

FEI Helios NanoLab 460F1
SEM Operational guide
AggieFab
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Beginning your session

Note:

- Always check the stage in quad 4 on the screen when loading/unloading your samples.
- Please contact staff for ferromagnetic powers/particles or small samples.
- For ferromagnetic samples, place your sample securely on the stub so that samples will not hit the objective lens.

Starting your session

1. Start iLab.
2. Log in the user **software**
3. Load your sample
 1. Check the height of your sample
 2. Loading/unloading --- See next page
 3. Wait until the stage moves to the sample transfer chamber
 4. Pick up the stage, load your sample, and place the stage back to the stage holder
 5. Click load/unload button
 6. Wait until the stage transfer is completed
4. Take a Navigation picture
 1. In the menu, 'stage' – **take nav-Cam Photo**
 2. Explore the sample locations by clicking the specific locations in the picture at 3rd quad

Sample mount and loading/unloading

Sample stage



Max sample height

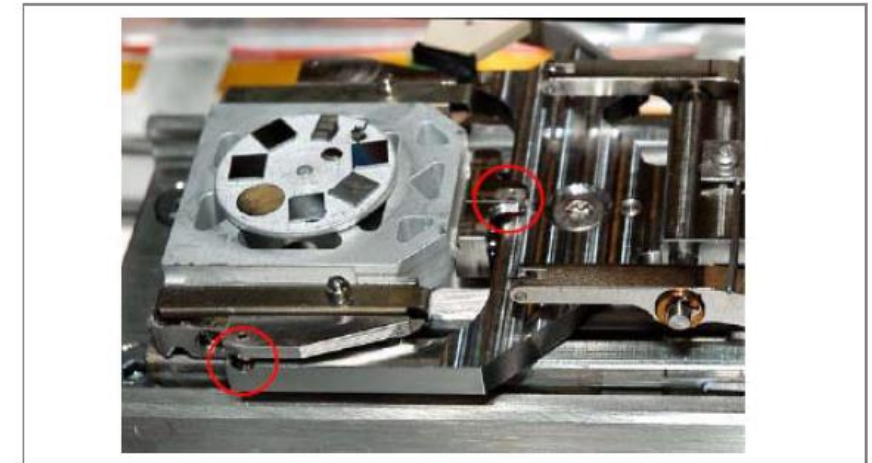
Unloading Sequence

1. Push the **Unload / Release** button to start the unloading sequence (lit is blinking). After finishing, the Loadlock is vented and the lid can be opened. Both buttons are enabled.
2. Open the lid, the **Clamp / Load** button becomes disabled. Push the **Unload / Release** button to release the carrier from the Loadlock arm.
3. Take the carrier out from the Loadlock arm.

Loading Sequence

1. Place the carrier on the Loadlock arm, making sure that all three alignment rubies are positioned properly. The **Clamp / Load** button becomes enabled (lit is on).

Figure 5-7 Alignment Rubies with Only Two Shown



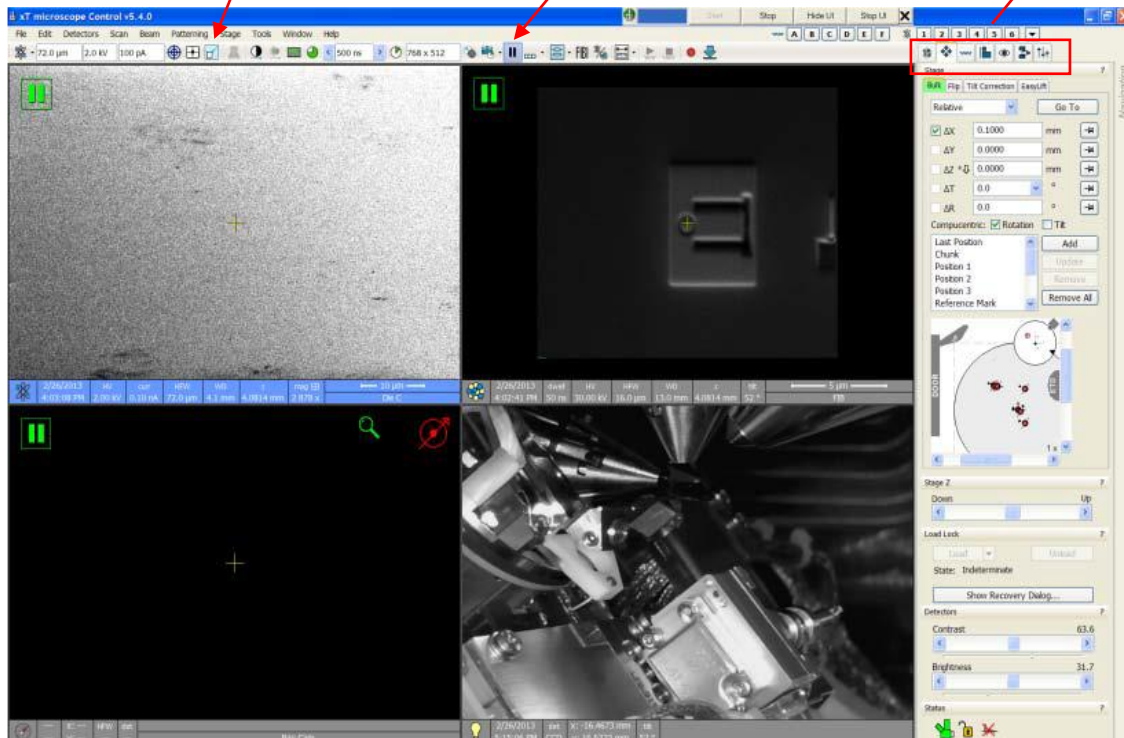
2. Close the lid and push the **Clamp / Load** button. The loading sequence starts (lit is blinking).

Turn on E-beam

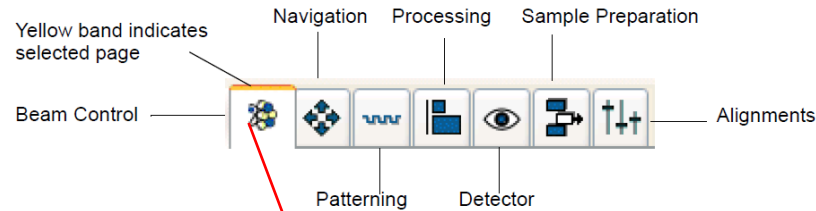
Main Window

'Reduced Area' icon

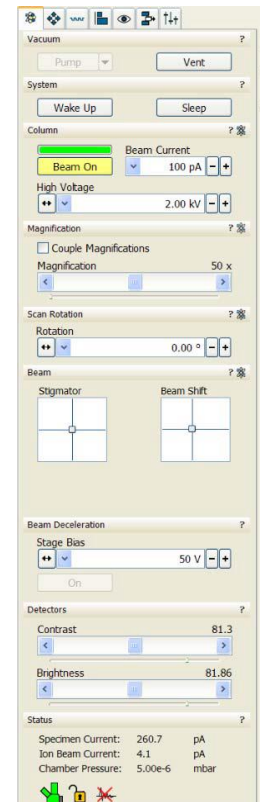
'Pause' icon



Pages Toolbar



Beam control page



Preferences configurations Tools-preferences

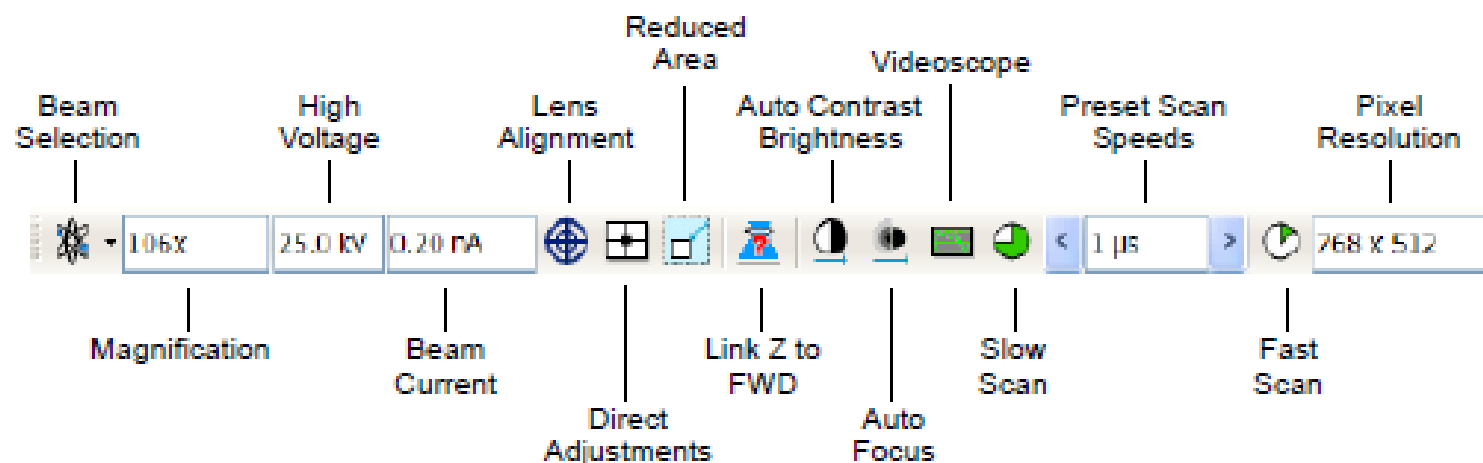
- Center cross bar
- 4mm mark
- Image quality

Turning e-beam

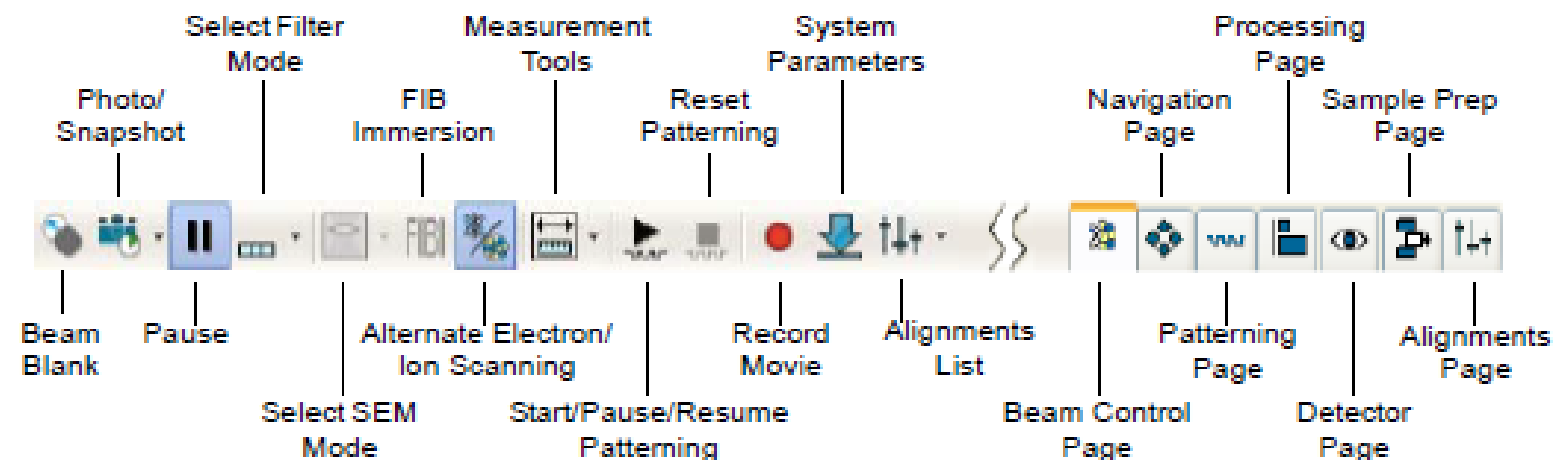
1. Click 'Beam control' in the **Pages Toolbar**
2. Click 1st quad on the monitor screen
3. Select the voltage and current
 1. Menu bar or
 2. **'Beam Control page'**
4. Click the **Beam on** button under the **'Beam Control page'** tab
5. Unpause the screen using the **'Pause'** icon

Toolbar icons/menus

Toolbar Left Half



Toolbar Right Half



Link Z to WD

1. Rotation alignment – Stage – xT Align Feature
2. Link Z to working distance
 1. Focus on the surface with SEM
 2. Click 'Z to WD icon'
 1. The icon should be one with a green arrow
 2. In the 'Navigate' page, the arrow by the 'Z' changes to pointing down
3. Set the working distance 4 mm.
 1. Input 4 in the Z (Navigate page)
 2. Click 'go to' button

'Z to WD icon'



- **Red question mark:** The function is enabled and the link between Z and FWD is unknown. Use the function as soon as possible, after properly focusing the image.

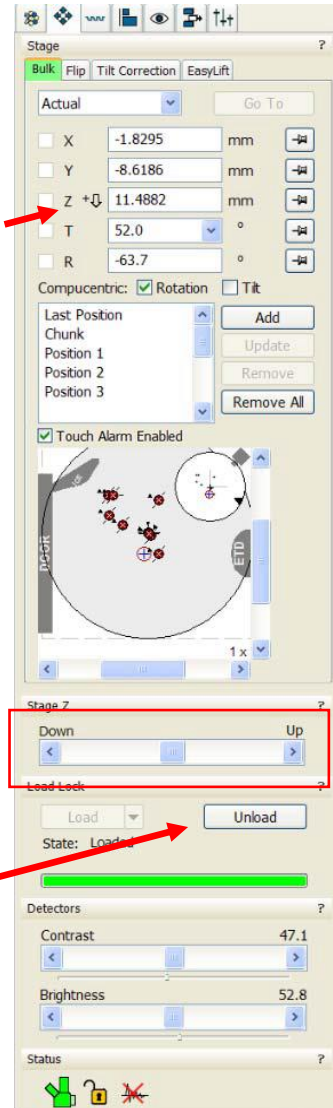


- **Red circle:** The function is enabled. Z is roughly linked to FWD, but it needs correction. This could happen after changing the sample, focusing and linking Z to FWD at a long working distance (WD), and then moving the stage to a short WD. Focus the image carefully at a WD around 4 mm and use this function again.



- **Green double-ended arrow:** The function is still enabled and Z is properly linked to FWD. It is now safe to change the WD by setting a Z coordinate on the Stage page

'Navigate'



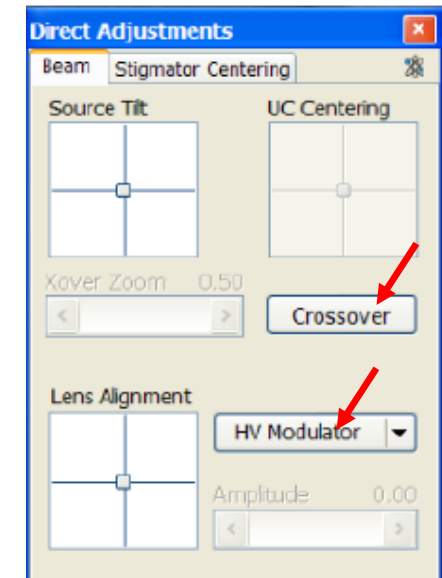
Load/Unload button

E-beam alignment

Note: It is recommended to do the e-beam alignment when the imaging location or beam conditions changed.

1. Focus on the surface with the magnification you will do operating.
2. Adjust stigma
3. Do lens modulation
 1. Click 'Direct Adjustments' icon
 2. Click 'Crossover' button and center the beam
 3. Click 'HV Modulator' and make the image static by adjusting the horizontal and vertical lines. Click and drag the lines one by one.
4. Adjust focus and stigma again.

'Direct Adjustments'



Finishing your session

1. Click the 'Pause' button to stop scan beam
2. Turn off the e-beam: click the '**Beam On**' buttons in the beam control page
3. Click the '**Sleep**' button
4. Set tilt = 0
5. Lower the stage
6. Unload your samples
7. Transfer the stage back to the main chamber: wait until the stage comes back to the main chamber
 1. Check visually through the CCD cam at quad 4.
8. Log off from the SEM/FIB software and iLab
9. File – log off