

LAr R&D Progress Report

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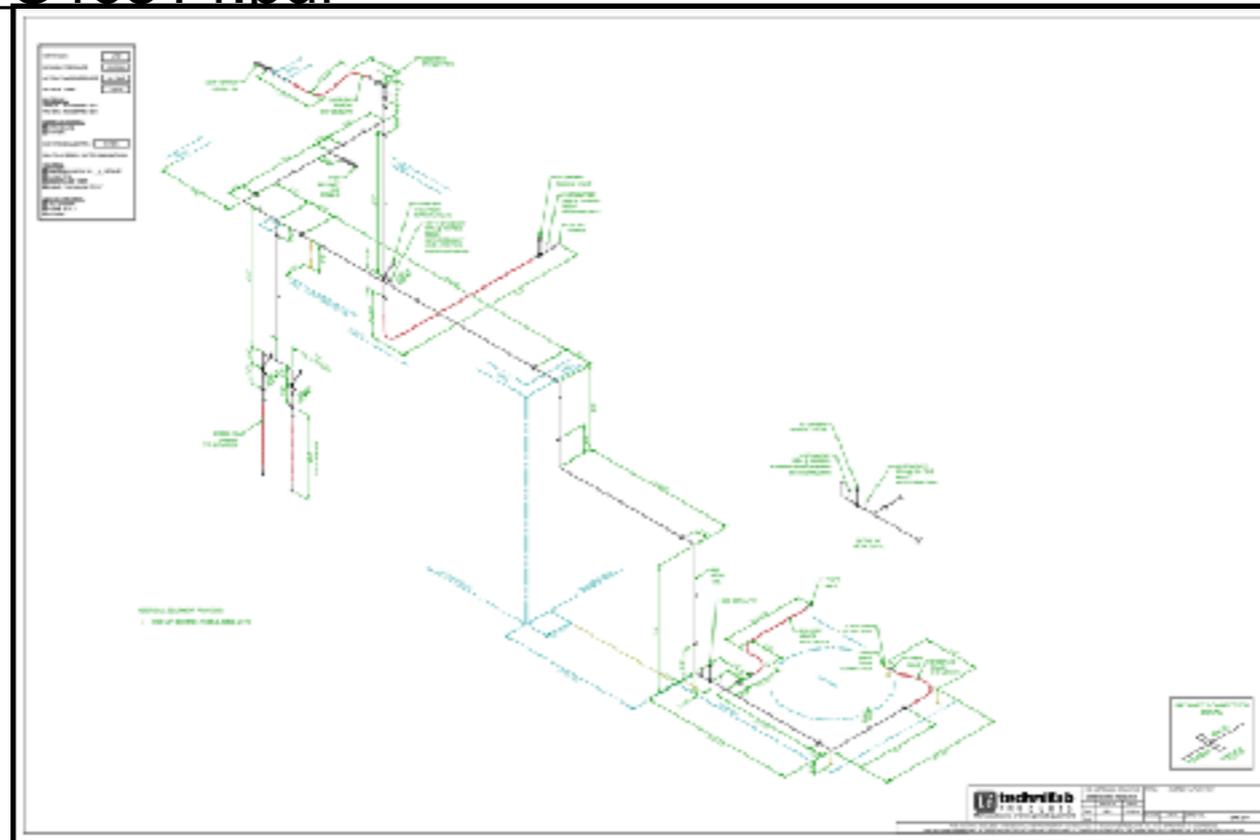
4/23/24



Lab Safety and Space Management

▶ 6000 gallon LN2 tank transfer line design review

- The internal review of the engineering drawing started on 04/18
- No table review is scheduled
- The comments are due by the end of 05/03
- The fabrication can be started once the engineering drawings and calculations are approved
- People involved in the review should have received a message from the MPO
- A copy uploaded to BNLIF docdb: <https://www.phy.bnl.gov/bnlif/docdb/0003/000331/002/S46314.pdf>



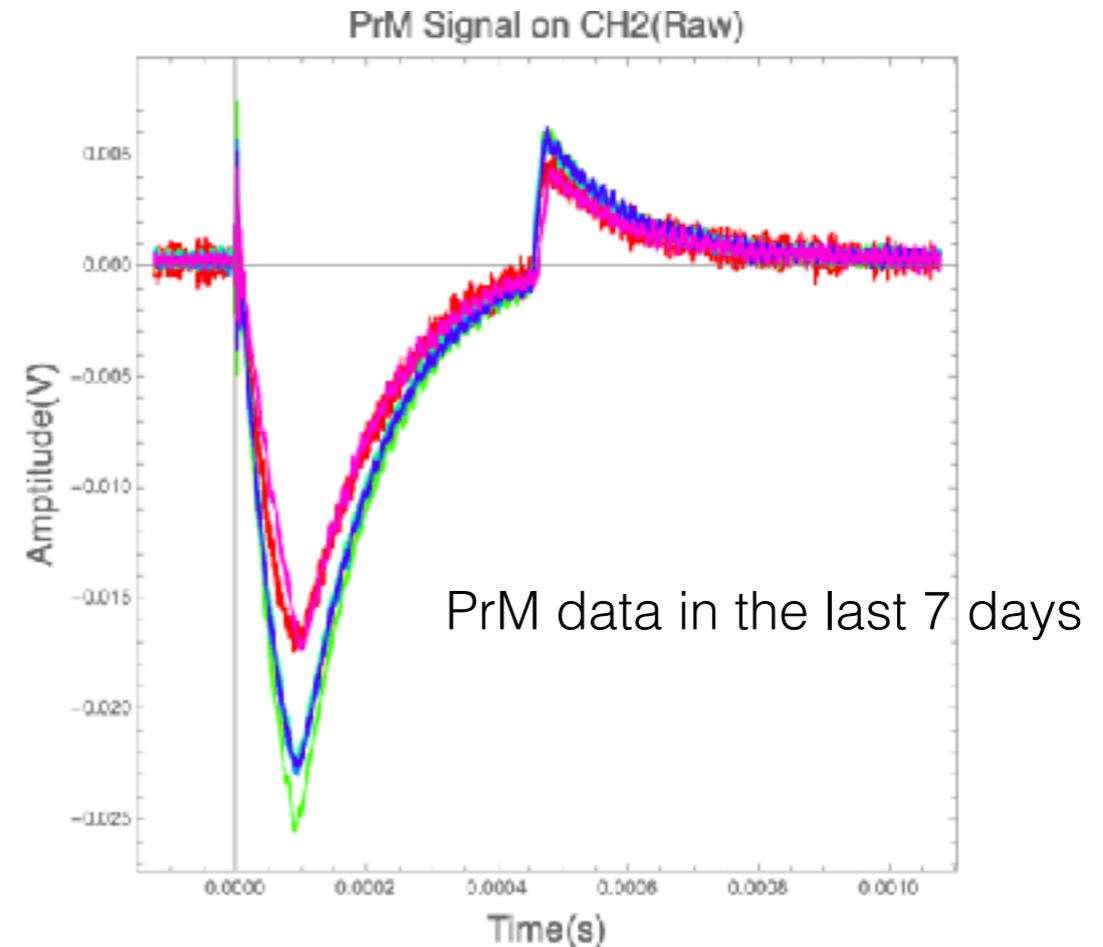
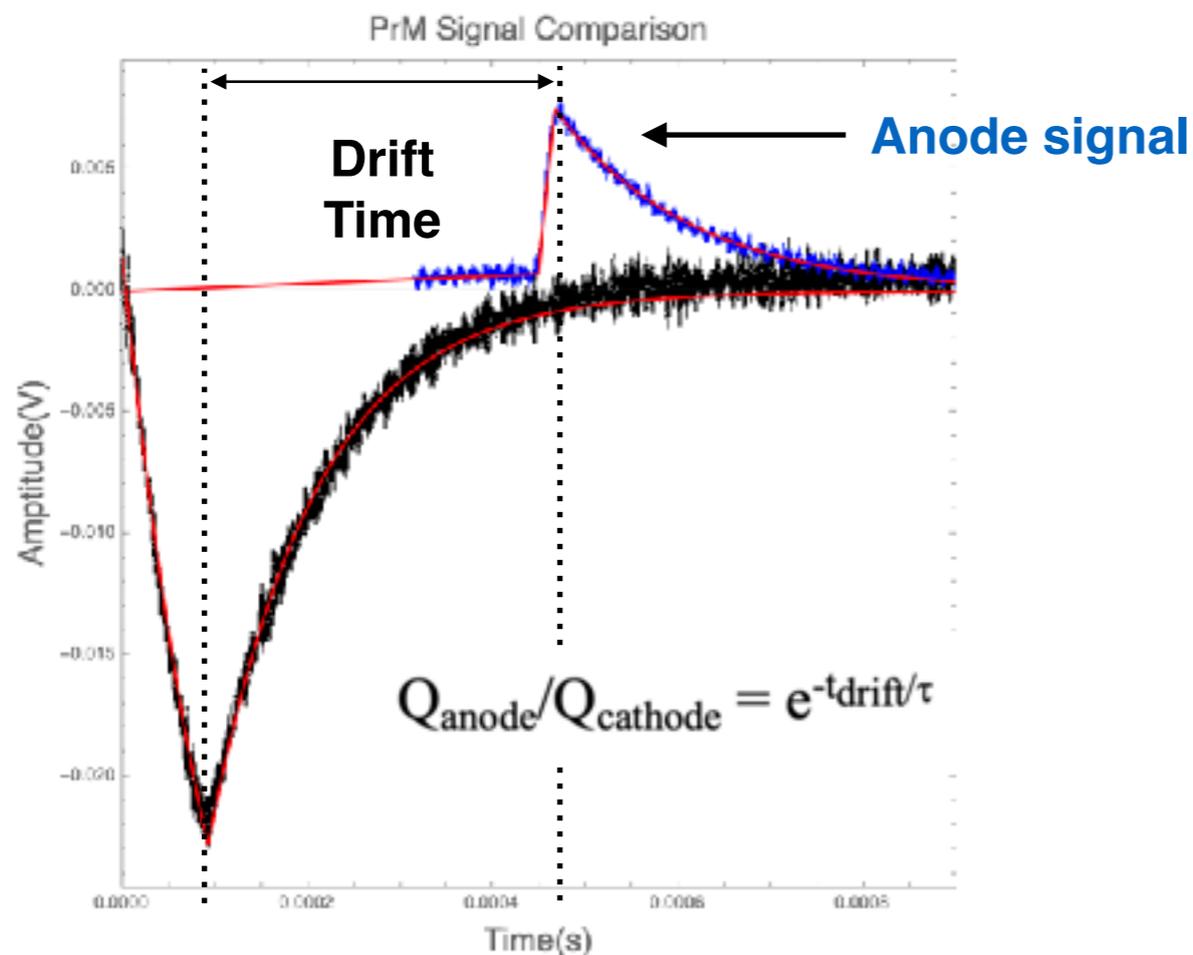
260L LAr System Cryogenic Operation Status

- The 260-L LAr system has been running for 19 days
- Overall, it is pretty stable with no LAr loss
- LN2 consumption is slightly higher compared to the previous runs with ~110 L LAr filled into the main dewar
 - Each 230L LN2 supply dewar can maintain the cryogenic operation for ~36-45 hrs
 - For sustainable operation, the LN2 supply dewar is changed ~24 hrs with a fully filled one
 - 6000 gallon LN2 tank ensures stable cryogenic operation
 - So minor issues were found with the fill line and will fix for the next run
- PrM data was taken at least once a day



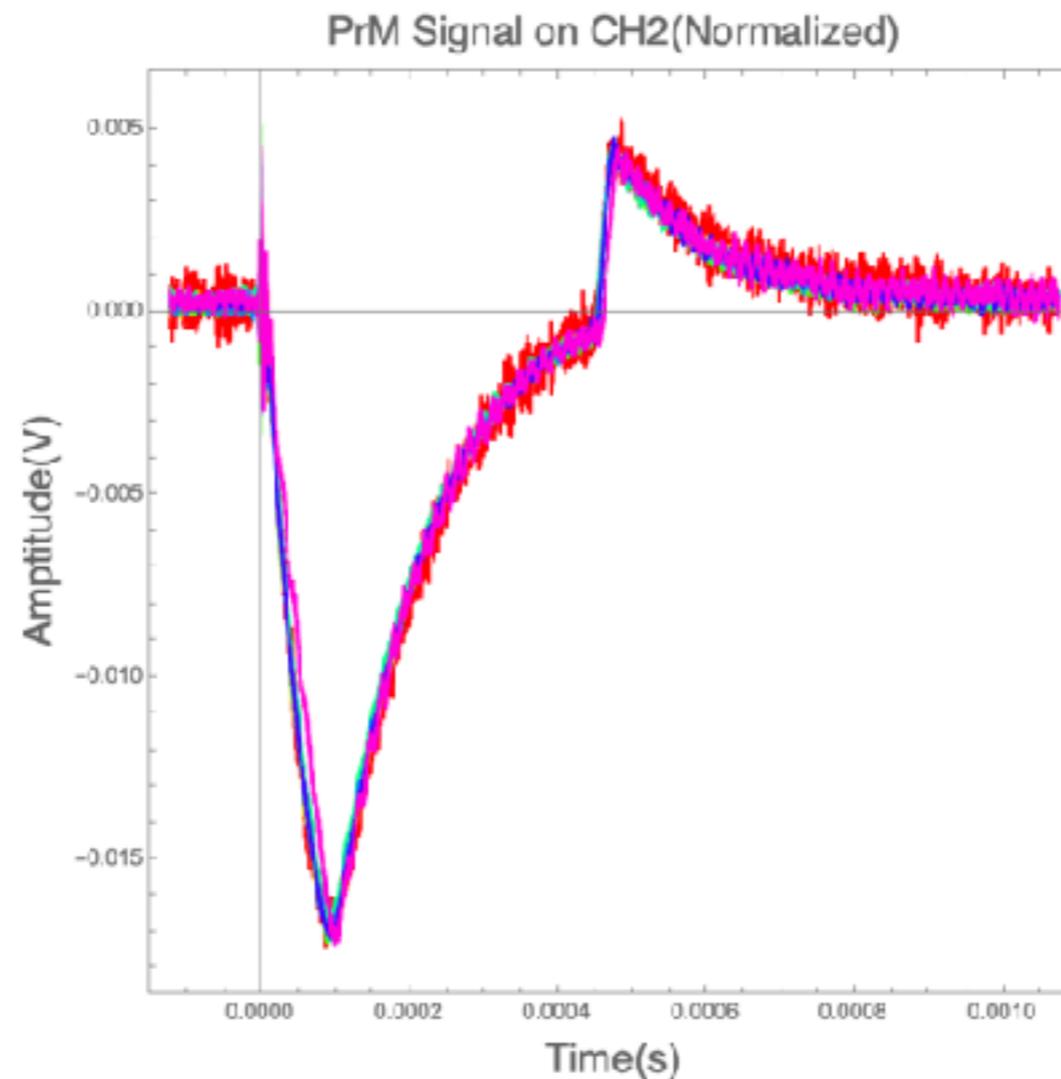
260L LAr System Purity Performance Preliminary Results

- Data taking separately on anode and cathode contains large errors given the Xenon lamp fluctuation
- The estimated purity is $\sim 0.70\text{-}0.90$ ppb with electron lifetime $\sim 0.3\text{-}0.4$ ms at 500V/cm , $\sim 0.5\text{-}0.65$ meter drift distance, sufficient for physics measurement
- So now we took data on the same channel for direct comparison



260L LAr System Purity Performance Preliminary Results

- Normalized the data to the peak of cathode signals of the last 7 days
 - The electron lifetime by the peak ratio is kept about the same
 - Developing a fitting function to extract the electron life time
- Still trying to get a well-functioning electronic box from UCI
- Jianming suggested swapping the pre-amp on in the electronics box to debug the noisy channel, which is too risky
- Prafull at IO is going to help us



260L LAr System Running Plan

- I will be on vacation 04/25-04/30, the cryogenic operation will be continued
- Lingyun agrees to change LN2 supply during the time, once a day
- We practiced the LN2 supply dewar change in the last 10 days
- Lingyun is familiar with the procedures and operations now
- Milind will take the PrM once a day, DAQ procedures written up, available on <https://www.phy.bnl.gov/bnlif/cgi-bin/private/ShowDocument?docid=353>
- Drafting an summary for the experience learned in this as well as the previous runs