

Results from ProtoDUNE-II

Far Detector TPC and BD Electronics Cold Cables PRR
12/13/2024

Roger Huang

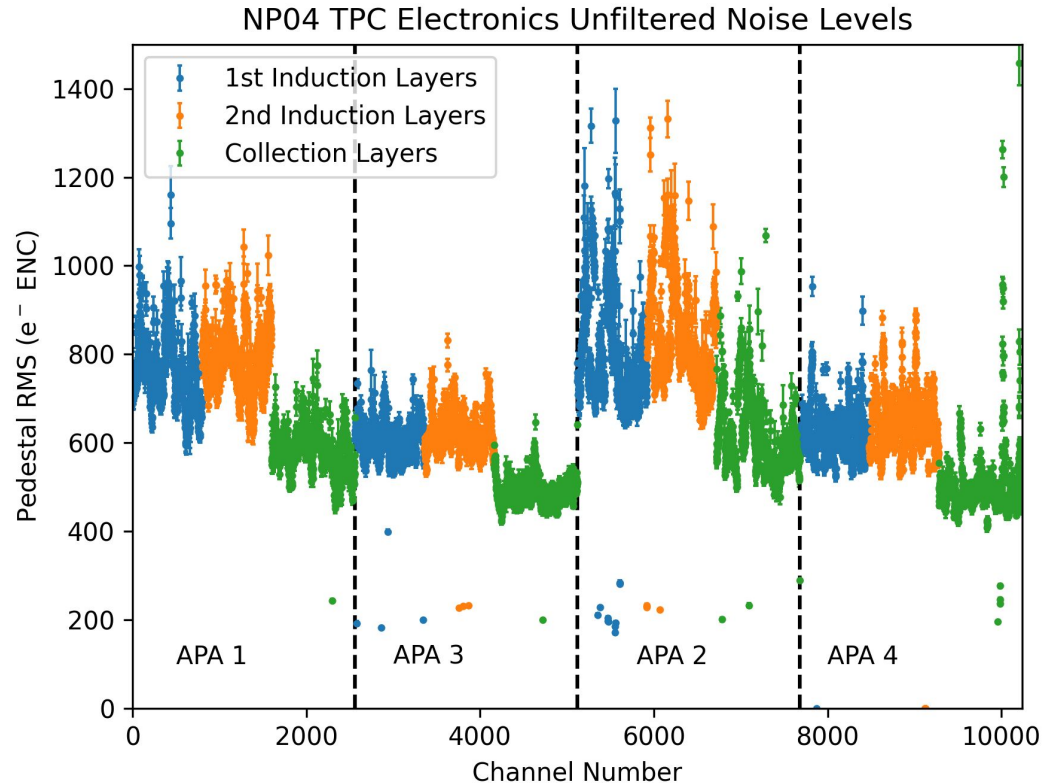
APA Coldbox Tests

- 4 APAs used in ProtoDUNE-ND underwent coldbox tests, stressing them in a way similar to what will be done at the far detector
- 2 production APAs have also been tested in this coldbox now
- No cable-related issues observed



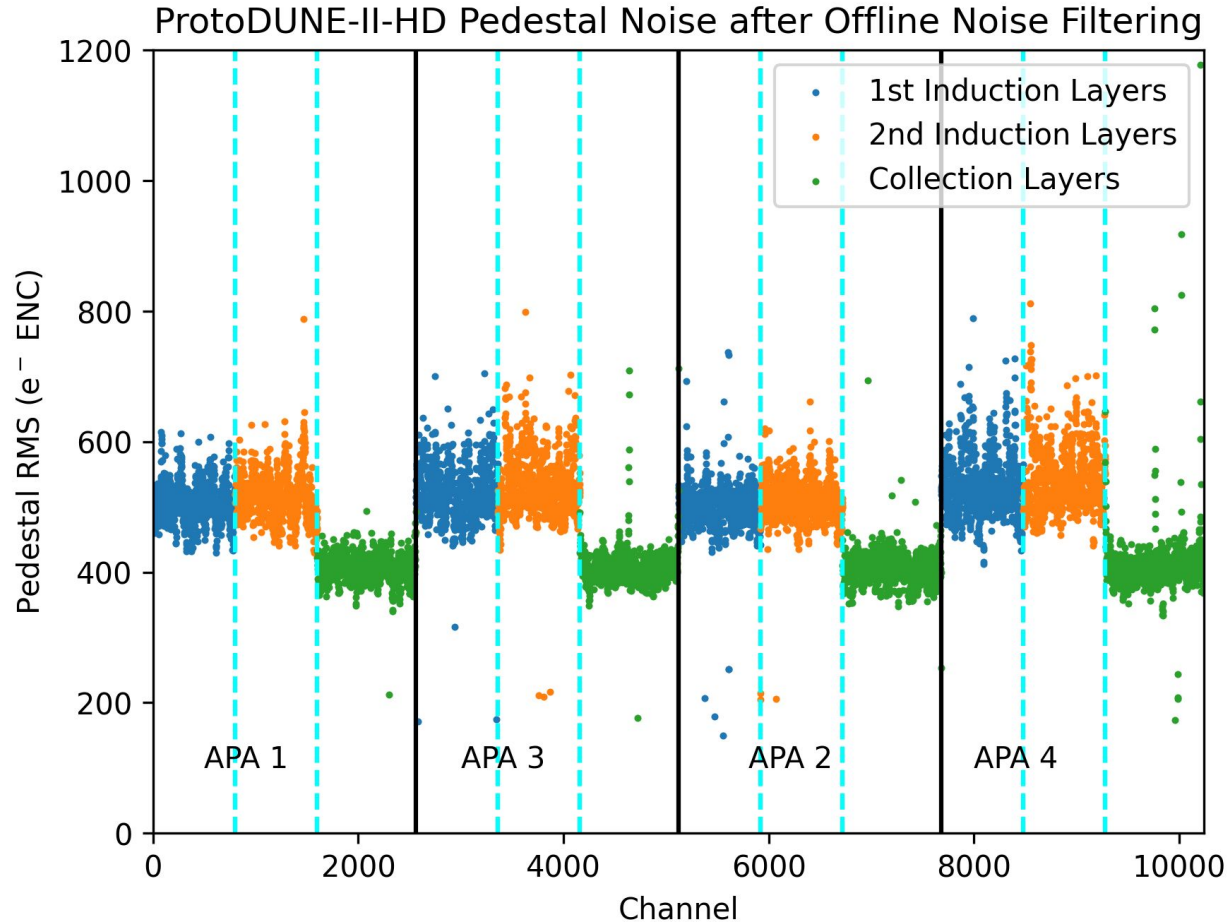
ProtoDUNE-HD

- ProtoDUNE-HD took continuous data in liquid argon for 6+ months this year
 - Uses a total of **80 pairs** of data/power cables
- No problems observed with TPC electronics cables
 - No power issues
 - No communication issues
 - No loss of data integrity in any of the collected data



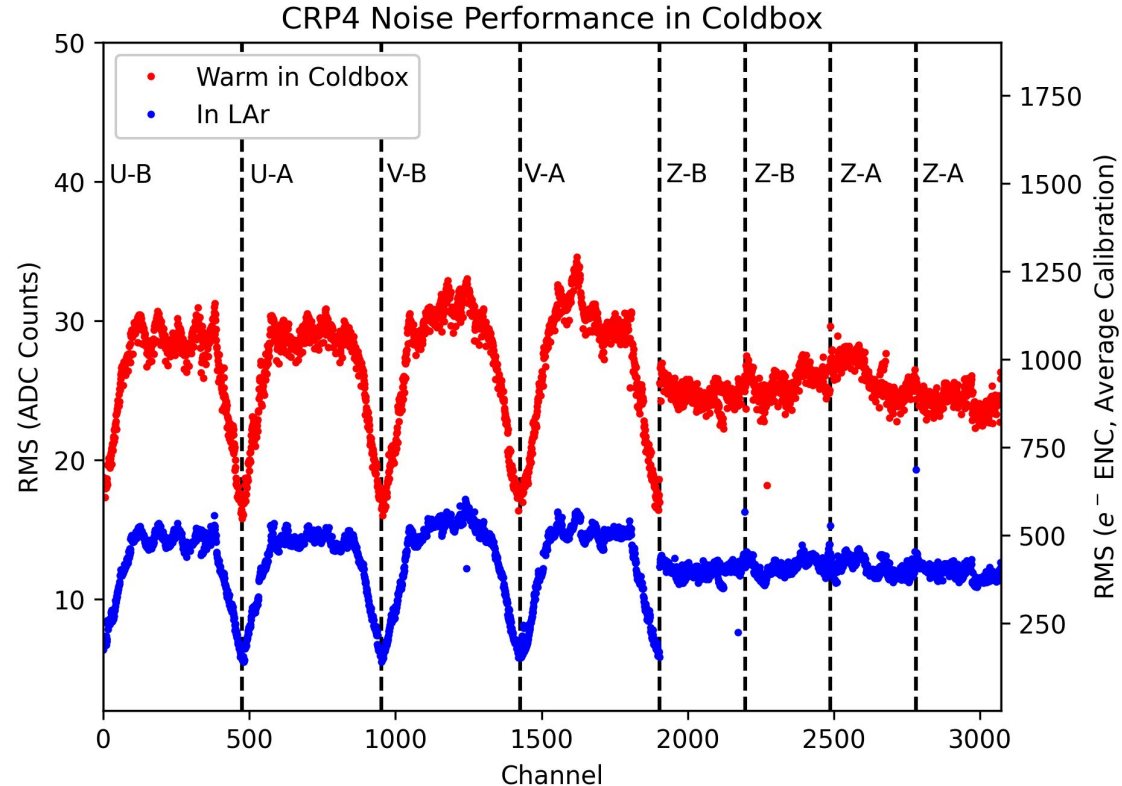
ProtoDUNE-HD Noise after CNR

- Applying the offline coherent noise removal module eliminates most of the differences between upper and lower APAs



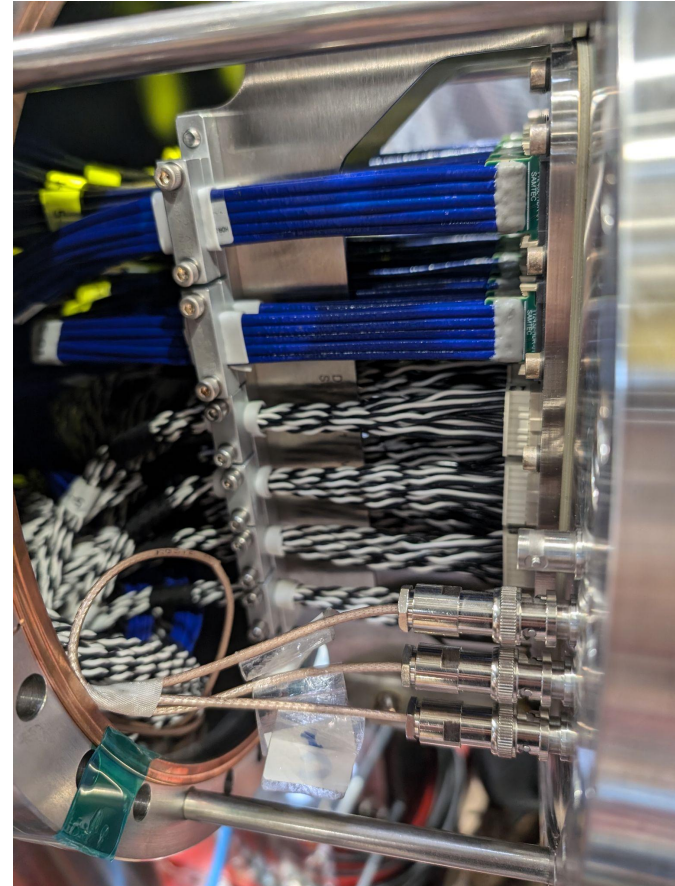
CRP Coldbox Tests

- We have undergone 9 coldbox tests of bottom CRPs with BDE
- No issues observed with the cables themselves during these tests
 - As mentioned in Cheng-Ju's talk, the first test had an issue with the mini-SAS cable clamp that has since been resolved



ProtoDUNE-VD

- Two bottom CRPs are now submerged in liquid argon in ProtoDUNE-VD
- No cable-related issues have been observed so far
 - **48 pairs** of data/power cables in total
 - Several spare cables were also installed with these CRPs, and no negative effects have been seen from their inclusion
- ProtoDUNE-VD will take data throughout most of next year



Summary

- Across the various APA tests at CERN, we have tested **120 pairs** of data/power cables in warm and cold conditions and through many thermal cycles, with no issues
 - Including 6+ months of continuous LAr operation in ProtoDUNE-HD
- In the CRP coldbox tests, we have observed no problems with the longer data/power cables
 - During the first test, we saw some issues with the connection of the mini-SAS cables, but this was found to be solved by improving the cable clamp process
 - No issues seen in any of the tests since then
- ProtoDUNE-VD has begun operation in LAr and will run through at least most of next year