

VST work protocol

Version: 3

Date: 29/04/21

Editor: Yuri Kolesnikov

All Users:

1. All users must sign in with BOOKIT with reservations.
2. Fill in online VST logbook
3. Maximum wafer size- 4 inch.
4. Tape samples with Kapton tape only.
5. Students **MAY NOT** replace or fill crucibles .
6. Students **MAY NOT** open the main vacuum door in VST system.
7. Keep loadlock in "vacuum" mode until your process is completed. Do NOT use "standby" mode.
8. Use your own program recipe saved with your name. Use the "templates" folder as a recipe reference.
9. Always compare your recipe to the last instance of that material being deposited.
10. Crucible 5 is for Mark.S. group only! Other users are not allowed to touch or use this crucibles.

Malfunctions!

- ☒ 0 rate with power rising high(25+) → stop the process immediately and call
- ☒ Erratic rate – large jumps in rate, sometimes negative rate → stop the process immediately and call
- ☒ Cryo temperature >14 → call to report

FAB STAFF ONLY!!

1. Wait at least 15 minutes after deposition process before opening main chamber
2. Crucible 1 (Ti), Crucible 2 (Cr), and Crucible 5 (Au MS) MAY NOT be changed.
 - a. If absolutely necessary Crucible 2 (Cr) may be changed temporarily and switched back immediately after use

VST Manual

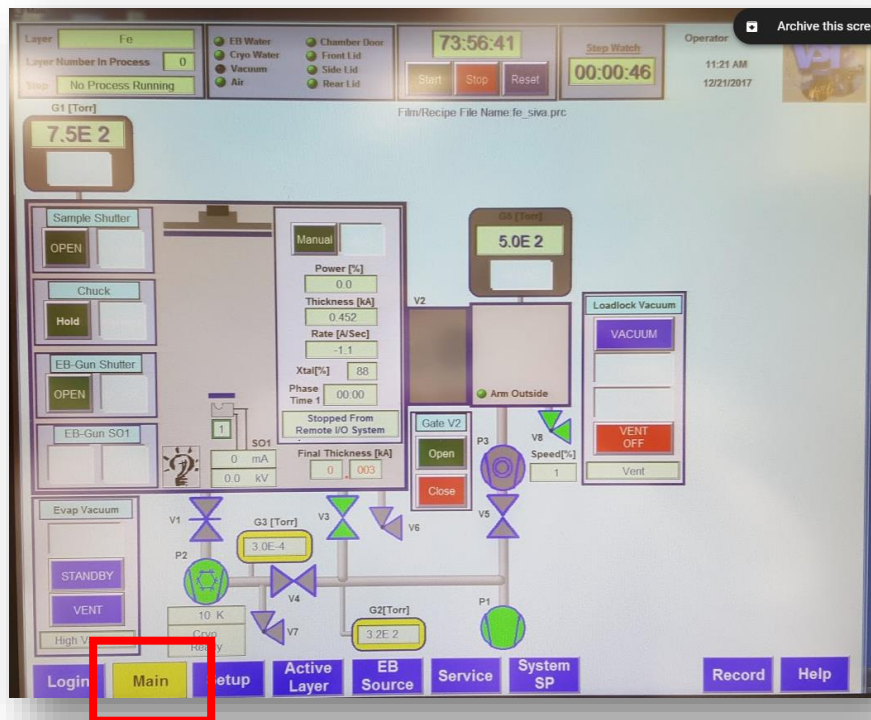
Version: 2

Date: 29/04/21

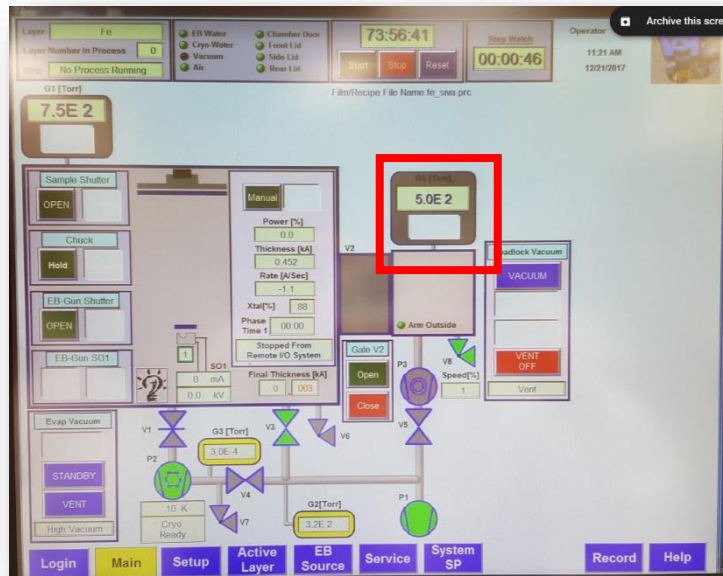
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Loading the sample- Load lock

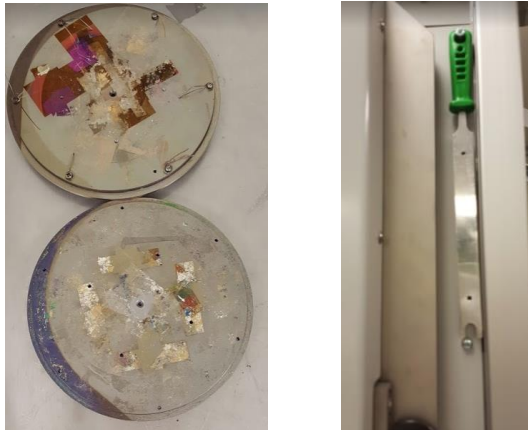
1. Tape sample with Kapton tape to stage.
2. Work in "Main" window.



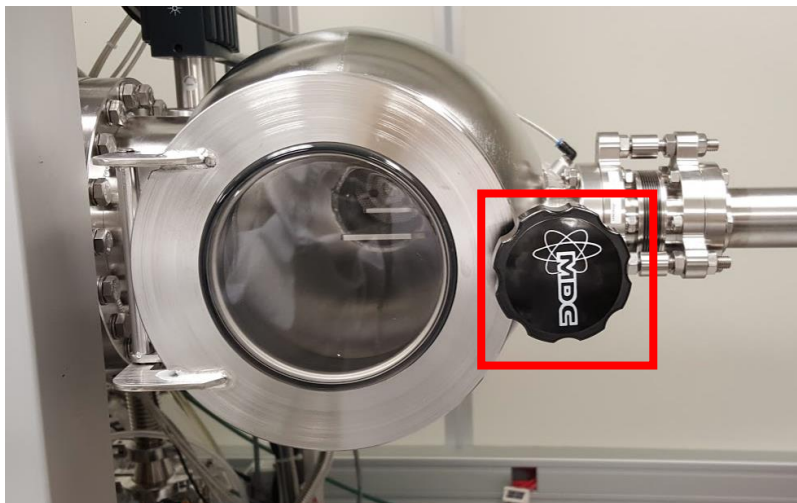
3. Check if the load lock chamber is at atmospheric pressure ($\approx 6 \times 10^{-2}$ Torr). If not, unlock chamber and press on **Loadlock Vent**



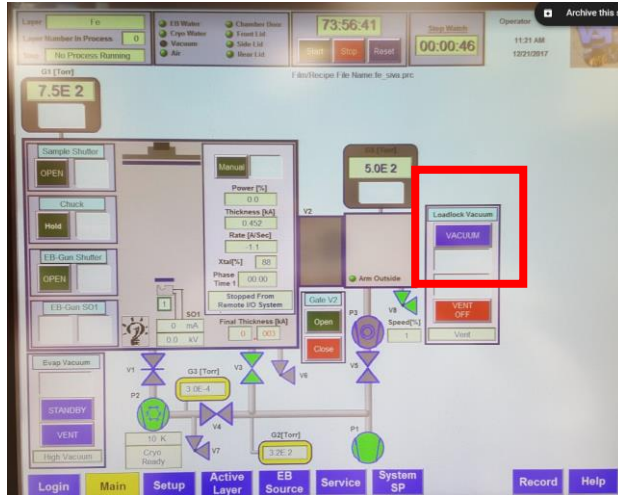
4. Insert the stage (with your sample) to the loadlock, with the stage arm and make sure the stage is in the right position.



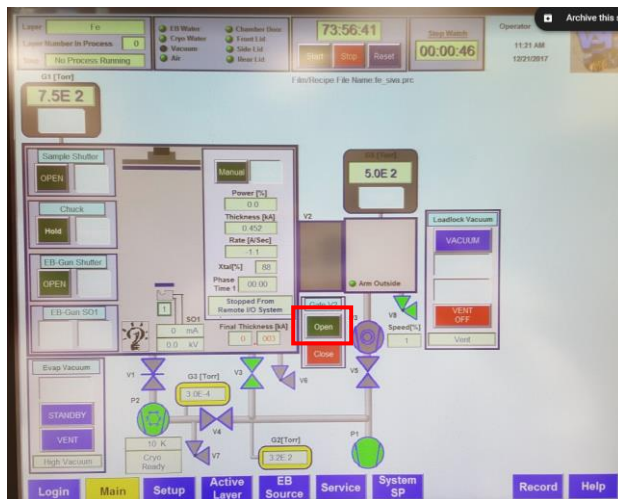
5. Close the load lock chamber window.



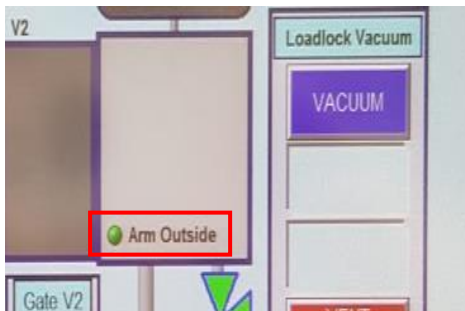
- Press on load lock chamber Vacuum bottom.



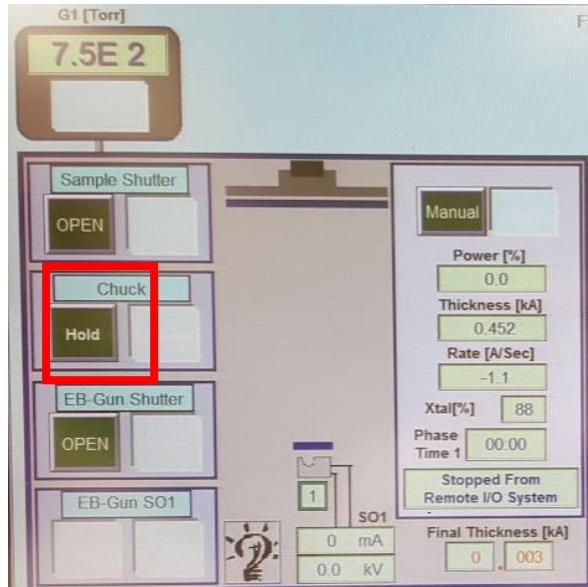
- When there is enough vacuum in loadlock chamber, the gate open button becomes green.
- Press on "open" to open the gate between the chambers.



- Insert the stage inside the main chamber with the arm. Check that the arm status is changed from "arm outside" to "arm inside".



10. Load the stage to the chamber by pressing chuck "hold" button.

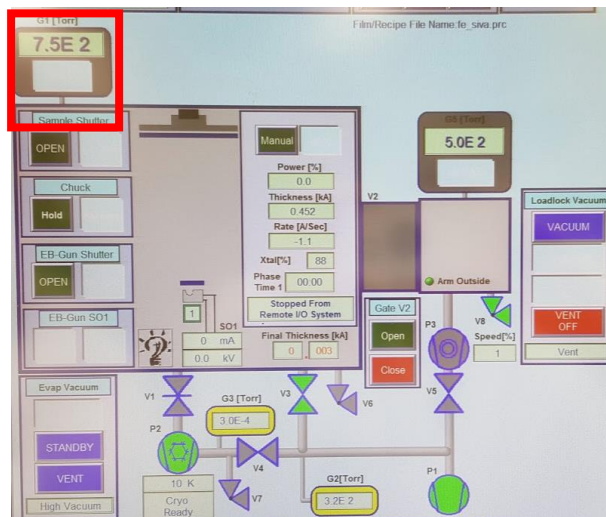


Moving the sample out- Load lock

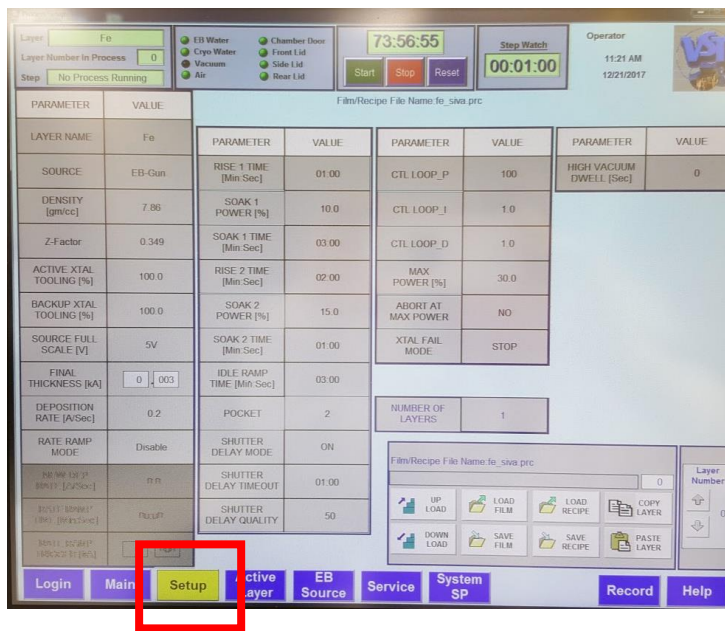
1. Press "open" to open the gate between the main chamber and the load lock.
2. Push the arm inside and make sure "arm inside" appears on the screen.
3. In chuck window press "release" to release the stage from the chamber to the arm. Check that the stage sits properly on the arm.
4. Pull the arm outside and make sure "arm outside" appears on the screen.
5. Press on "close" bottom to close the gate between the main chamber and the load lock.
6. Unlock the loadlock and press on "vent" to vent the load lock chamber.
7. Wait for atmospheric pressure to open.

Deposition process-main chamber

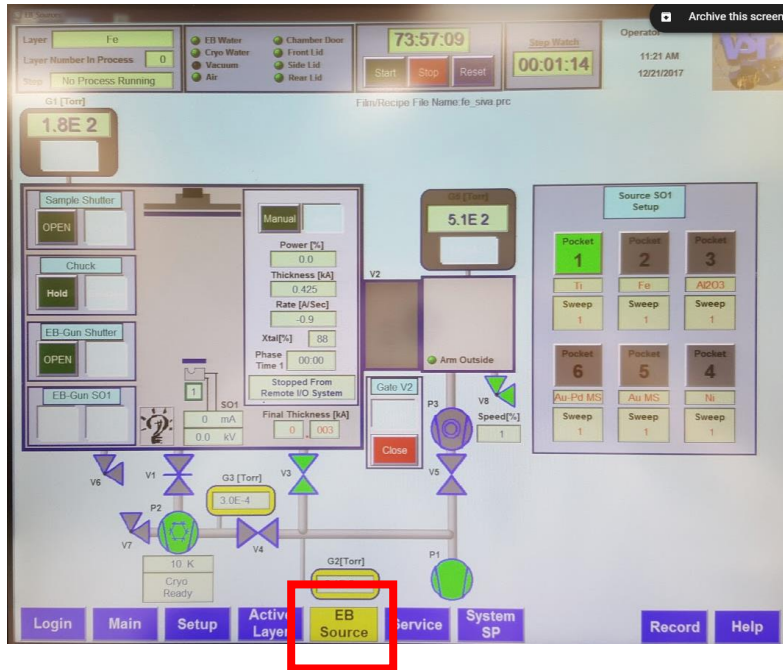
1. Make sure that the main chamber pressure is $< 2 \times 10^{-6}$ Torr.



2. Move to "setup" screen.

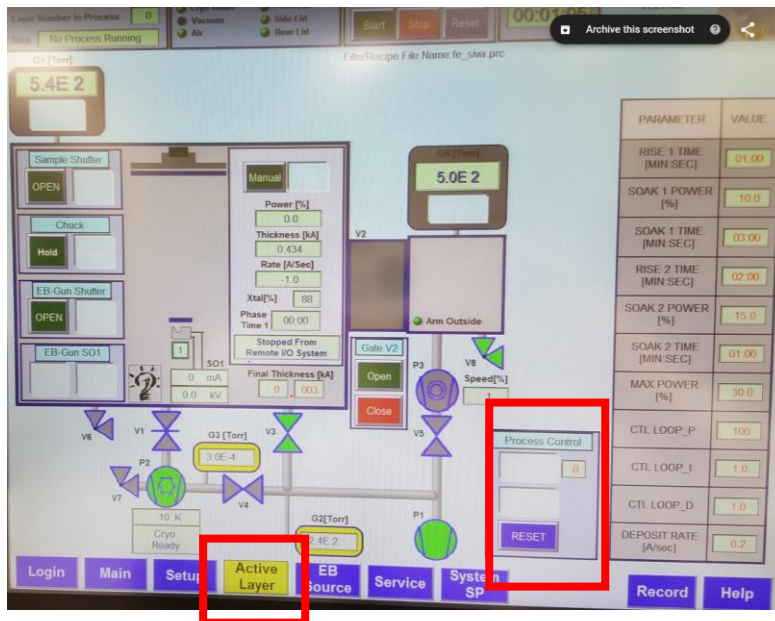


3. Press on "load recipe" and choose recipe from the folder.
4. Check the parameters and if it suits your process. **Most important parameters are: power, final thickness, material crucible number in the recipe** (that will fit to the material actual crucible number inside the chamber), **and soak and rise parameters.**
5. Make sure shutter delay is ON.
6. Compare your recipe to a template recipe to make sure it is appropriate.
7. If you made any changes and you want to save them press on "save recipe" under your name to not overwrite existing recipes.
8. Press on "download recipe".
9. Move to "EB source" screen to make sure you are using the right crucible number.



10. Move to "active layer" screen.

11. Press on "start" bottom to start the process.



12. When the power starts to increase wait for the crucible to be red (to have melting) and then make sure that the beam is at the right position.

13. Make sure to balance giving enough time for the material to melt, but do not make the soak times longer than necessary which wastes material.

14. During the melting process make sure to look into the chamber to see the material being melted and the Electron Beam being it the center of the material.

Open the main chamber- FAB STAFF ONLY!!

1. Press on "Vent" of the main chamber.
2. Make sure the both locks are open and wait for atmospheric pressure (6×10^2 Torr).
3. When you done your work make sure all the materials are in the right crucibles, and lock the door with the 2 locks.
4. Press on "Vacuum" bottom and wait for lower pressure then 2×10^{-6} .