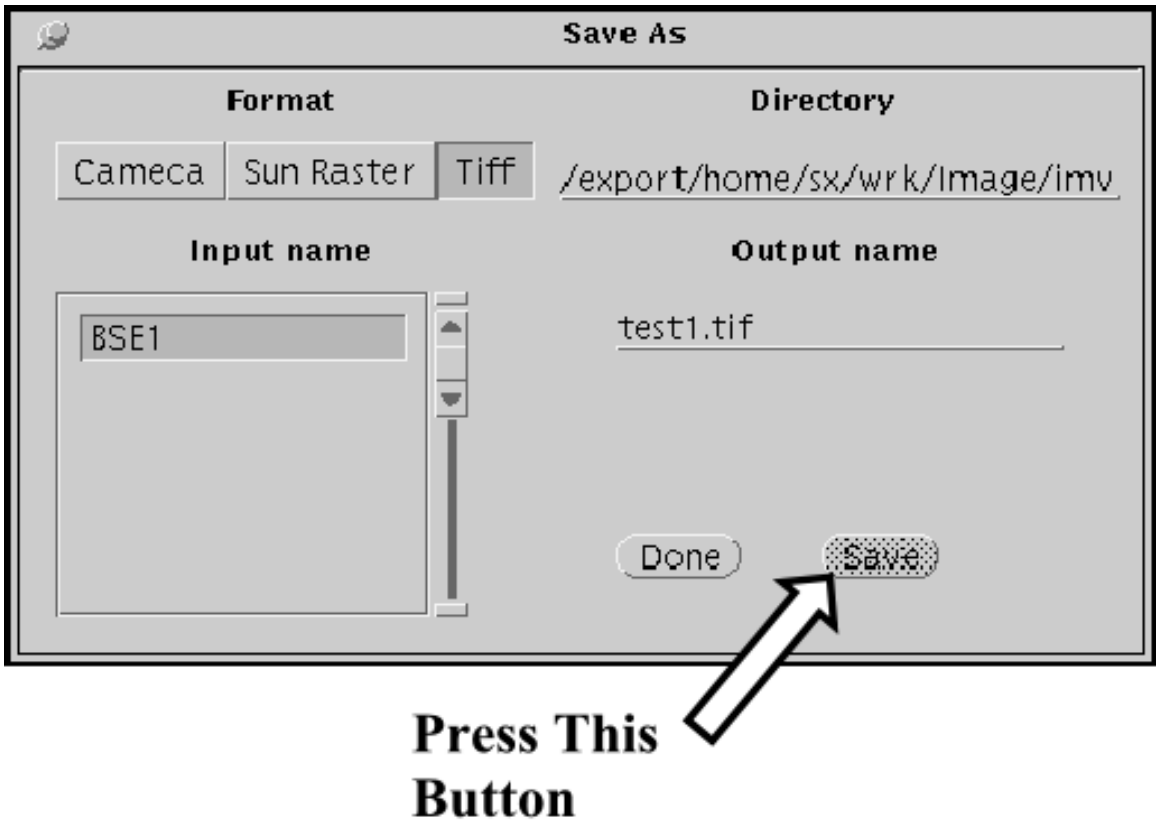


Step 4

Type in a name to call the tiff file.
(Do not add .tif at the end).



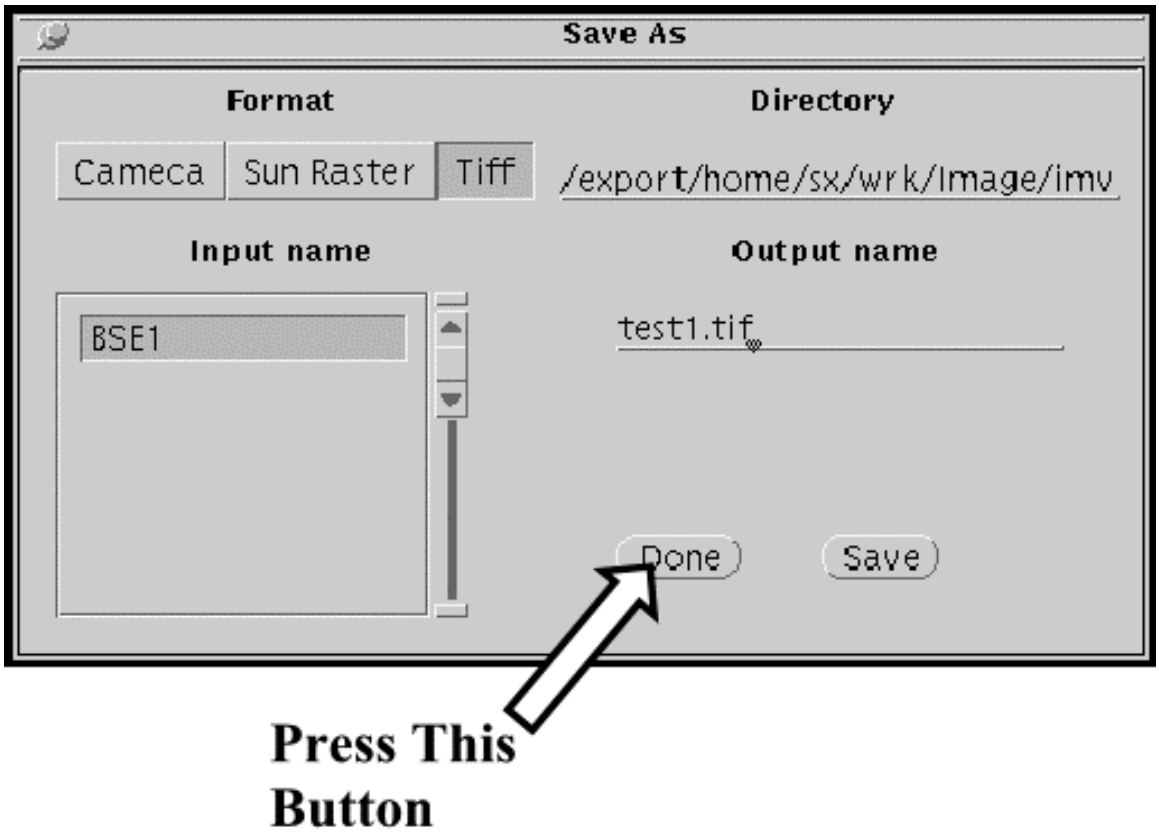
Step 5


Save As
Format
Directory
Cameca
Sun Raster
Tiff
/export/home/sx/wrk/Image/imv
Input name
Output name
BSE1
test1.tif
Done
Save
Press This
Button

Step 6

The save button will be grayed out until the picture is saved.

When it is done:

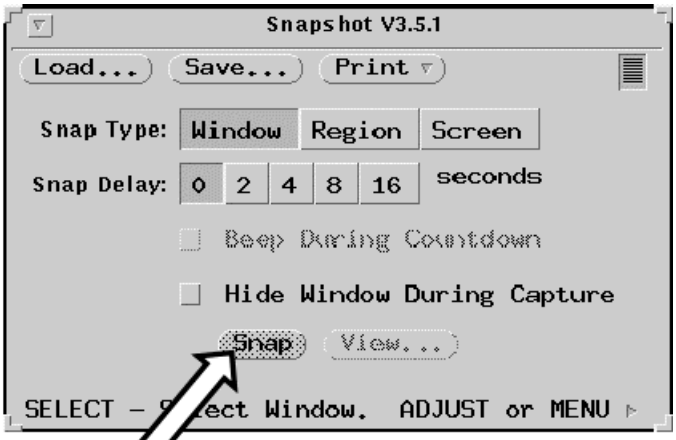


3: Print the Image on Paper

Step 1

Double click on the camera icon (Snapshot) on the blue background of the Sun computer.

Step 2

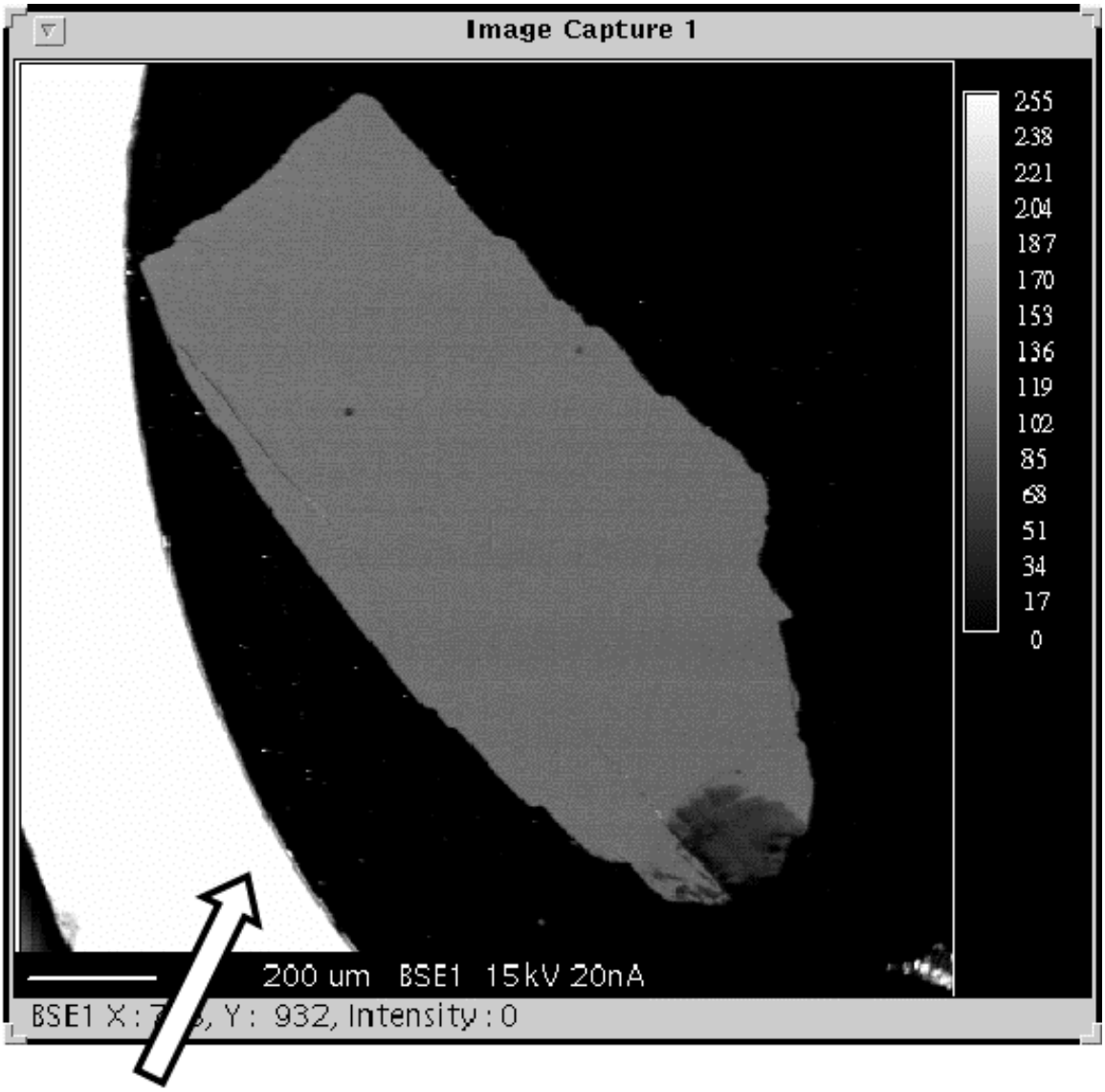


Press This Button

Then:

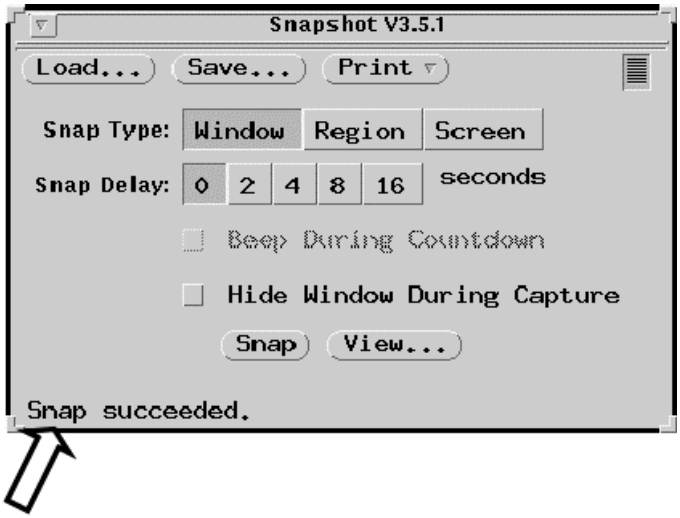
L-Click on the button - Discard Snapshot.

Step 3



L-Click on the picture.

Step 4



Wait for this message to appear

Then:

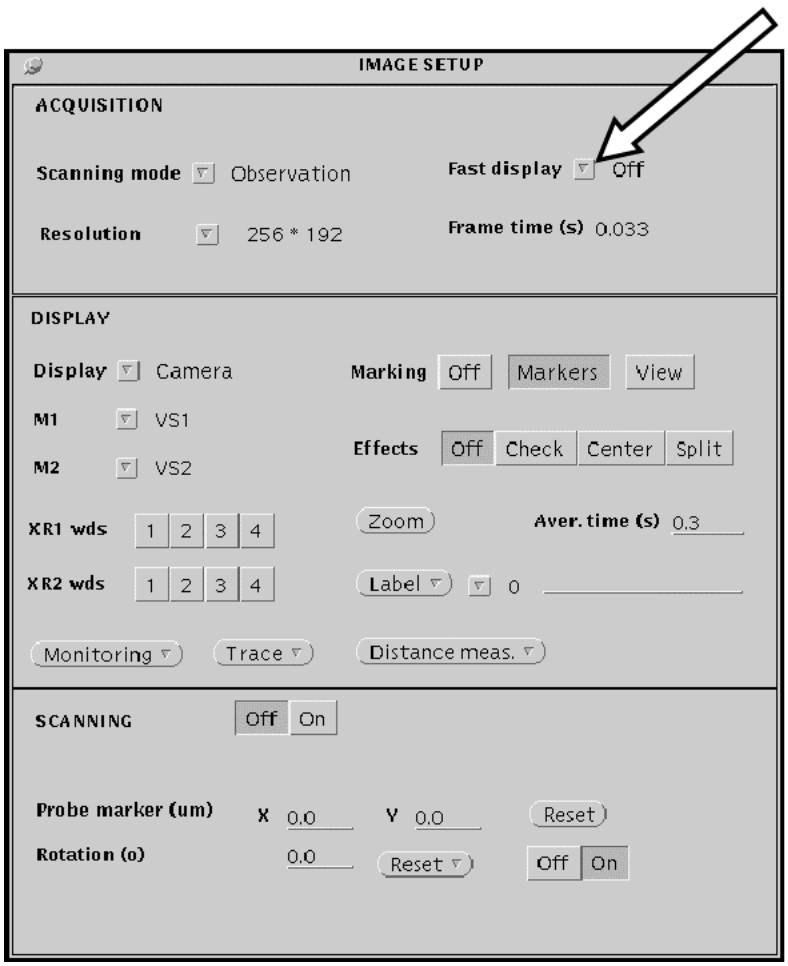
Press This Button

Step 5

This message will appear when the picture has printed

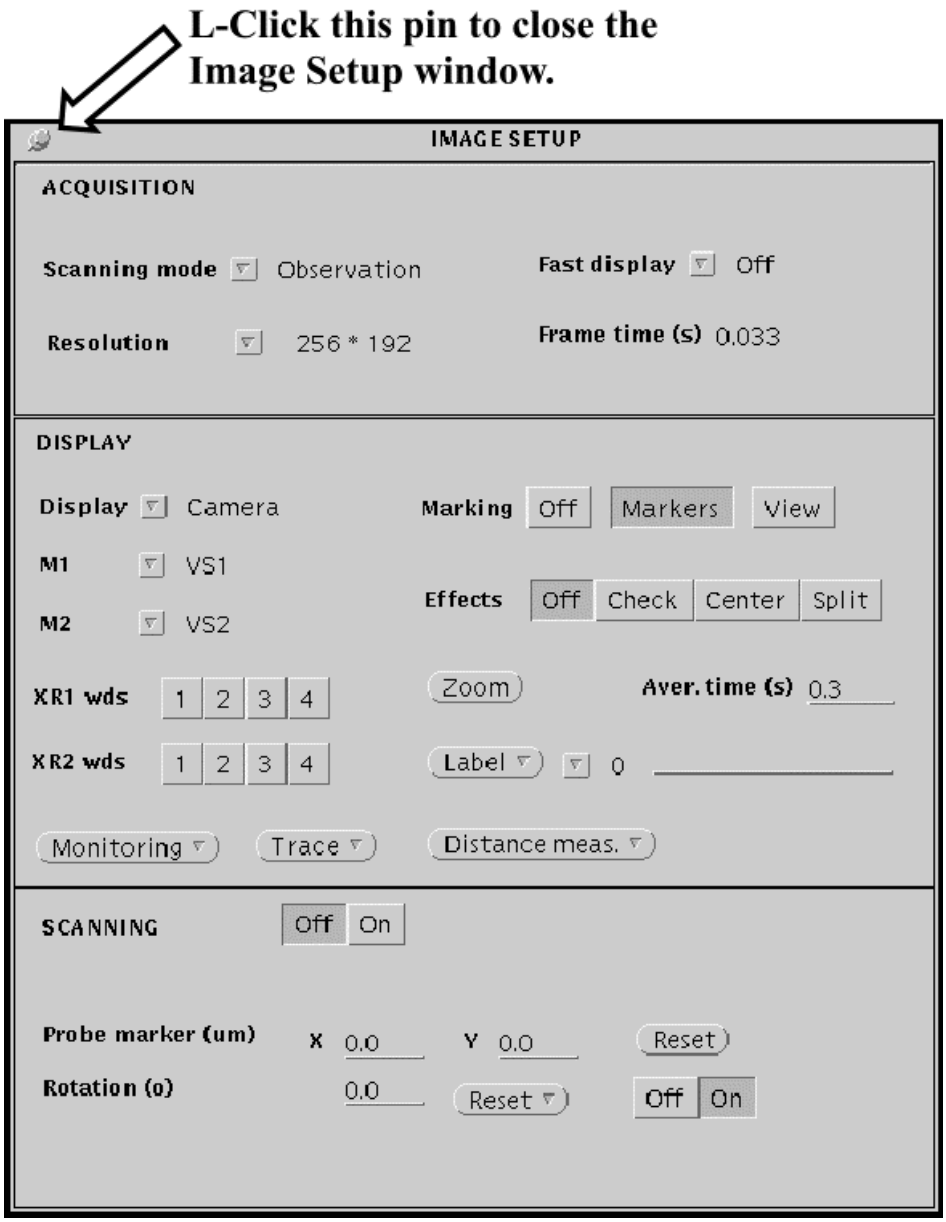
4: Turn Fast display Off

Step 1


R-Click this button and
select Off
from the pop-up menu.
IMAGE SETUP
ACQUISITION
Scanning mode
Observation
Fast display
Off
Resolution
256 * 192
Frame time (s) 0.033
DISPLAY
Display
Camera
Marking
Off
Markers
View
M1
VS1
M2
VS2
Effects
Off
Check
Center
Split
XR1 wds
1
2
3
4
Zoom
Aver. time (s) 0.3
XR2 wds
1
2
3
4
Label
0
Monitoring
Trace
Distance meas.
SCANNING
Off
On
Probe marker (um)
X 0.0
Y 0.0
Reset
Rotation (o)
0.0
Reset
Off
On

Step 2

If you are done taking pictures:



Analysis: Instruction Set 4

Taking EDS Spectra

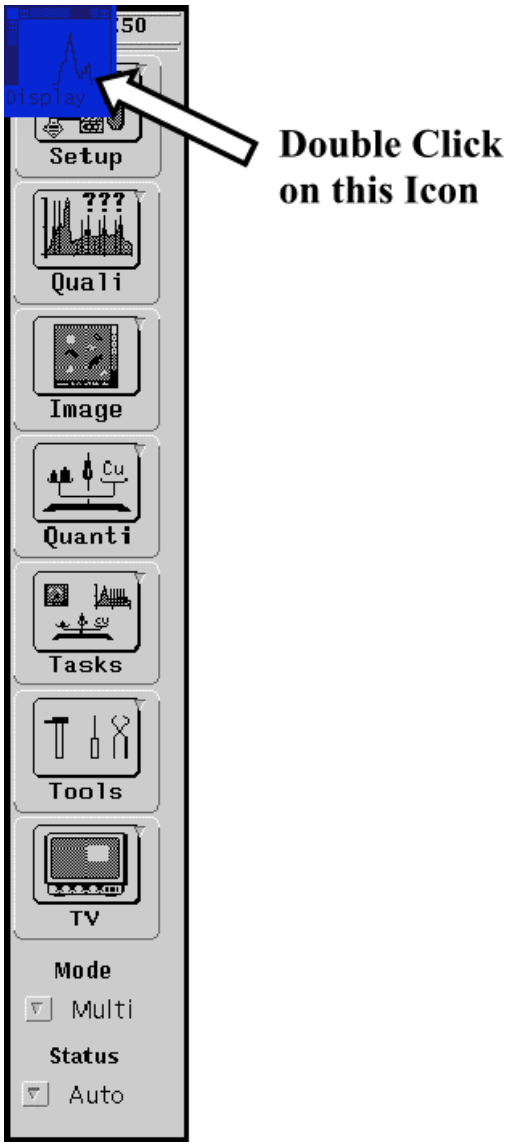
TOP

Step 1

Move to the first spot that you want to analyze and focus the optical image.

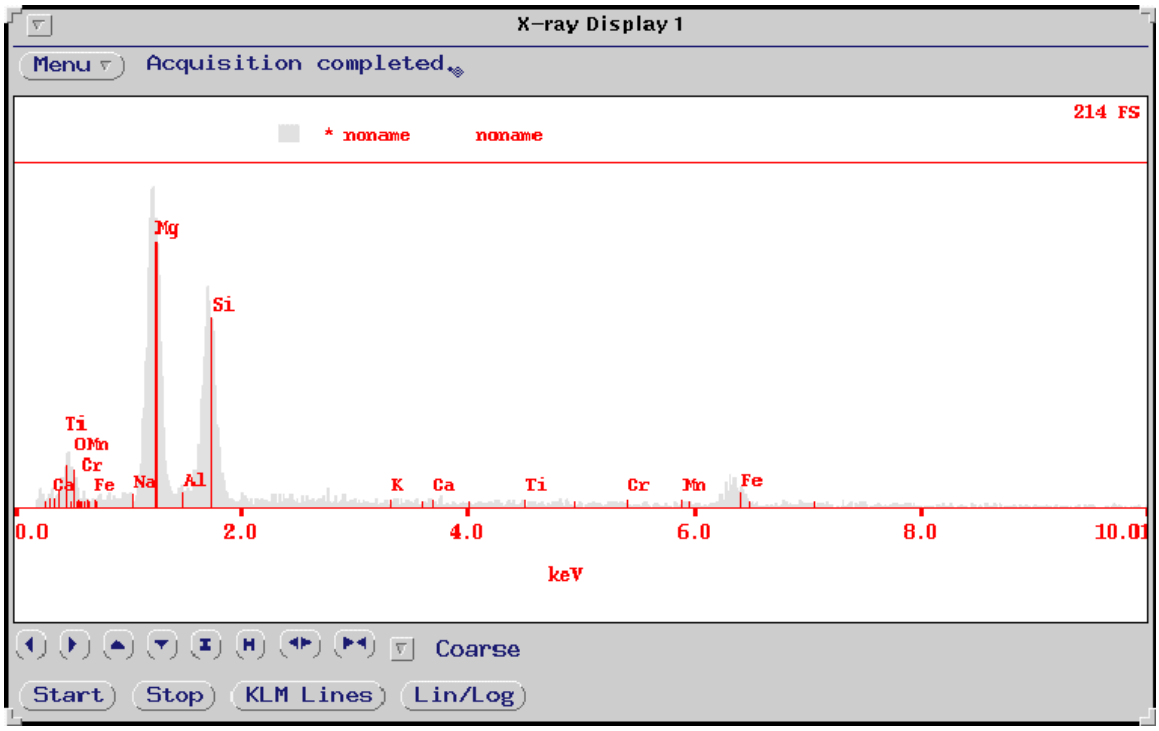
Step 2

Open the EDS window (if not already open).



Step 3

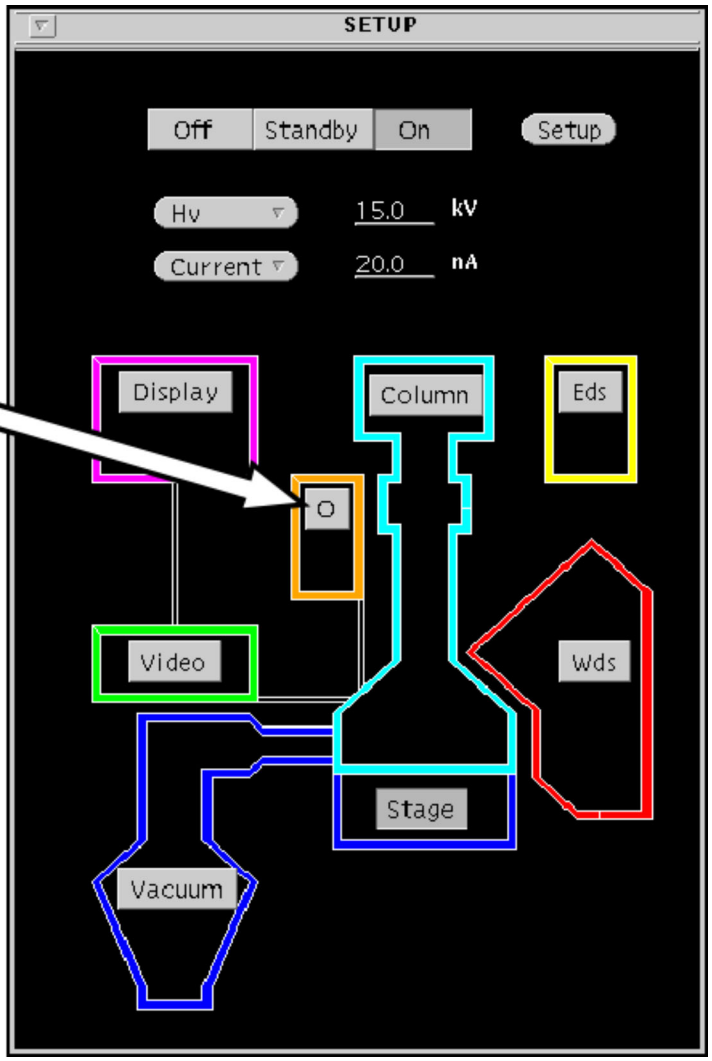
The EDS window will appear.



Step 4

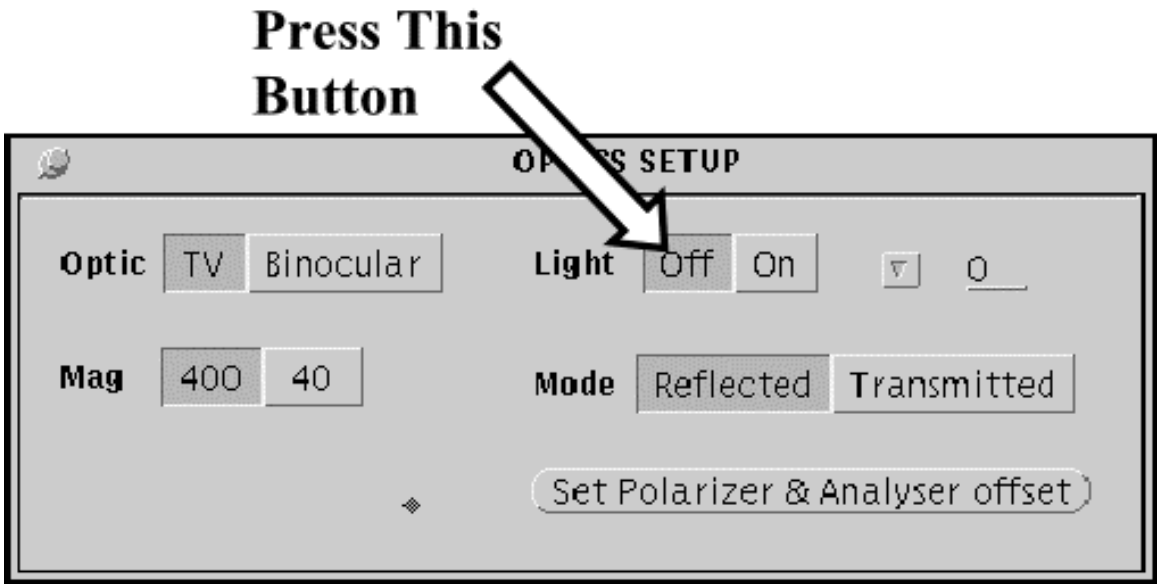
Open the Optics window (if not already open).

Press This Button



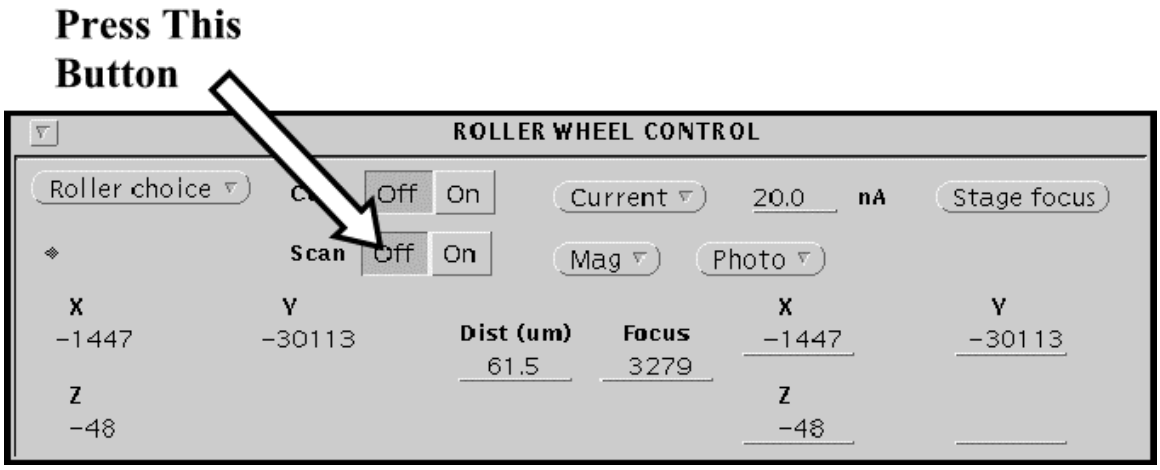
Step 5

Turn the light off.

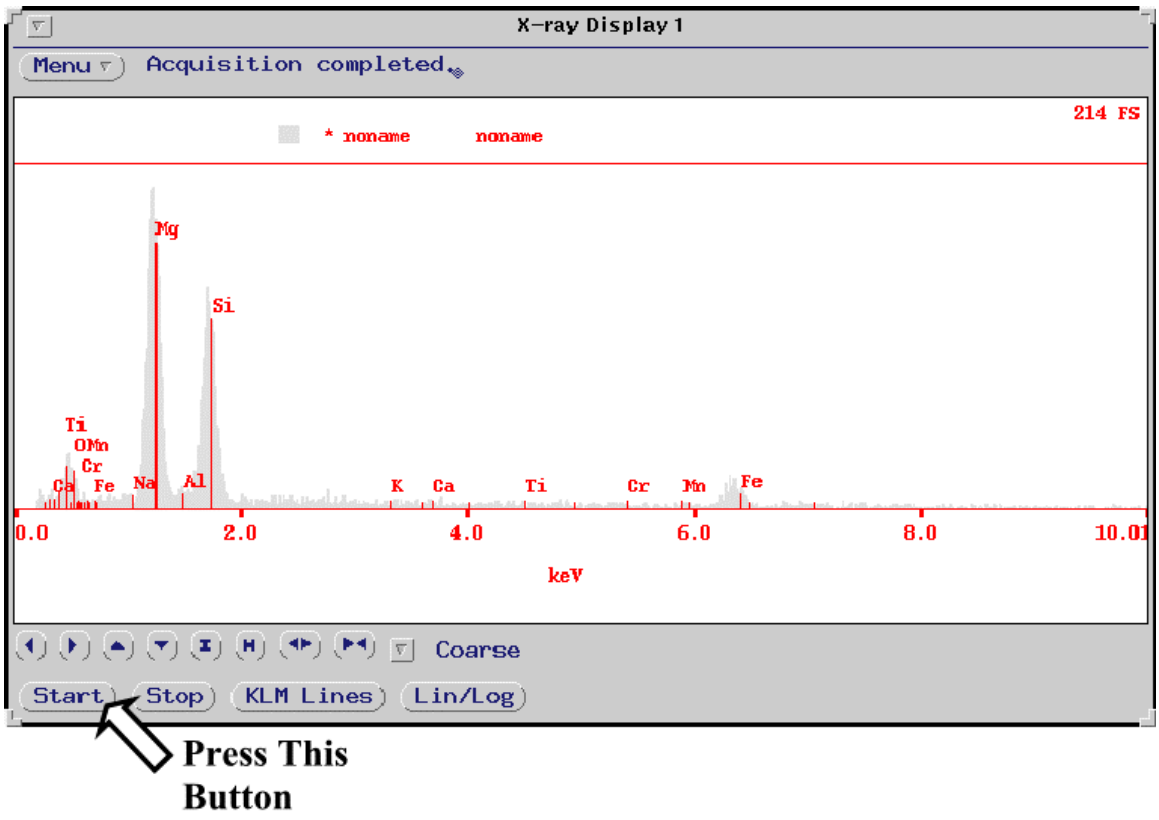


Step 6

Turn Scan Off.

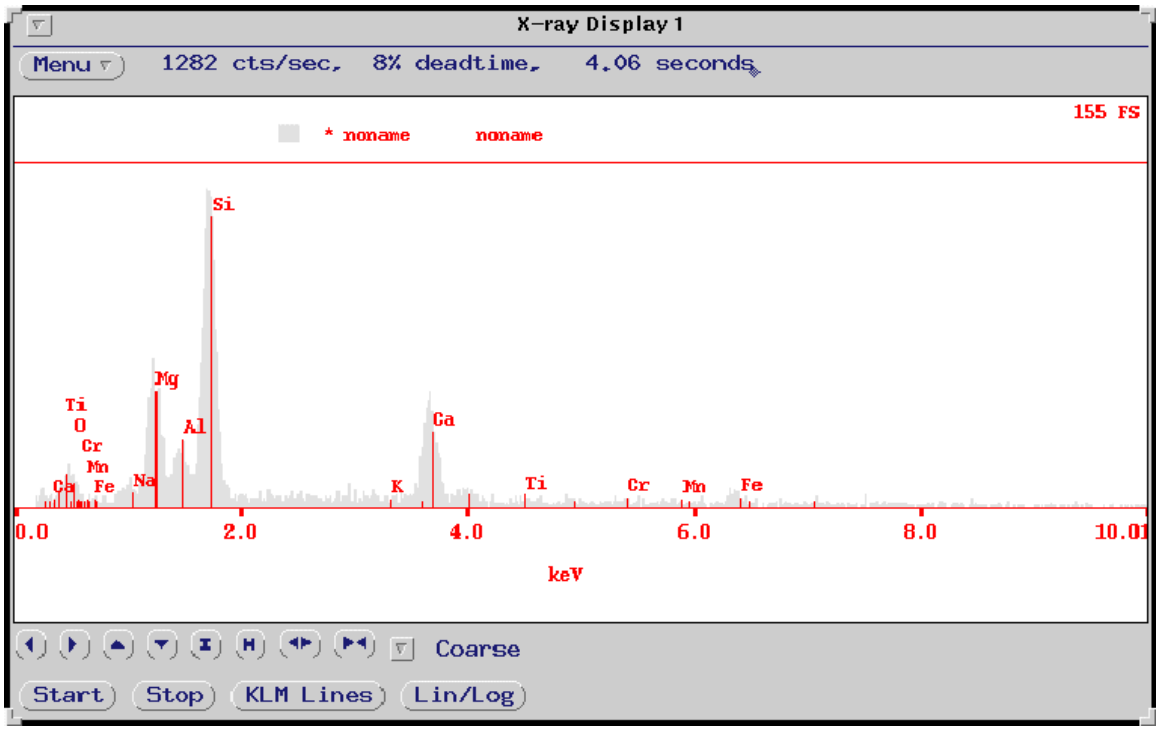


Step 7


X-ray Display 1
Menu
Acquisition completed
214 FS
* noname
noname
Mg
Si
Ti
OMn
Cr
Ca
Fe
Na
Al
K
Ca
Ti
Cr
Mn
Fe
0.0
2.0
4.0
6.0
8.0
10.01
keV
Coarse
Start
Stop
KLM Lines
Lin/Log
Press This Button

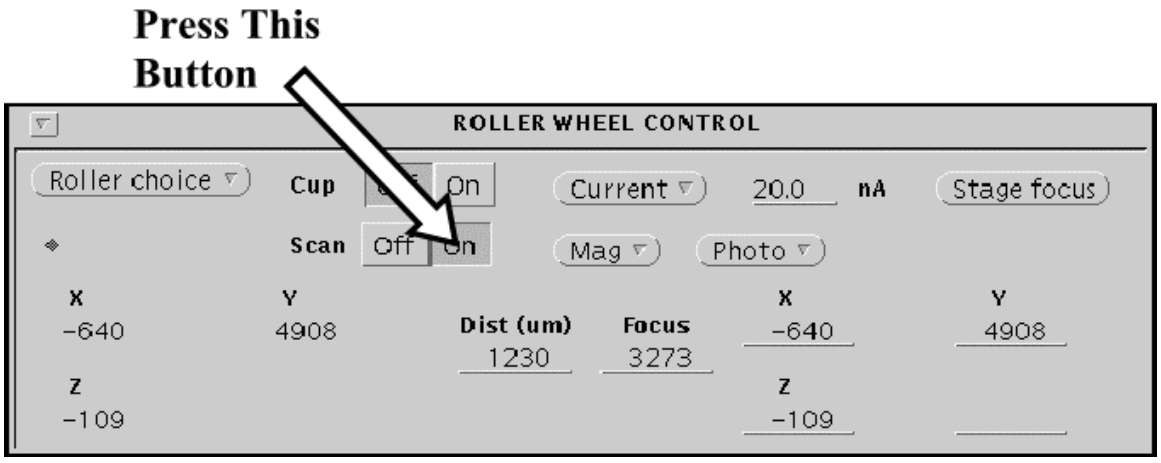
Step 8

The EDS will accumulate an X-ray spectra.



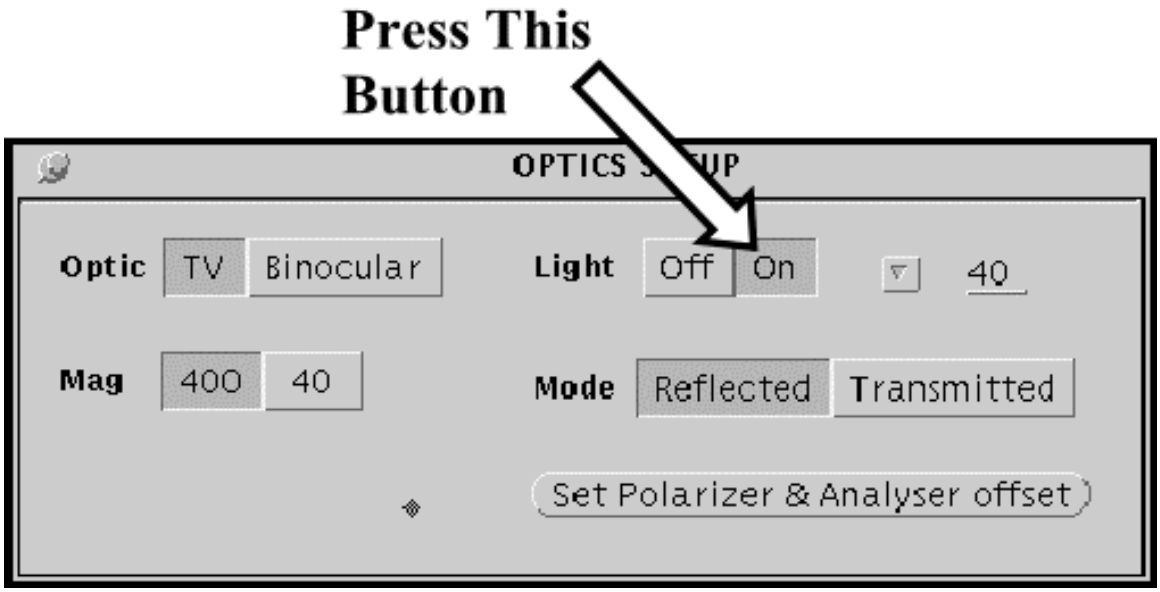
Step 9

When the EDS spectrum is finished, turn the Scan on.



Step 10

Turn the light on.



Step 11

REPEAT STEPS 5 – 10 for each EDS analysis point you want to analyze.

Appendix 1

Analysis Screen Disappears after pressing Continue

If analysis screen disappears after you press the continue button for the final time you need to create another Define file that has a different name but the same elements and beam conditions to use for doing additional analyses.

To do this follow steps 1 and 2 beginning on page 65 of the Calibration Instruction Set (Define an Analysis File: Instruction Set 4b Update an existing file). In Step 2, use the file name you were previously using. Modify this name (e.g. add a number after it), and skip to Step 7 and continue following the instructions to the end. After saving the new file, start with Step 1 of this instruction set (Analysis Instruction Set 2a). Be sure to use the new file name in Step 3

Analysis

TOP

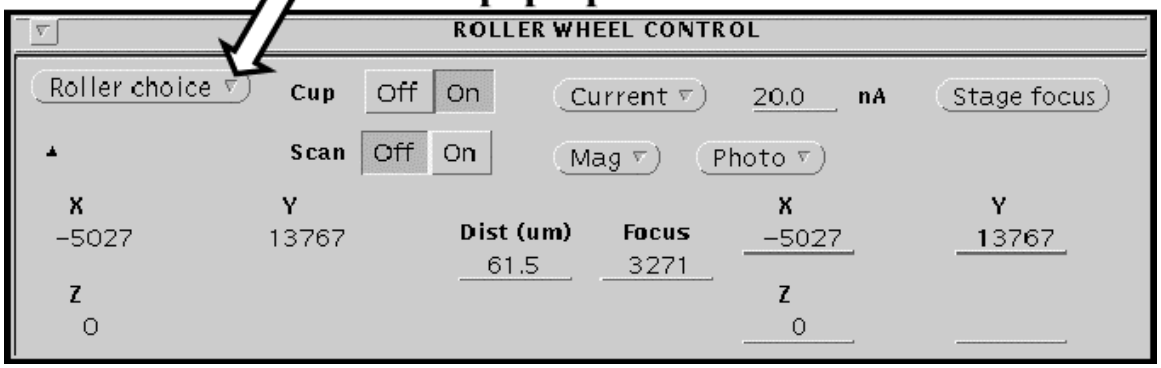
Appendix 2

Reset the Probe Marker

TOP

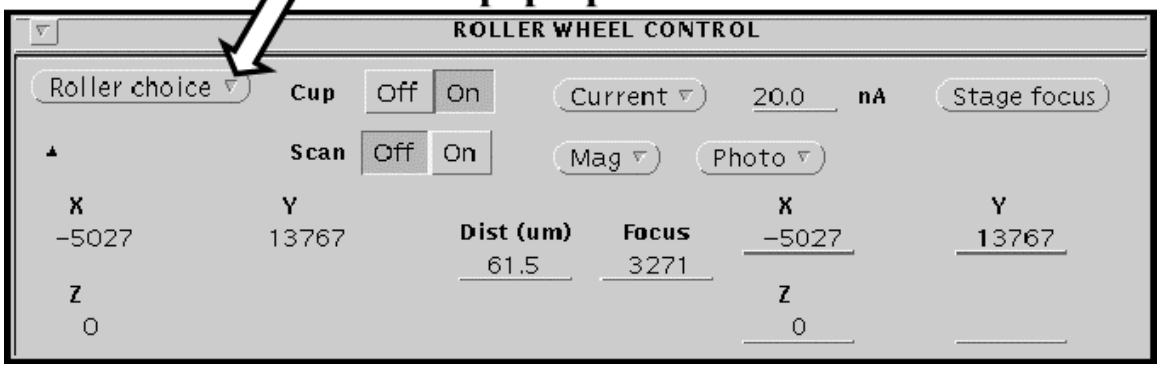
Step 1

R-Click this button and select <u>Probe Marker</u> from the pop-up menu.



Step 2

R-Click this button and select Stage from the pop-up menu.



Multipoint

Line Scan

Appendix 3

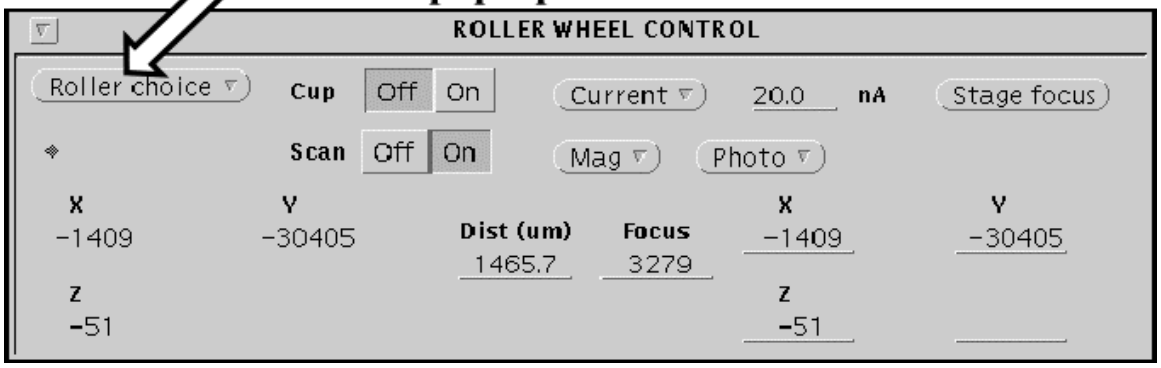
Adjust BSE Image Brightness and Contrast

TOP

1: Using Automatic Mode: (easier)

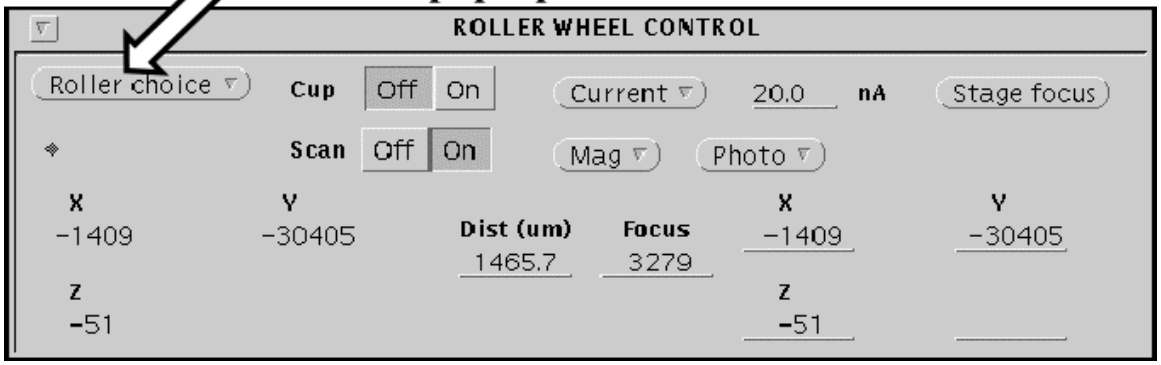
Step 1

R-Click this Button and Select <u>Video Mode 1</u> from the pop-up menu.



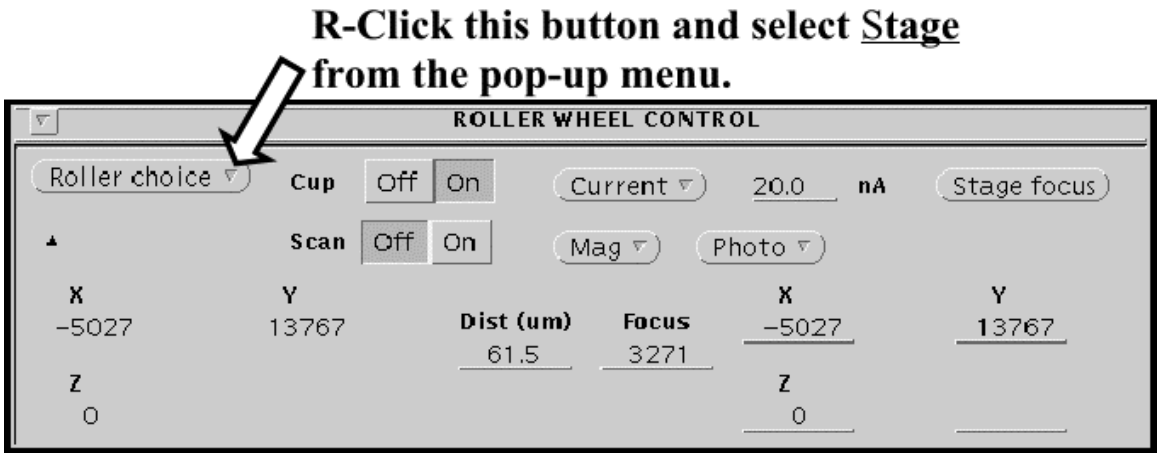
Step 2

R-Click this Button and Select <u>Video Mode 1</u> from the pop-up menu.



Step 3

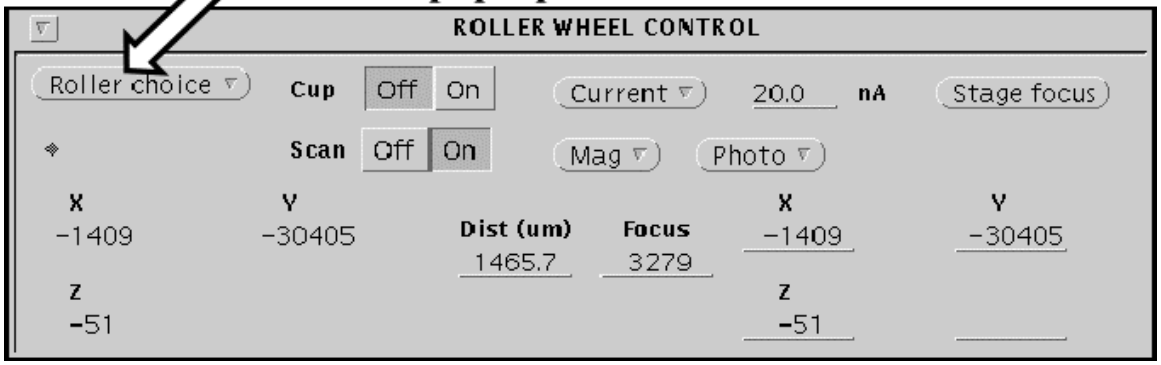
When you are finished adjusting the contrast:



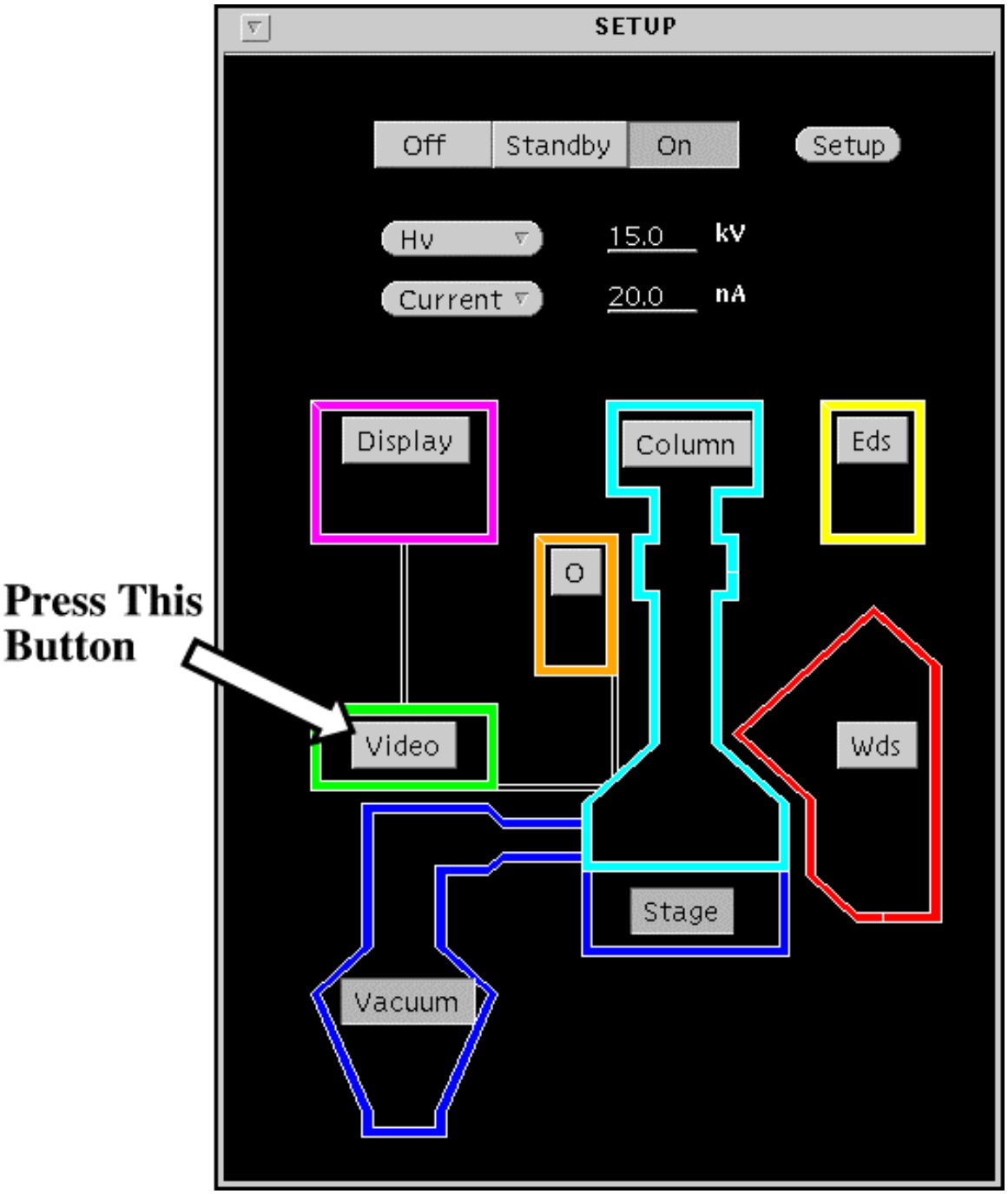
2: Using Manual Mode: (more control)

Step 1

R-Click this Button and Select <u>Video Mode 1</u> from the pop-up menu.

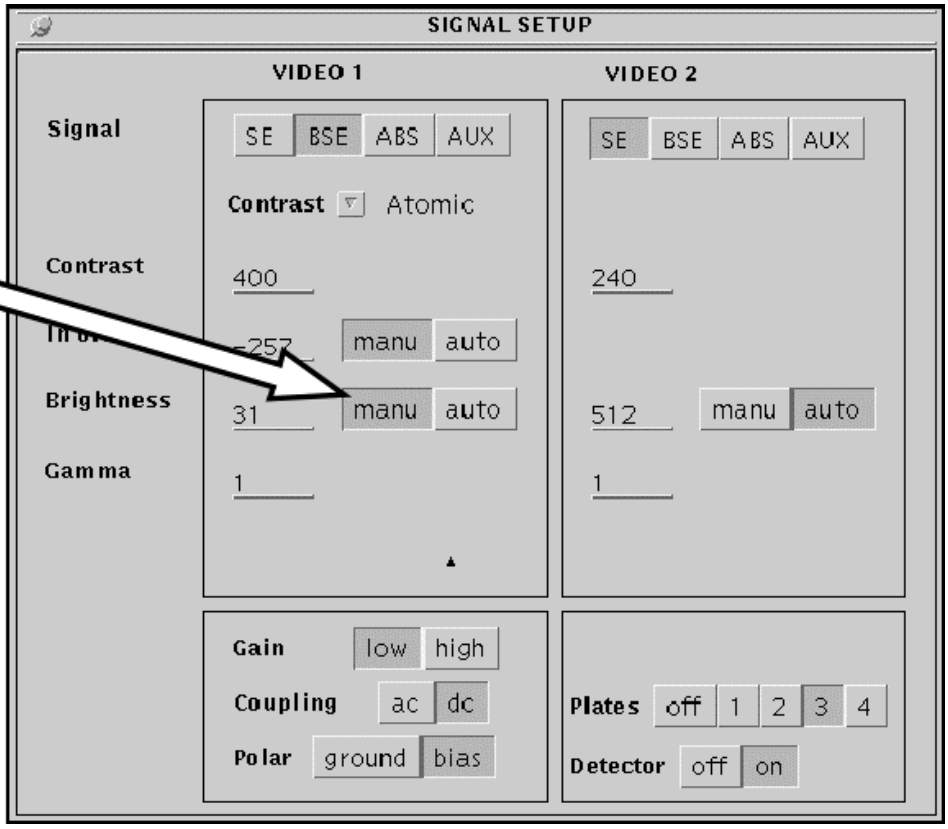


Step 2


SETUP
Off
Standby
On
Setup
Hv
15.0
kV
Current
20.0
nA
Display
Column
Eds
O
Video
Wds
Stage
Vacuum
Press This Button

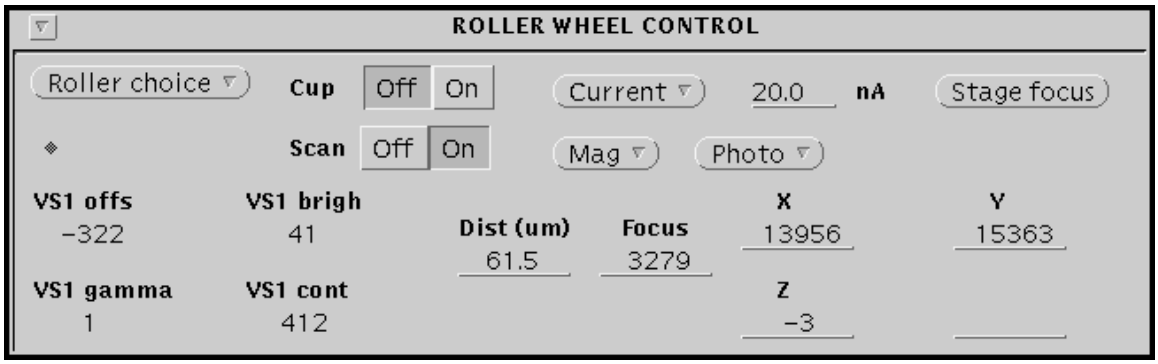
Step 3

Press This Button



Step 4

Adjust Roller Wheel controls to obtain a good picture.

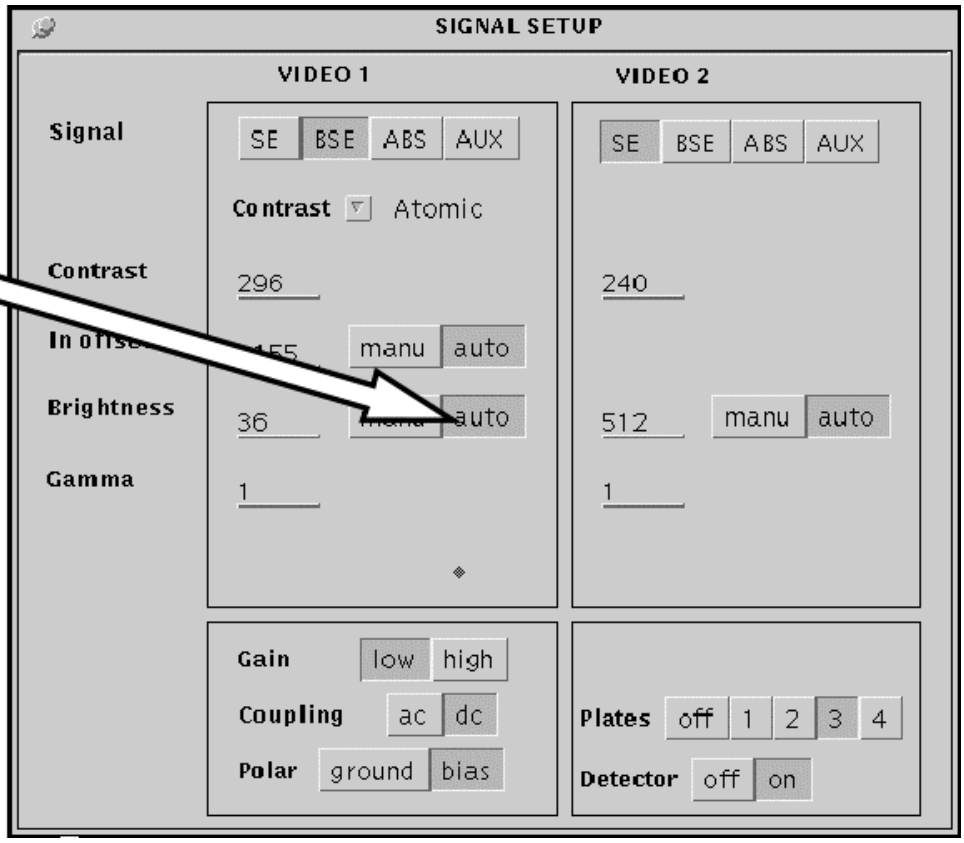


VS1 Offset: Large changes in image brightness.
VS1 Brightness: Small changes in image brightness.
VS1 Gamma: Contrast for very bright objects (seldom used).
VS1 Contrast: Contrast adjustment.

Step 5

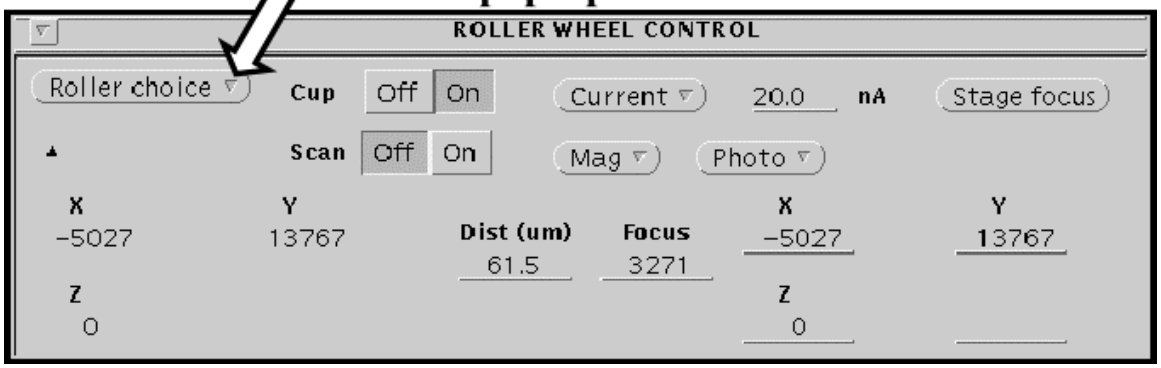
When you are finished with the picture:

Press This Button



Step 6

R-Click this button and select Stage from the pop-up menu.



BSE