


Title <i>(Of equipment, plant, experiment, activity, etc.)</i>	Operating procedure of EBL 1		Date	10/11/2023
			Version	1.1
Activity Details <i>(of equipment, plant, experiment, activity, etc.)</i>	Description	Step wise procedure to operate the EBL 1 tool		
	Location	#160_P3.51H (EBL1)		
	After-Hours Work	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	
Photo/s <i>(of equipment, plant, experiment, activity, etc. used as part of this procedure)</i>	 EBL1			
Operational requirements	Equipment / Process / Plant / etc.		Instruction Manual (IM)	
	Cleanroom Laboratory Dress Code		IM_160-P3.51_Gowning_Cleanroom_V1.2	
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Table of Contents

Pre-operational check3

OPERATION – List steps to complete the activity from start to finish3

Sample loading 3

Set up the Beam conditions 6

Set up the Exposure 11

Sample Unloading 13

Sample ready for next processing step 14

Development [Ref. IM_160-P3.51B_WB2]..... 14

Transport method15

Waste Disposal.....15

Completion of Work15

Clean up after use..... 15

Describe, in detail and in sequence, the steps involved in this activity

PRE-OPERATIONAL CHECK

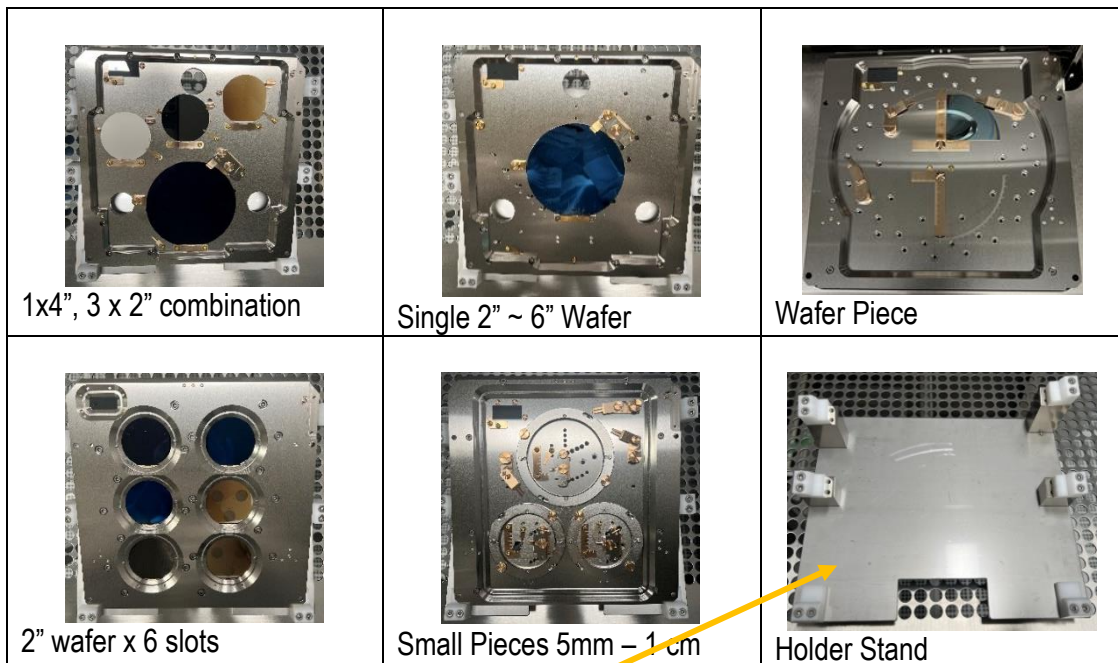
- Required: user sample Clean and Spin coated
- Required: user mask - CAD design

OPERATION – LIST STEPS TO COMPLETE THE ACTIVITY FROM START TO FINISH

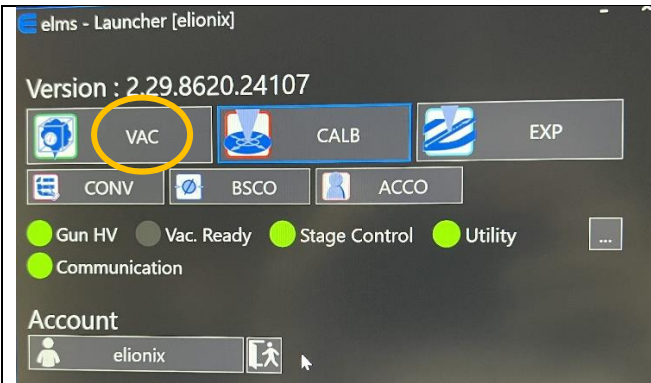
Sample loading

Things needed: Tweezers / sample holder stand / sample holder / resist coated sample

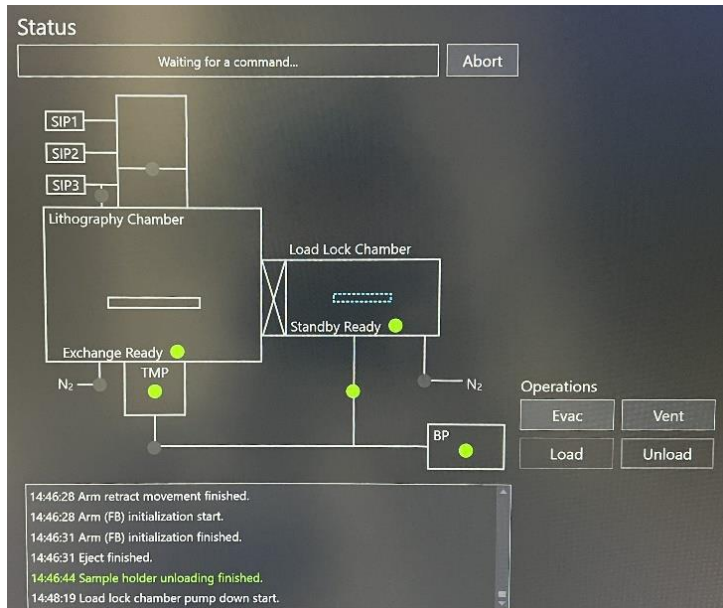
- Select the holder you plan to use
- If required, use Isopropanol (squirt-bottle) and lint-free cloth to wipe holder clean



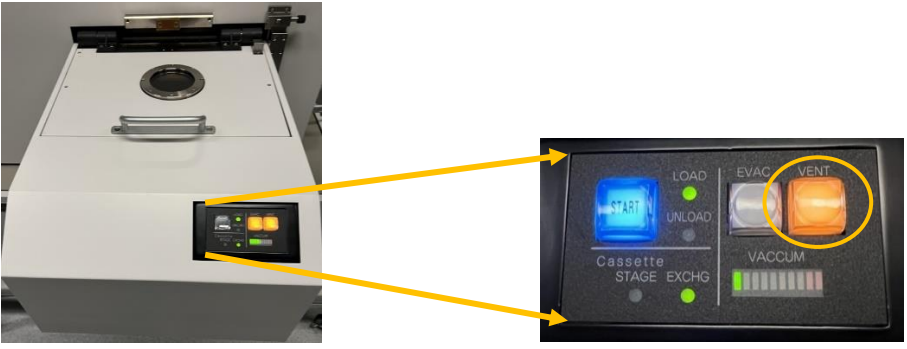
- Place the selected holder on the stand
- Mount your sample on the holder and clamp it
- N2 blow the sample to get rid of any particles or contaminations present on the sample surface
- Check the display on the screen
- Open the **elms Launcher** window
- Login to your account



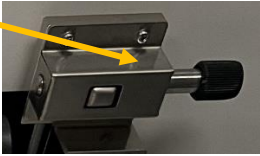
- Click on **VAC**
- The window seen below pops up



- If the status of the blue plate is in the **load lock (LL) chamber** as seen in the image above
- Go to the **Load Lock chamber** and Press **Vent**



- As the chamber is vented the button stops glowing



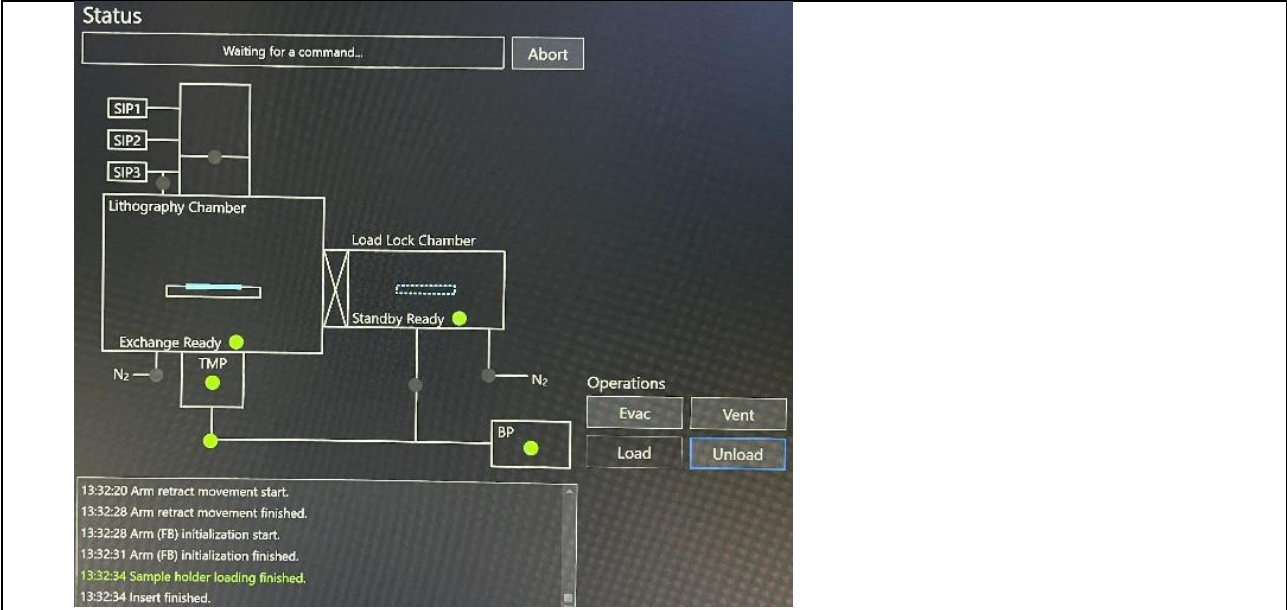
- Open LL lid and lock it using the knob at the right corner of the LL



- Load the holder
- Close the lid by unlocking it – to unlock tilt it a bit to the back and press the **small button** on the right-side knob

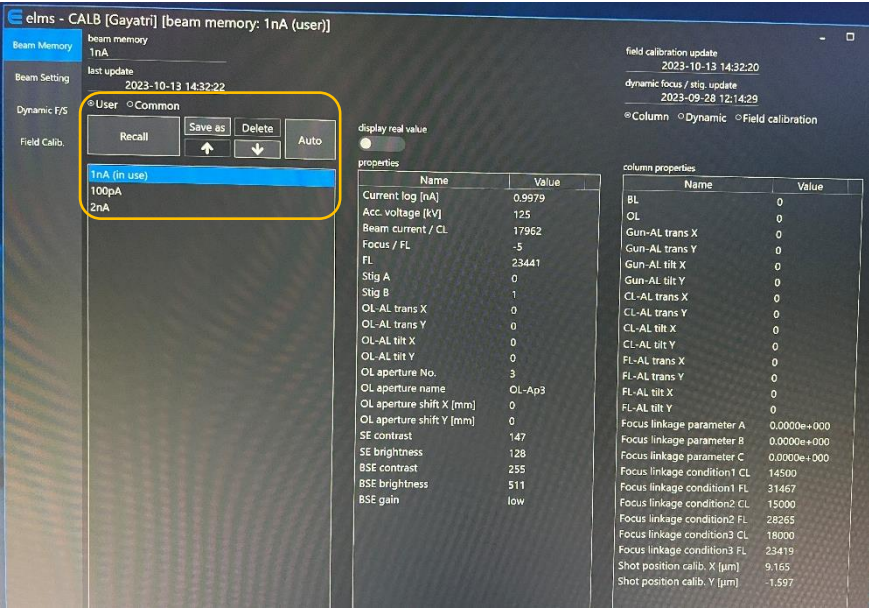


- Press **Start**
- Wait till the blue plate is in the lithography chamber and you get the message “sample holder loading finished” as seen in the image

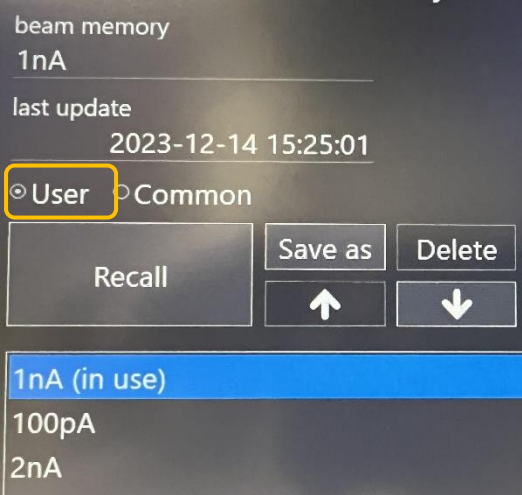


Set up the Beam conditions

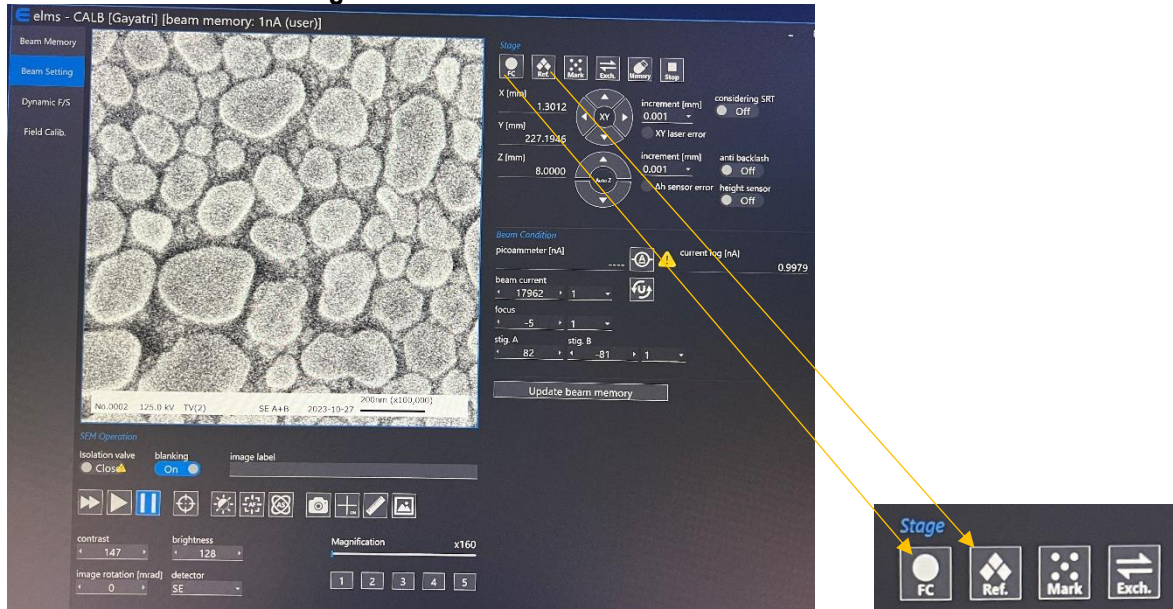
- Select the **CALB** window
- Click on **Beam Memory**



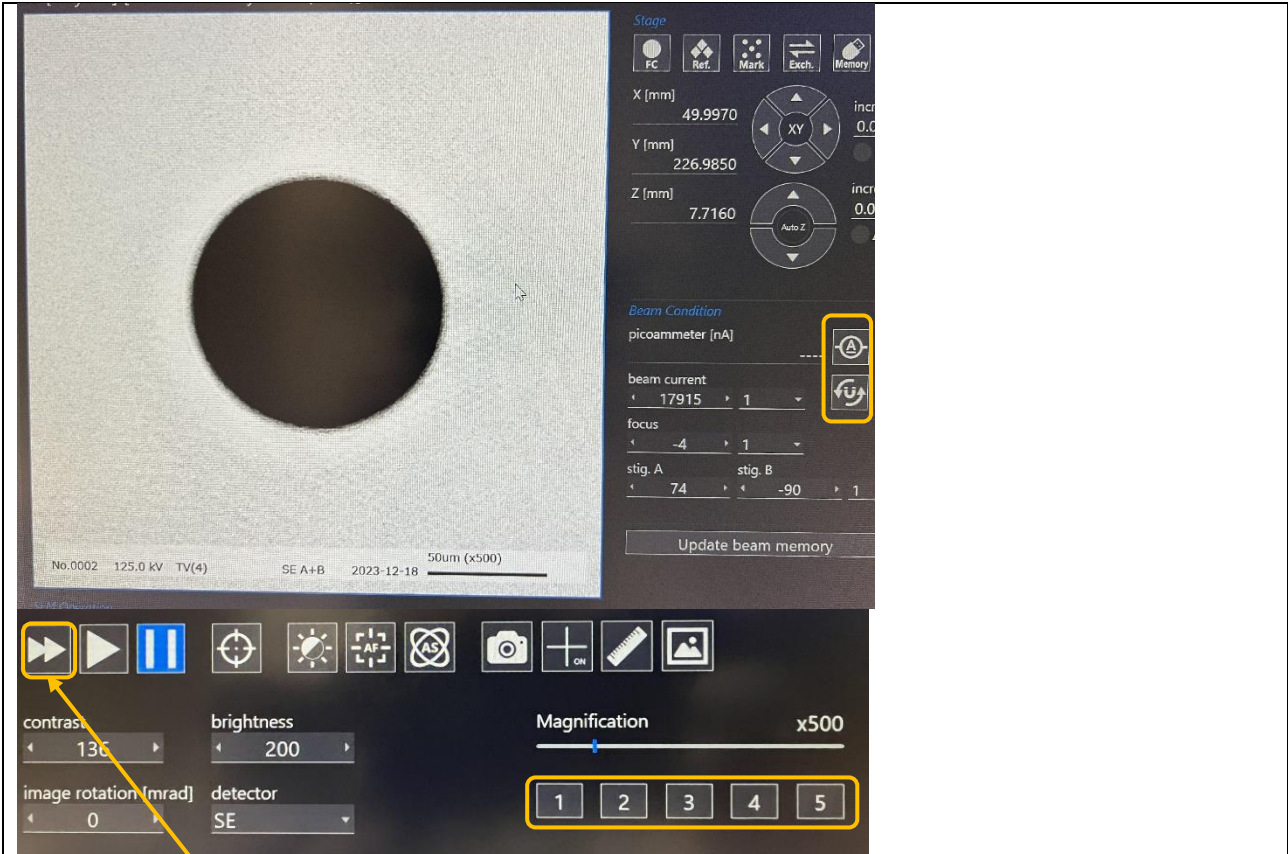
- Check if the **USER** option is selected
- Choose the current you plan to use and Click on **Recall** - For eg. If you Recall 1nA all the settings done at 1nA will be set





- **Select Beam Setting**




- Click on **FC**, to move the stage for current measurement



- Click on **Scan**, the FC is visible on the screen as seen above
- Select **Mag 2 or 3**

- Measure the **Current** by clicking on 
- You can adjust the current if the measured value is low compared to the set value
- Click on  to stop the measurement

- Move to **Reference Sample** 
- Select **Mag 2** and Scan to check the sample
- Later Select **Mag 4/5** to do the corrections
- Click Auto focus (AF)

- Click Auto Stig (AS) 

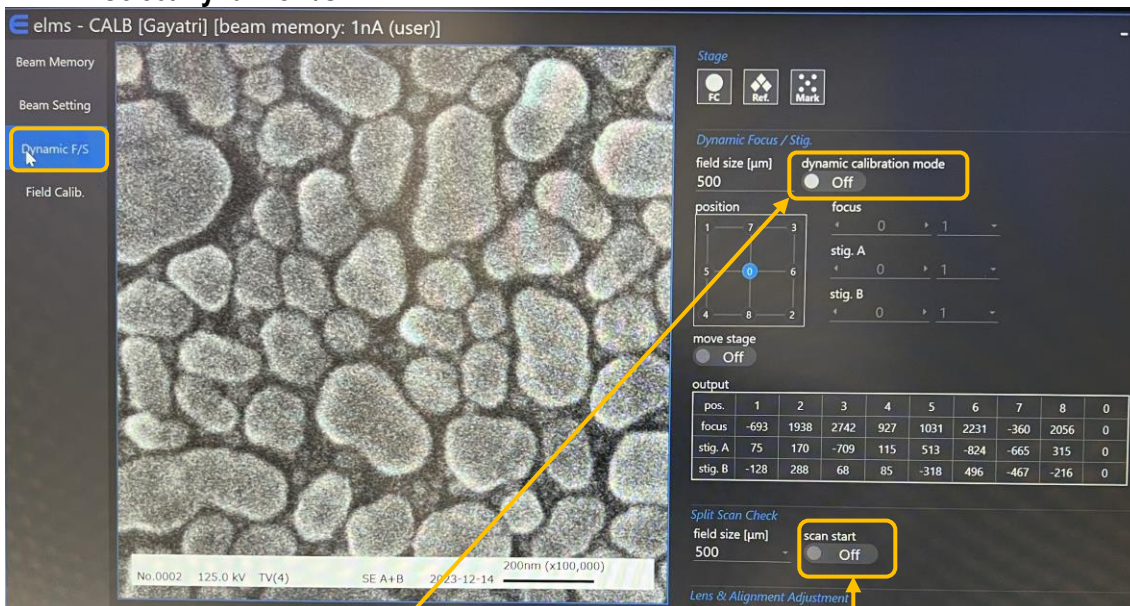
- Click on  if you make any changes.


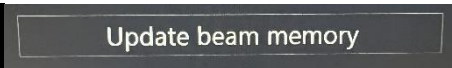
- Update Beam memory 

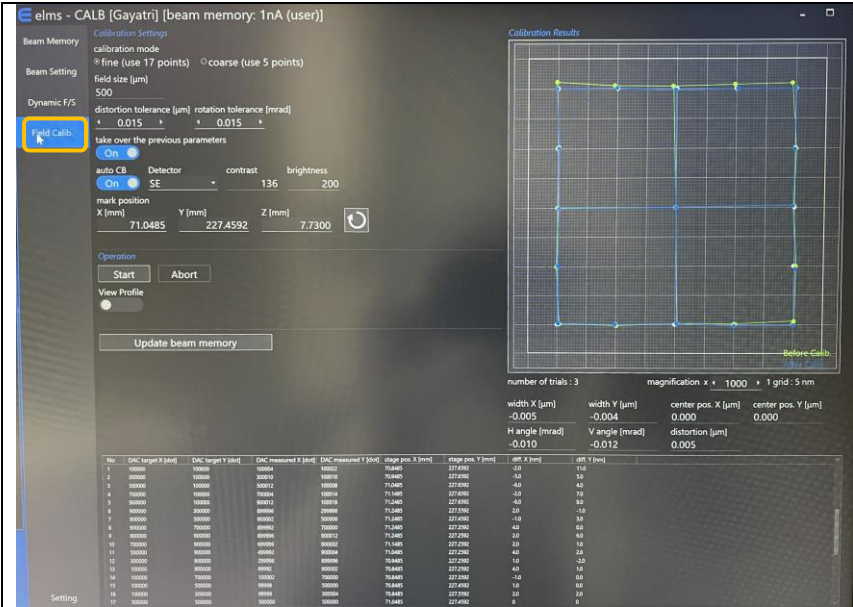
- To move stage position Right Click on the image and select **Stage Moving**, this will move the stage

to the point you click on.

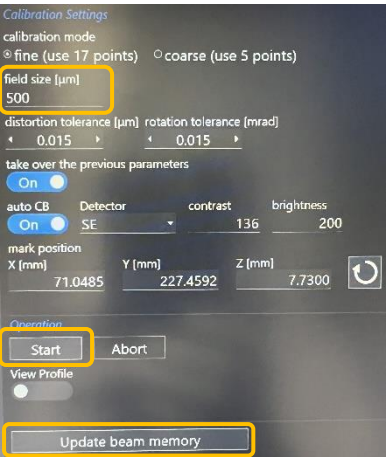
- Select **Dynamic F/S**



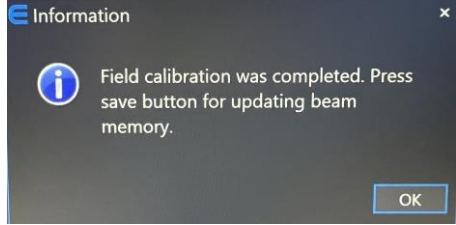
- Click on the **Dynamic Calibration Mode**
- Click on **Scan Start**
- This Performs the focusing at the center and 4 corners of the field
- Once the scan is complete, Select the corner that needs correction
- Click on Auto DFocus (AF) and Auto DStig (AS) for all the corners that need correction 
- Click on **SCAN start** again to check the results, if satisfied proceed to next step or repeat the step
- Once satisfied switch off the **Scan Start** and **Dy. calibration** buttons
- Click on 
- Select **Field Calib**



- Check the Field selected




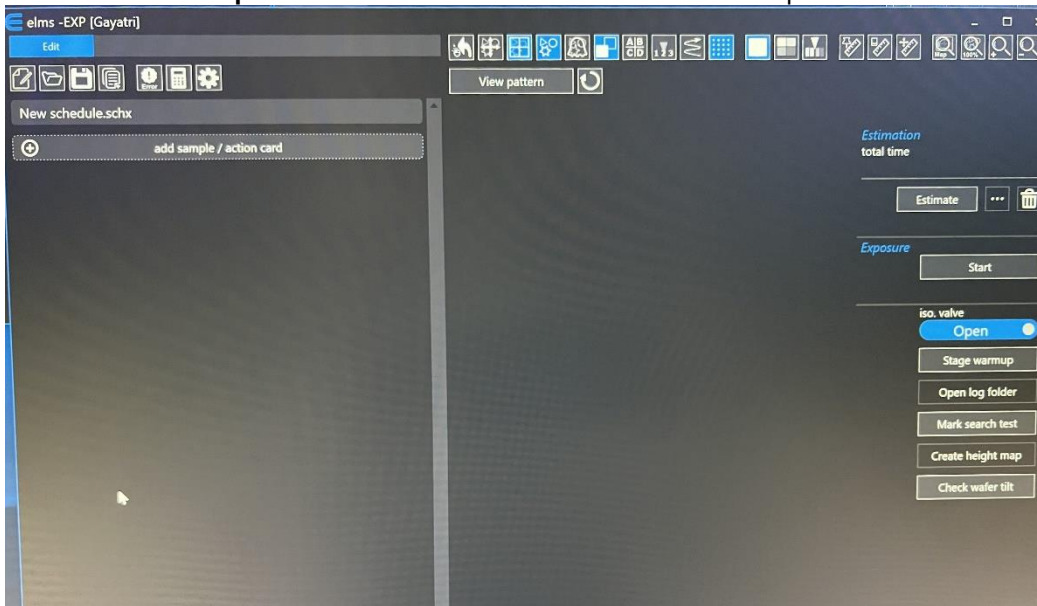
- Click on **Start**: This performs the field alignment and displays the below message once the alignment is complete.



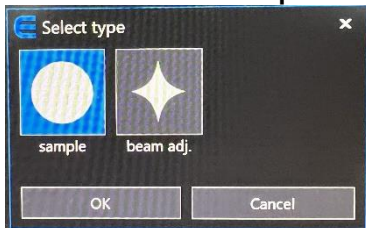
- Click On 

Set up the Exposure

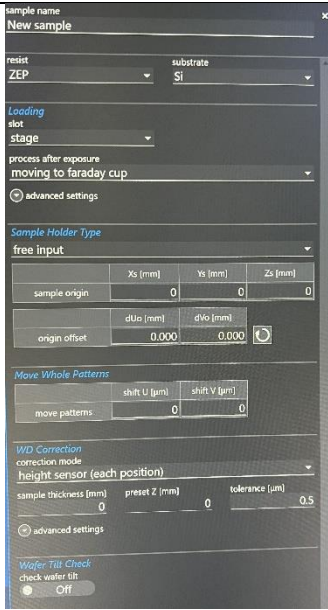
- Click on **Exposure** button  this will open the EXP window below



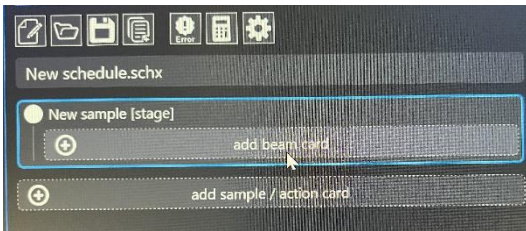
- Click on Add Sample / Action Card, window seen below appears
- Select the **sample** click **OK**



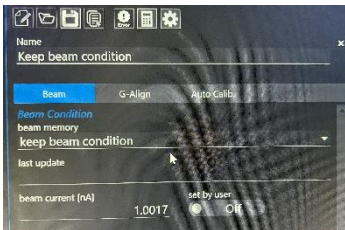
- The below display appears to enter the necessary details
- Select the sample details as per your requirements
- Select the sample holder used during loading



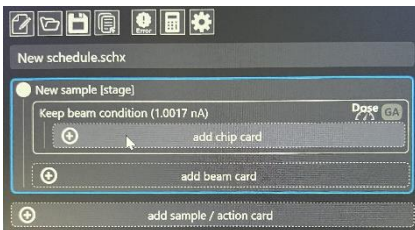
- Click **x** to close the Menu
- The screen below appears



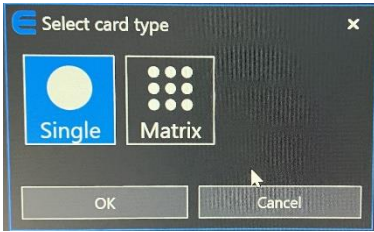
- Click on **add beam Card**,
- below **menu** appears



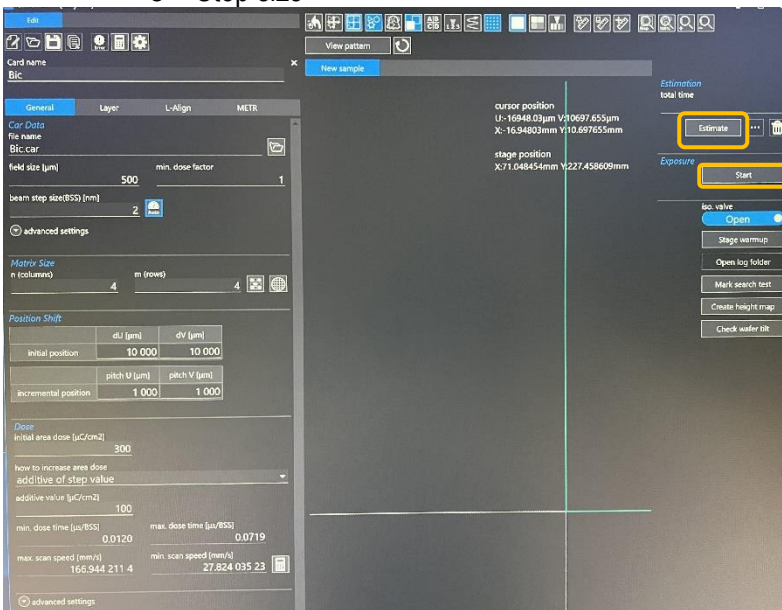
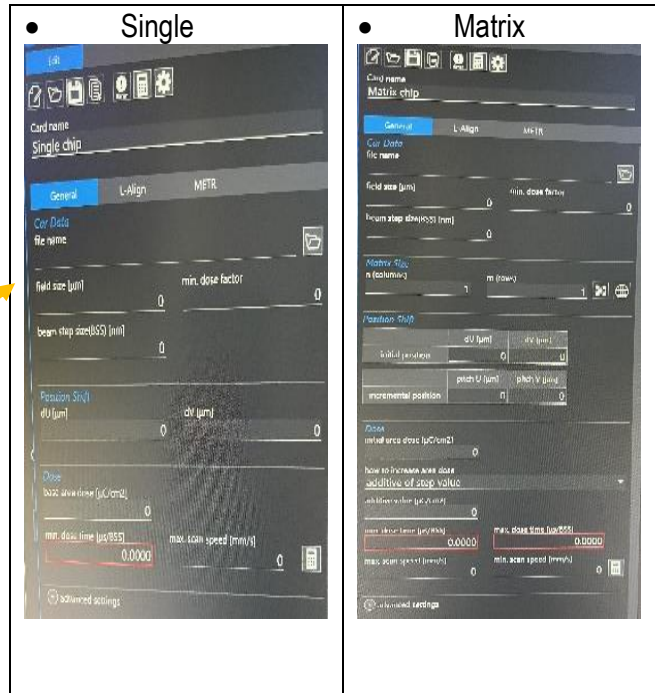
- Keep Beam Conditions and close the window by clicking on **x**,



- Click on **Add Chip Card**, the selection window seen below appears



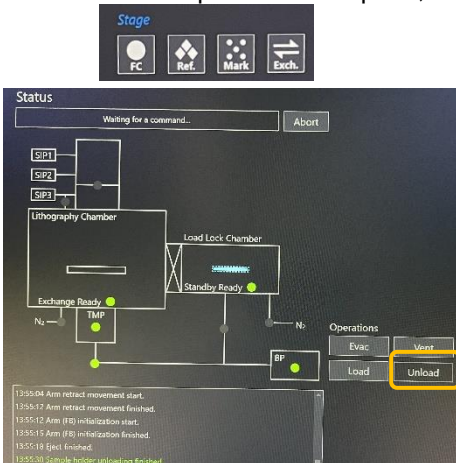
- Select an option as per your exposure requirement **Single or Matrix**
- Enter details in the menu that appears
- For eg: if you have selected Matrix
- Choose the design or .car file
- Enter the exposure parameters:
 - Position,
 - Matrix Size,
 - Matrix increment,
 - Initial Dose,
 - Dose increment value and
 - Step size



- Click on **Estimate** for the approximate exposure time
- Click on **Start** Button
- A message to save the Schedule file will appear
- Save the **Schx** file
- Exposure starts

Sample Unloading

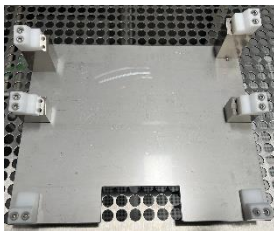
- Once exposure is complete, stage moves to FC or you can move it to exchange position



- Click unload
- Wait till you get the message "sample unload finished"
- Click the VENT button to open the load lock



- Take out the holder and place it on the holder stand



- Close the loading chamber and press EVAC button
- Log out from your session.

Sample ready for next processing step

- Unmount the sample from holder
- Store it in you Carrier box
- Place the holder in its respective box

Development [Ref. IM_160-P3.51B_WB2]

- Take your sample to WB2 for development
- Develop – as per optimised time for a particular resist
- IPA Rinse (as per the resist used)
- DI water Rinse (if required)

TRANSPORT METHOD for hazardous substances, biological, animal, or radioactive materials or plant equipment

Samples transported around labs using closed plastic carrier boxes that can be locked

WASTE DISPOSAL

1. Waste bins available in the gowning area and yellow rooms
2. Any waste generated in EBL room to be disposed in the waste bins by the users
3. Sharps container placed in the yellow room for sharps disposal

COMPLETION OF WORK – List steps to make area safe (include clean up, any waste disposal & service/maintenance requirements)

Clean up after use

1. Clean up the lab area and working table surface after completion of work (no tapes/ broken substrate pieces/ used clean wipes should be lying around)
2. Keep the holder back in its respective box
3. Sharps waste goes in the sharp's bins placed in the yellow rooms
4. Deposit any waste generated other than sharps in the bins available in yellow room or gowning area.

Workers must read and completely understand the relevant equipment risk assessment and this instruction manual before they are allowed to work on the activity without direct supervision.