STANDARD OPERATING PROCEDURE – SCANNING ELECTRON MICROSCOPE IMAGING

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To Start Your Session

1. Log on, sign in, record your index number and record the chamber pressure on the log sheet

LOG onto Microscope Computers

2. Username: **emlab** Password: **scopes**

3. Log on ESCOPE TIME. You must have your index number for this

4. Start the ESCOPE TIMER on the Support computer. Fill in the boxes. You need your index number

Microscope operation

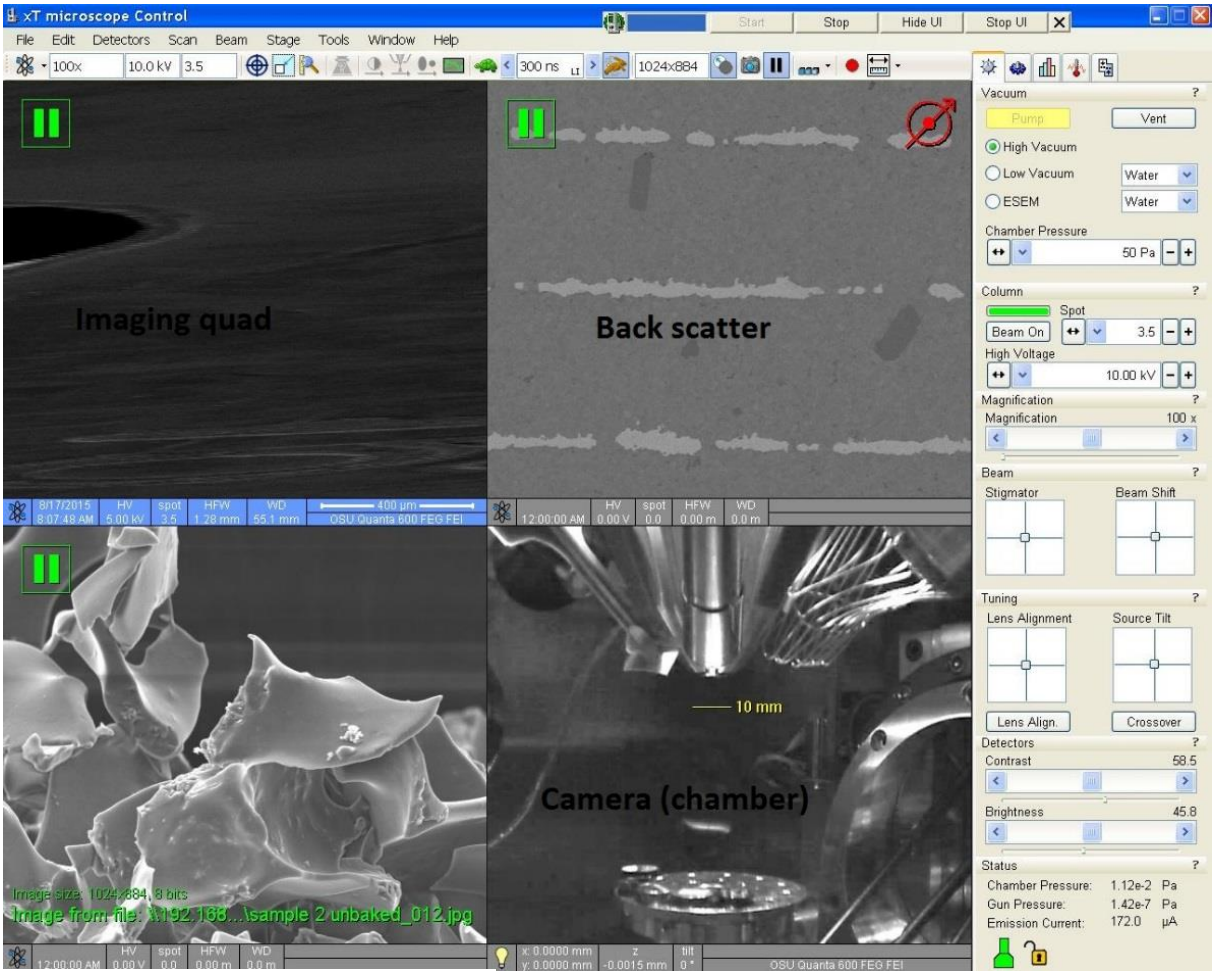


Figure 1. Home screen

5. Home Stage, **Shift F3.** Only Home Stage when Chamber in at High Vacuum

    - This will bring the stage into “0, 0” coordinates
    - High Vacuum is indicated by the green chamber icon  at the right-bottom of the screen

6. **VENT** the chamber

7. **NEVER EVER TYPE 0 IN THE Z AXIS BOX – NEVER EVER –** this is a very expensive repair due to potential damage to the pole piece. This cannot be stressed enough.

8. Load your samples, record sample sites for future reference

9. **PUMP** the chamber and wait for **Working Vacuum** – small microscope at bottom right will be green.

10. Zero the Stigmator and the Beam shift controls, Right click, select Zero

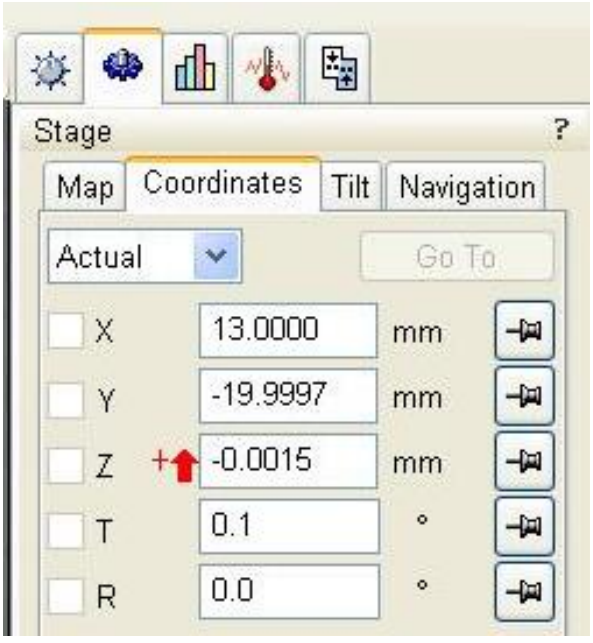
    - Sigmator and Beam shift alignments will change with kV value, so if you change the kV value, then you must zero the stigmator and Beam shift alignments again.

11. Set High Voltage to 10, Press the **BEAM ON** button

12. Activate both the **IMAGING** quad and the **CCD** quad (chamber camera) 

    - In order to activate a quad, you have to highlight it (by clicking on respective quad and press above icon

13. Type in the stage coordinates (X and Y coordinates only) of the tallest specimen or the first sample location



14. Increase the magnification to ~ 1000 or **30um** on the scale bar. **MUST BE FOCUSED**

15. **Click** the icon on the tool bar to LINK Z WORKING DISTANCE; ***it is blue with a red question mark***.

- Once the link established, the question mark will disappear and double headed arrow will appear.  This is really important.
- LINK Z WORKING DISTANCE may change if you change the "Z" value. Therefore, it is important to check and "LINK" with "Z" value adjustments.

16. The value for Z WD coordinate will change to 50-60 mm

17. On the coordinate page, set the **Z WD to 20 mm,** Type this value in.

18. Hit the **GO TO** button, prepare to STOP the stage with the **STOP** button or the **ESC** button

19. When the stage stops moving, **Re-focus and Re-link.**

20. On the coordinate page, set the Z WD to 10.5 mm, Type this value in.

21. Hit the go to button**, preparing to stop the stage if it goes above the 10 mm mark in the CCD quad**.

22. Re-focus. Re-link. This is the last Z axis change.

23. Start imaging, F5, for single quad mode

Useful hints

- Proper brightness and contrast is important to see fine features of the image
- AUTO CONTRAST adjustment option  can be used in lower magnification (below 5000x) but **does not produce good results at higher magnification**
  - Can be adjusted using hand panel knobs
- Use of **fine-focus** and **stigmator** help to focus image properly
- Avoid pressing  key, you might have to restart the computer ☹
- **Horizontal field width (HFW)** is a good parameter to keep the consistency of the image
- 5 – 10 kV is good for imaging (However it is depend on the sample type and your requirements). Higher current may damage or cause charging of your sample.

At the end of your session follow these steps

1. Pause Imaging Quad
2. Turn Beam Off
3. Return to 4 Quad Mode (F5)
4. Vent Chamber
5. Remove samples
6. Pump Chamber to return to **High Vacuum**
7. Record beam time and chamber pressure
8. Log off the Microscope in the File Menu after High Vacuum is reached
9. On the Support Computer STOP timer and select Finish the ESCOPE TIMER
10. Transfer images to online server – **FLASH DRIVES ARE NOT ALLOWED**

Save your images to the ARCHIVE folder on the desktop. When you complete your session go to the support computer and TRANSFER your folder to the PUBLIC drive.

Online Images

After you return to your personal computer you can down load your images.

Download your images

http://sem-nas.science.oregonstate.edu/

Username: escope Password: izoominLPSC145

Folder: your name Transfer your folder to your computer.