LAr R&D Progress Report

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Lab Safety and Space Management

- **6000 gallon LN2 tank refill**
  - 6000 gallon LN2 was topped off with 4765 gallon LN2
  - Now familiar with the LN2 delivery arrangement with Airgas dispatch center
  - LN2 delivery can be arranged within 48hours after putting the order
- **Inspection for new HV supplier**
  - CAEN top table HV supplies received
  - The device has only CE and UKCA certificate, arrangement with electrical safety for inspection and approval for use in the lab

260L LAr System Cryogenic Operation Status

- **It has been 54 days since the beginning of the operation**
  - First 50 days with purification ON
  - The recent 4 days with purification OFF (purifier bypassed)
- **No LAr loss so far**
- **The cryogenic operation is overall very smooth**
  - LN2 supply dewar was kept switching ~24 hrs
  - The consumption of LN2 increased after the vacuum seal popped on the filling hose
  - The LAr conditions are still stable
  - The only issue is the water condensation and droplets on the cold parts

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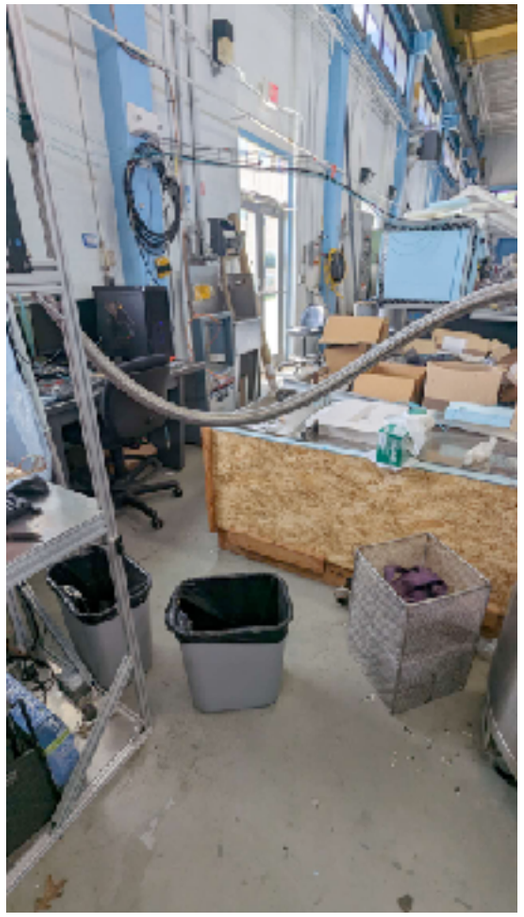
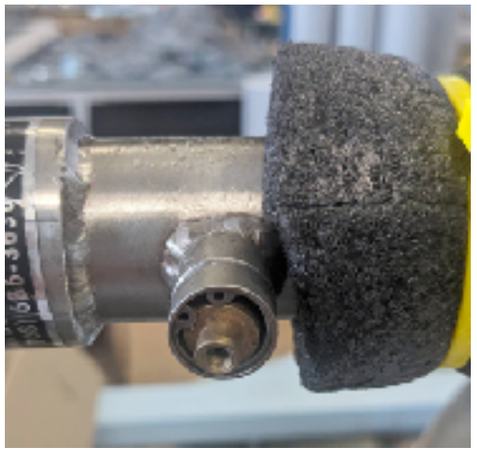
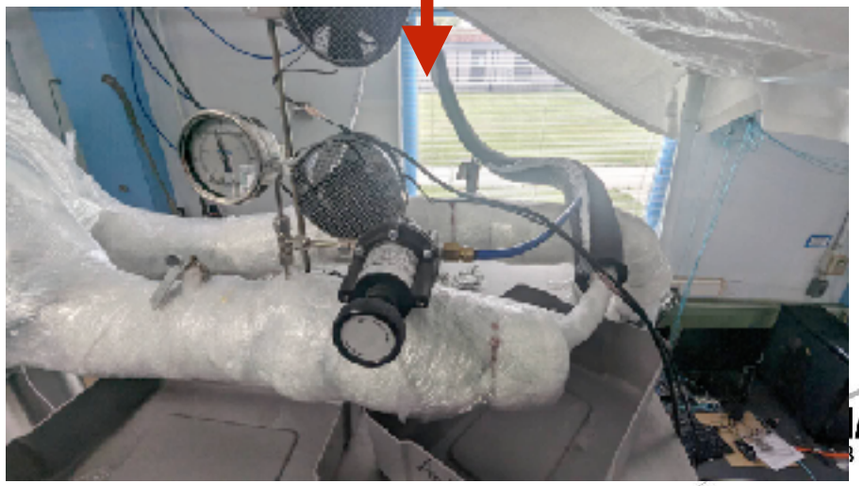
Problems and Solutions

- **LN2 filling hose to the dewar (Can only resolve after the run)**
  - The vacuum seal plug popped
  - More LN2 consumption observed since the plug popped
  - Significant water condensation on the jacket
- **Ice accumulation on the N2 venting plumbing (resolved)**
  - Significant ice ball on the relief valve and un-insulated plumbing
  - Fans blowing on the parts stopped the accumulation





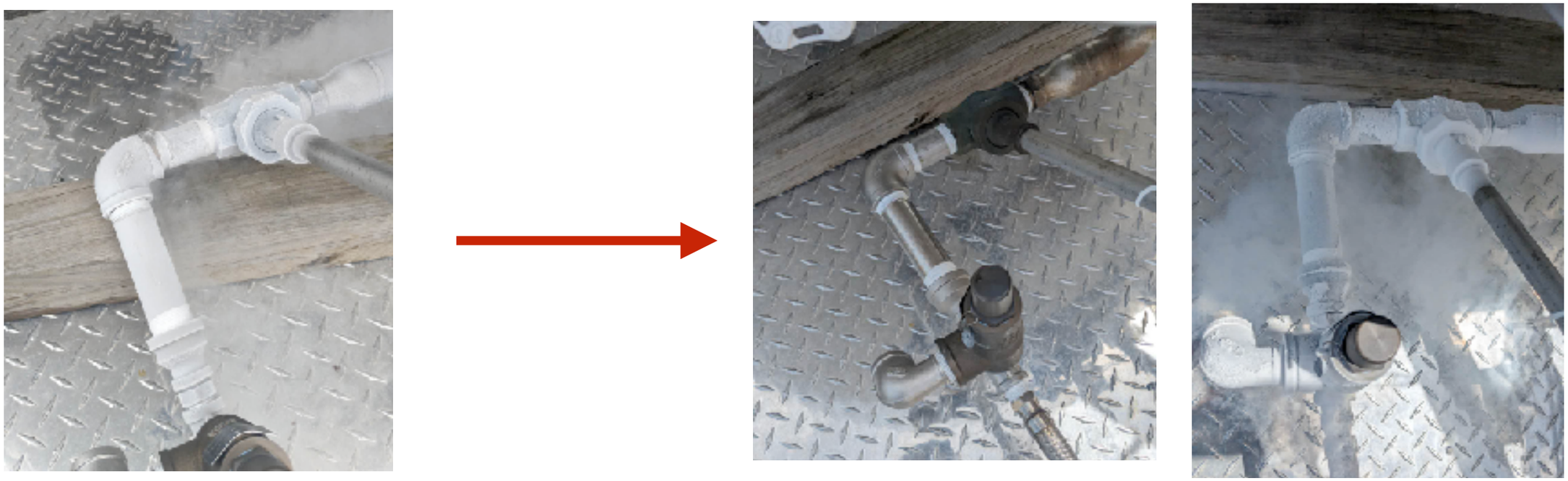


Problems and Solutions

- **Water drop from the setup (partially resolved)**
  - By arranging buckets on the dripping locations
- **Worn out LN2 fittings on the supply dewar (resolved)**
  - New brass fitting installed on all LN2 ports to replace the worn out fitting

Problems and Solutions

- **PrM electronics(In progress)**
  - Still only have one normal channel
  - Jianming confirmed there is spare can be swapped
  - Arranging for the shipment
- **LN2 plumbing leakage(Resolved)**
  - There was pretty significant leak on the 6000 gallon tank filling plumbing
  - Redo the plumbing and the piping is no leakage at cold



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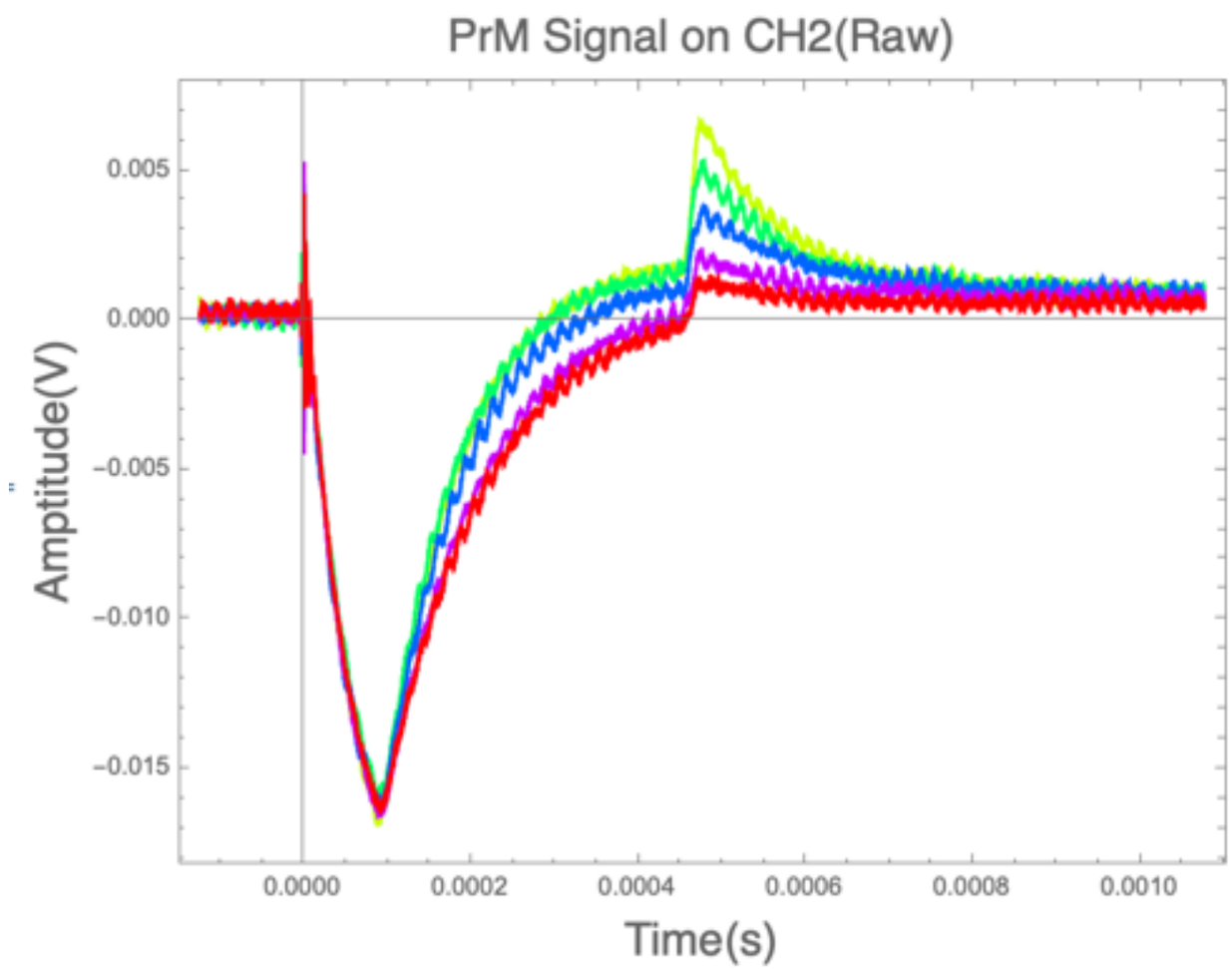
Purification bypass test

- **The purification turned OFF on 05/24**
  - GAr bypassed the purifier, no purification
  - Electron lifetime, i.e. reduced slowly as we expected
  - No significant change in the first 12 hours
  - Data shown with ~24 hrs intervals since 05/24-05/28



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Running Plan

- Continue the purification OFF test to tomorrow
- Re-engage purification, observing the improvement of the electron lifetime/purity, expected to resume in a few days
- Directly sample LAr to get the N2 concentration to confirm the system is ready for light measurement
- Warm up the system

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