Prepping the 7 T Superconducting Magnet

Pumping Down

Pump vacuum jacket to mid 10^{-5} torr. The vacuum valve requires a special attachment, found on the cart. Close the valve and remove the attachment, but be careful not to tighten the valve too much; this may deform the mechanism. Pump down the vacuum space between the coils to 10^{-4} torr and close valve.

Pre-cool with Nitrogen

Open the helium exhaust valve and the clamps over the two magnet leads. Fill liquid nitrogen through the LHe fill port. Pre-cooling can be tricky because you want enough nitrogen to cool completely, but not so much that you are left with a puddle of nitrogen. The best technique is to fill for a little less than 10 minutes, although this still sometimes leaves a puddle. Liquid Nitrogen temperature is approximately 80 ohms across the magnet.

Expel Excess Nitrogen

If you put in just the right amount, the nitrogen will boil off by itself: just wait for the resistance through the coils to start going up. If you put in too much nitrogen (it can be seen through the sample well cover using a flashlight), you will have to blow it out. Put some metal tubing through the sample well cover down to the bottom of the reservoir and attach a rubber hose going to a dewar to collect what you blow off. Attach a fitting to the helium fill port to blow helium gas through. Seal off all the 5-10 psi pressure relief valves with tape, close the helium exhaust valve and pressurize the sample well with helium gas. This will blow off the extra nitrogen.

Fill with Cryogens

If you had to blow off nitrogen, remove the tape you used to seal the pressure relief valves. Open the helium exhaust valve and fill liquid helium through the fill port. Helium is starting to collect when the magnet coils go to 0 Ω (become superconducting). Begin to fill the nitrogen jacket with liquid nitrogen just after the helium fill has been started.

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