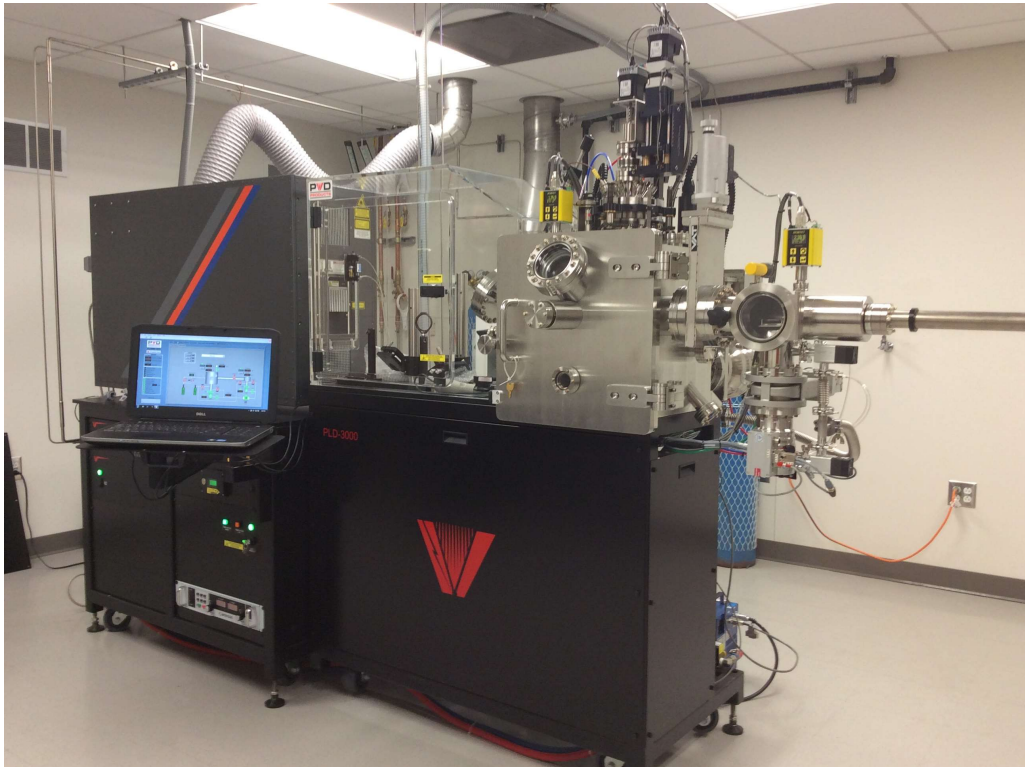




University of Pittsburgh

Nanoscale Fabrication & Characterization Facility

PVD Products PLD 3000 Deposition system User Guide



PVD Products PLD-3000 System with dual wafer loadlock and Class 4 Coherent 110F series COMPex Pro excimer laser. The laser is UV with a 248nm wavelength, The system has an ultimate vacuum on the order of 1.1×10^{-7} .

Operation Procedure:

- 1) Sign out key to room 620 from NFCF staff. It is kept in the NFCF office area of the sub-basement on a large copper ring.
- 2) Requests to change the target configuration must be made at least 48 hours in advance to allow for the work and system vacuum recovery. E-mail NFCF staff as far in advance as possible.
- 3) Log into the PLD through FOM.
- 4) Turn the laser control switch on the power disconnect panel near the door to "on". This enables the interlock for both doors in the lab. In the event of the either door opening the laser will lose complete power.
- 5) Laser safety glasses are in the top right drawer and must be worn to avoid laser contact with the eyes.
- 6) Turn on the laser with both the red main power and the control key located on the back of the laser. This will start the laser warm up process.
- 7) Note the system pressure before venting the load lock. It should be near or below $5e-7$ Torr. If it is not, document the pressure in the FOM system and e-mail the NFCF staff with details of the problem.
- 8) Make sure the gate valve is closed and vent the load lock by selecting the "Chamber control" tab and select load lock vent under "pump sequence".
- 9) Once the load lock is vented, insert your sample (upside down) and holder into the load arm. Make certain the holder is in the recess, with the hole centered and facing toward you. The notch will be facing away. There is a holder for a full 3-inch wafer, a 2-inch wafer, and 2x2 cm samples. There is also a plate with clips that can be used with the 2 -inch wafer holder. **All holes must be covered to prevent coating the lamps!**
- 10) Do not leave the system venting/vented. It must be pumping unless you are loading the samples. Leaving the system venting drains the N2 bottle!!

- 11) Pump the load lock by selecting the “Chamber control” tab and select load lock pump under “pump sequence”. **Do not over tighten the door or it will leak!**
- 12) Once the load lock has achieved a pressure lower than 5×10^{-5} Torr fully open the manual valve to the chamber.
- 13) Carefully insert the transfer arm until your sample is centered in the chamber side window.
- 14) Make certain the heater enclosure is in the “up” position and the sample holder is in the “load” position.
- 15) Carefully release the wobble stick. The pressure difference will pull it onto the chamber so maintain a strong grip. **Do not let go!**
- 16) Carefully use the wobble stick to pick up the holder and transfer it from the load arm to the process holder. The pin must be completely inserted to support the holder. Turning on the chamber light and shutting off the room lights can help you to see for alignment purposes during this process. It takes some practice, but you will get it.
- 17) Once the sample is transferred, lock the wobble stick back into position, remove the load arm and close the gate valve fully. You will feel it cam into place when fully closed.
- 18) Close the heater housing and set the sample to your desired position height. **This is not controlled from the recipe and must be completed manually from the “Main” tab window.**
- 19) Check the laser manual control panel and verify that the laser has completed its warm up cycle and is ready for use. Press the run button on the control panel to allow control with the PLD software on the laptop.
- 20) **HEAT:** If using heat in your process, press the power supply enable button on the side of the machine below the computer, then hit the “start” button on the Magna-power electronics heater power supply.
- 21) Load/modify the desired recipe.

- 22) Notes for process creation:
- a. Target and substrate rotation set point must be set on the “Main tab before saving the recipe.
 - b. All other parameters are set on the “Recipes” tab.
 - c. If using heat, remember to enable the power supplies and press the green start button on the Magna-power electronics controller.
 - d. Prior to processing, set the heater enclosure to the “down” position.
 - e. Set the desired target to substrate height.
 - f. The recommended raster parameters for 2 inch targets are below:

Mirror Position = 2.1 Raster Type = Mirror Offset = 0

Position:	Velocity:
2.15	.2
2.25	.4
2.86	1
3.18	.4
3.4	.2
3.18	.2
2.86	.4
2.25	1
2.15	.4
2.1	.2

- 23) Press start from the “Recipe” tab window and watch the actual readings from the “Main” tab.
- 24) Remember to wear eye protection when looking into the laser path, looking into the chamber or looking at the plume of the deposition process
- 25) Once the process is complete, move the heater housing to up and the sample position to load by pressing the appropriate button in the software.
- 26) Turn off the heater power supply enable.

- 27) If using heat, allow significant time for the sample to cool. **It will be HOT!**
- 28) Open the load lock gate valve and insert the load arm to line up with the wobble stick.
- 29) Move the sample from the sample holder to the load arm.
- 30) Lock the wobble stick.
- 31) Move the load arm to the load lock and close the gate valve fully.
- 32) Turn off the chamber light.
- 33) Vent the load lock and remove your sample.
- 34) Pump down the load lock.
- 35) Turn off the laser key, main power and the switch on the power panel.
- 36) Log out of FOM.
- 37) Return the key to the NFCF staff in the Sub Basement.