HITACHI SU-70 SEM CHEAT SHEET

INITIAL CHECK

1. On right of column

FIL light should be on

HV light should be off

2. If the Hitachi PC-SEM control program is not running then start it from the desktop. The user name is “user” and the password is “yinqe”.

   If you had to reboot then note that WINDOWS has no password. Just press ENTER.

3. Check the detector: while in high-mag mode, choose the SEM tab and then look at the SE detector setting. It should be set to “mix” without any “BSE” filtering.

LOAD SAMPLE

1. Check the height with the height gauge. If your sample is a little high or a little low, then set the height and size from the STAGE tab. Your sample should not be more than 2 mm higher than standard.

2. Make sure that NOTHING PROTRUDES from the bottom of the stub.
   Your sample should not wiggle around. NEVER put a pin stub directly in a threaded post (that would be really, really stupid.)

3. Put your sample in the load lock and pump it down... while wearing gloves.

4. BEFORE moving the sample inside the SEM, be sure to set the sample size (diameter) and height from the STAGE tab.

GET AN IMAGE

1. Select voltage and turn on HV

   Did you remember to set the sample diameter and height?

   Note that you cannot change the extraction voltage.

   Make sure that “deceleration” is NOT selected. (Well, unless

   that’s really what you want. But that’s unlikely.)

   Feel free to discard any stage history, if you are asked.

2. Move to HOME position by answering “yes” when prompted.

   If you click on the “home” button then you are doing things in the wrong order! Set the sample size **first** then choose the voltage, then the system will ask if you would like to move home.

3. Turn down Magnification all the way

4. Try using low-res mode initially- click on the H/L button

5. Center some prominent feature while in Low-res mode, then switch to high-res mode (with the H/L button). You are probably far out of focus. Look at the working distance at the bottom of the video window. Is it close to your actual Z coordinate? If not, crank the coarse focus knob in the direction which brings that number closer to the actual height.

   On the SEM tab, check that you are using “SE detector – mix”.

   If the sample is close to the objective, then you will get a poor signal from the lower detector, that’s why we are mixing together the two signals from the two detectors.

6. For best resolution, move the sample close to the objective.

   Choose a Z coordinate of 3 to 5 mm, using the stage menu.

ALIGNMENT

1. In high-res mode, find a nice piece of dirt or colloidal gold, or a lump of something. Do not use a straight edge.

   Increase the magnification to the range 2 – 20 kx.

   Does the image shift? If not, skip step 2.

2. Click on ALIGN button. By default this function will wobble the focus, and the two alignment knobs will allow you to move the beam to the center of the objective aperture. Do not adjust anything else in the ALIGN box.

   Do NOT use the “stigma align x/y” function in the alignment menu box. These functions are for ajusting the stigmator balance, not the stigmation. You do NOT need to adjust the stigmator balance.

3. Stigmation: Close the alignment dialog box. Look at something bumpy or round to adjust the stigmation. Do not use a grating! Adjusting the stigmation is critical. Find out how to do it right.

THE THREE-FOLD PATH TO STIGMATION

1. SEE THE ASTIGMATISM

   Do not try to fix the stigmation unless you see the effect of astigmatism. Look at something bright and lumpy. Do not look at long, straight things. Increase the magnification until you see the astigmatism. There is *always* astigmatism. This is not optional.

2. CENTER THE FOCUS

   Start from the center point, or you will get lost.

3. SEARCH FOR GOODNESS IN TWO DIMENSIONS

   The two knobs let you walk in two directions in stigmation space. Ignore the “x” and “y” labels.

TAKE A PICTURE

1. Choose scan speed, then use the “M” button (on top) to grab a high resolution image. The thumbnail image will appear on the lower-left.

2. Select the thumbnail images, then click on the “PCI” button on the LOWER LEFT to start the Quartz PCI program. The selected images will appear in this program.

3. From PCI, use File: Export to save the images to a file. “Export” will let you save all the annotation to the image file. If instead you use “save” then your annotation will be lost. Store your image files on the YINQE file server (gir.eng.yale.internal).

TAKE AWAY

You are required to store images on the YINQE file server. Files will be deleted automatically after three years. For instructions on finding and using the file server, read the email “welcome” message.

Move your image files somewhere else for permanent storage. Check out the Box storage and Google drive at its.yale.edu or box.yale.edu.

BEFORE YOU LEAVE

1. Shut off the high voltage

2. Remove your sample. Put the sample holder parts away neatly.

3. Delete images from PCI-Quartz and from the Hitachi control program

4. Delete any crap you left on the SEM screen, including an labels and borders created in the “utility” menu.

5. Look around and clean up after yourself.

6. Do not log off Windows. Do not shut down the Hitachi control program.

7. Leave the sample stubs in the drawer. DO NOT TAKE THE STUBS. Buy your own stubs at tedpella.com

DO NOT LEAVE YOUR SAMPLES OR OTHER JUNK IN THE SEM ROOM.

LOOK FOR LOST ITEMS IN THE LOST-AND-FOUND DRAWER OR TRASH CAN.