

FEI/Philips XL 30 FEG-SEM Operation Procedure

Before using the microscope, first you should use your assigned username and password to login to the microscope control system located down in the hall way.

- Program Control - (XL Control:\Microscope Control.)
Log on using username -SEMUSER and password -SEMUSER.
- Using CCD under detectors on menu bar - check position of sample stage head, adjust x, y, z, and rotation appropriately if necessary.
- In Settings Mode check the HT is off & vent system, waiting until chamber is at atmospheric pressure before opening.
- Load sample using lint free gloves & tweezers, secure into place using Allen key - rotate stage if necessary turning rotation knob anti-clockwise, check that the maximum height of the sample head does not exceed 60mm (or below the bottom edge of metal gauge) - adjust, if necessary then close & evacuate the chamber, by clicking on pump or using the shortcut keystroke-scroll lock. Wait until the pressure reads $<4 \times 10^{-5}$ mbar.
- Select SE under detectors on the menu bar, choose HT setting & check aperture setting (using aperture 2 or 3 in most of cases, aperture 1 can only be used for HT <5 KeV).
- Scanning in TV mode is generally recommended at first to find the area of interest and at low magnification.
- Reduce magnification (magnification may be changed in a number of ways - using the settings under the menu bar, the + and – keys on the keypad or the magnification glass - this automatically zooms push stop when required magnification is obtained). Check for charging and if necessary reduce High Tension (high voltage).
- Adjust Contrast and Brightness - this can be done manually or automatically (click on ACB button for auto mode).
- Focusing may be accomplished by using the right button on the mouse - hold down until double headed arrow appears on the screen. If the image appears to move during focusing it is necessary to adjust the aperture slightly. First, set the proper WD. Then expand the Beam page, click on final lens modulator & using only the middle and single controls on the aperture, adjust each slowly until the image no longer moves. Click on final lens modulator again to put the system back into real time scanning.
- Note also that you may wish to change the spot size and working distance when working at high magnification to obtain better resolution. However, spot size 3 and WD= 10-15mm is

appropriate for most applications.

- Setting the WD properly. Make sure sample is focussed correctly. Then select (Z<=>FWD) button, this will make the Z value(stage position) and the WD value(lens strength) the same. Set the WD to 10mm from the drop down menu.
 - Correcting Astigmatism is needed to get the best image quality, especially at higher mags. This is done with using the SA(selected area) window and slower scan speeds. Use the "Shift" button plus the right button on the mouse.
 - Moving around on the sample may be accomplished using the track mode, changing x and y values manually or through the computer settings.
 - Images may be produced by making sure that the sample is well focused, stigmated, and the contrast/ brightness are set at appropriate levels. Scan in the slowest mode (slow scan4). In the "Filter" tab select "integrate 1"(this freezes the image on the screen) and "High Definition" is selected.
 - Images may be saved using "Scandium" program which is located on the desk screen. Click on the camera icon within "Scandium" window to move the collected image from XL30 image display to the screen on the right side. Then you can save the image as a "tiff" or "Jpeg" image in the XL30 shared data folder on desktop.
 - If the images are saved correctly in the shared data folder on SEM computer, you should be able to find your data in the "shared data folder for XL30" on the computers in central- computer room. File transfer is allowed on these computers.
 - At the end of the session turn the high voltage off, check with CCD the position of the sample holder and adjust if necessary (the sample holder must be tilted back to 0 degree position if it was pre-tilted, and lower the Z position). Vent system and remove sample, pumpsystemdownwaitinguntilthevacuumisOKAYbeforeexiting program.
 - **Fill out the logbook and clean up the mess if there is any.**
- DO NOT USE THIS COMPUTER FOR ANYTHING BUT RUNNING THE MICROSCOPE-IF YOU NEED TO GO ONLINE OR CHECK YOUR EMAIL USE ONE OF THE COMPUTERS IN THE CENTRAL FACILITY!

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Emergency Information:

Medical Emergencies: **Contact 911 and Public Safety (609) 258-1000**

Room / facility emergencies: **Contact Public Safety (609) 258-1000**

Issues related to the instrument:

1. **Contact IAC Staff.**
2. **Leave system as is, Do Not disable vacuum system.**
3. **Try to shut off the High Tension (HT).**

Audible/Siren Emergency Alerts:

Follow previous steps 2 & 3 and leave the building.