

# LArFCS Progress Report

Yichen

5/17/22



# Lab Safety Issue

## ► Response to Lesson learned at Ames lab about tip-over dewar

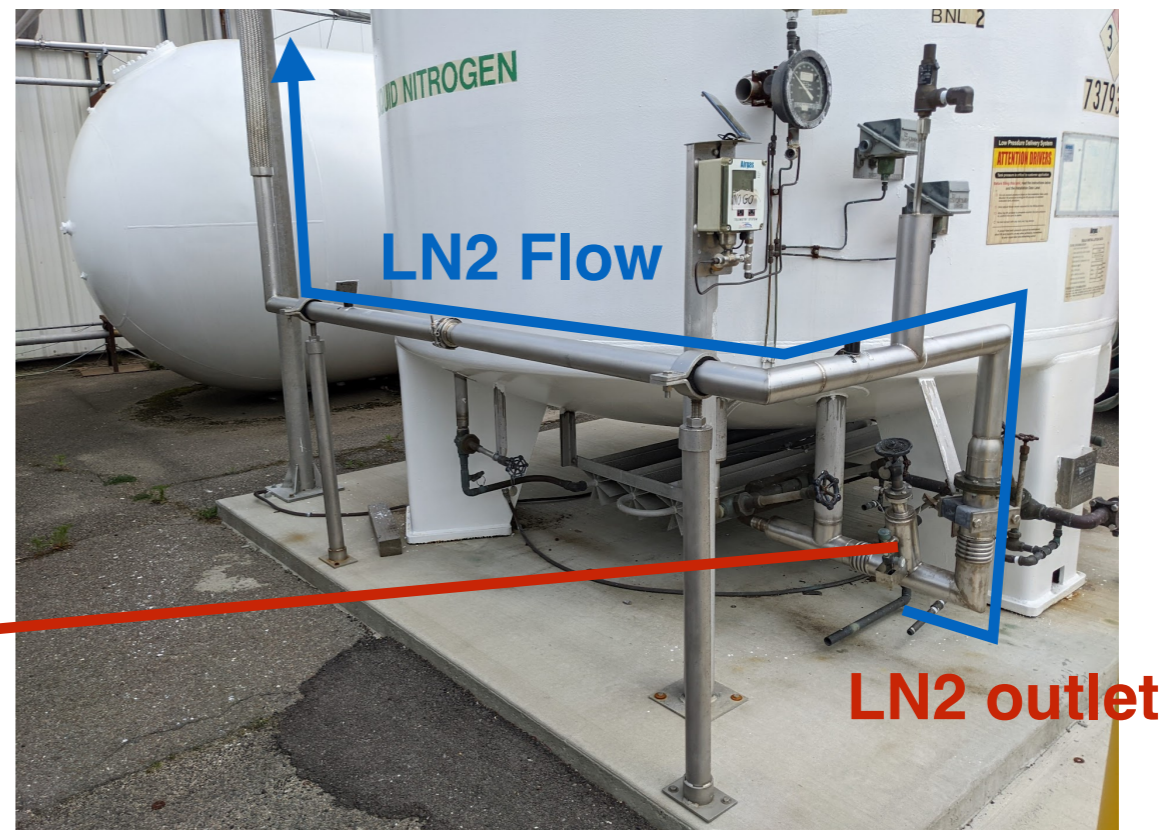
- I found the phone number of Airgas emergency response center, to be added to our portable dewars
- A shallow ditch outside Highbay developed with years of traffic through the gap between concrete and asphalt surface, which can stuck the wheels
- Building manager Tom put in a work order to fix it
- Reminder to wear face mask when coming into highbay lab



# 11000 gallon LN2 tank at Magnet Division

## ▶ 11000 gallon LN2 tank Magnet Division

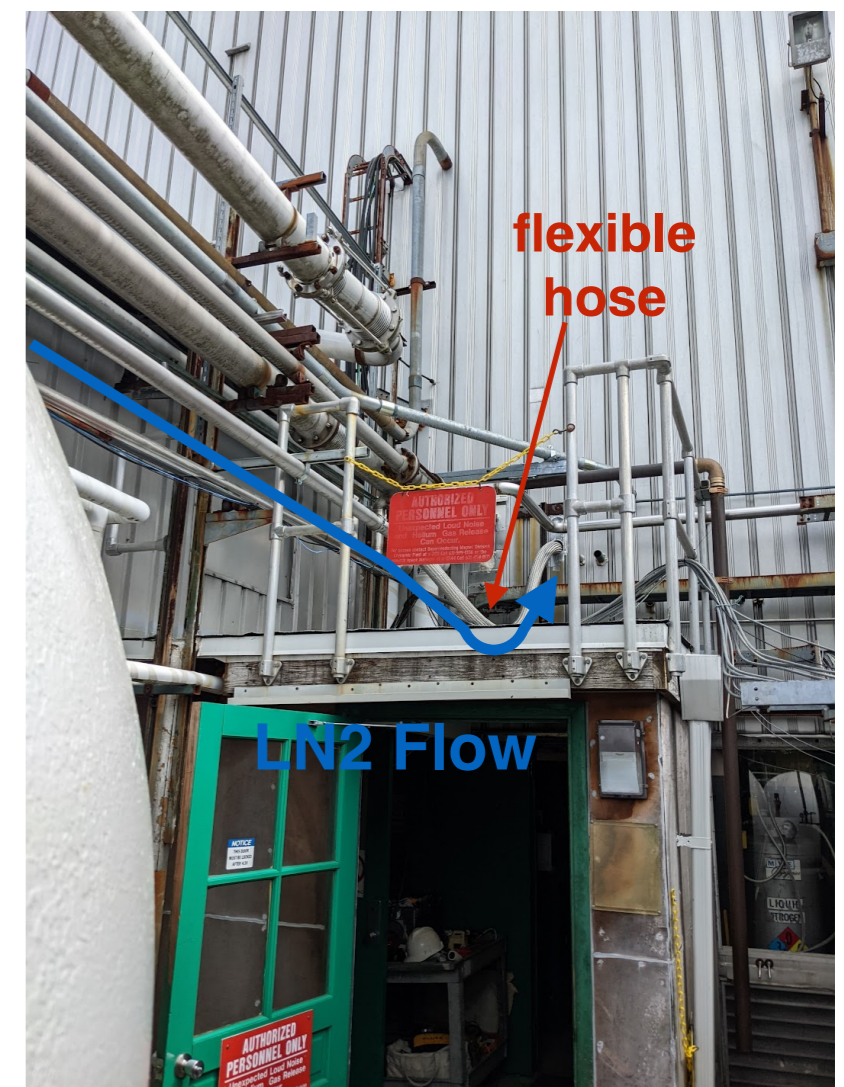
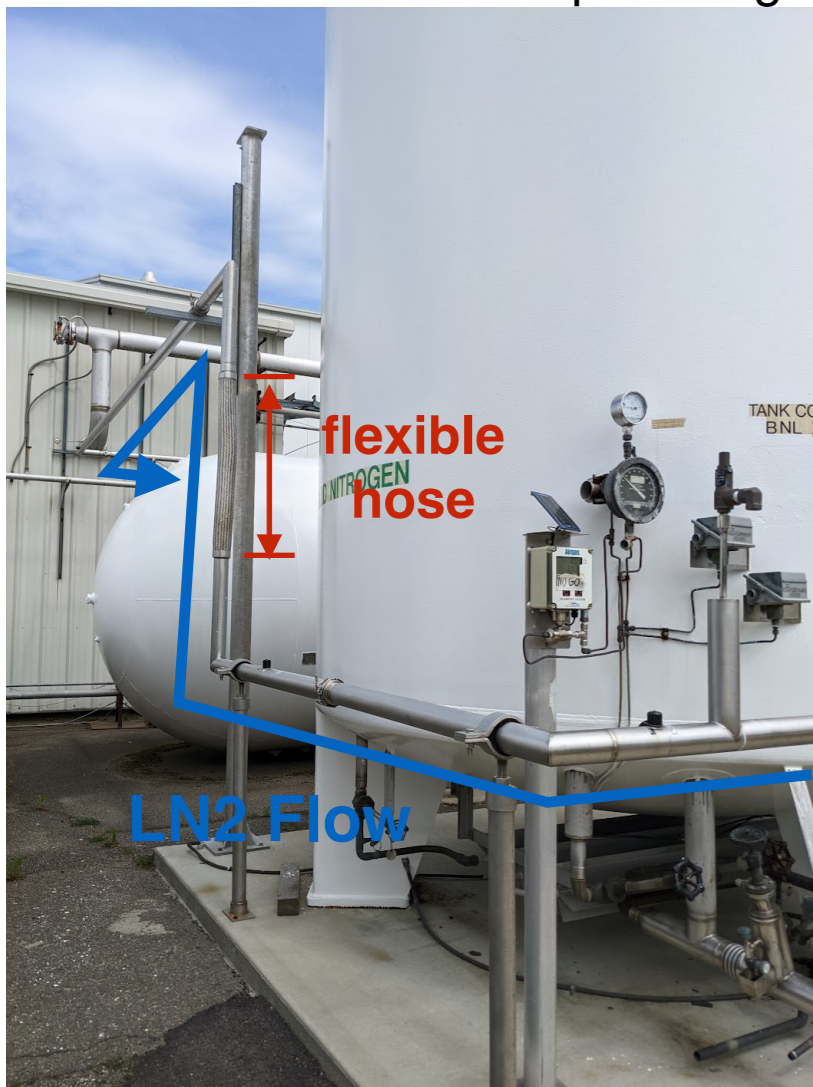
- The 11000 gallon LN2 tank originally located by NSLS-I, moved to Magnet Division
- Our effort of getting the 6000 gallon LN2 tank was motivated by the work, and we were following their steps
- The 11000 gallon LN2 tank has been plumbed with vacuum insulation piping into their lab, again a good reference for our planning



# 11000 gallon LN2 tank at Magnet Division

## ▸ LN2 plumbing on the 11000 gallon LN2 tank

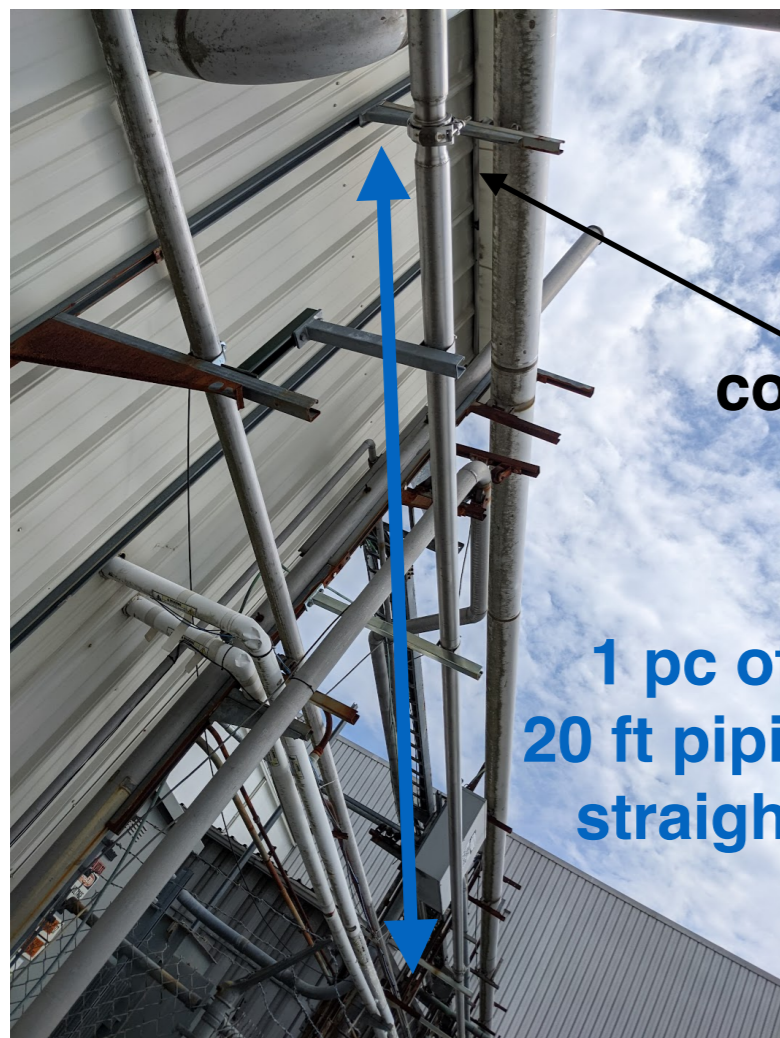
- The LN2 withdrawn from the bottom of the tank, similar location like our tank
- The plumbing runs ~150 ft from the tank to the indoor outlets
- The plumbing is constructed with super insulation piping ordered from Cryofab by sections with bayonet connectors Magnet Division did the piping installation by their own technician
- The piping sections fabricated at CryoFab were connected by clamps
- Most of the plumbing is rigid piping, only two sections with flexible hoses



# 11000 gallon LN2 tank at Magnet Division

## ▸ LN2 plumbing on the 11000 gallon LN2 tank

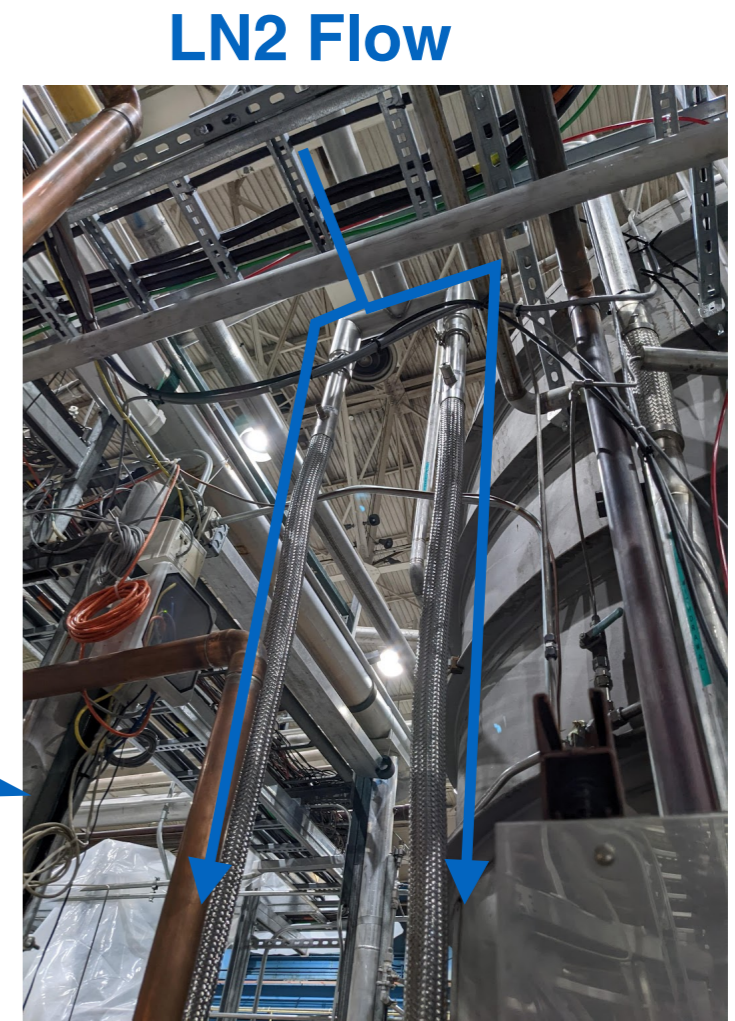
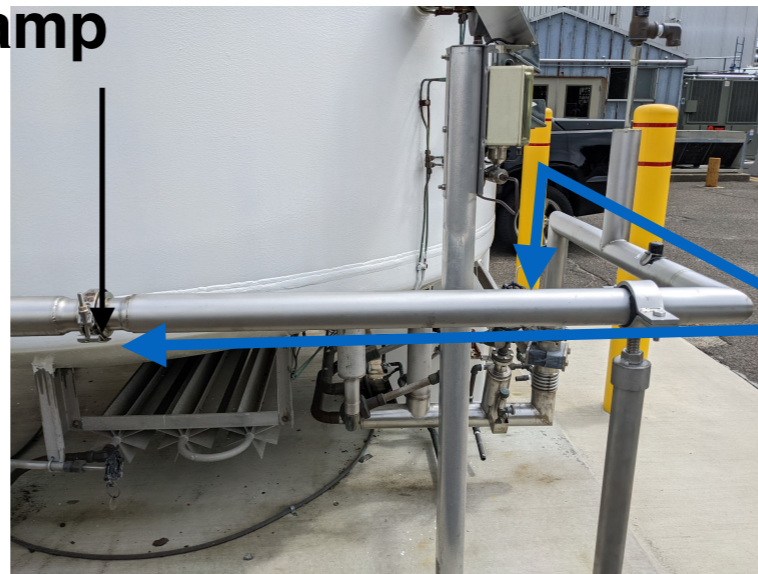
- The basic cryogenic piping parts fabricated by Cryofab is straight with 20 ft length
- Some others requires to be customized with specifications on the length and turning directions
- There are LN2 3 outlets in the building, 2 in pair in use, 1 spare
- A very rough cost estimation consulted with Cryofab for 150 ft rigid piping with 6 turns, 2 outlets:
  - 8 piping sections for the total length, ~30k, leading time ~ 3 months



connecting clamp

1 pc of 20 ft piping straight

1 pc of piping with 2 turns

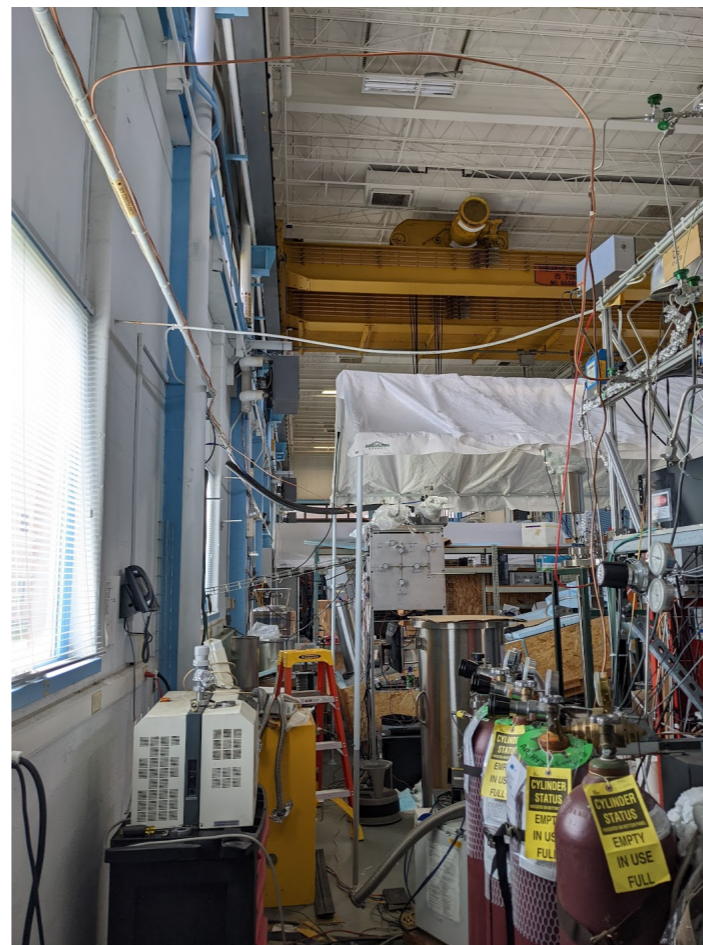
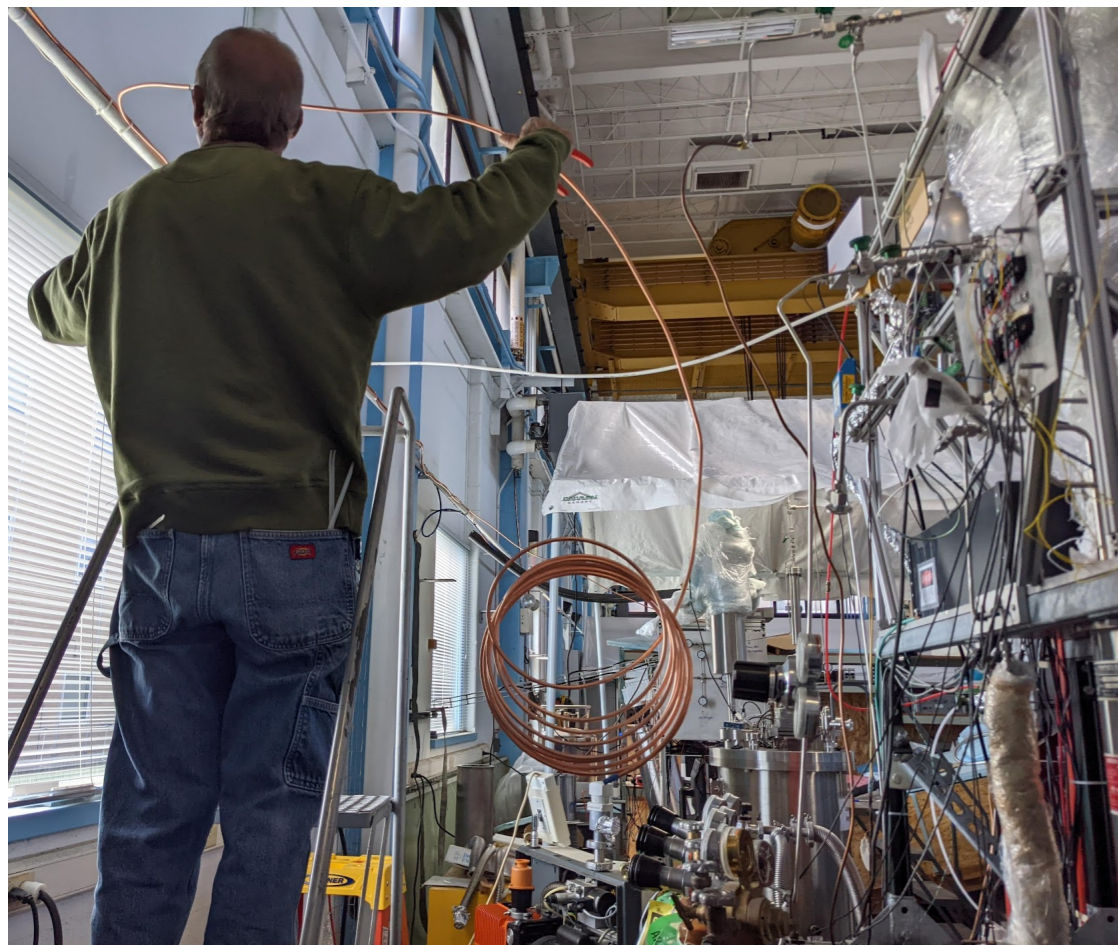


LN2 Flow

Indoor LN2 outlets

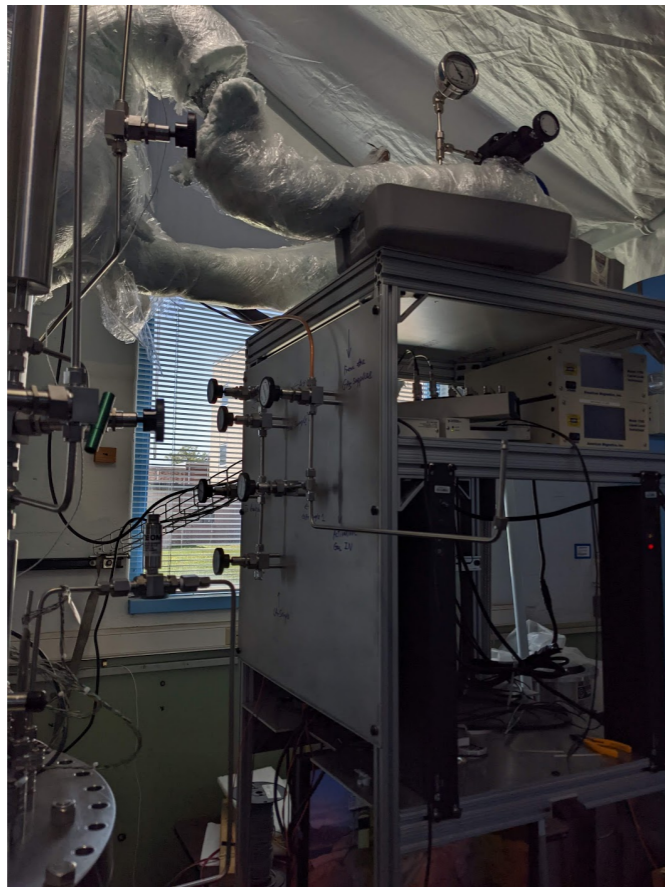
# LArFCS Purity Run

- ▶ **Finish plumbing for the activation gas to LArFCS(copper tube)**
  - Fresh copper tubing runs from the activation gas manifold
  - A new Tee with a valve added to the activation gas manifold
  - About 30 ft of copper tubing used
  - SS tubing to gas analyzers will go the similar routine



# LArFCS Purity Run

- ▶ **Moving top flange assembly to the assembly flange**
  - All the fitting be tighten up to form the seal
  - The plumbing separated as expected



# LArFCS Purity Run

- ▶ **Moving top flange assembly to the assembly flange**
  - Plumbing separate easily
  - Lifting with the level of top flange assembly well maintained



# LArFCS Purity Run

## ► To do list

- ~~Finish the plumbing the activation gas to the LArFCS(Copper tubing)~~
- Plumbing for the tubing to the gas analyzers(SS tubing) *Waiting for SS tubing delivery*
- Setting up liquid sampling dipping tube (After lifting the top flange to the assembly frame) *In production*
- ~~Moving top flange assembly back to the main dewar~~
- Leak check the new added plumbing: gas panel+plumbings added
- Wrapping up heating tape and thermal insulation
- Purifier scrubber activation



# Electron Attachment paper

- The paper is available on [arXiv 2205.06888](#)
- Submitted to JINST as a tech report JINST\_007T\_0522