

FEI ESEM operation notes

Standby Condition

- Specimen chamber under vacuum.
- Simple sample holder with conical lock nut in stage.
- HT off.
- Stage tilt zero. Tilt correction off. Dynamic focus off.
- Usage recorded on time sheet.
- Computer monitors and room lights off.

If you step away briefly from the microscope select **Beam blank**.

Startup

- Turn on monitor. Microscope Control program should be running. If not seek assistance.

Sample Loading/Unloading

Loading

- Press **Vent** and wait until the stage door opens with a gentle pull.
- Choose a sample holder appropriate for the sample and position it on the stage,
- Make sure the sample is securely held.
- (If unloading sample(s) remove sample and holder.)
- Use the height gauge to make sure that the sample will clear the back scattered electron detector (BSED). The BSED on this machine is a fragile silicon diode!!
- Close the chamber door while watching on the CCD. Hold it shut and press **Pump**.

Wait until **Vac OK** is displayed in the vacuum control panel.

Alignment Info

- Center the final apertures on this machine using the aperture shift knobs on the aperture holder.
- Column alignment and gun tilts and shifts are preset and may not be changed by users.

Obtaining an image

- From the **Detectors** pull down menu select **SE**.
- Select a low magnification (<50x) from the **Magnification** pull down menu or + & - keys.
- Select accelerating voltage and spot size (beam current) from the **Beam** pull down menu. (These values depend upon sample type and may need some trial and error.)
- Click on the **HT** button which will light up yellow.
- Adjust Contrast and Brightness manually using the sliders or click on **ACB** or click on the half sun and half dark icon in the tool bar.

- Focus: click and hold down the right mouse button while the mouse is moved left and right.
- When the image is focused at a magnification greater than x500, and not before, click on the button [Z<->FWD] which couples the Z-axis to the working distance at which you have just focused.

Stigmatism

- Examine image when changing focus. (High magnification may be necessary.) If the image distorts by elongating in different directions as focus is changed, a stigmatism correction must be applied.
- Choose a small clearly defined spot on the specimen. Hold down a **Shift** key (to change mouse function) and at the same time use the right mouse button to alter the field produced by the stigmator coils. Move the mouse left and right as well as up and down. Try to make the edges of the object appear as sharp as possible.
- Go back to focusing the image. It should expand and contract symmetrically. If not go back and stigmatize further.

Taking Pictures

- Roughly compose the image with respect to magnification and x, y position.
- Double the magnification with the + key.
- Center a small clearly defined object and select the reduced area scan from the scan menu or the icon in the tool bar.
- Select an appropriate scan rate from the scan menu and focus the image carefully.
- Go back to full screen and halve the magnification with the – button.
- Compose the image carefully and check the contrast and brightness with the waveform monitor.
- Press the **F2** key on the keyboard to do a single slow scan and freeze. (Seek assistance to change this preset scan rate.)
- From the **In/Out** pull down menu choose **Databar**. Check mark the data you wish to burn on to the image. Think twice about selecting magnification! Type in a sample name if desired.
- When the slow scan stops and the snowflake icon illuminates to indicate that the image is frozen, select **Image** from the **In/Out** pull down menu. Navigate to your folder and name and save the image there.
- Click on the snowflake icon to unfreeze the image.

Leaving the ESEM

- Click on **HT** to turn the accelerating voltage off.
- Follow the instructions in **Sample Loading/Unloading** above.