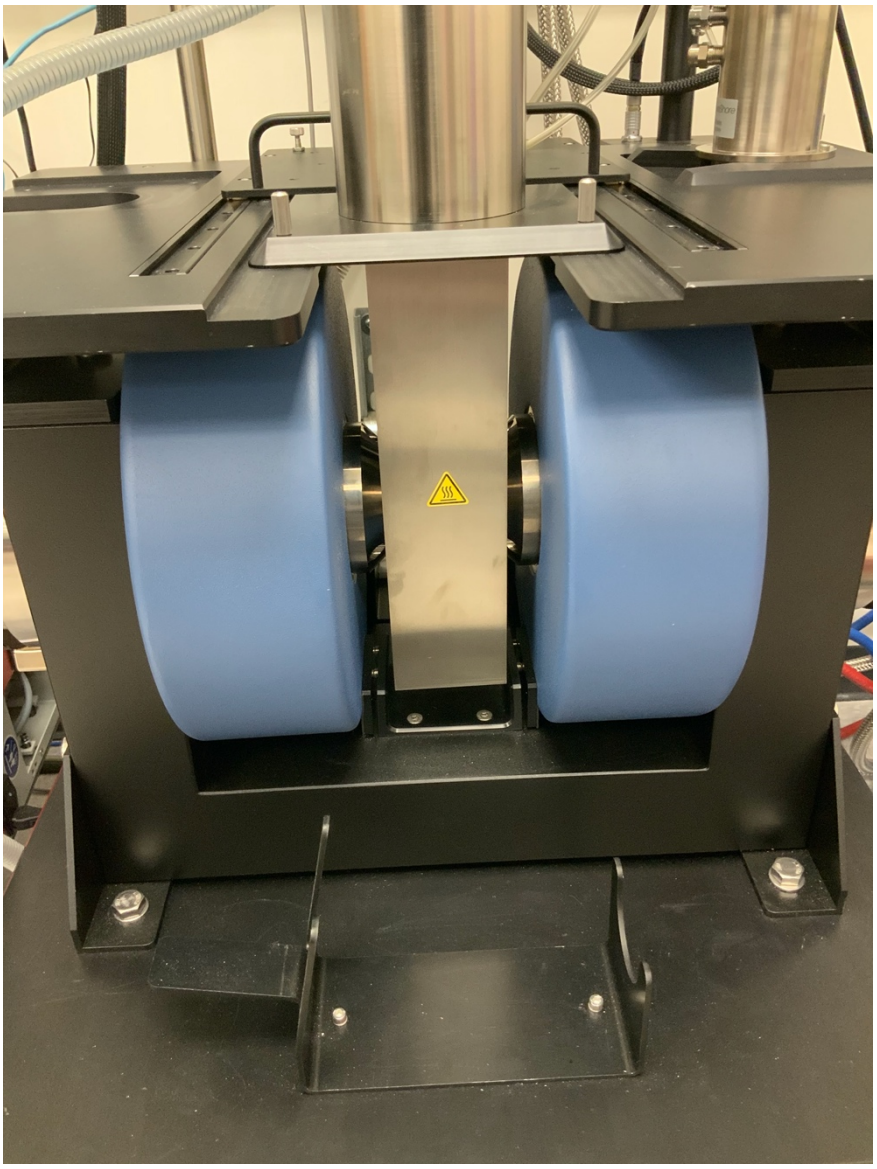
High Temperature (Oven) Startup

Standby Condition

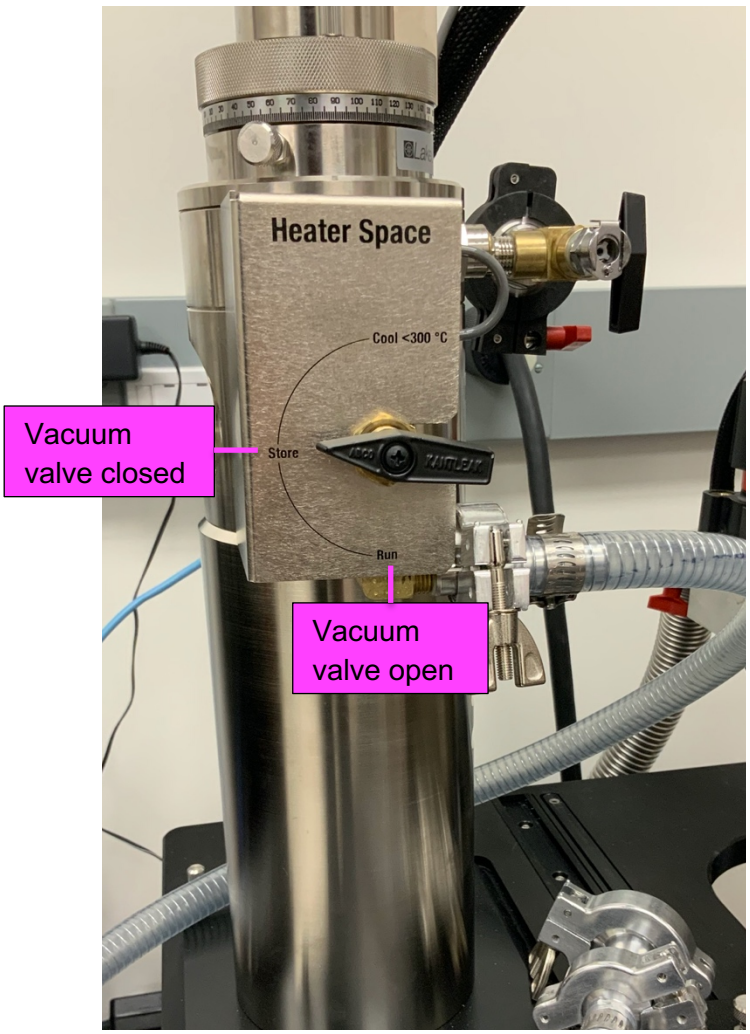
1. The turbo pump is off (0 Hz). The Oven pumping line (the plastic tube) is connected to the turbo pump (picture below).
2. Coax cables and control cables should be disconnected.
3. Nothing between magnets (CCR head back, Oven/RT on the left and right side).
4. Tables should be tidy.

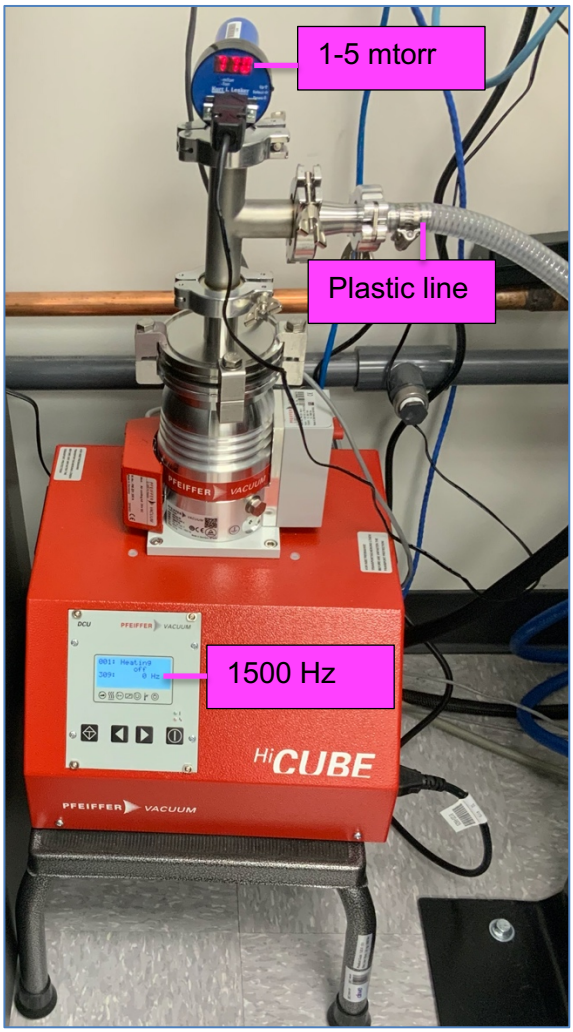
Startup the Oven

1. **Setting up for the Oven:**
    a. Enable the Lakeshore on Badger.
    b. Make sure that the tool is calibrated to setting 3 (refer to previous use in the Lakeshore logbook). The Oven base will not fit in setting 1.
    If the calibration is in setting 1, you will need to calibrate to setting 3 using the RT head.
    c. Carry the Oven head over to the measuring station.

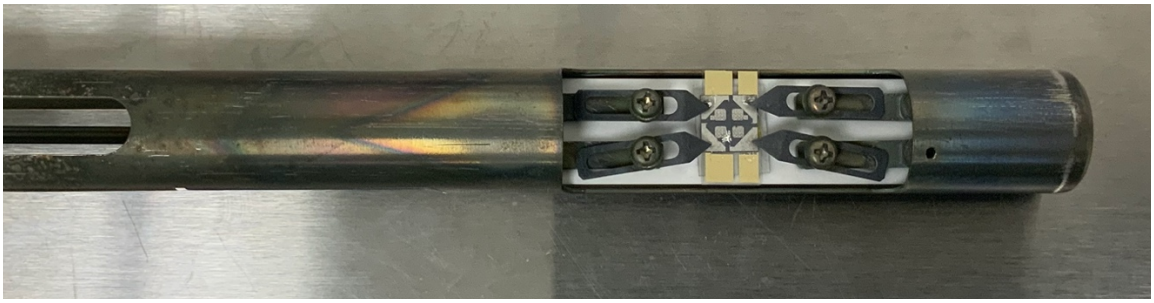


2. **Pumping the Oven vacuum space.**
   The Oven vacuum space should be under vacuum with the valve closed. If, for any reason, the Oven vacuum space is at atmospheric pressure, reverse steps a) and b) below.
   a. Turn on the turbopump, wait until the frequency reads 1500 Hz, and the pressure should read below 10 mTorr.
   b. Slowly open the valve to the Oven vacuum space. The valve is completely open when the arrow points to “Run”.
   c. The valve must remain <u>open</u> and pump must remain <u>ON</u> during the entirety of your run (pressure below 10 mTorr, usually 1-5 mTorr).

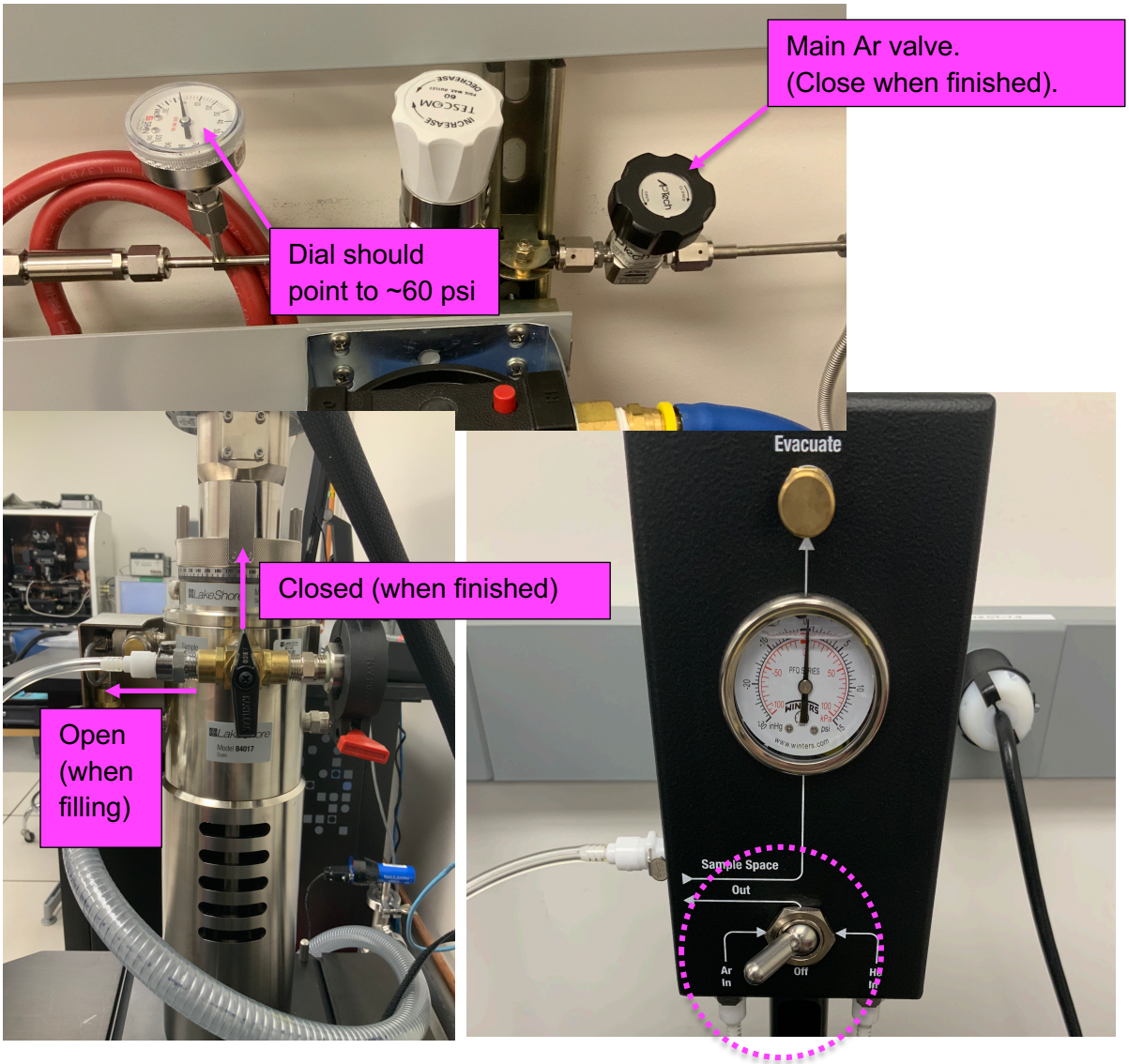




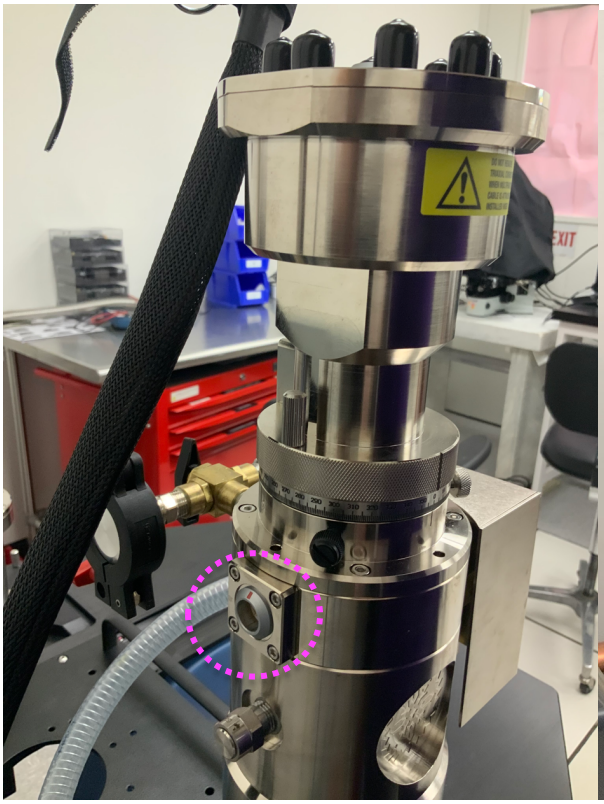
3. **Loading your sample**
   Wearing gloves, remove the insert from the Oven, and carefully lay it by the soldering station.
   a. Use the screwdriver to loosen the prober pins and make contact onto your sample. Take care to not accidentally short the pins together.
   b. Once your sample is mounted, slowly place the insert back into the Oven, and shut tightly.

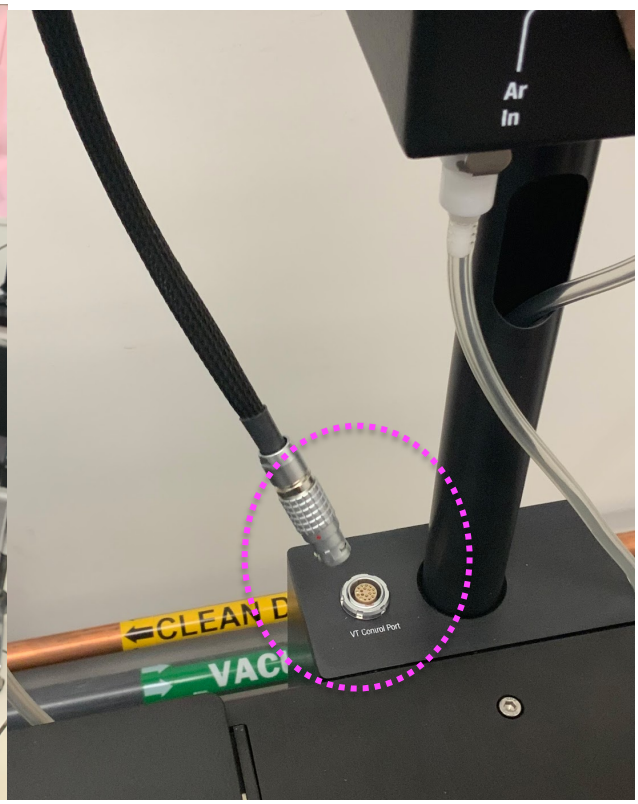


4. **Filling sample space with Argon by pressing "Evacuate" at least 3 times**
    a. The argon flow comes from the pipe with the black and white knobs. Turn the black knob counterclockwise and the white knob clockwise to open them (picture below). The dial on the left should read ~60 psi.
    b. The argon line must be connected to the Oven sample space inlet (picture below).
    c. The valve to the sample space must be open (Open means that the arrow is parallel to the pipe… it is closed in the picture below).
    d. The switch on the gas handler must be toggled to "Ar In" (picture below).
    e. Press and hole "Evacuate" until the dial rotates ~80 degrees. <u>This should take about ~8 seconds</u>. If the dial rotates *quickly*, or doesn't rotate *at all*, <u>something is wrong.</u> It is likely that the valve to the sample space is still closed, or the valves to the Argon line are closed.
    f. Once finished, close the valve to the sample space (arrow perpendicular to gas line) and also close the main valve of the Argon gas.



5. **Connect the 8 coax cables and both control ports.**
    a. There are two control ports, one in the middle of the coax cables, and another on the left side of the Oven head (picture below). There should be another port cable in the drawer. Connect this second port to the “VT Control Port” (picture below)





6. Turn on the Lakeshore magnets.
7. Review the Oven Checklist prior to starting.
   If everything checks out, then you can now open the Lakeshore software on the computer and start your experiment.

Shutdown procedure for the Oven

1. Export your data.
2. Read the *NOTE below. Wait for the Oven temperature to go below 60 degC.
   If the temperature is above 300 C, the valve must always be pointing to 'Run' with the vacuum ON. It may take a while to cool.
3. The vacuum space should be at 1-5 mTorr by default. If you used the option "**Cool <300C"**, the vacuum space is no longer at 1-5 mTorr. To bring the pressure back down, *slowly* rotate the valve to **"Run"** while the turbopump is running.
   a. As you're rotating the valve, the pressure reading on the turbopump will increase quickly. Stop here and wait until the pressure drops to 1-5mTorr. This process may take time.
   b. Continue turning slowly until the valve points to **"Run"** and the pressure is 1-5 mTorr.
4. Once the temperature is below 60 degC, retrieve your sample (wear gloves).
   a. Disconnect the VT control port, and leave the other control port with the 8 coax cables hanging in the arm.
   b. Remove and lay the Oven insert onto the table and use the screwdriver to retrieve your sample. Lightly tighten the prober pins once finished.
5. Place the insert back into the Oven head and close firmly.
6. Close the Oven valve to the vacuum space ("Store"), then turn off the turbopump.
7. Carry the Oven head back over to its standby position.
8. Fill out the Lakeshore logbook!
9. Ensure that the space is clean.
10. Disable tool on Badger and close the software.

NOTE: The Oven must be below 60 degC before retrieving your sample. If the temperature is below 300 degC, you can rotate the valve to "Cool < 300C". This will accelerate the cooling process by partially filling the vacuum space (and thus allowing for heat exchange).

Ideally, you can leave the Oven overnight and this should cool the sample space sufficiently. Just make sure that the vacuum is ON the entire time.