STANDARD OPERATING PROCEDURES

******ZEISS EM 10********

I. CONFIRM THAT THE FOLLOWING ARE TRUE:

a. High voltage selection is at 80 kV
b. Vacuum indicator is < 10^{-5} Torr
c. The green light is illuminated on the button labeled "HV ON"
d. Set the magnification to read 100x.
e. Toggle switch for the CCD camera is to the right (camera out)

II. SIGN INTO THE LOGBOOK

III. FILL THE LIQUID N_2 DEWAR FOR THE DECONTAMINATOR ***(Always wear safety glasses when handling liquid nitrogen.)*** **Be certain that the Shield Master is covering the viewing chamber glass.**

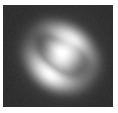
Check the status of beam before loading specimen (IV-V)

IV. TURN ON THE HIGH VOLTAGE AND HEAT THE FILAMENT:

a. Depress the green "HV ON" button; the green light will go off and the red light will become illuminated on the button labeled "HV OFF"
b. **Wait 10 seconds for HT to stabilize.**
c. Depress the button labeled "FIL"; the red light on this button will also become illuminated, and the meter that indicates the filament heating will jump up to about 1.0 V and settle to 0.6 V.
d. Wait a few seconds to stabilize.
e. Adjust the Condenser 2 knob to make a focused image of the illuminated spot
f. If you cannot find the beam, Check:
    1. CCD camera is out (switch to right),
    2. Specimen not blocking beam.
    3. Objective aperture out.

Note: If objective aperture is withdrawn beyond the open position, air leaks into the column. This is shown by a suddenly very weird beam image and very poor vacuum. This situation is to be avoided.

g. With focused spot, increase magnification to 6,300x.
h. ***Turn the filament heater knob clockwise to get an elliptical "eye" shape.***
i. Use the "Y" and "X" Beam Alignment knobs to position the focused under-saturated illumination spot at a convenient position on the viewing screen;
j. The focused spot should have an elliptical "eye" shape.
k. If needed, adjust the C_2-STIGM. "Wheels" to get the sharpest image of filament.
l. Decrease the magnification to lowest, 100x.
m. Spread beam clockwise to fill viewing screen. Now you can load a specimen.



V. TURN OFF THE FILAMENT AND THE HIGH VOLTAGE

a. Decrease (turn counterclockwise) the Filament Heating knob [ON THE LOWER LEFT control panel], all the way to the "stop"; the meter should read ~0.7.
b. Press and release the button labeled "**FIL**"; the red light on this button will go off as the button pops out, and the meter that indicates the filament heating will drop to 0.0

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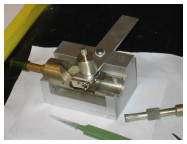
c. Press and release the button labeled "**HV OFF**"; the red light on this button will go off as the button pops out, and the green light will become illuminated on the "HV ON" button

VI. REMOVE SPECIMEN HOLDER AND INSERT YOUR SPECIMEN

a. **Zero the specimen translators to 500, 500**
b. Make sure filament and high voltage are **OFF**.
c. Pull out specimen rod to forward position, turn counter-clockwise from 6:00 to 12:00 and pull out until it engages in stop position.



d. Turn large knurled wheel fully counter-clockwise.
e. Screw key into slide, remove slide by gently pulling on key, and place slide in slide support. **Do not touch slide or specimen holder with fingers.**
f. Place cartridge upright and support with holder on slide support.
g. Remove screw cap with tool.
h. Place grid in cartridge, specimen side down.
i. Replace screw cap. Watch bottom edge of cap move. Turn only until it stops. **Do not over-tighten or force cap.**
j. Swing aside slide support and lower cartridge.
k. Remove cap tool.
l. Holding slide key, insert slide into air lock tube.
m. Remove key.
n. Turn large knurled wheel fully clockwise to seal air lock chamber.
o. Press red button to release specimen rod and push in rod to stop position.
p. Turn rod clockwise in milled-out ring **to 3:00 position. Rod will be in horizontal position. Red pre-pump light comes on.** ***If light does not turn on or it red light does not turn off--get Help - DO NOT PROCEED.***
q. **When red light below meter for high vacuum/beam current goes out,** turn rod to 6:00 position.
r. Press red button on specimen rod and push into intermediate stop. Vacuum level may jump a bit.
s. Press red button again and gently push rod, 2 more times, to insert cartridge into stage.

VII. TURN ON THE HIGH VOLTAGE AND THE FILAMENT--Refer to the instructions above. ***For viewing you sample heat the filament no more than a meter reading of 1.0 V; this is saturation for this filament.***

VIII. ENDING YOUR SESSION ON THE MICROSCOPE

a. **Toggle switch for the CCD camera to the right (camera out)**
b. Turn off the filament and the high voltage – see item V. above
c. Remove your specimen from holder and put holder back into microscope.
d. As courtesy-turn mag to 100x and spread C2 course fully clockwise to spread beam.
e. Enter the filament time in the log book
f. Write down any problems you found in the logbook and email problems to manager.
g. **Turn off the light switches on the right-hand control panel, and turn off the room lights as you leave the room.**

Contact Manager with any problems.

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- **When leaving the room, look back at the TEM**
  a. **Is the camera out, to the right?**
  b. **Are the desk lights off?**
  c. **Is the room light off?**