

# Long Shutdown Activities

QIANG (ALAN) YE  
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# LIST OF ACTIVITIES

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- Maintenance and testing of 9T, 10T, 15T, Oxford dil fridge insert, Big Blue.
- More items
- Projects

# 9T MAINTENANCE AND TESTING (1.5 WEEKS)

- Replace all power strips with NIST approved ones.
- Opened up in August and fixed the leak from the helium main bath into the vacuum. Tested in August to make sure no leak appeared. Base T is 2K, cooling time and helium consumption rate are acceptable.
- Will test again by the end of October to make sure it is still working fine.
  - No leak
  - Magnet ramping speed (-9T ->9T)
  - Fastest cooling time with minimum helium consumption
  - Helium consumption rate with sample temperature of  $\geq 200\text{K}$



# 10T MAINTENANCE AND TESTING (1.5 WEEKS)

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- Replace all power strips with NIST approved ones.
- Service both cold heads, one for sample well, one for the magnet.
- Recharge helium in both compressors.
- Replace helium in the dump.
- Replace cold head helium hoses.
- Service the ACP40 pump.



# 10T MAINTENANCE AND TESTING (1.5 WEEKS)

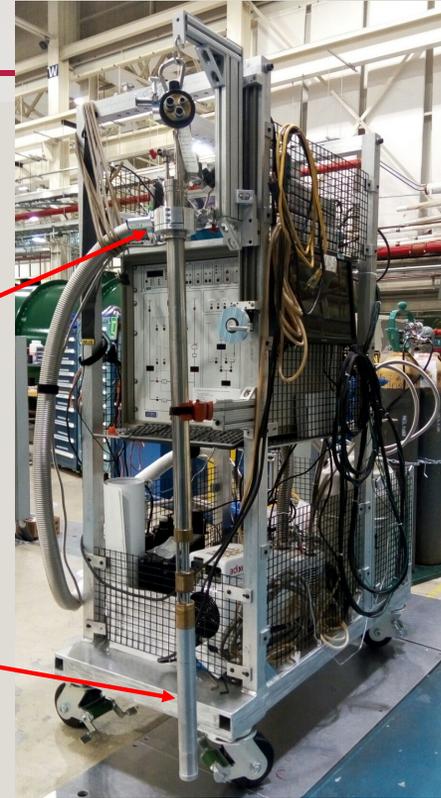
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- Lemon opened up in August and fixed the leak from the sample well indium seal. Tested in August to make sure no leak appeared. Base T is 1.5K, cooling time is normal.
- Testing it with Oxford Dil fridge by the end of September.
  - No leak
  - Magnet ramping speed (-10T -> 10T)
  - Fastest magnet cooling time.
  - Fastest sample well cooling time in vacuum, with 1K stick, with dil fridge insert.
  - Will test again after the cold heads are hot-swapped before start-up.

# OXFORD DIL FRIDGE INSERT MAINTENANCE AND TESTING (WITH 10T, 1.5 WEEKS)

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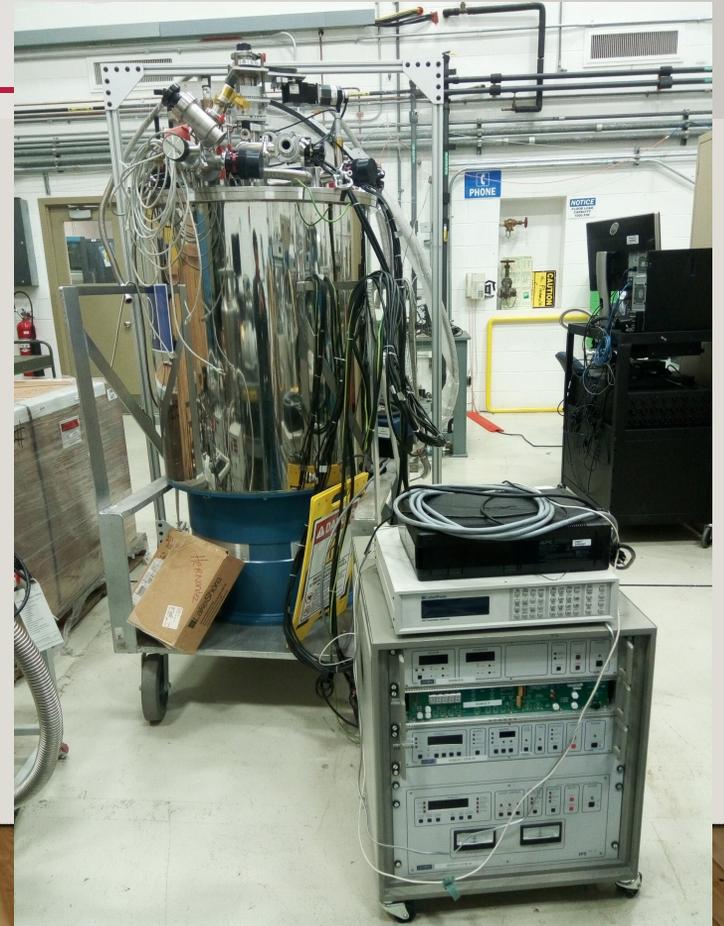
- **Why?**  
Couldn't fine adjust the sample height  
Couldn't house samples longer than 9cm.
- Make a height adjustment jig
- Make a new longer IVC can



# I5T MAINTENANCE AND TESTING (2 WEEKS)

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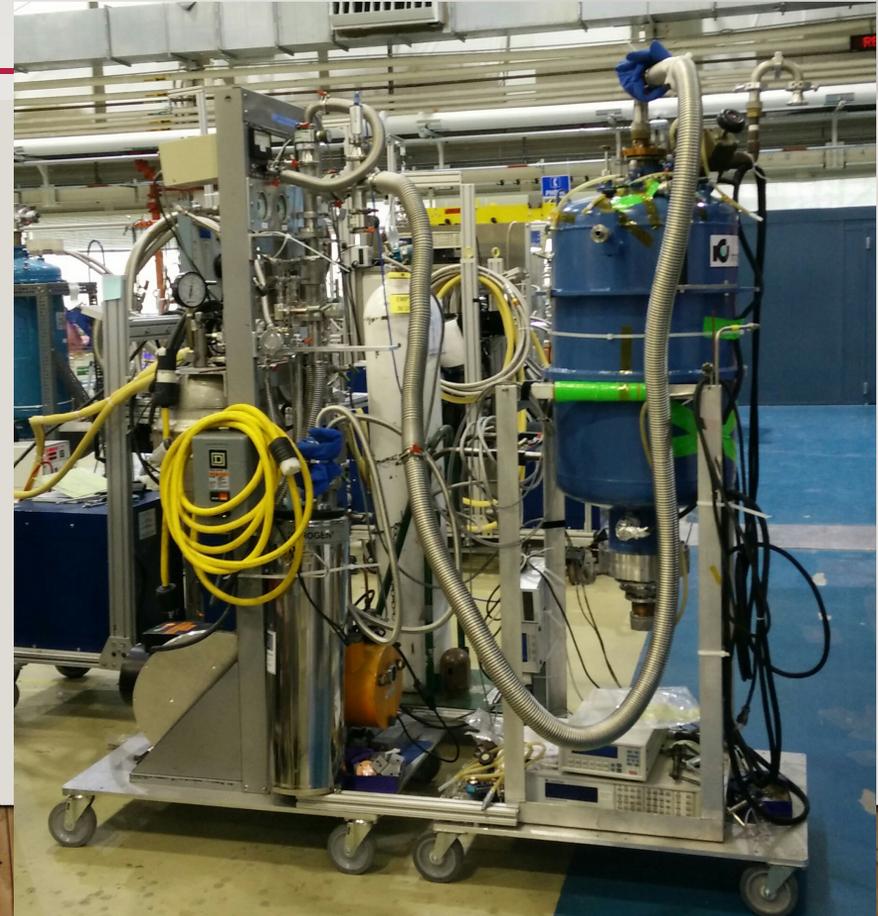
- Replace all power strips with NIST approved ones.
- Inspection of all components.
- Testing I5T in Decemeber on BT7(after C100 is open).
  - No leak
  - Magnet ramping speed (-14T ->14T)
  - Fastest magnet cooling time.
  - Fastest sample well cooling time with 1K stick.



# BIGBLUE CRYOSTAT MAINTENANCE AND TESTING (2 WEEKS)

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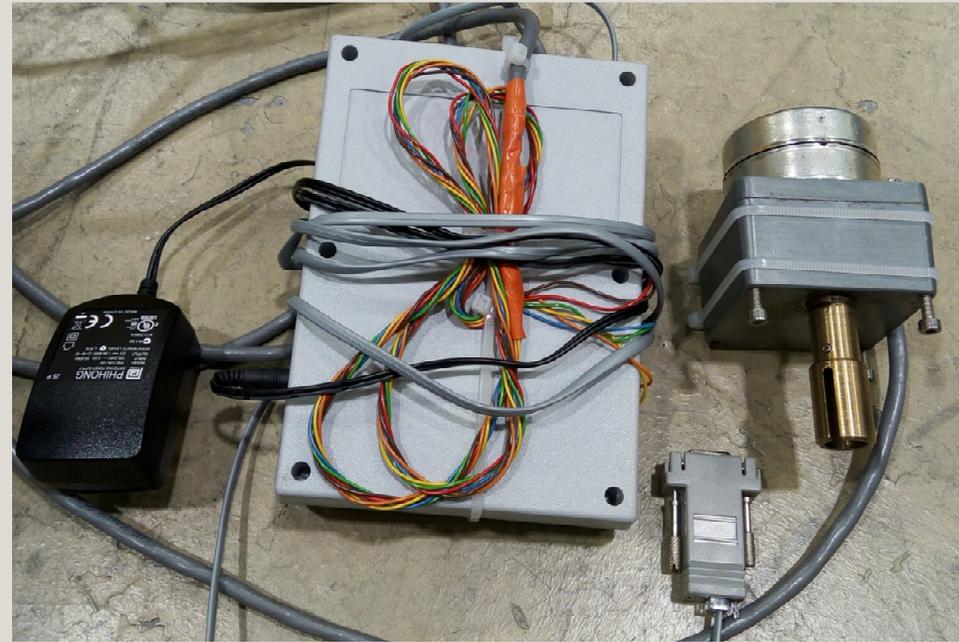
- Advantage: sample space is huge!
- Inspection of all components. Check for leaks.
- “Big Blue” couldn’t control  $0.4\text{K} < T < 1.5\text{K}$ .
- Control the Big Blue sample temperature to be between  $0.4\text{K}$ - $1.5\text{K}$  by reducing the  $3\text{He}$  pumping speed  $\rightarrow$  control the KF40 valve opening.



# BIGBLUE CRYOSTAT MAINTENANCE AND TESTING (2 WEEKS)

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- Step motor control box & labview software to control KF40 valve opening to control the pumping speed of  $3\text{He}$ .
- Testing BIG BLUE in November after Juscelino installs high pressure cells on the sample stage.
  - Fastest cooling time.
  - Achieve temperature between  $0.4\text{K}$  to  $1.5\text{K}$ .
  - Lowest achievable temperature and longest hold time.



# MORE THINGS NEED TO BE DONE

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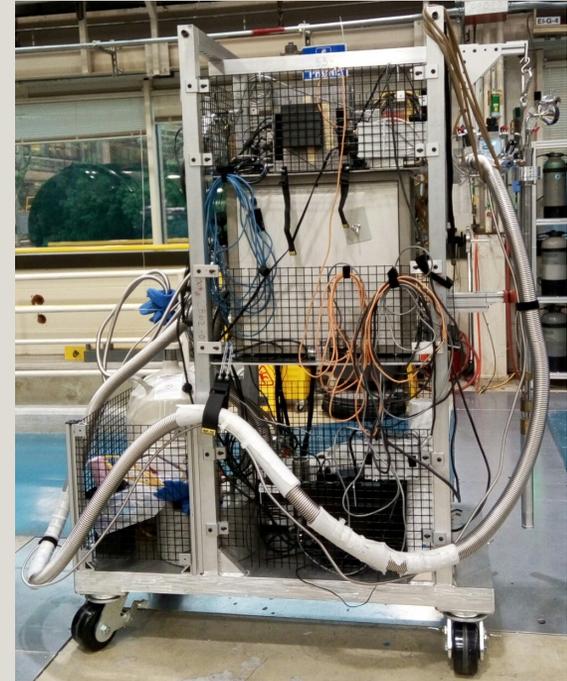
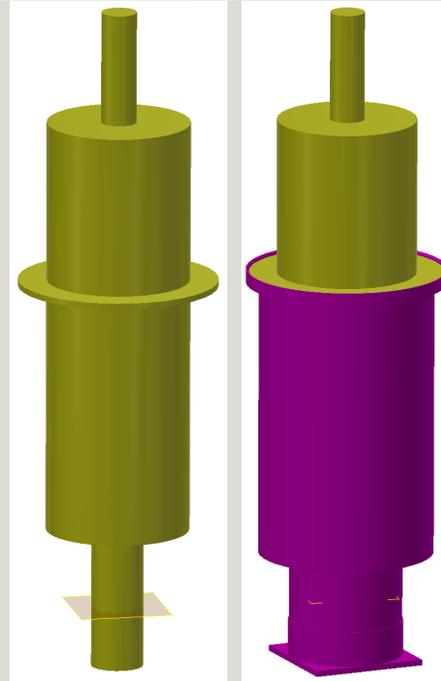
- Work with Tanya Dax for CCR maintenance.
- Update new SE website (<https://www.nist.gov/ncnr/sample-environment>)
- Inventory all turbo pump carts and make sure they all work fine.
- Test all helium transfer lines (10).
- Help Jacob Tosado with the new cryopad design.
- Make dil fridge lakeshore 370 relay box to 10T/OC fittings.
- Fix HFBS valve delay opening labview programs.

# HFBS ORANGE CRYOSTAT CONVERSION KIT & HOLDER TO THE OXFORD DIL FRIDGE CART

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- **Why?**

- Convert HFBS orange cryostat to be able to use on any instruments. Because it can house the 50 mm dil fridge insert.
- Able to precool the sample inside the cryostat before lifting onto instrument.



# SANS TITANIUM CELL HEATING/COOLING SETUP

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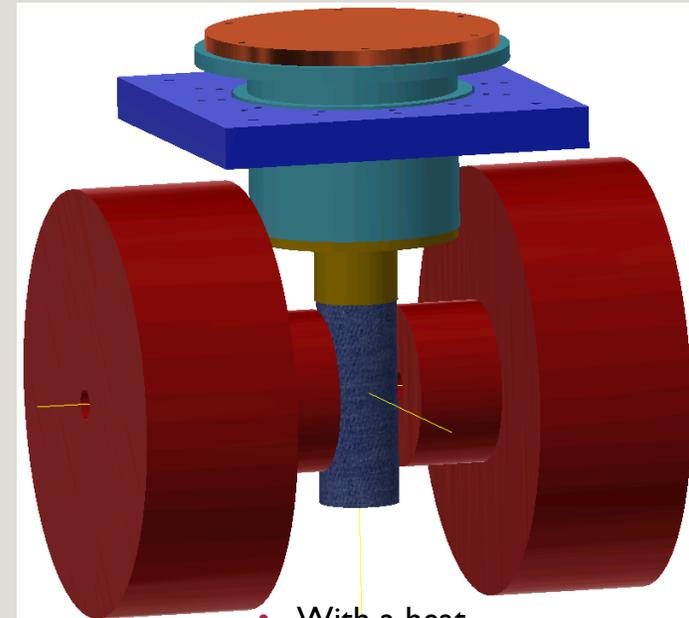
- **Why?** Sample change times in multiple-sample experiments around room temperatures in the titanium cells using CCRs are too long.
- Use the water chiller to control sample cell temperature in vacuum.
- Sample change time 2 hours -> 10 minutes
- Temperature range: -20C to 80C.



# MAKE A ROUND SILICON CELL VACUUM SHROUD AND HEAT SHIELD



- **Why?** Users need to change the sample orientation to more than 30 degrees in the red longitudinal magnet. Not possible with square tail.
- Single silicon crystal cylindrical tail
- Decrease background
- Able to rotate the sample in the field
- Will make one for TITAN magnet if it works



- With a heat shield inside

COMMENTS? QUESTIONS?

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