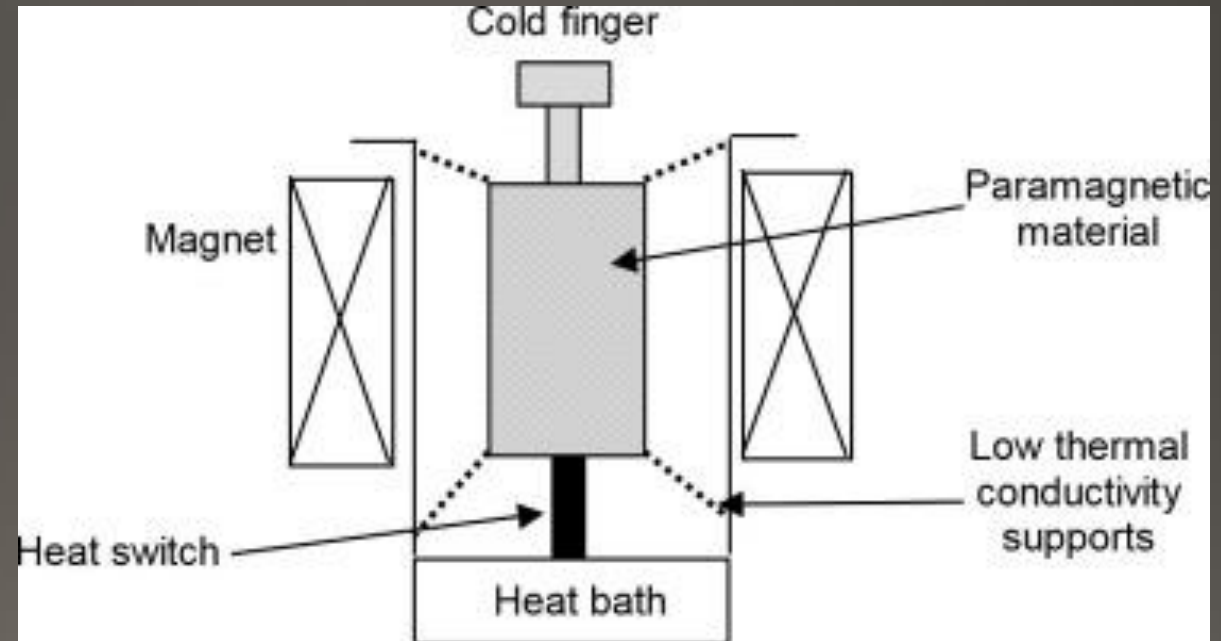


# Week of 11/1/2017

- ChoozSimulation
  - After many meetings...
  - It works
  - There would be a histogram for proof if I could login in to the right place

# Refrigerators

- ADR (Adiabatic Demagnetization Refrigerator)
  - Magnetic moment aligns with magnetic field
  - Strength of magnetic field  $\sim$  strength of alignment
  - Lowering the field slowly to cool
  - Control temp using control of the magnetic field strength

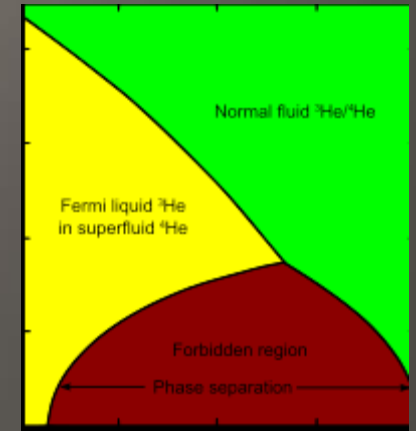


# Refrigerators

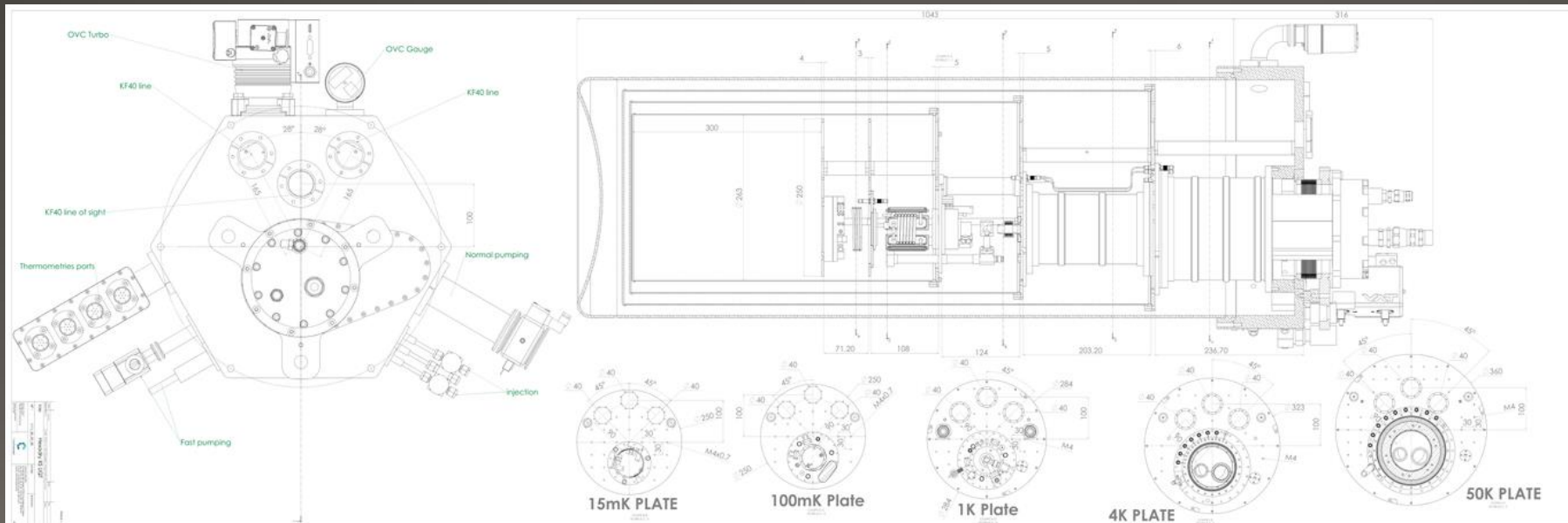
- Dilution Refrigerator

- .87 Kelvin,  $He^4$  goes to  $He^3$
- First gets sent through a cooling section surrounded by liquid nitrogen
- Through each chamber, pressure goes down, lowering the temperature
- Can go very low (.002 K usually)

Temperature(K)



He<sub>3</sub> concentration (%)



# Week of 10/18/2017

- ChoozSimulation
  - Meeting with Dan Bradley tomorrow
  - Recompile ChoozSim
- Geometry files
  - Learning about ADR and Dilution Refrigerators
  - Drawing the Geometry to better visualize a transition

# Week of 10/3/17

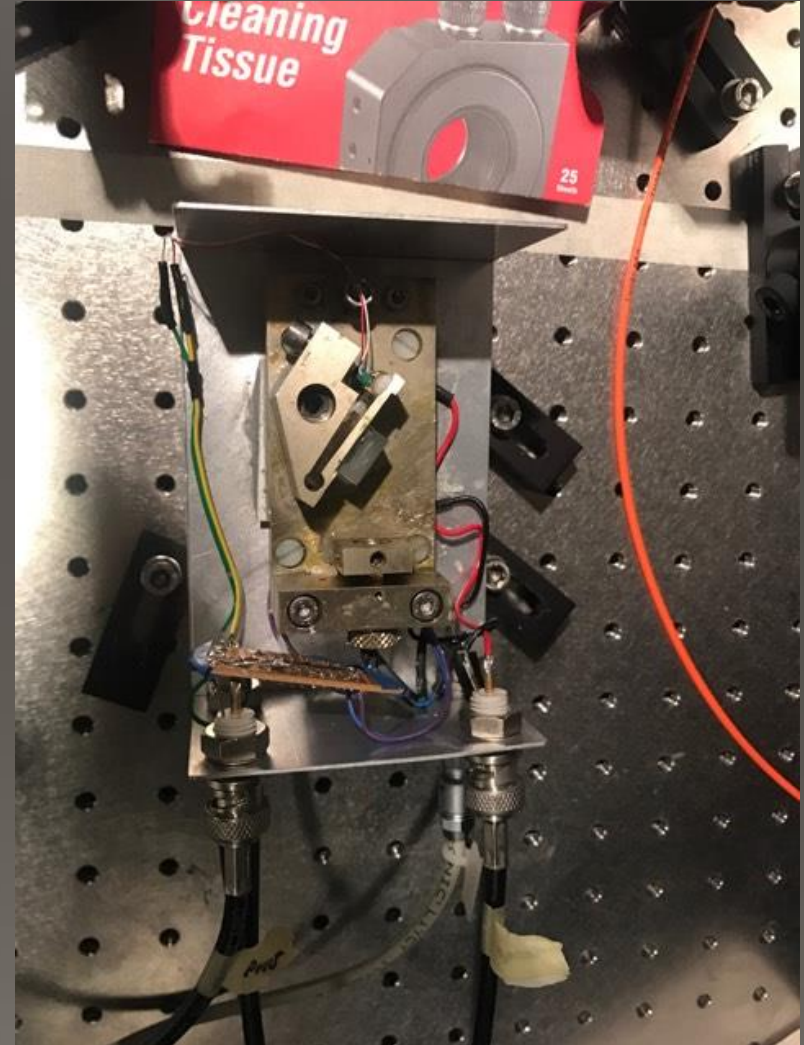
- Gone last week
- RicochetChoozSim
  - Info from Carolyn
  - Get a segmentation fault
  - Learn about debugging program

# Semester Goals Fall 2017

- Get ChoozSimulation working on our computers
- Replace the ADR with a dilution refrigerator in the geometry
- Run the backgrounds with the new geometry
- Run backgrounds finding an exponential rise at the threshold

# Summer in Denmark

- Aarhus University
- Ion trapping
- Lasers
- Calculations for  $MgH^+$



# Overall Project

I am working with Ricochet and will be doing simulations of the neutron background being received in the detector.



# Week of 5/23

- Trouble with the unzipped ChoozSimulation
- Try to get git clone working with github.mit.edu to acquire the
- Getting help with our github.mit.edu problems
  - Talking to Alex and trying to figure out why it wasn't working
    - Lead to creating ssh keys that did not work
  - Call MIT help desk
    - So far they have been unable to help
  - Alex was able to get the github working on our computers, but through a vncserver, not through a ssh pipe

# Spring Semester 2017

## Started:

- We have moved closer to being able to do simulations in our new directories with our new code and the new information that comes with that.
- Over the summer Carolyn and Kim will move on, I will work with them for about 3 more weeks.

## Learned:

- About linux and more about these simulations
- About Ricochet, what it is doing and some of the parts that go into building it.

# Week of 5/2

## Goals:

- Create an environment so that I can move forward with installing the ChoozSimulation code
- Get the installation finished off with hopefully no more problems.

## Completed:

- Made an env.sh that seems to work and has brought me to the next part of the install of ChoozSimulation code.
- The testCfneutrons.mac works in the new (ratcage-040317) directory

# Week of 4/25

## Goals:

- Install the ChoozSimulation code into the new directory and build it
- Have the testCfneutrons.mac run in the old directory and new directory to make sure everything is working

## Completed:

- The MATERIALS.ratdb is now as it should be and working
- Downloaded the ChoozSimulation after having trouble transferring it from github to the server

# Week of 4/18

## Goals:

- Install ChoozSimulation code into the new Ricochet directory and try and build it
- Fix typos in MATERIALS.ratdb

## Completed:

- Transfer from old SPECTRUM.ratdb and adding additional elements to ELEMENTS.ratdb from old directory (ratcage) to new directory (ratcage-040317)

# Week of 4/11

## Goals:

- Transfer old spectrum, needed materials and elements over from old rat folder into the new rat folder, where the simulations will be done from now on.