

# SAFE USAGE OF THE FEI SEM (SMIF SEM1)

- **Don't** press the buttons on the SEM module (on the front of the chamber)
- **Don't** make any changes to the computer settings (including screen resolution) as the current settings are needed for proper SEM functionality
- Check for E-beam lithography:
  - Verify no DOS program running on the second computer
  - Make sure that the *beam blanker electronics controller* (an external unit sitting on the left of the second computer) is **switched off**
- Loading the sample into the chamber
  - **Don't** touch the interior of the chamber
  - Check the height of the sample using “elephant’s ear” height gauge
  - Open and close the chamber door using the EXTERNAL door handle only
  - Watch the door closing on the monitor (change the *detector* setting to ‘CCD’). **Verify the sample/holder is low enough to fit under the lens.**
  - Make sure the door is fully closed before you start pumping.
- Before turning beam on verify the **contrast** setting isn't too high (typical:20-50%)
- Set **contrast** and **brightness** manually the 1st time before using the ACB button
- Moving the stage
  - The easiest way to damage the SEM is to crash your sample into the pole piece (a cone just above the sample). Unfortunately, the microscope has **no interlocks** for this case, so if you move the stage always check using CCD that you are far enough from the pole piece.
  - Have Z distance (pole piece – sample distance) set correctly. When loading the sample, this distance is unknown (the SEM assumes that it's the same distance as it was for the previously loaded sample). After focusing the beam on the surface of your sample, “working distance” (WD) shows the actual distance between the pole piece and the sample. Have Z set equal to WD at this point! (The SEM asks to confirm that  $Z \leq WD$  every time you turn the beam on, don't click “OK” without focusing the sample first). Stop and ask clarifications if you do not understand the difference between Z, WD and the actual distance between the pole piece and the sample.
  - Having several samples of different height and moving from one of them to another can also lead to crashing into the pole piece. To avoid it increase Z and check with CCD what is happening inside the chamber as you are moving the stage.
- **Don't** use magnetic holders or samples in the system as they can be peeled off by the magnetic field created in the chamber and damage the pole piece
- **Don't** use powdered samples or powdered gloves in the chamber

**Any Questions or Problems: Contact SMIF Staff**

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