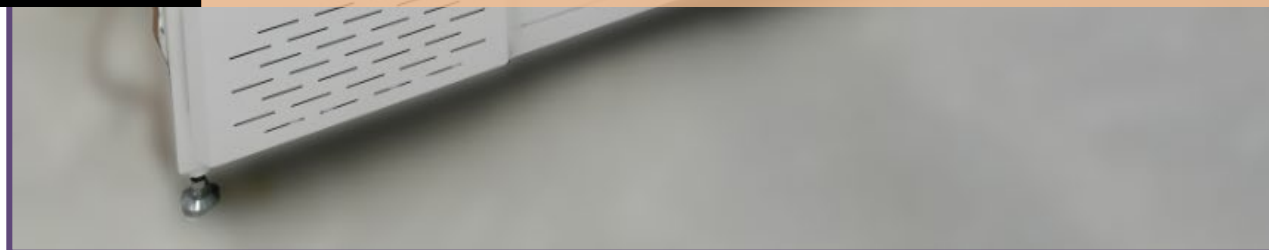**Nano Fabrication Center**
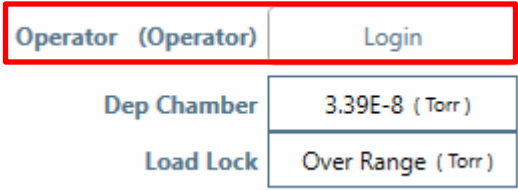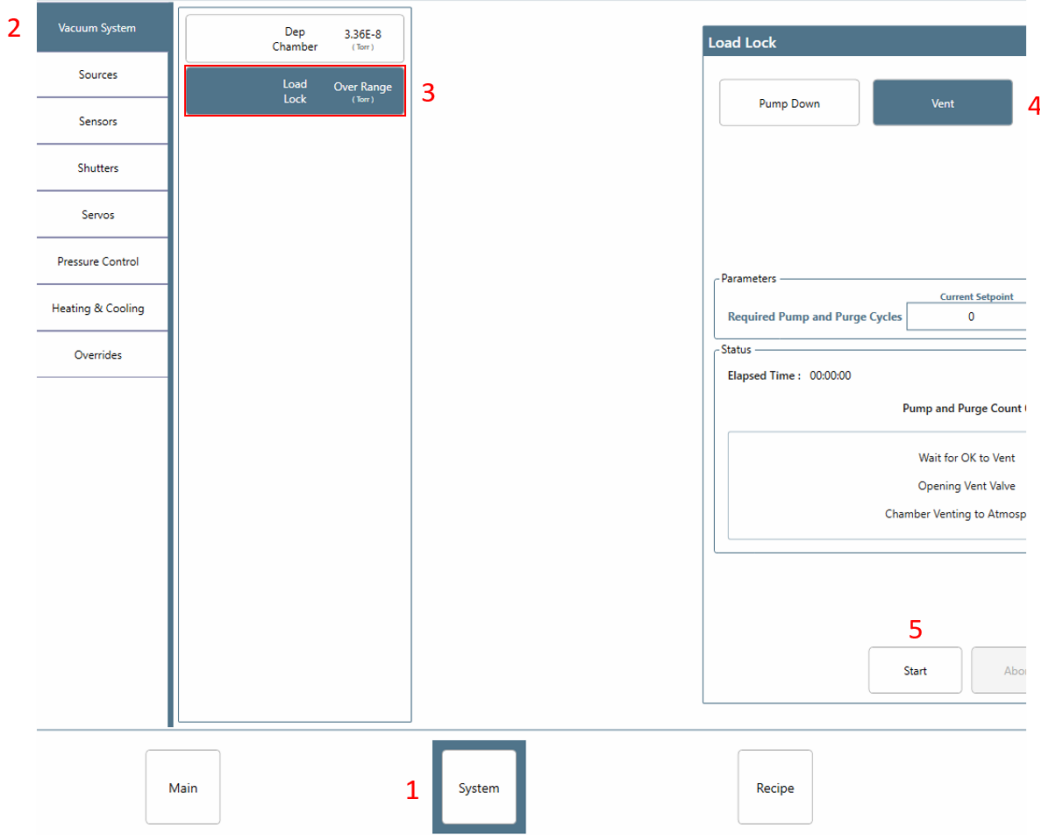
Angstrom Evaporator
Standard Operating Procedure
Written by Sigal Keshet
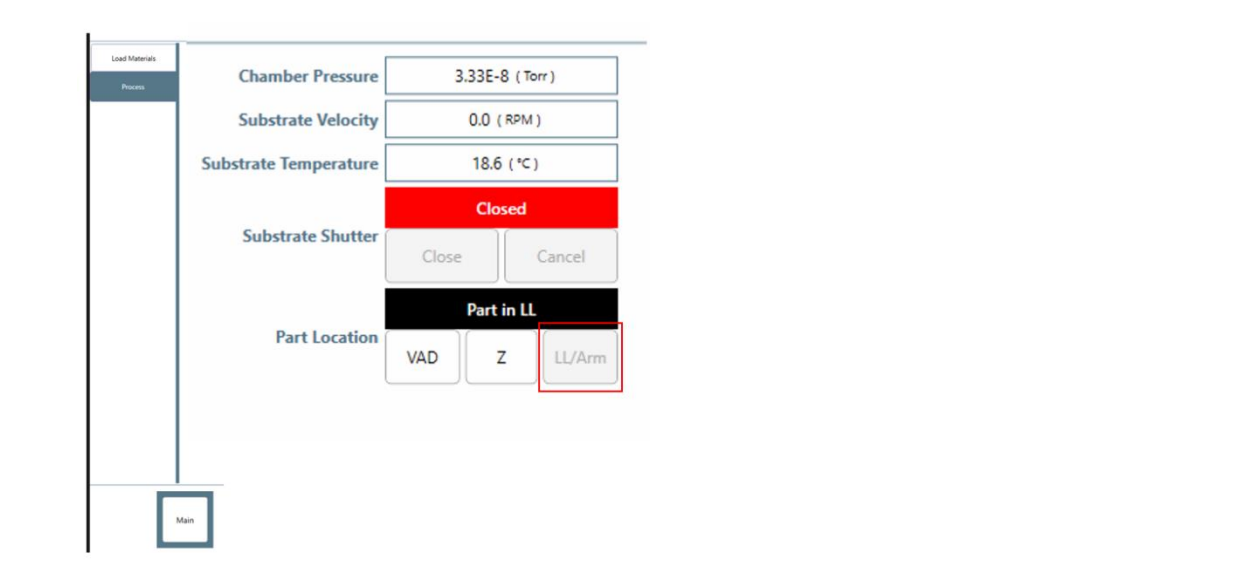
	Standard Operation	
1	**Log** in to system by pressing the logged user on the upper right corner. **Username/ Password**: Operator.	Operator (Operator) Login Dep Chamber 3.39E-8 (Torr) Load Lock Over Range (Torr)
*	**Overview**	1. LL vent and insert the sample (system→vacuum tab) 2. Loading (main→process→load recipe option) 3. Process (main→process→load recipe option) 4. Unloading (main→process→load recipe option) 5. LL vent and taking out the sample (system→vacuum tab) 6. LL vacuum (system→vacuum tab)
2	**LL vent:** go to 1. system (bottom bar) 2. vacuum system 3. load lock 4. vent 5. Start wait till completed.	

3	**Open the load lock** chamber door. take out the sample holder (touching edges only).	
4	**Attach your samples** to the sample holder.	
5	**Place sample holder** in the load lock and **make sure it seats in the right orientation: tape to tape!**	

6	**Make sure pins sits correctly in place.**	
7	**Close load lock chamber door.**	
8	**Most important step!** **In part location, make sure the part in LL (sample holder).** If not, arm will be crushed by z stage.	

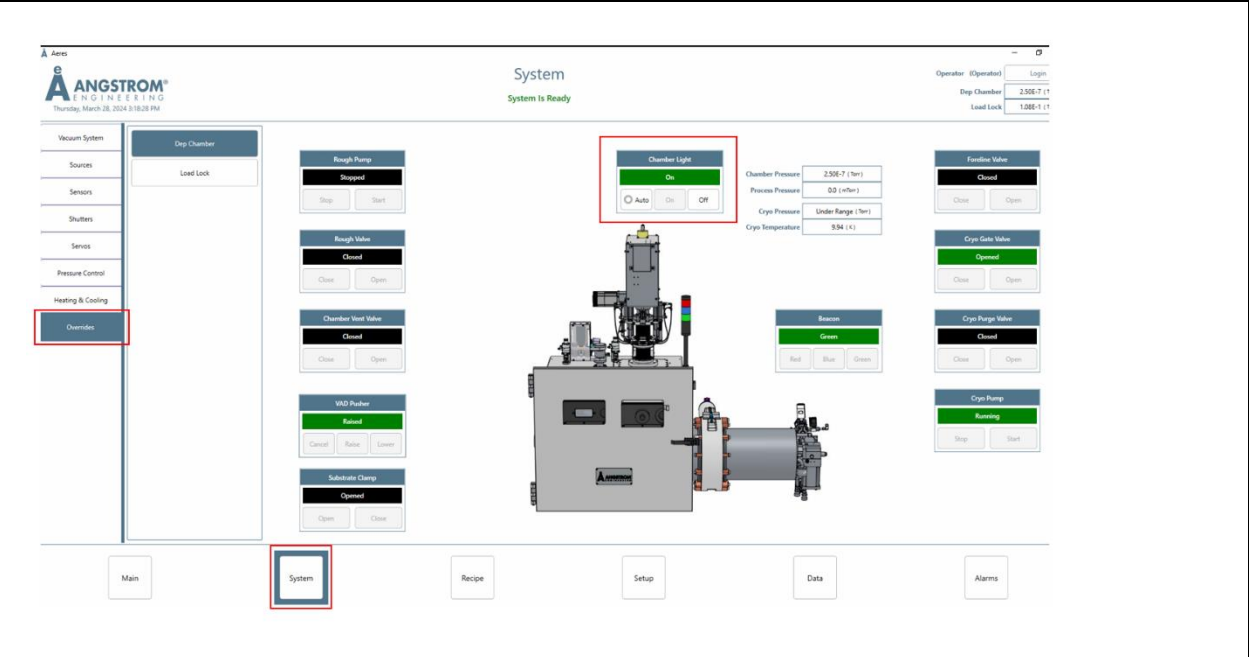| 9	**Load recipe** In main-process-choose load option (on the right). You have 3 mechanical options. For **ebeam** process: choose 'Transfer to Z stage'. For **thermal /ion milling** process: choose 'Transfer to VAD'. Then load recipe (recipe will appear on the left). Click sub arrows, then press start . **Make sure process is completed.**	Sample holder in VAD stage Sample holder in Z stage
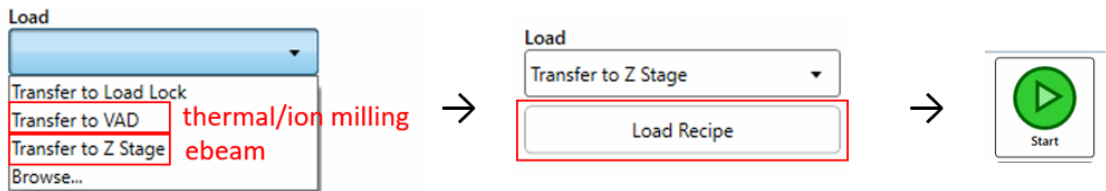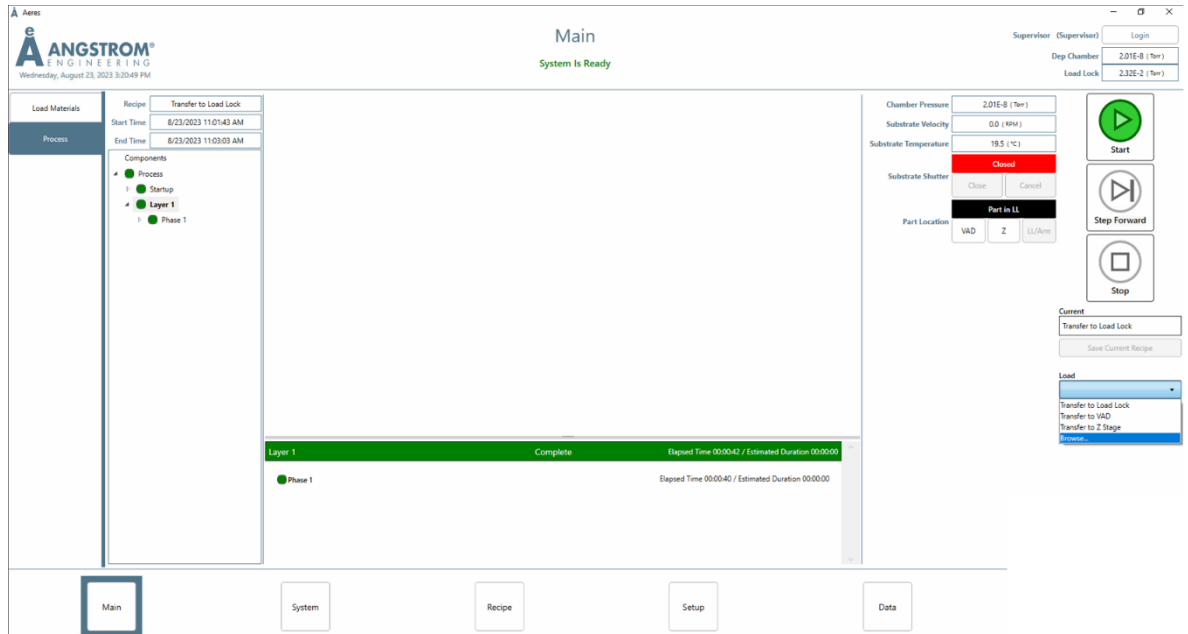
*	**Turn on/off chamber light**	
10	**Process:** from main-process option-choose 1. load 2. browse 3. choose your desired recipe. 4. load recipe.	
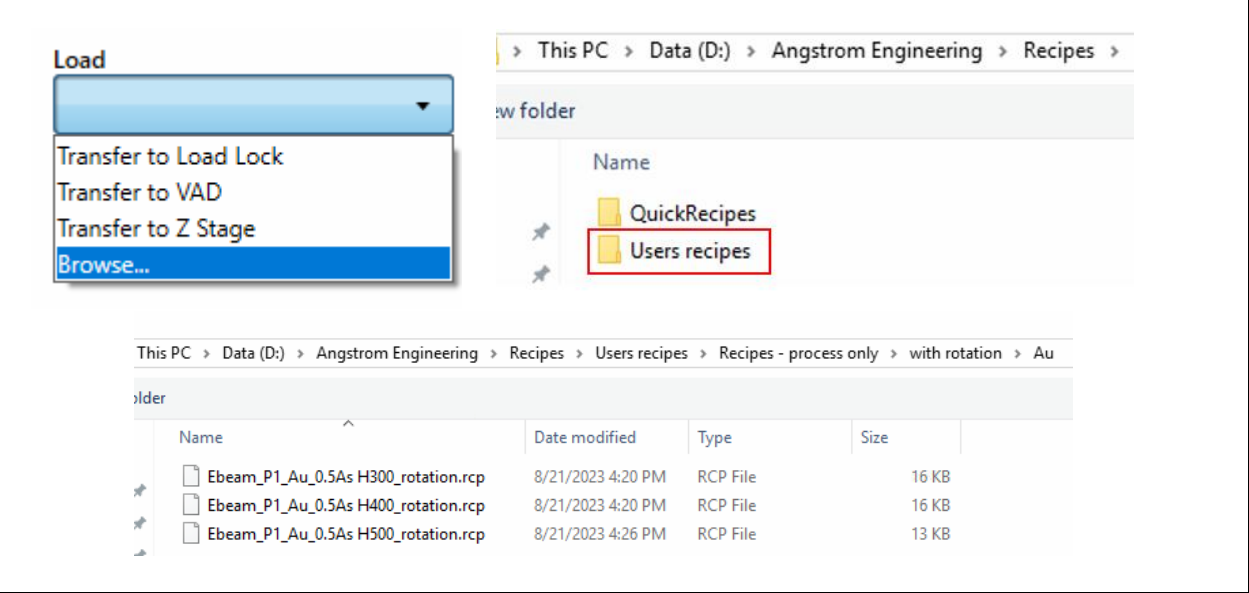
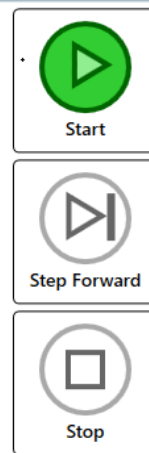| 11	**Define rate & thickness** press load recipe button, then define both rate and thickness. Click update. Load recipe opens your recipe on the left. Click the sub arrows to view the recipe and edit each step per your demand. You can edit during process as well.	
12	**Start recipe:** press start (or **stop** to stop recipe, if you wish to stop any action of the instrument).	

13	Click the marked arrow to open **QCM** data.	

Ti_P3_H400 eBeam Pocket 3 (Titanium)

Thickness	4.32 A	(0.00 A)
Rate	0.00 A/s	(0.50 A/s)
Output		0.00 %
High Voltage		0.00 kV
Beam Current		0 mA

☐ Manual   🟩 Automatic

Output (%)   0.00   Update

Zero Thickness

Closed

Source Shutter   Close   Open

Sensor	Rate	Thicknes	TF
Physical Sensor 1A	0.00 A/s	0.00 A	0.00
Physical Sensor 1B	0.00 A/s	0.00 A	0.00

14	**Process is built from 2 sections:** *Startup *Layers	

Load Materials

Process

Recipe   Ebeam_P3_Ti_H400_R0

Start Time

End Time

▷ Components

▲ ⬤ **Process**
  ▷ ◯ Startup
  ▷ ◯ Layer 1

15	**Startup** consist of chamber pump; chamber vacuum ($2e^{-7}$); substrate rotation (in case you choose rotation option).	

▲ Components
   ◼ Ti P3 H500 eBeam Pocket 3 (Titanium)
▲ ◯ Process
   ▲ ◯ **Startup**
      ▲ ◯ Step
         ◯ Pump Down Dep Chamber
      ▲ ◯ Step
         ◯ Wait For Dep Chamber Chamber Pressure
         ◯ Enable Substrate Rotation
   ▷ ◯ Layer 1

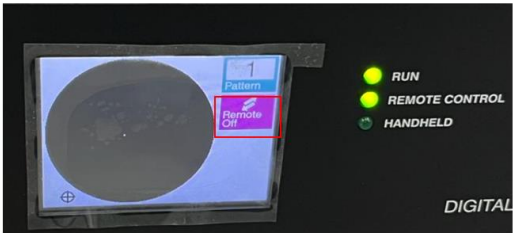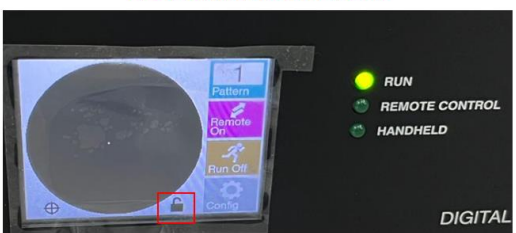| 16	**Layer 1** contain all process steps. Open the sub arrows and click on each step while working.	
17	**Layer section:** In **precondition step** (soak1), go to ramp power and adjust the target output (power) and ramp rate. recipe values are calibrated for rate 0.5Å/s. press update. rate and power (output) values appear on charts. **rate should reach ~70% of final rate.**	*The only step where you can control the power:*
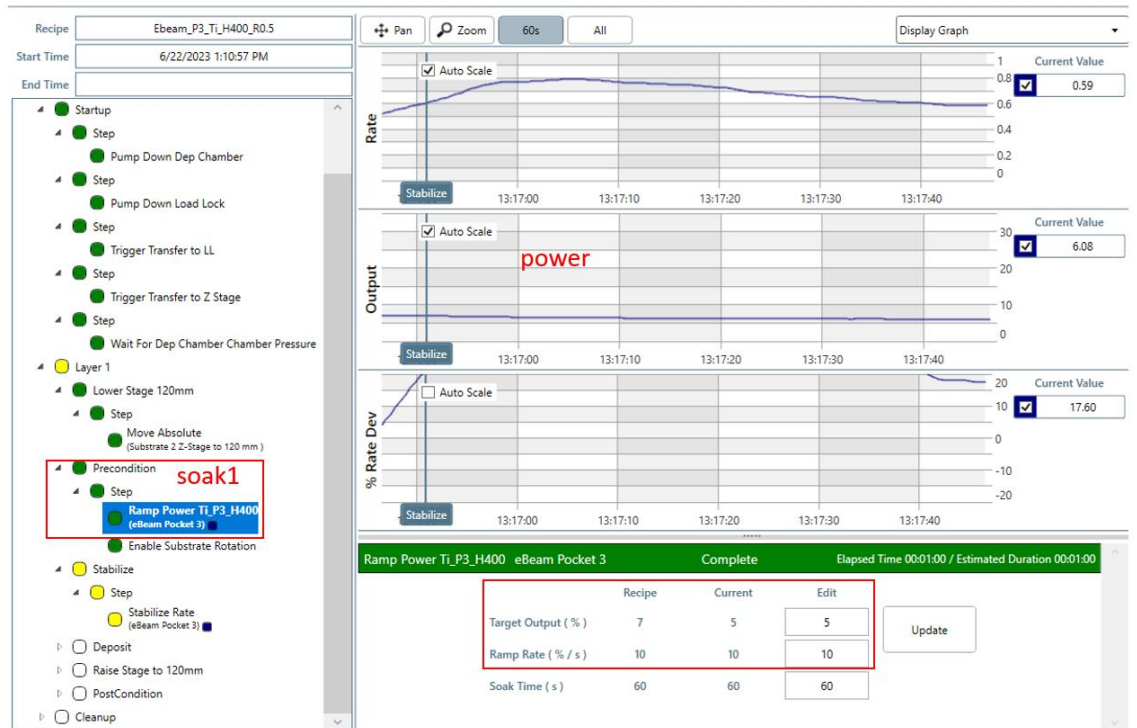
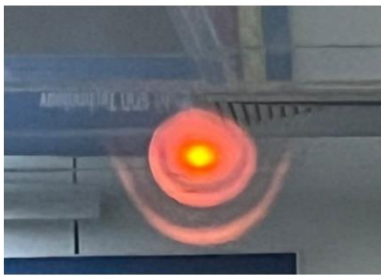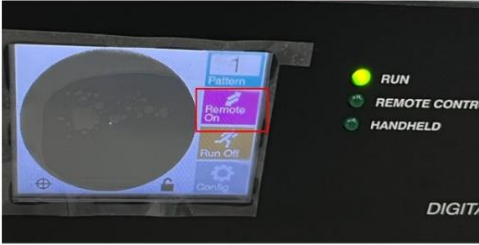|		
18	**Beam alignment** when beam is observed, start the alignment. **1**. click the Remote off option (make sure in unlock position, If in lock position- click the icon- then password 1234- then ok.). **2**. connect the joystick. **3**. click the target icon. **4**. align the beam.	Initial view 1 Post Remote off view If in lock position, open with password: Connect joystick 2 Click target icon: 3 Target icon
19	Cover the viewing window using the intensity reducer window.	
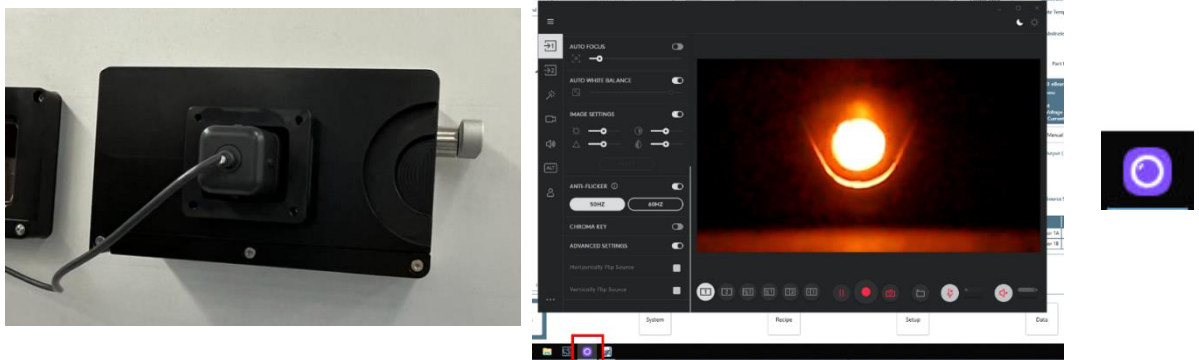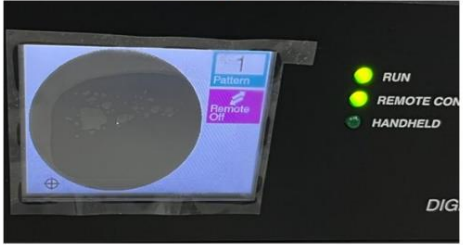
20	If you wish to see the beam in **camera**, use the camera shield as well.	
21	Make sure the correct pattern appears (sweep1 for spot, sweep2 for circle).	Cr/Co/oxides (sweep2) Rest of metals (sweep1)
22	**When alignment is finished:** **1**. click the ok button. **2**.disconnect joystick **3**. click the Remote on **4**. close the door.	 After disconnecting After clicking Remote on

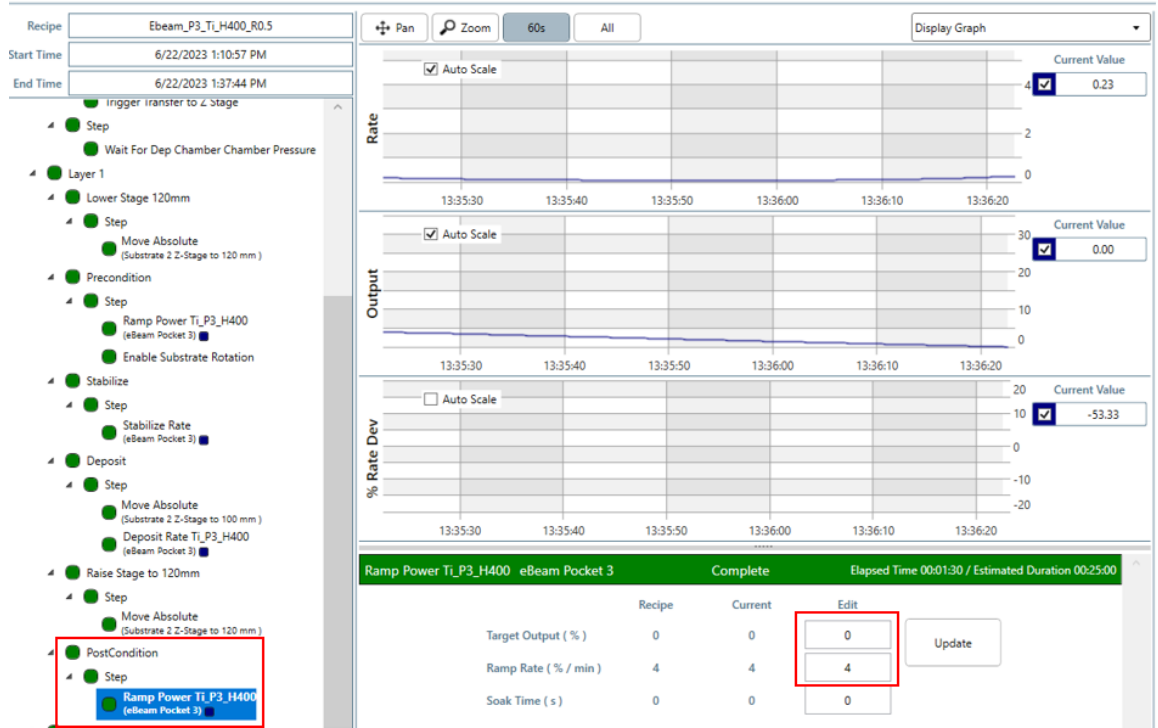| 23	In **stabilize step** (soak2), make sure your desired rate is stable in charts. **Power cannot be changed in this step.**	
24	**Deposition** In deposition step, you can view the actual thickness on the right side.	
*	**Logbook**	Please fill deposition details in the log book:
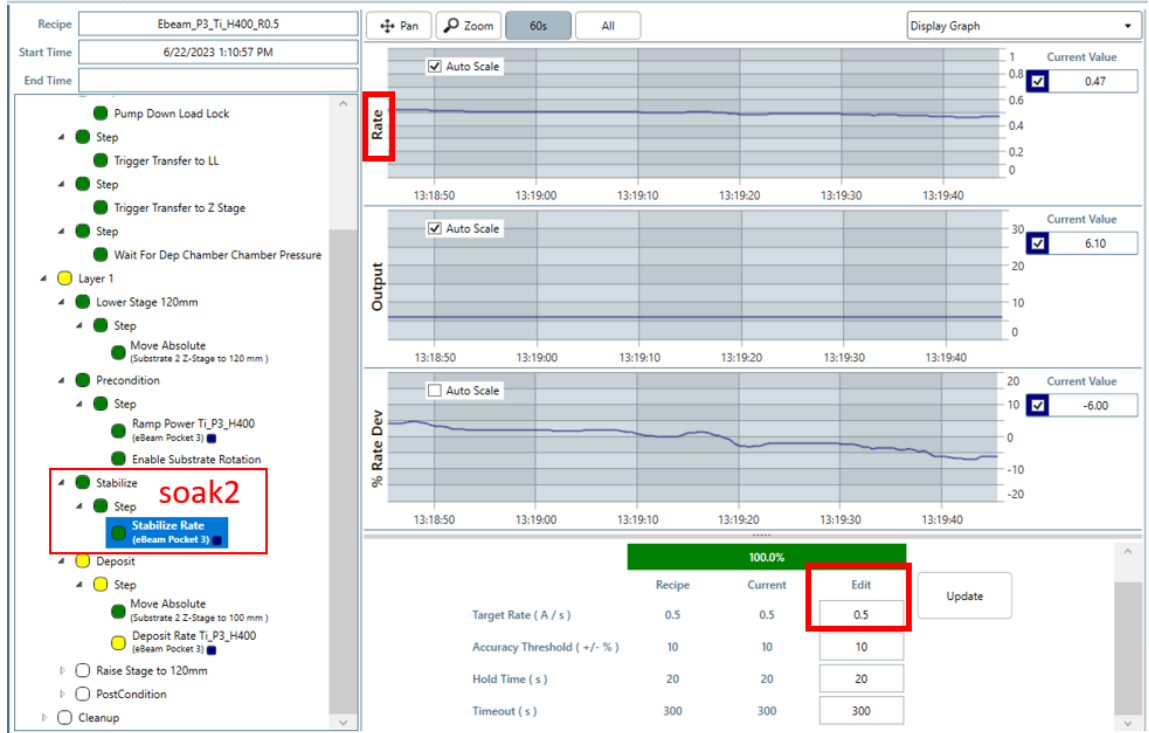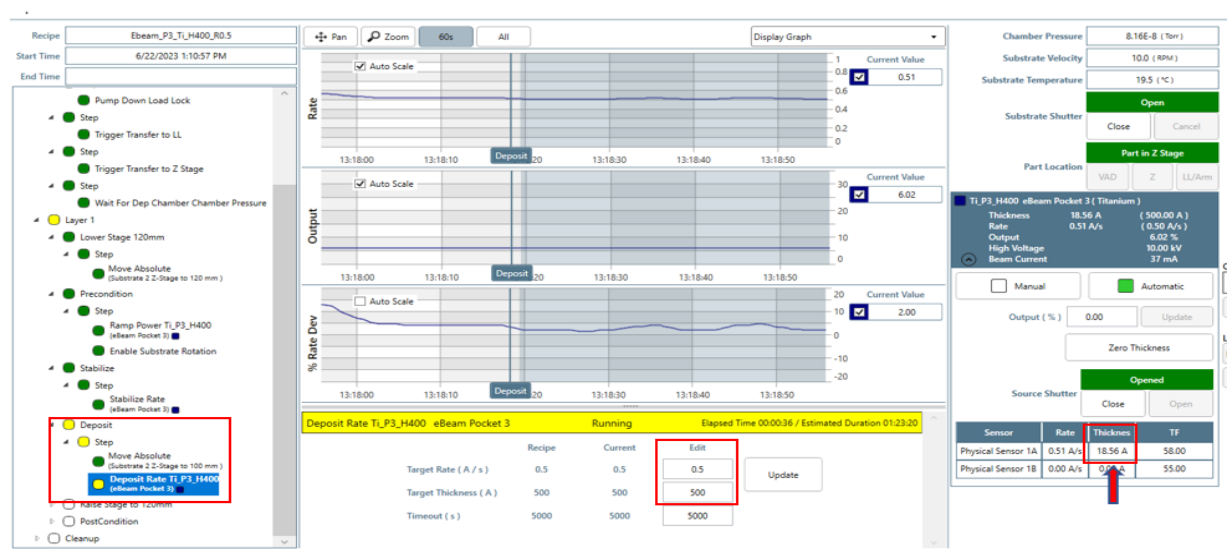
Angstrom Evaporator Users logbook

Date	Start Time	End Time	Username	Materials	Layer Thickness	Rate	Power	Remarks

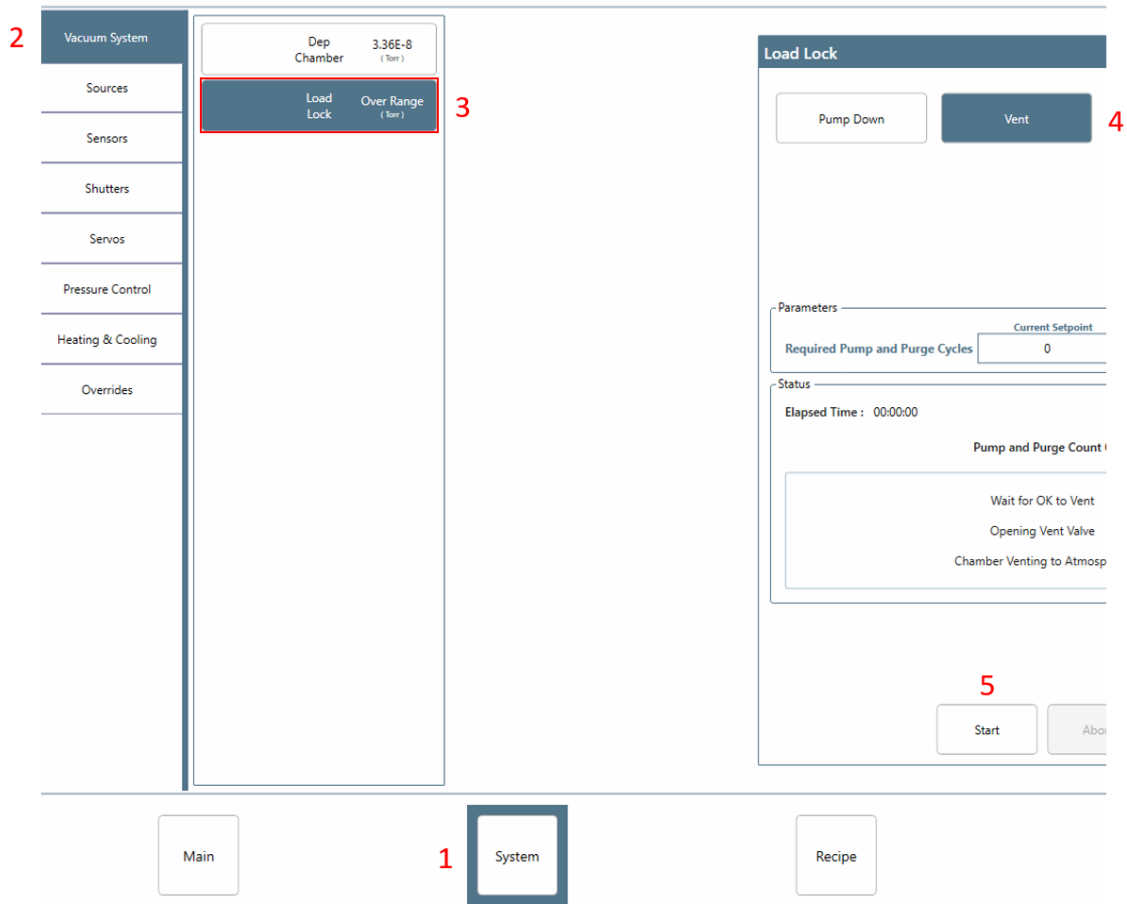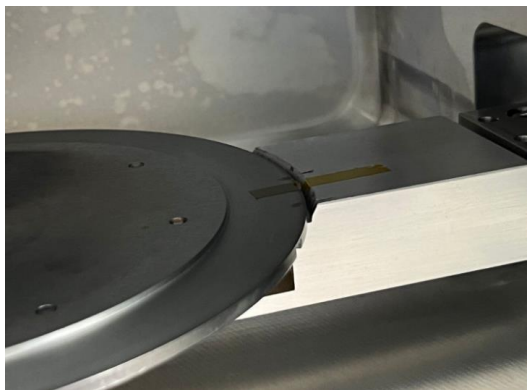|		
25	**Post condition** ramp down step. ramp down time should be at list **2** minutes. If your power was 18%, ramp rate should be 9%/min or lower value. For over 20%- make it 3 minutes. Wait till process is complete and all steps are green.	
26	**Unloading** from Load section, choose the transfer to load lock option. Then load recipe. Then start. wait till step is completed.	
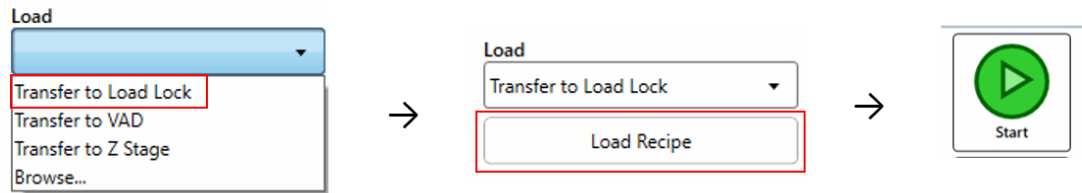
27	**Vent load lock** go to 1. system (bottom bar) 2. vacuum system 3. load lock 4. vent 5. Start wait till completed.	
28	**Take out the sample holder**, remove your sample, bring back the sample holder (tape to tape), close the door.	

29	Load lock vacuum go to 1. system (bottom bar) 2. vacuum system 3. load lock 4. pump down 5. Start	
*	**Errors**	If you have errors from any kind, please take a screen shot and save it here, and send an email to Sigal/Assaf/Sharon on call.