NP04 TPC Electronics Performance

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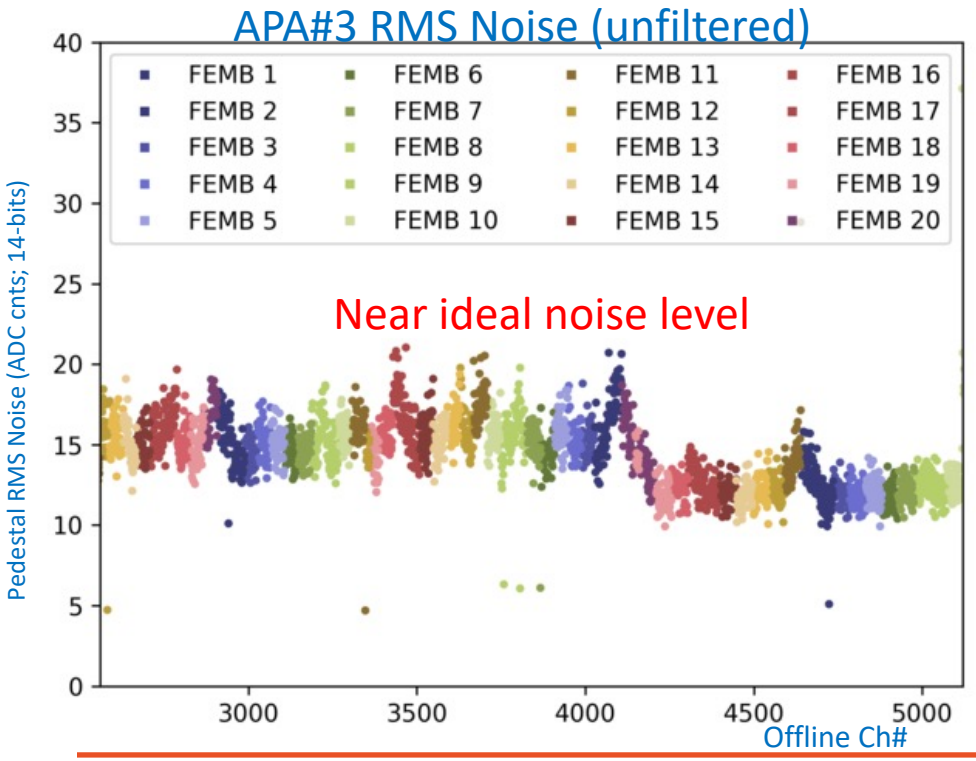
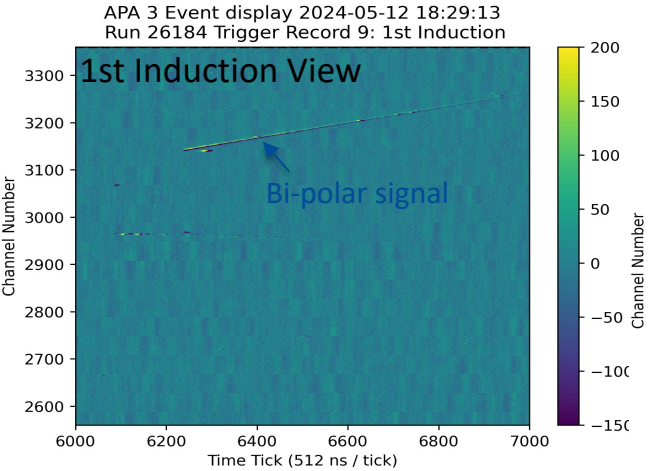
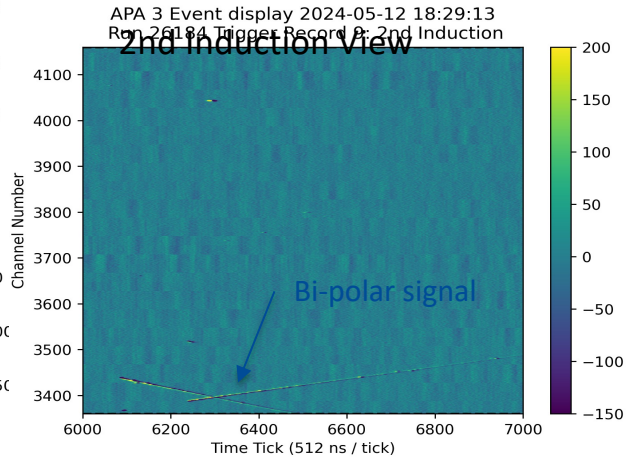
FD1 Technical Board Meeting
12 June 2024

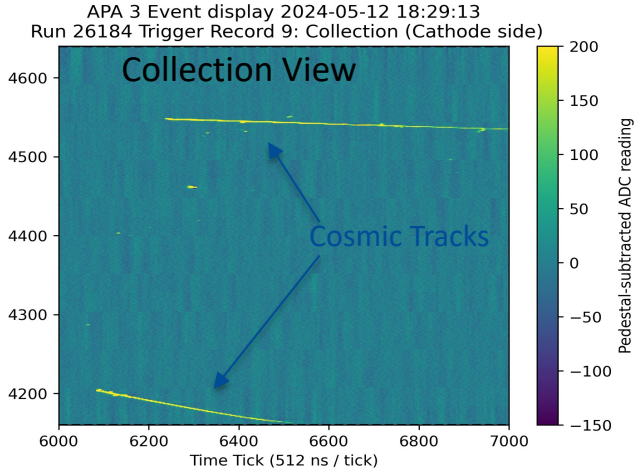
- TPC readout electronics have been performing reliably for the past few months
- All 10,240 channels on 80 Frontend Motherboards are functioning well → we have 0 dead electronic channels !
- Overall noise performance is decent



- APA1 and 2 have slightly higher coherent noise. With offline noise filter, noise level is also near ideal level

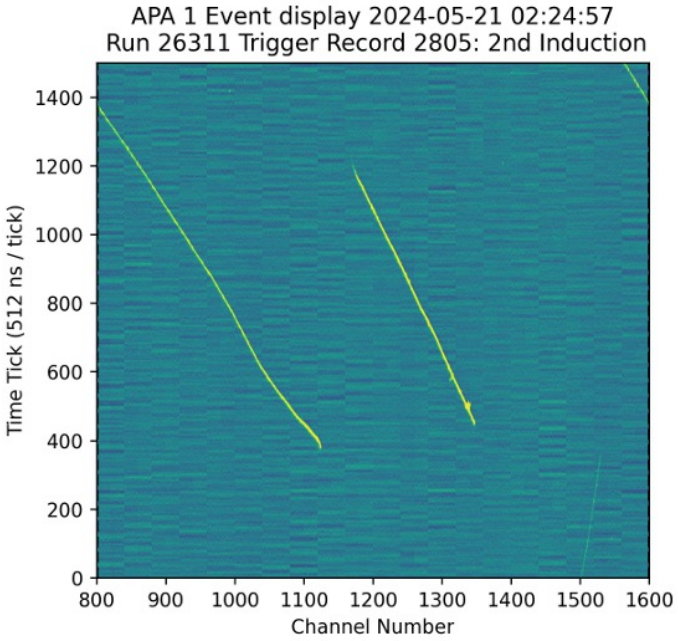


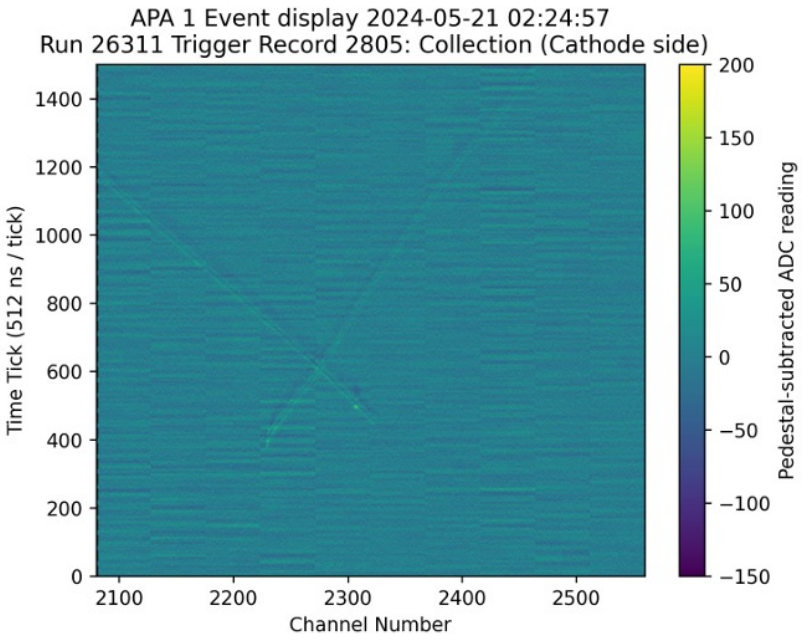




- Some issues impacting the readout electronics:
  - About 20 APA “wires” are disconnected to the TPC electronics for various reasons
  - Electrical shorts across wires that come and go. High noise on a few channels to a large fraction of channels
  - Origins are likely not related to the TPC electronics, but they do impact the operations of the electronics

- Most significant issue is the APA#1 HV bias on the collection plane
  - ➢ Based on the bias current and voltage measurement, the connection is likely intermittent
  - ➢ Not able to maintain a stable bias voltage on the collection wires
  - ➢ APA#1 is effectively a two-view TPC





- Lessons Learned for FD1
  - ➢ APA bias QC test failed to catch the APA#1 collection bias problem:
    - ☞ Looking into modifying the warm filter board to allow direct connectivity measurement of the bias line by measuring the capacitance. Testing the prototype board this week on CRP6 coldbox
    - ☞ Looking into adding a redundant bias line for the collection wires

- TPC Electronics/BDE Hardware Database Liaison: Martin Tzanov (LSU)