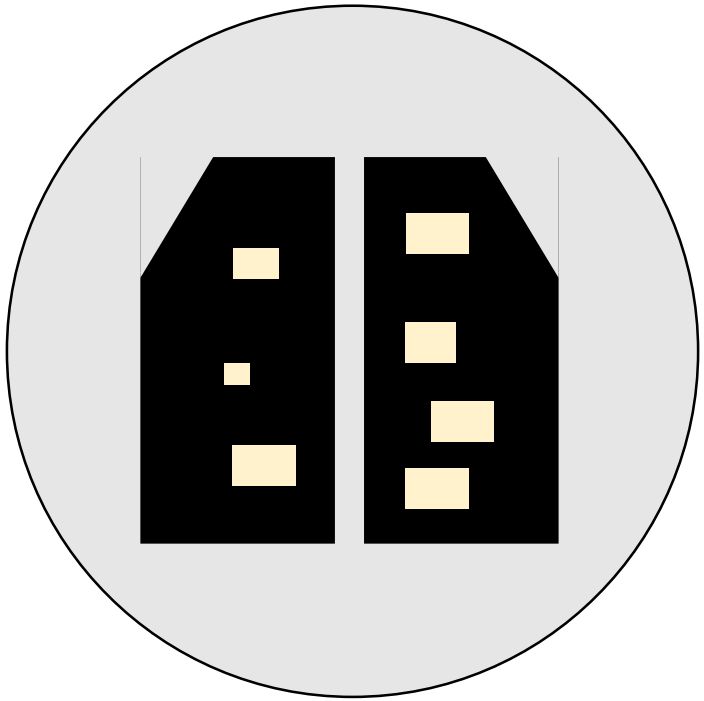
Ultra-55

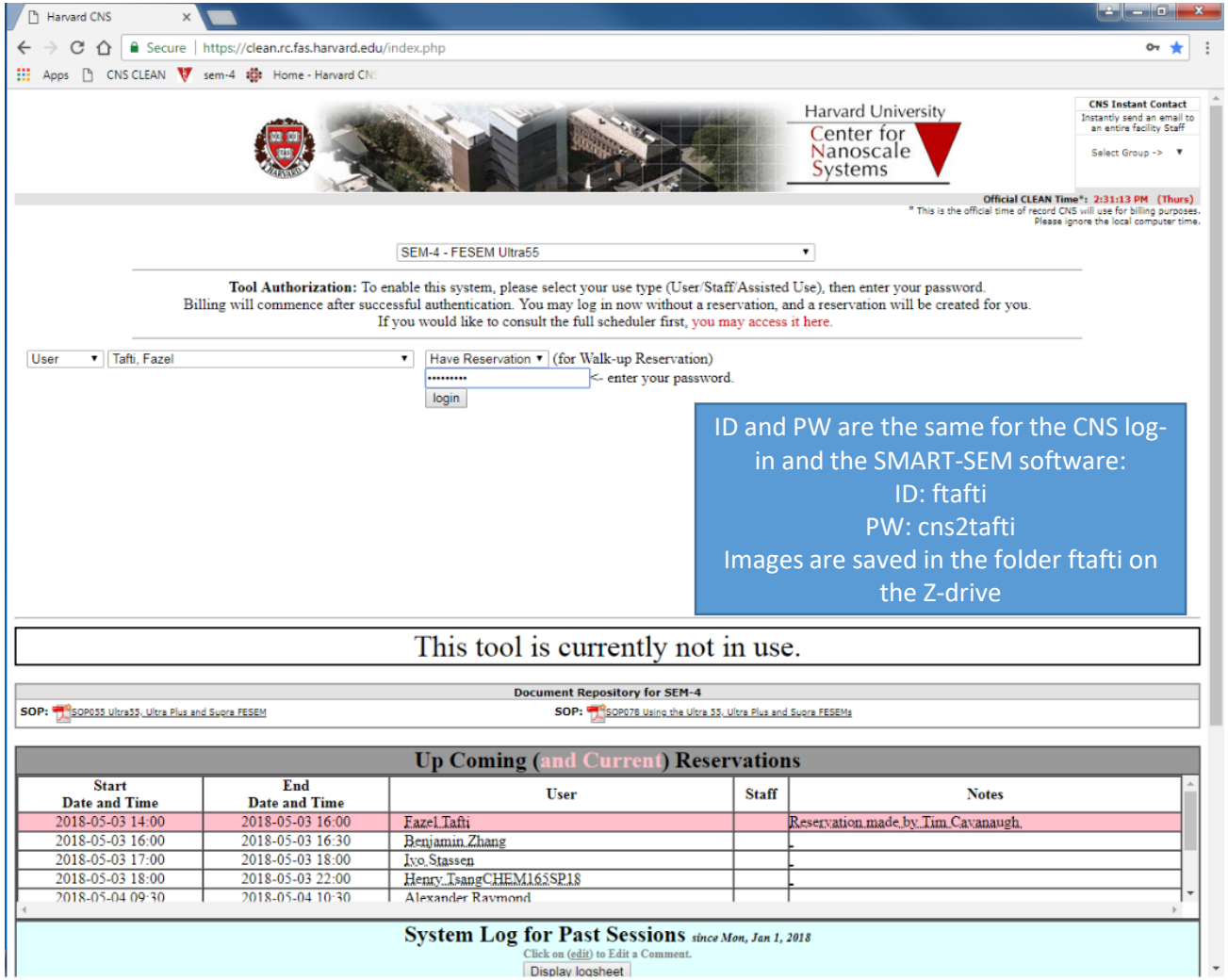
Zeiss Ultra-55 Field Emission Scanning Electron Microscope (FESEM)

CNS Harvard

- Prepare your samples in a puck and mark the tape by cutting one corner.
- Make a map of your samples
- Give a description of which elements you expect to find in each sample.



1. Open the web browser
2. Click on CNS CLEAN
3. Select Ultra55 from Room B15 i
4. User type → User
5. Select “Have Reservation”
6. Choose your name
7. Enter password (cns2tafti)
8. Login



Before starting EDX, make sure the detector is in the correct position and before removing samples, make sure the detector is in the safe position

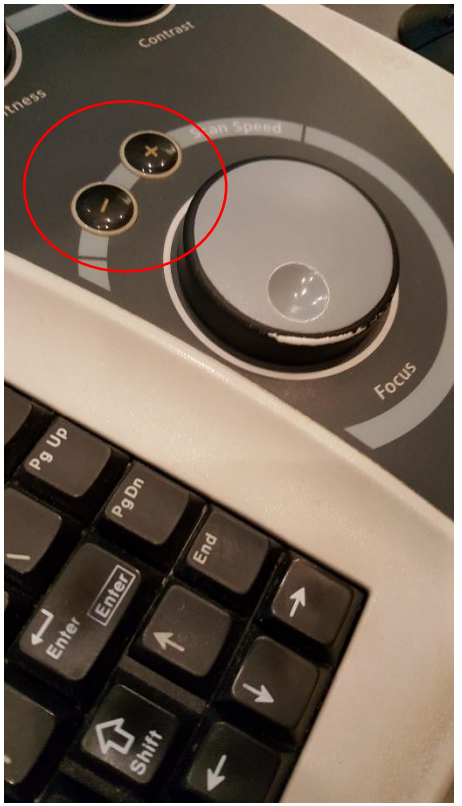
Place the puck in the holder and tighten the screw

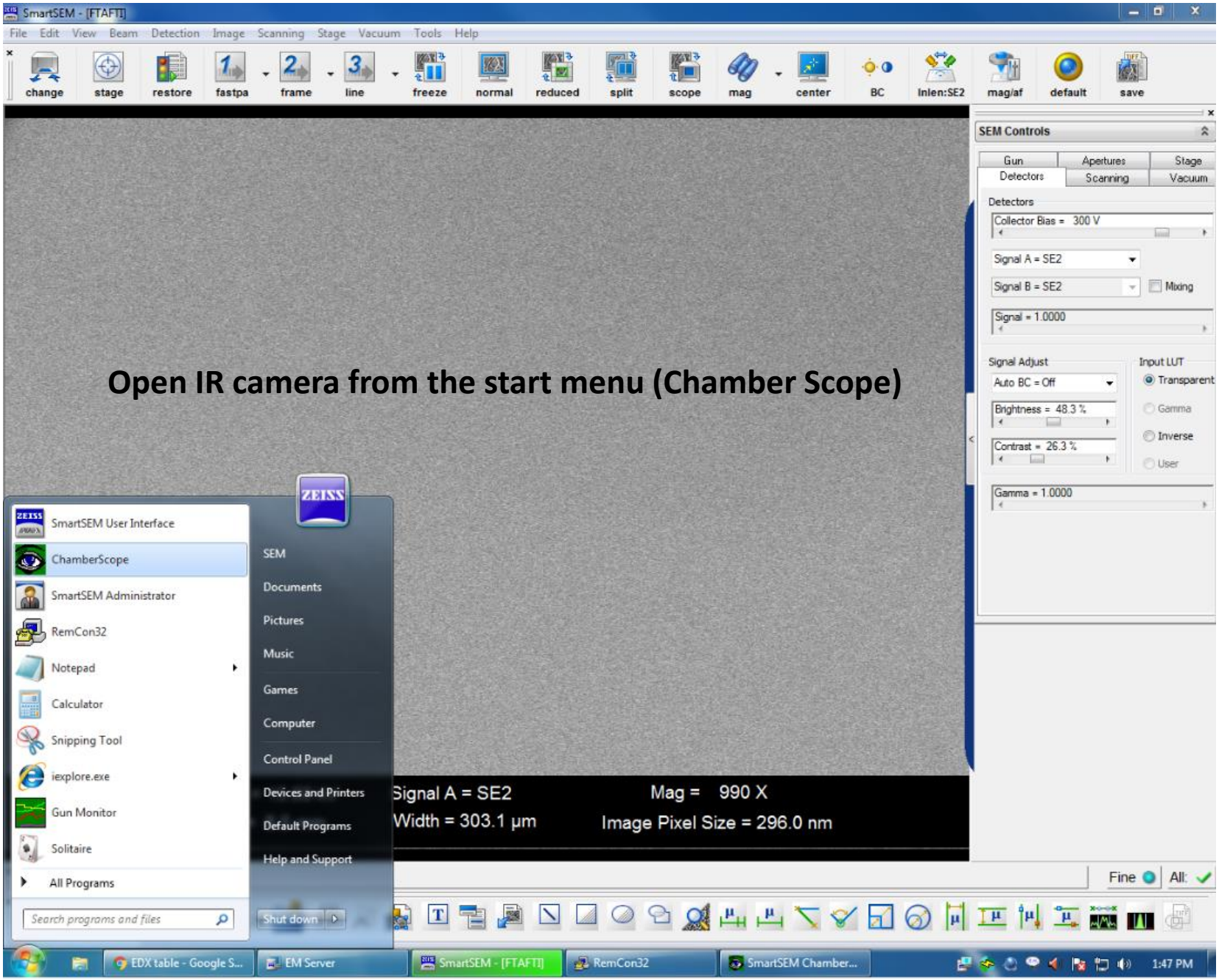
Magnification knob

XY-stick

Z-stick

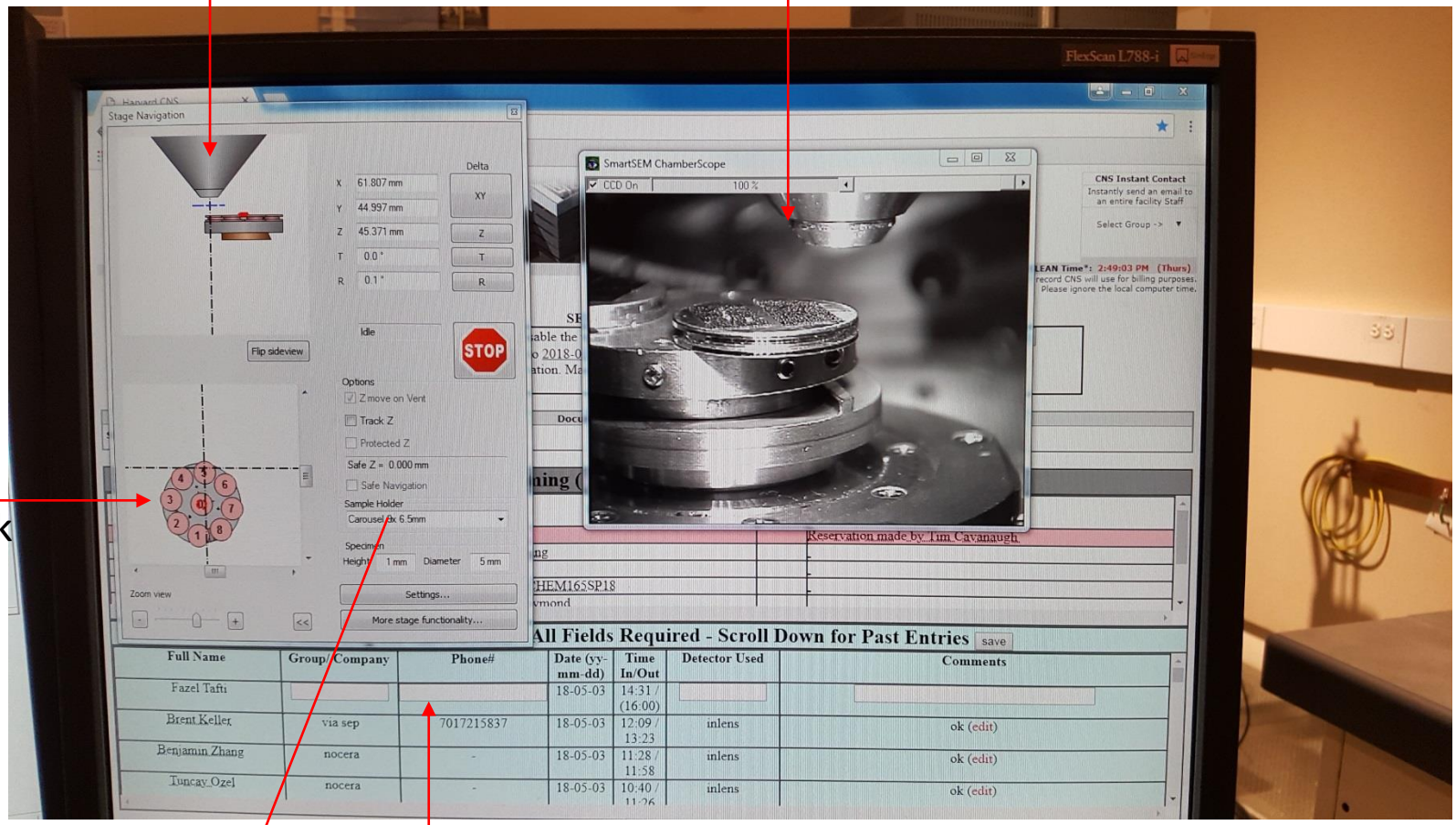
+/- increase/decrease scanning rates. Typically, you need slower scans to clarify backscattered images.



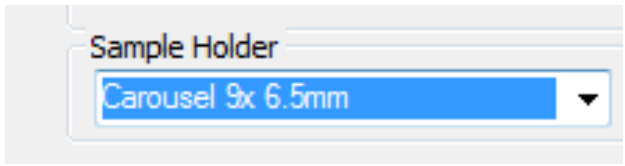

SmartSEM - [FTAFTI]
File Edit View Beam Detection Image Scanning Stage Vacuum Tools Help
change stage restore fastpa frame line freeze normal reduced split scope mag center BC Inlen:SE2 mag/af default save
SEM Controls
Gun Apertures Stage
Detectors Scanning Vacuum
Detectors
Collector Bias = 300 V
Signal A = SE2
Signal B = SE2
Mixing
Signal = 1.0000
Signal Adjust
Auto BC = Off
Brightness = 48.3 %
Contrast = 26.3 %
Input LUT
Transparent
Gamma
Inverse
User
Gamma = 1.0000
Open IR camera from the start menu (Chamber Scope)
ZEISS
SmartSEM User Interface
ChamberScope
SmartSEM Administrator
RemCon32
Notepad
Calculator
Snipping Tool
iexplore.exe
Gun Monitor
Solitaire
All Programs
Search programs and files
SEM
Documents
Pictures
Music
Games
Computer
Control Panel
Devices and Printers
Default Programs
Help and Support
Shut down
Signal A = SE2
Mag = 990 X
Width = 303.1 µm
Image Pixel Size = 296.0 nm
Fine
All
EDX table - Google S...
EM Server
SmartSEM - [FTAFTI]
RemCon32
SmartSEM Chamber...
1:47 PM

From top menu, select Stage\Navigation
Adjust a safe Z-height

IR camera
(Chamber Scope)



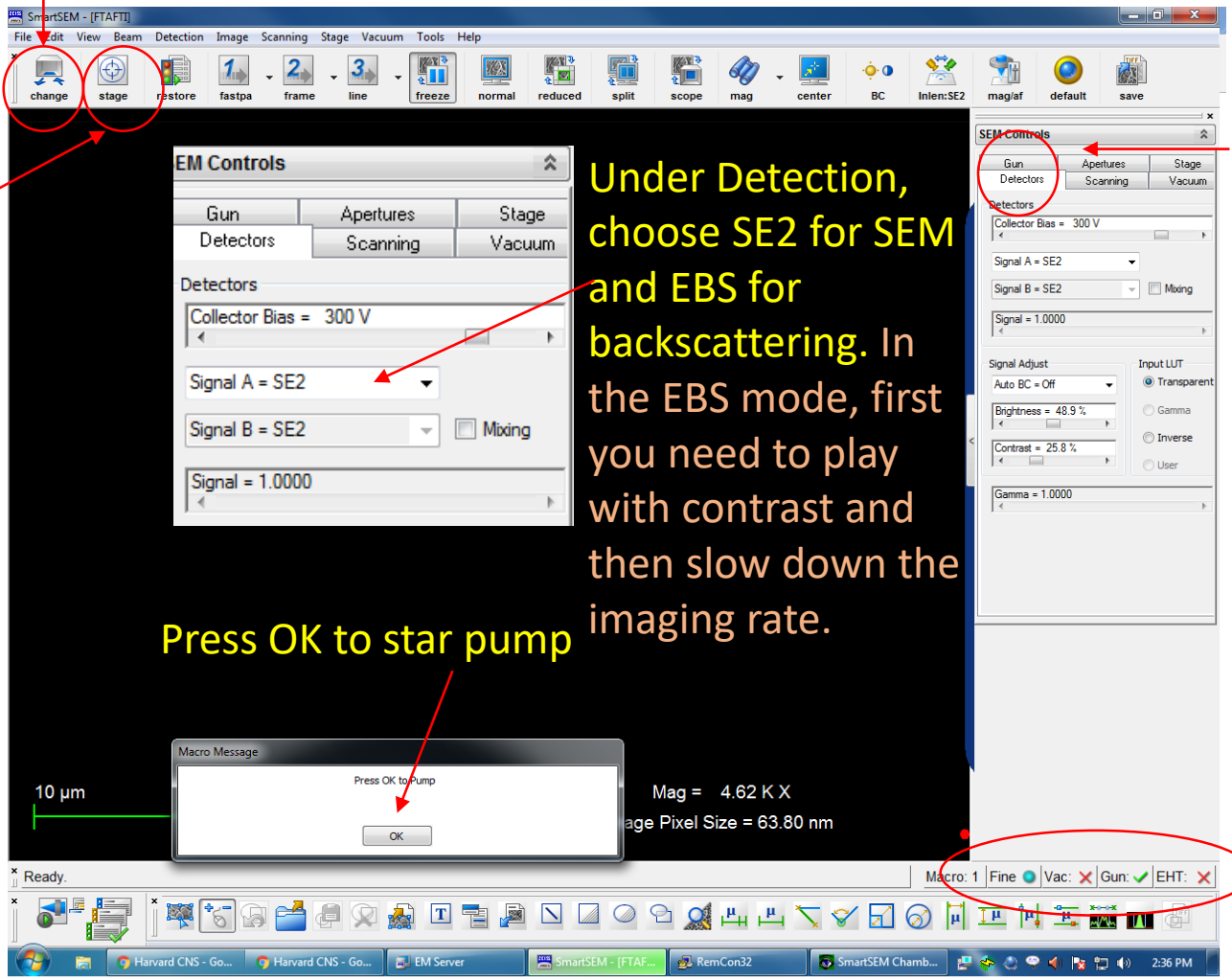
Double click
to select puck



At the end of the experiment, you need to insert the information here, enter your PW, and log out by re-entering your password

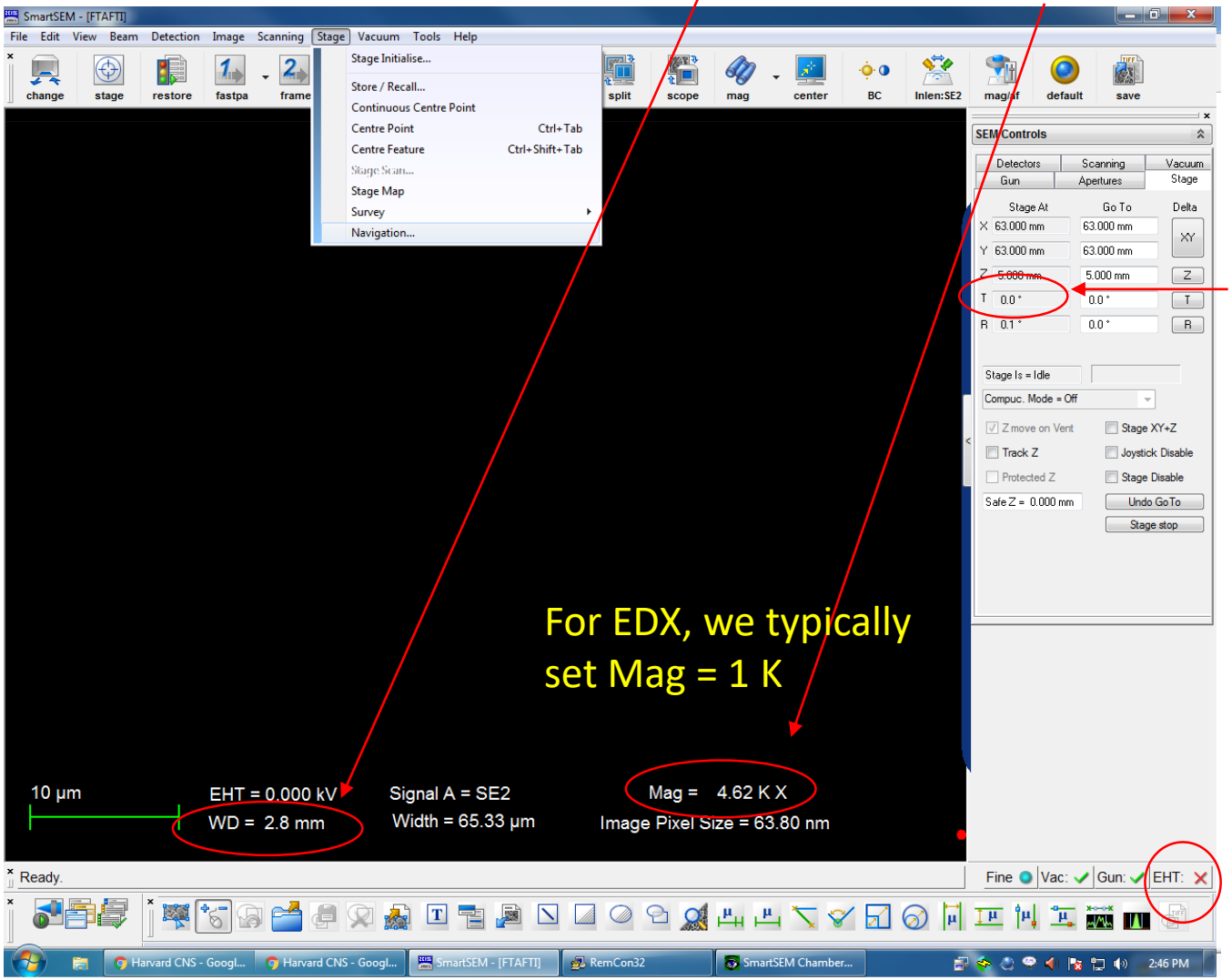
1. Double click on “smart sem”
2. Input ID and PW (ftafti, cns2tafti)
3. Fix samples on the puck
4. Click on “Change” to vents the chamber
5. Press “OK” to start pumping
6. Wait until “vac” is green
7. Press “EHT” and select “EHT on” to start high tension

Initializes stage position to remove the sample puck



Check the Gun and Detection status here

1. On top bar, select “stage” → “Navigation”
2. Double click on the stage number
3. Use the Z-stick to bring the stage up while monitoring with the IR camera
4. Be careful not to exceed the safe Z limit
5. Double click on “WD” and put it to 8.5, then hit enter
6. Use the Z-stick to bring the stage to focus
7. Double click on “Mag” to adjust



Make sure there is no tilt

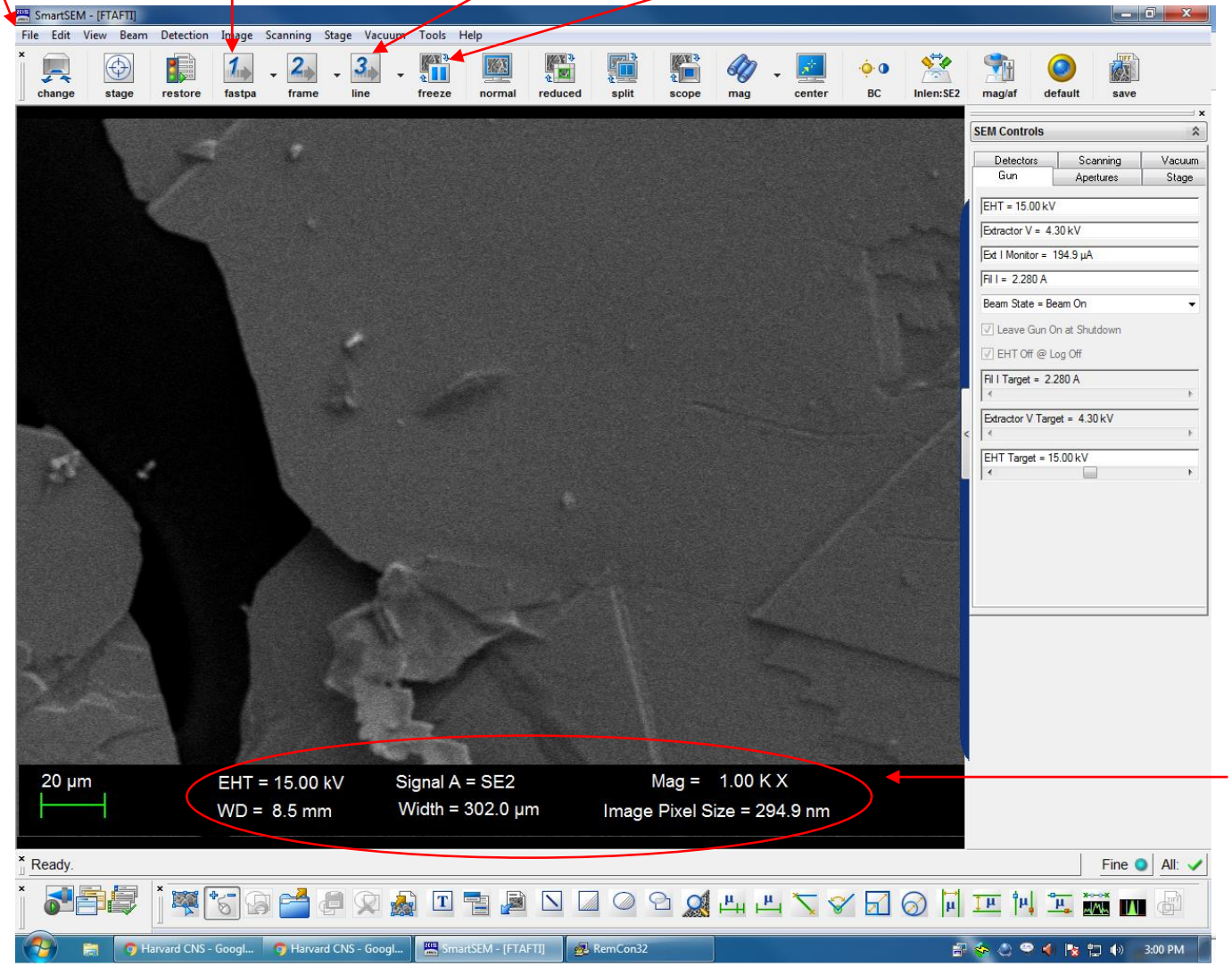
Turn on EHT

To save image, File → save image → choose directory and save

"fastpa" is good for scanning

"line" is good to take image

Make sure the image is not frozen



Typical parameters used for EDX analysis

To start EDX, put the detector in the correct position → **turn off ccd** (make sure the checkbox is off, no need to close the window) → double click on "EDX-Genesis"

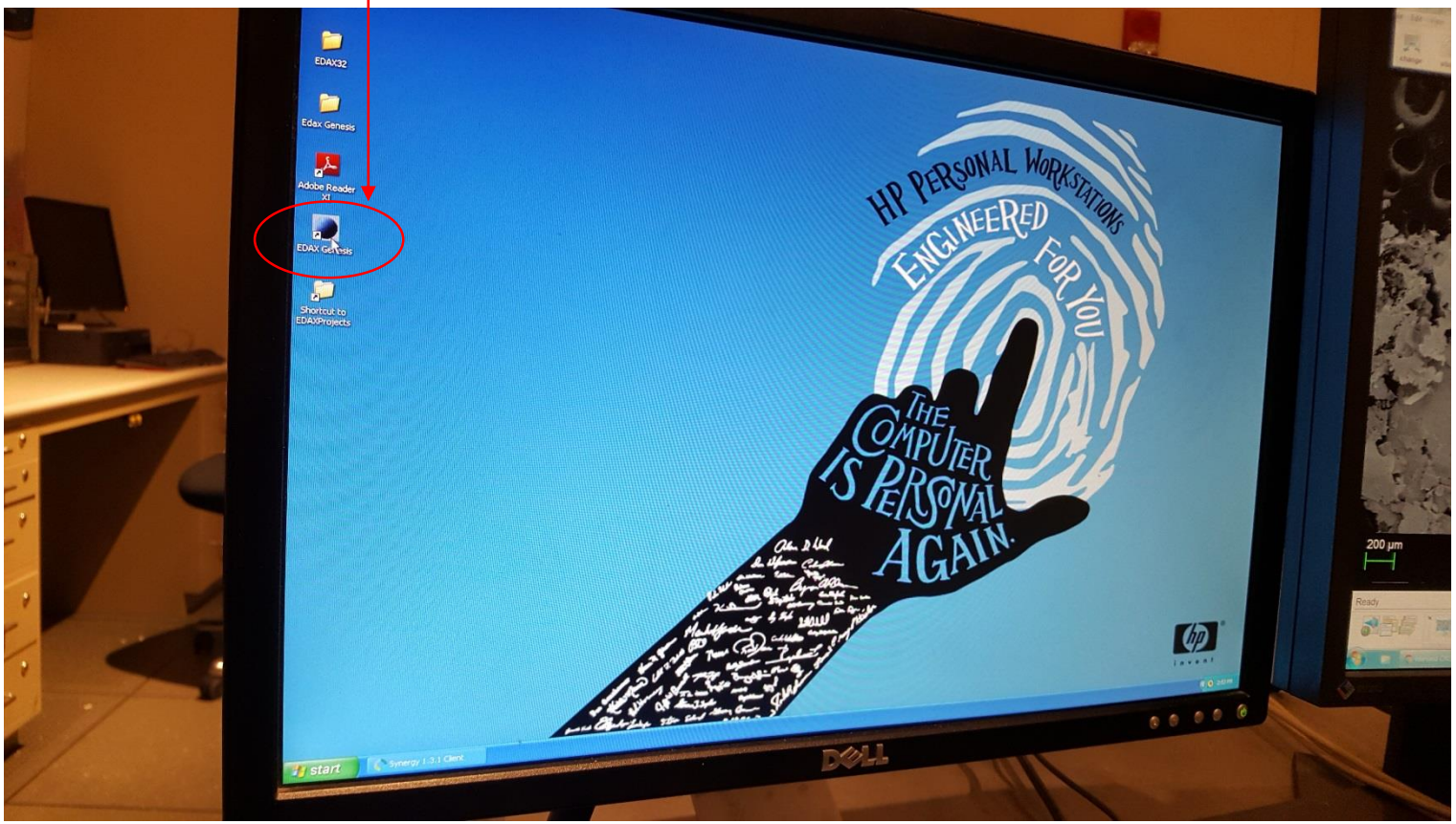
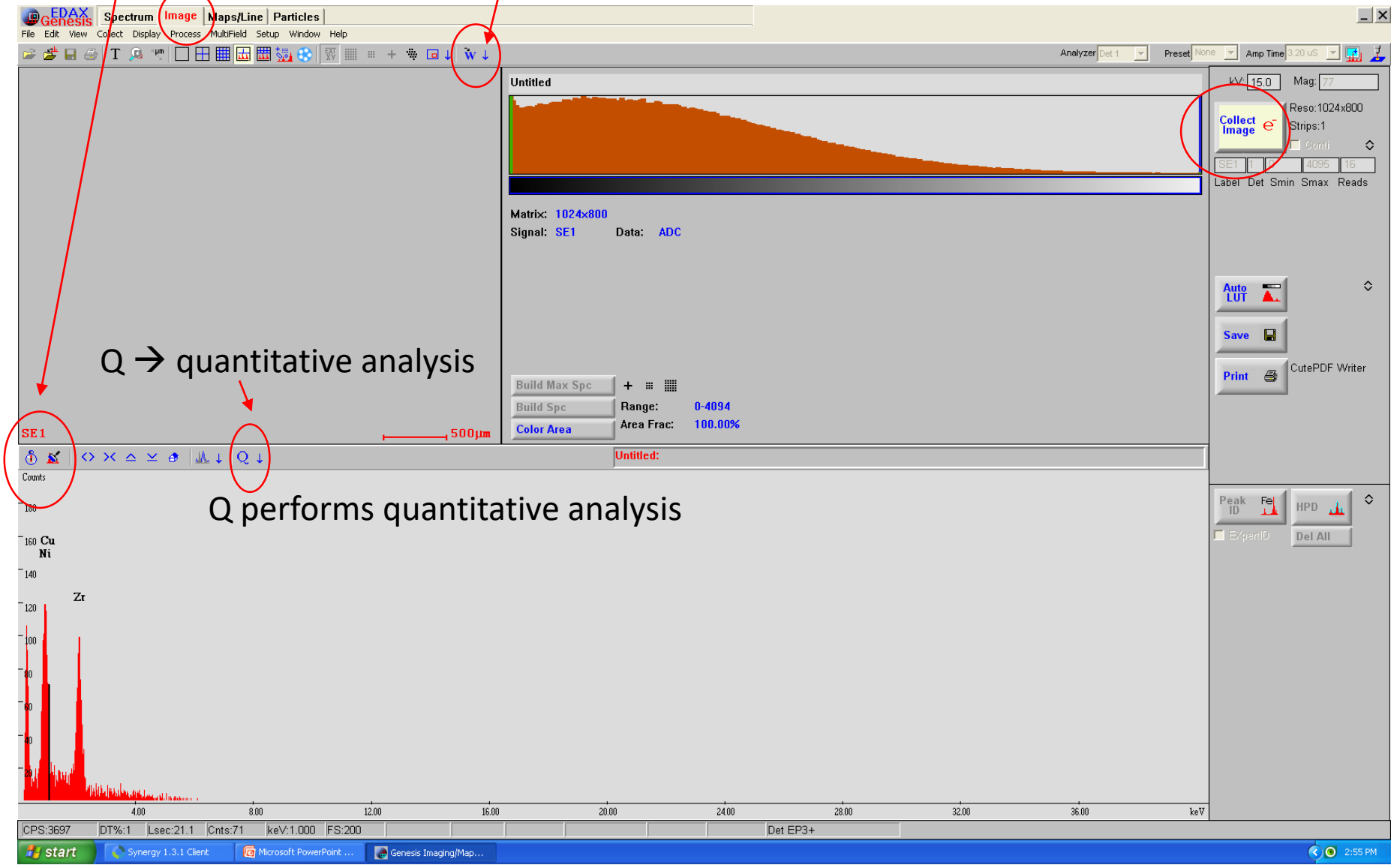


Image tab → collect e image → select region → red icon cleans the existing spectrum and stopwatch collects new spectrum

W generates words report

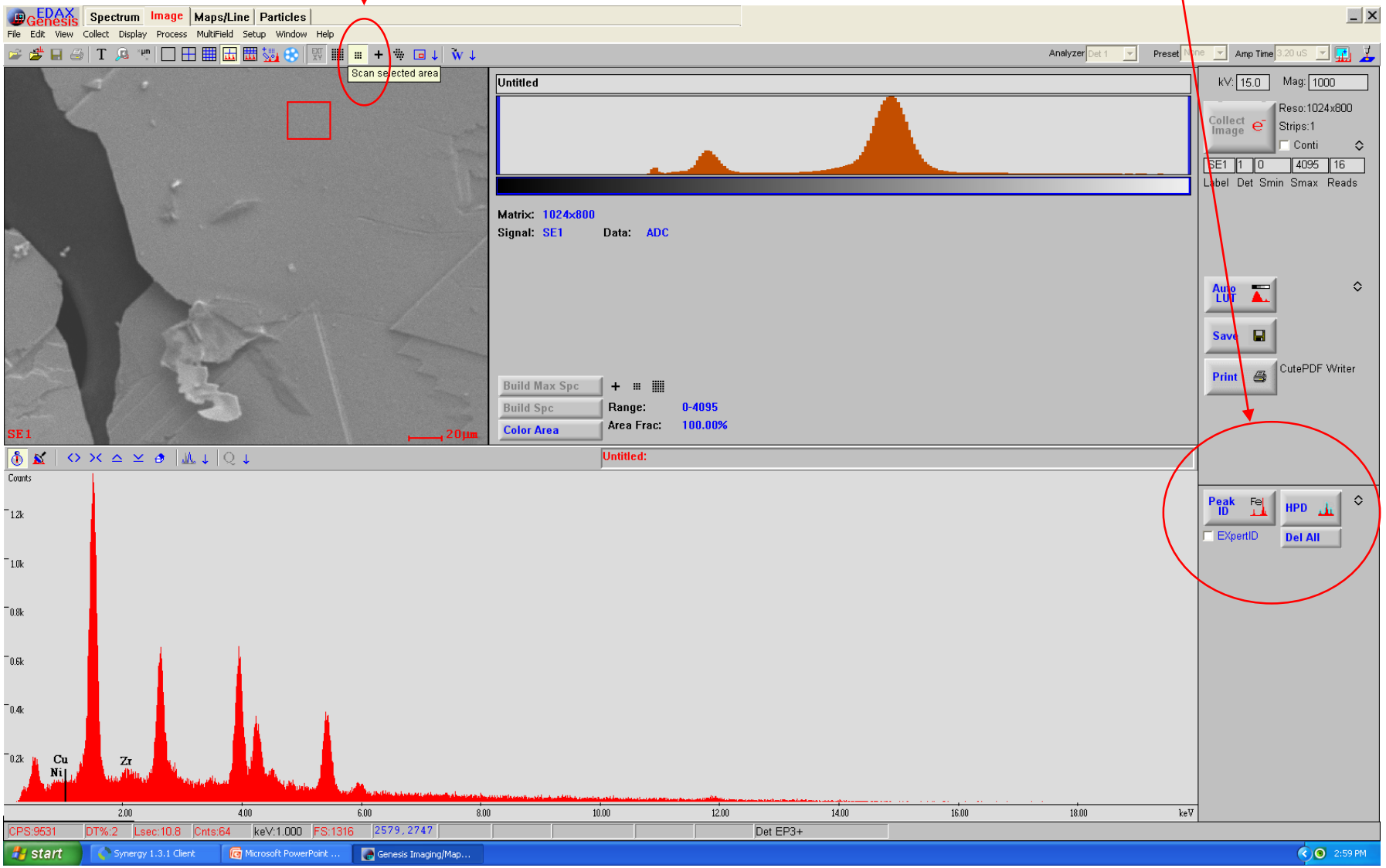


Q → quantitative analysis

Q performs quantitative analysis

Select area for scanning

Peak ID → click on the drop-down icon and select element, you may need to delete O or Al or C for better quantitative results, Pt and Pd coating always appear

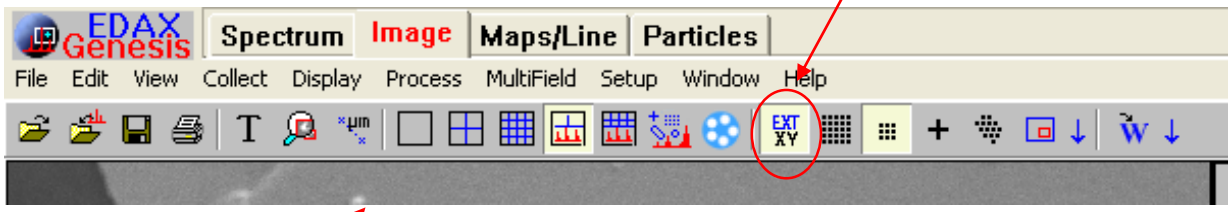


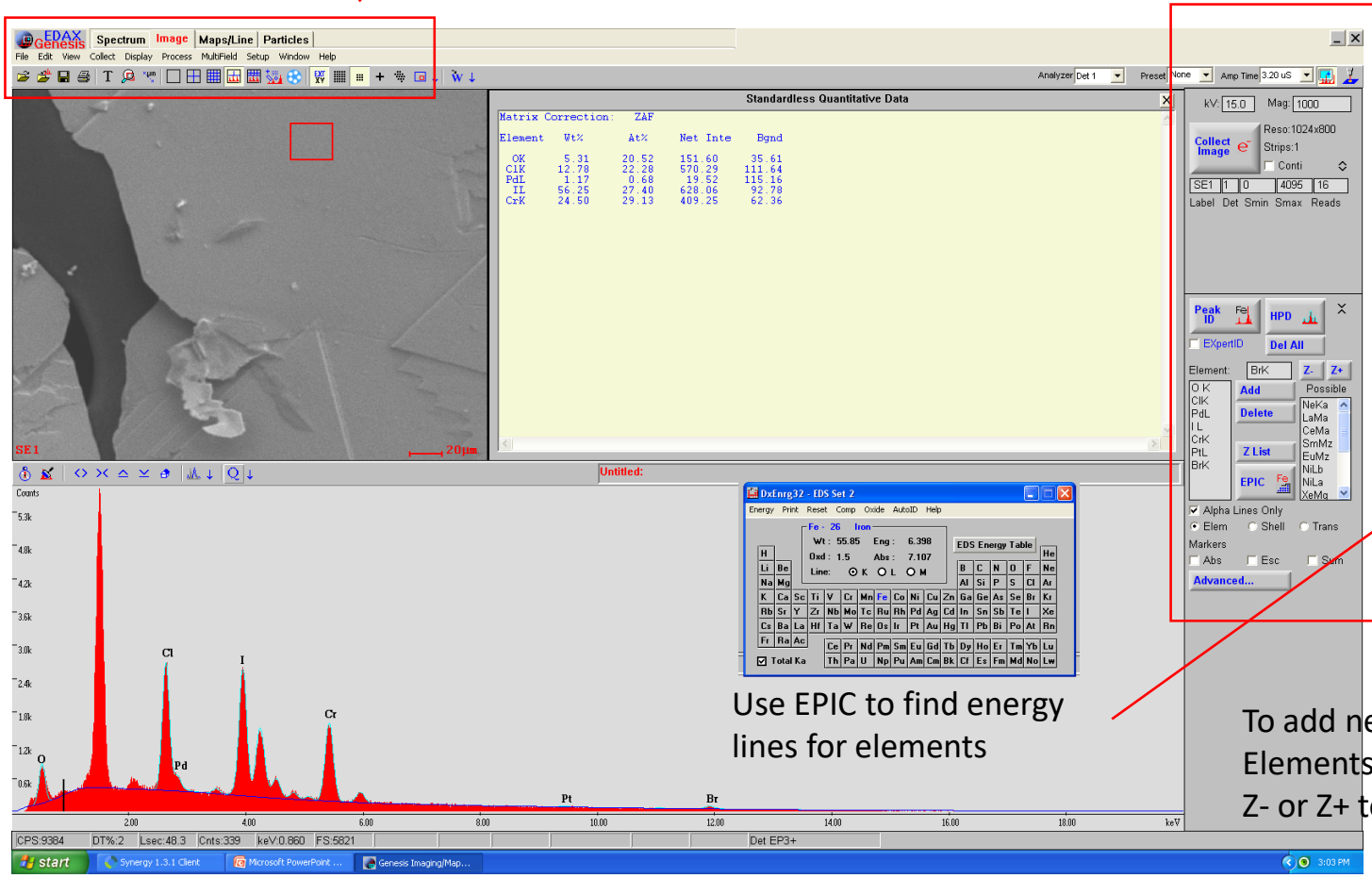
To adjust background manually

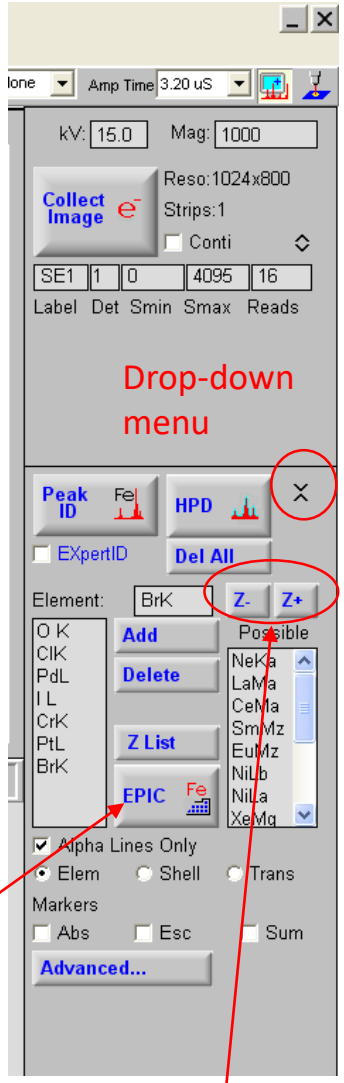
For regular EDX

For elemental mapping

Click after each EDX analysis to release the image





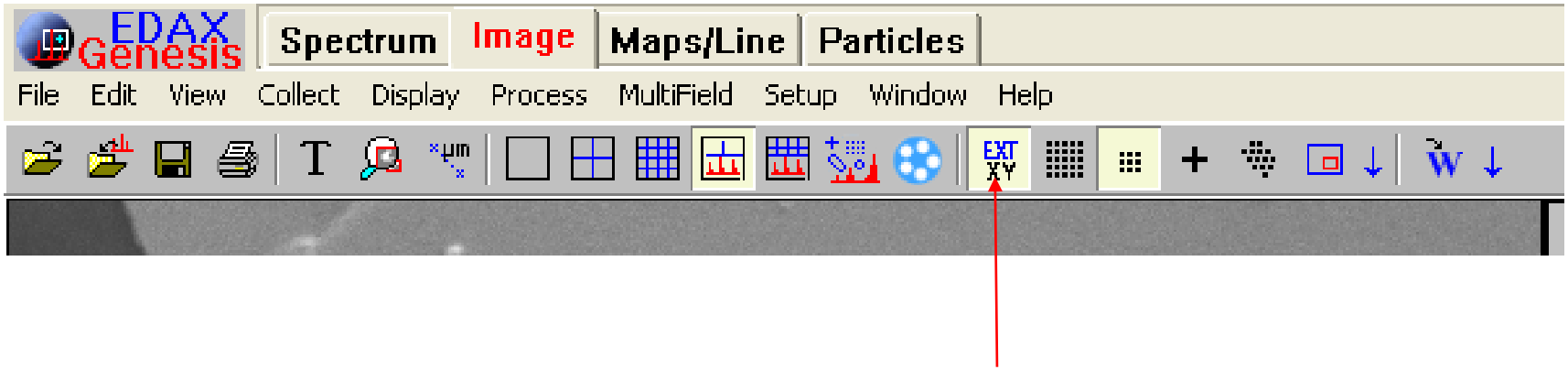


Use EPIC to find energy lines for elements

To add new elements, pick one of the Elements in the left column and use Z- or Z+ to reach other elements

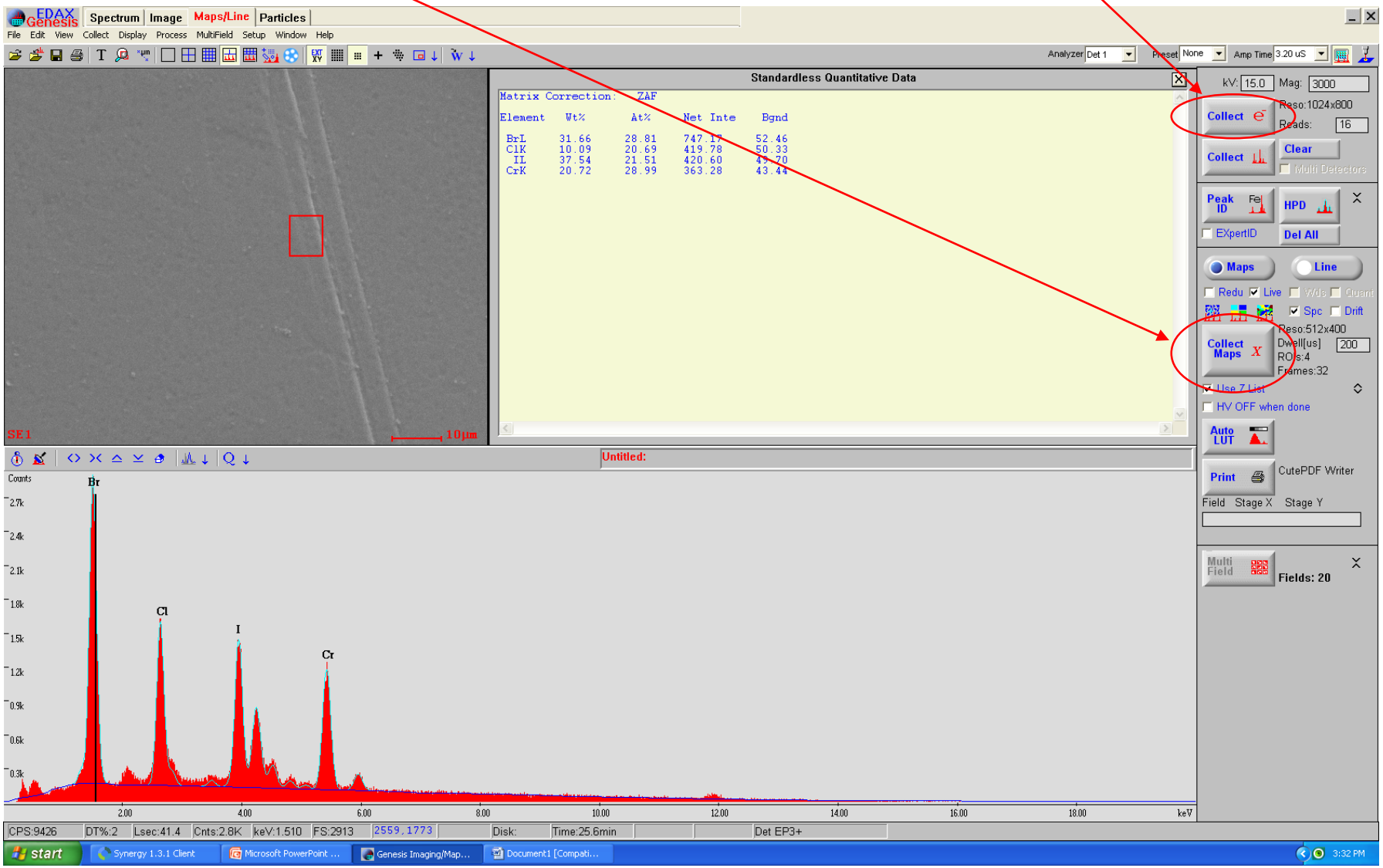
- To save spectrum data → Go to spectrum tab → File → Import SCP from → Image/Maps

- Then, Save → save as case.csv



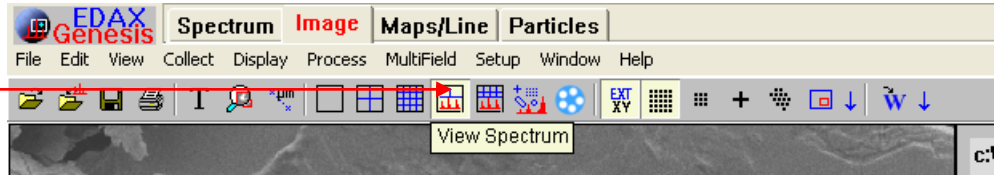
After each analysis and saving data, unfreeze the microscope by pressing on “EXT-XY”

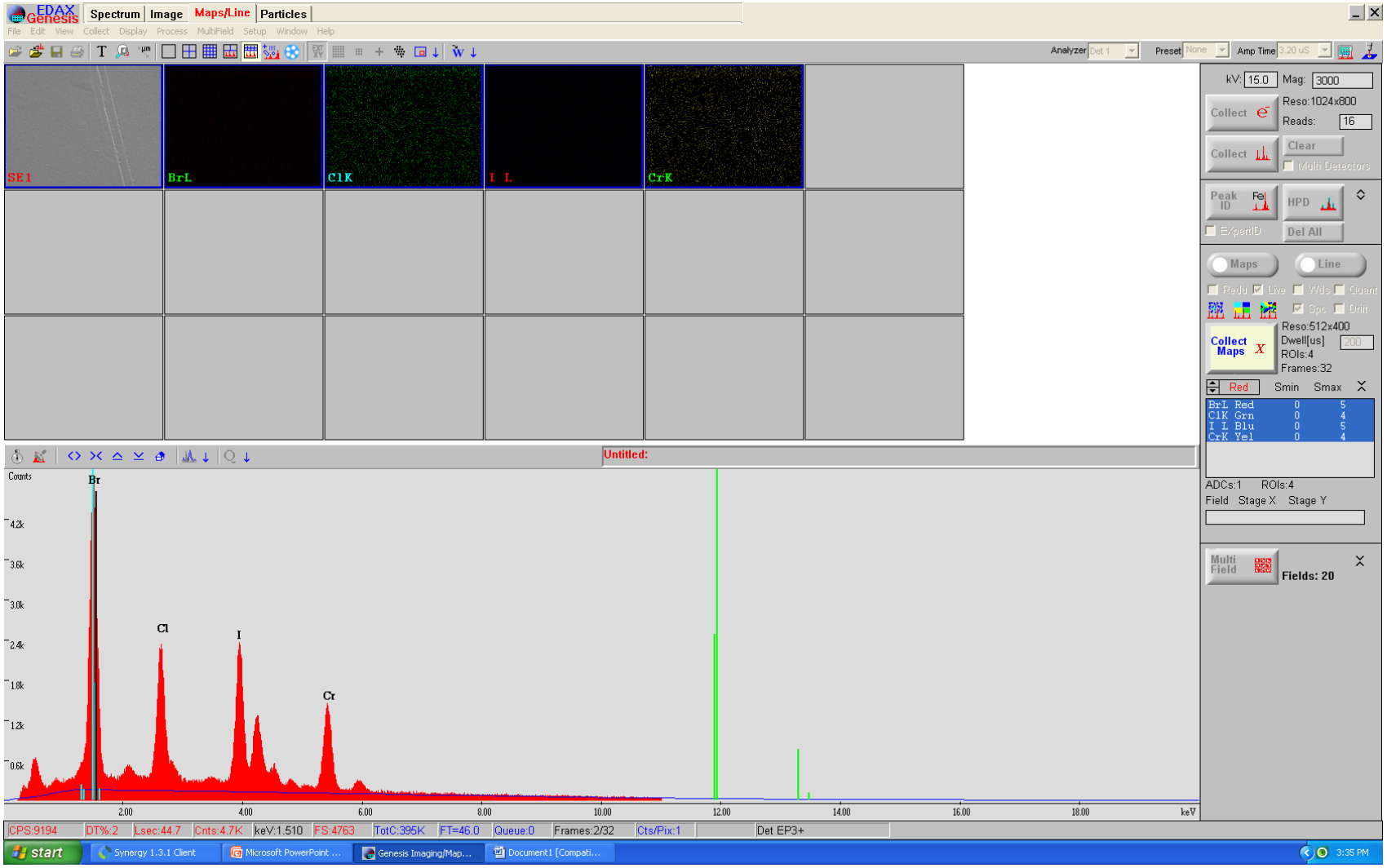
For elemental maps → select maps/line tab → press “collect e” → collect maps → save the maps in a proper directory



Color of each element can be changed after the mapping is finished and individual figures can be saved with a new color.

Panels can be re-arranged





Before logging out, make sure to remove your sample and pump down the chamber. To log out, input the information in the system Log, then input your password and click logout.