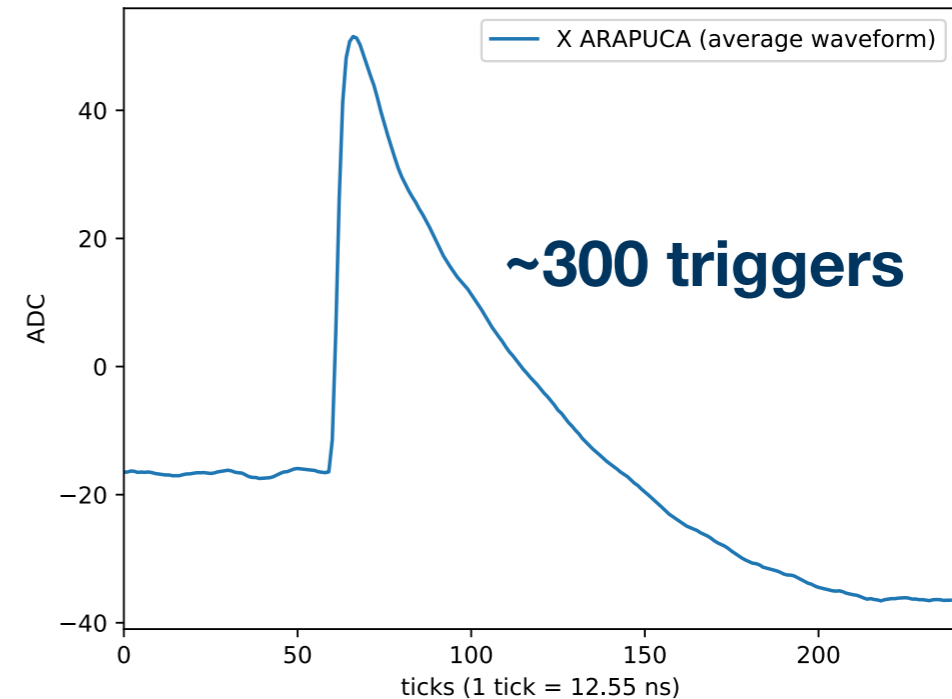
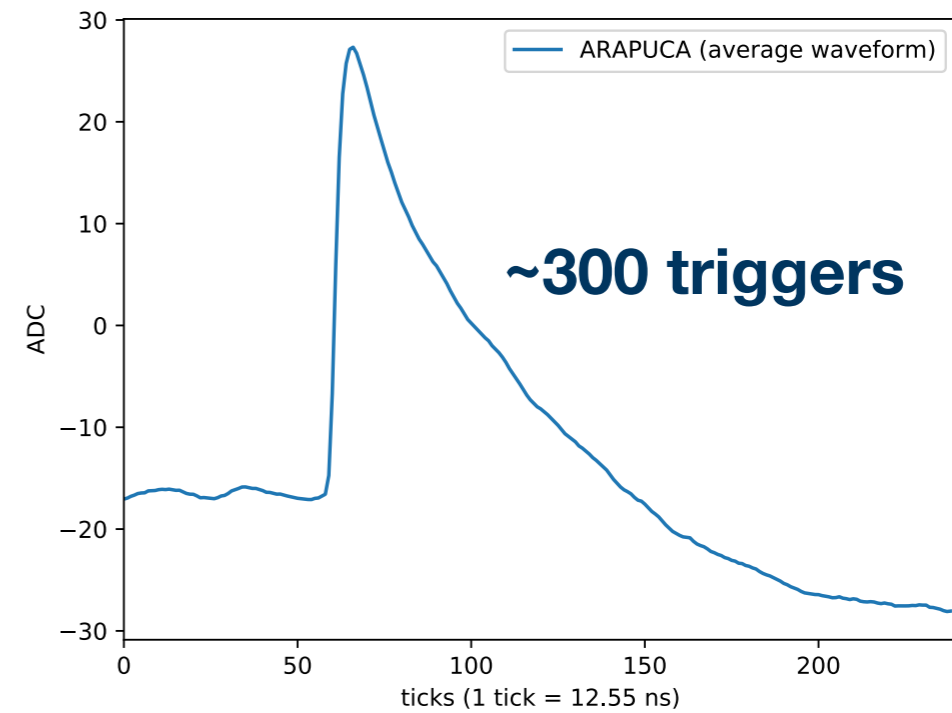
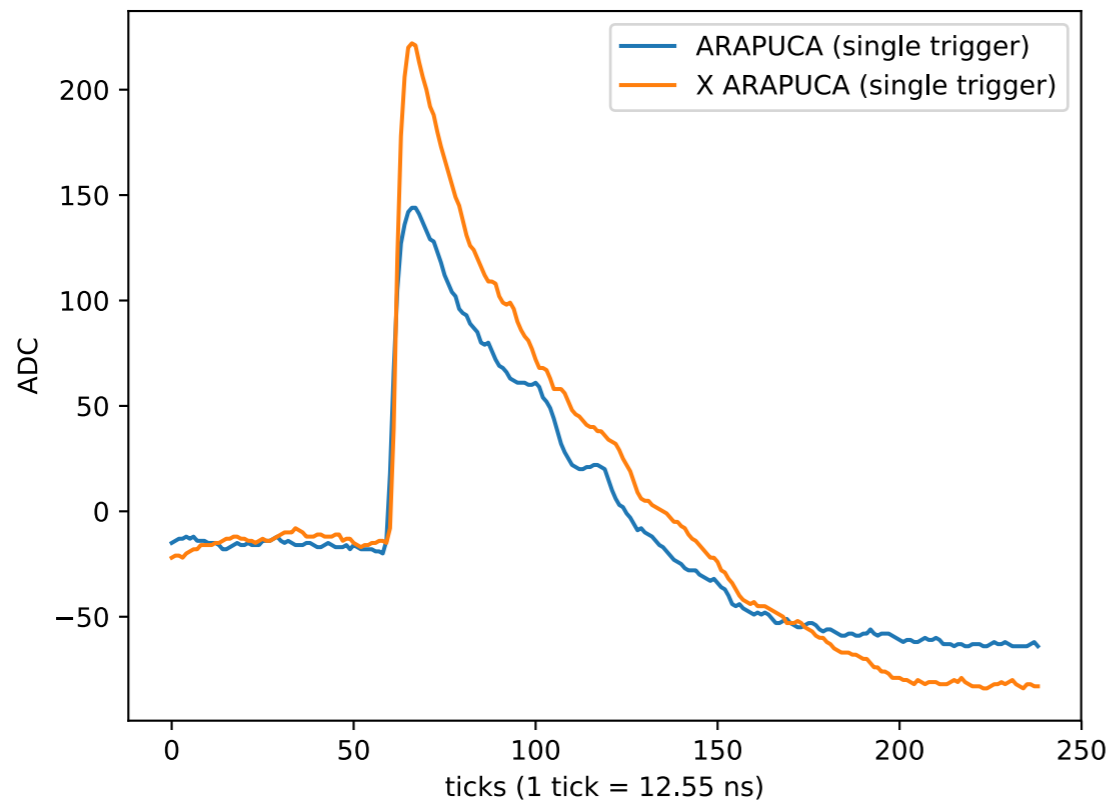


First Results from ICEBERG PD

Rory Fitzpatrick
ICEBERG PD Meeting
March 18, 2019

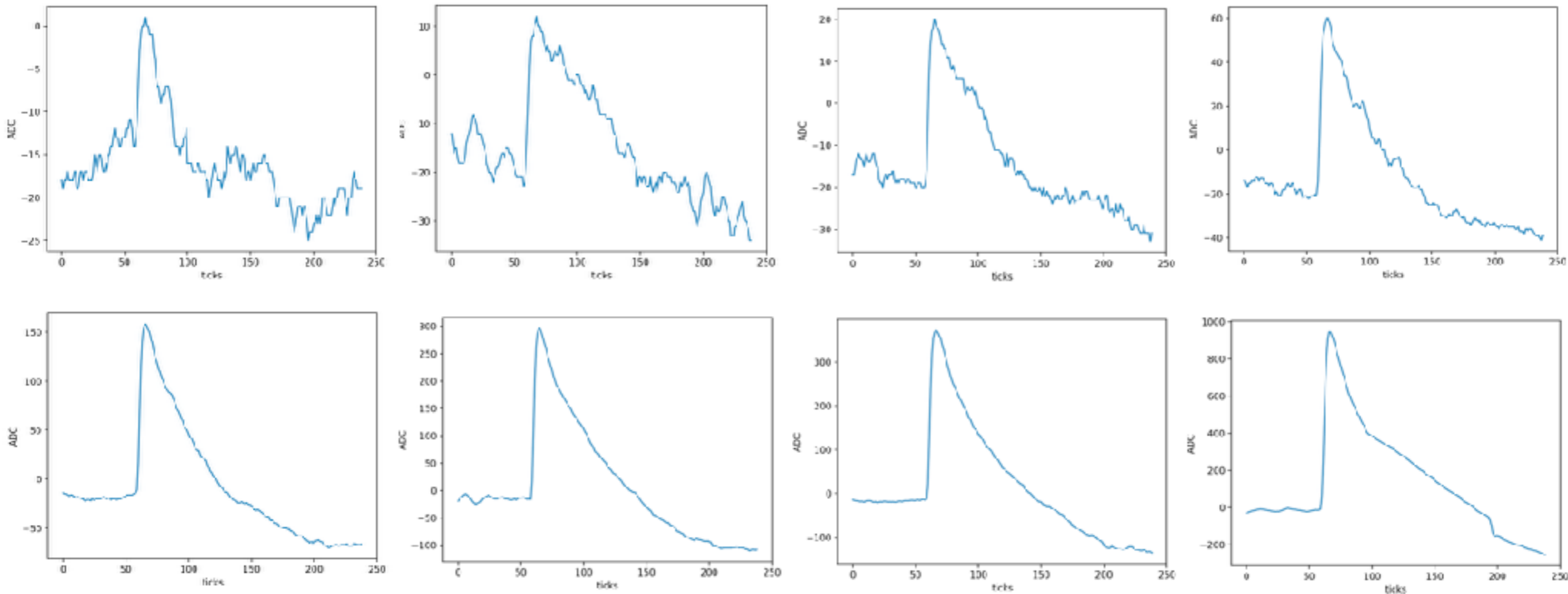
first light from cosmics!



ARAPUCA and X ARAPUCA data were not taken simultaneously, don't make direct comparisons yet

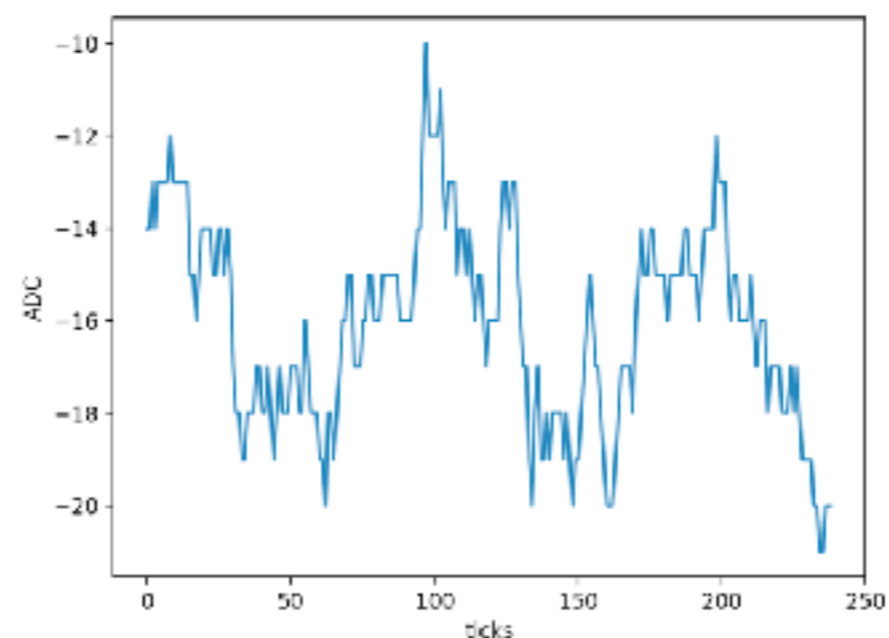
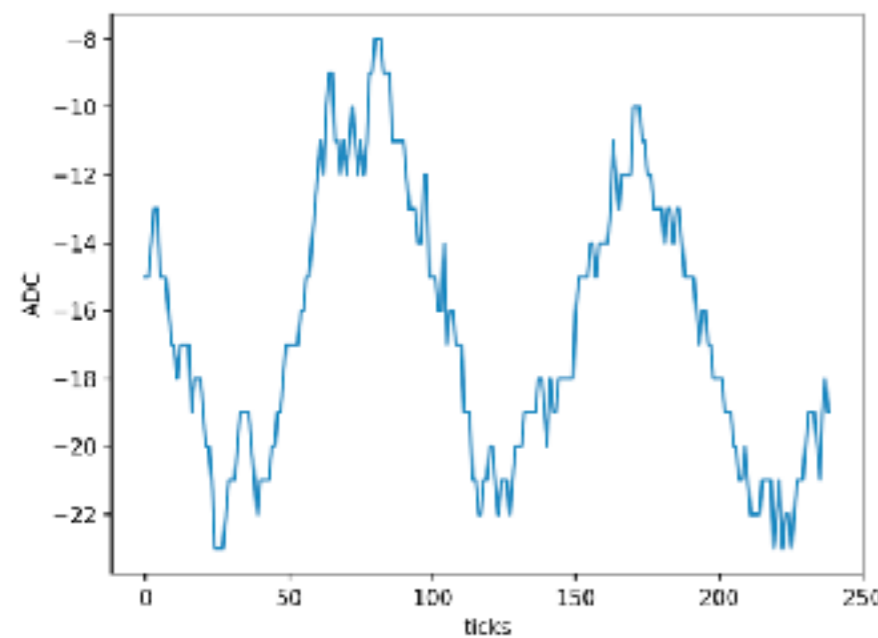
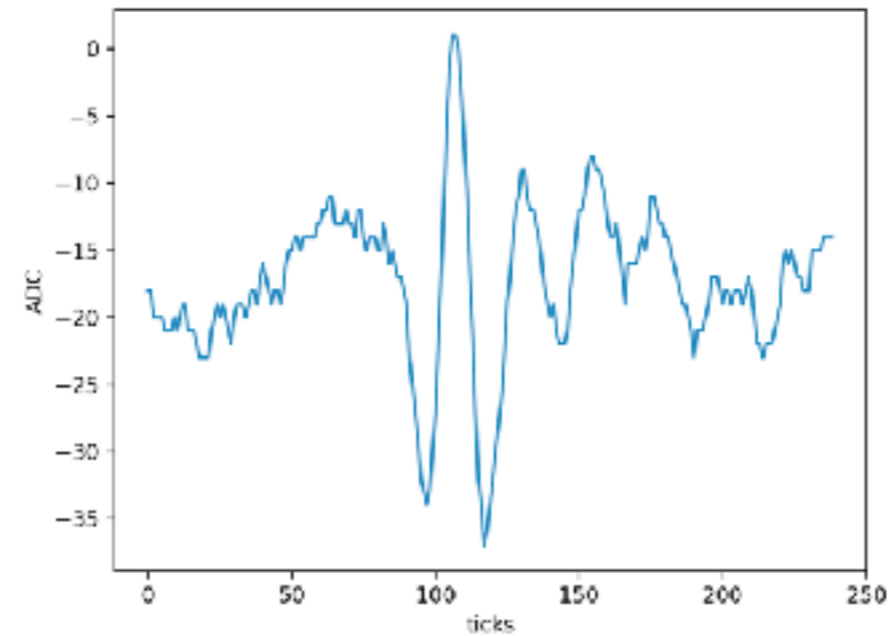
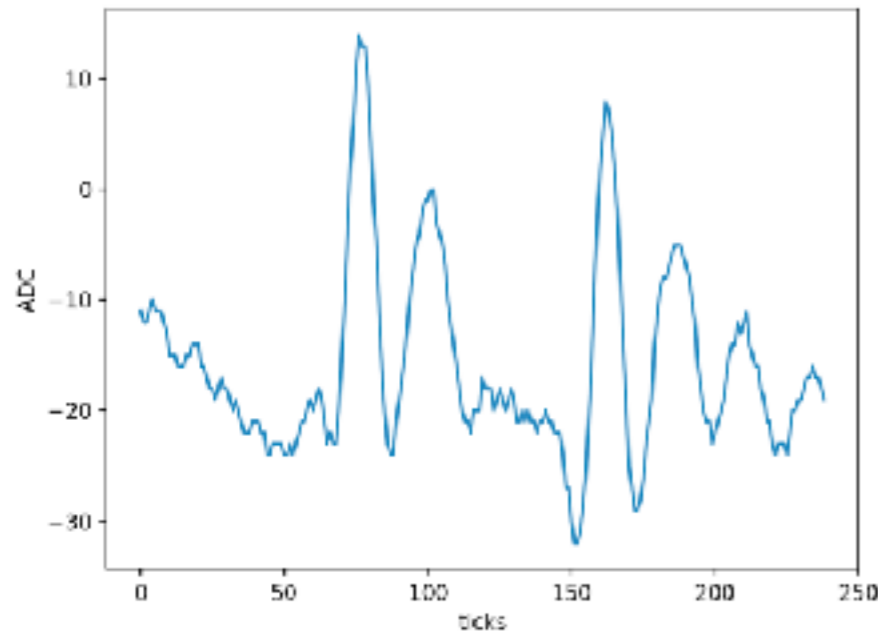
0.8 μ s pipeline delay, 3 μ s readout window

some more examples



Collected using the ARAPUCA.

noise features



Two noise features that stand out immediately.

short term mu2e readout plans

- **Identify noise sources:** Trigger off of a single cosmic paddle, $O(5k)$ events, with maximum readout window and V_b a few volts below breakdown (~ 44 V). Look at FFT to identify possible noise sources and develop methods for mitigation.
- **Look for single photoelectrons:** Do the same as above with $V_b = 48$ V and look for SPEs near pulse time that we've identified.
- **Identify through-going cosmic population:** Switch trigger to cosmic paddle coincidence and repeat again.

current data available

Coincident cosmic trigger data (3/11/19)

- ~300 triggers, $V_b = 47$ V (ARAPUCA and X-ARAPUCA read out consecutively)

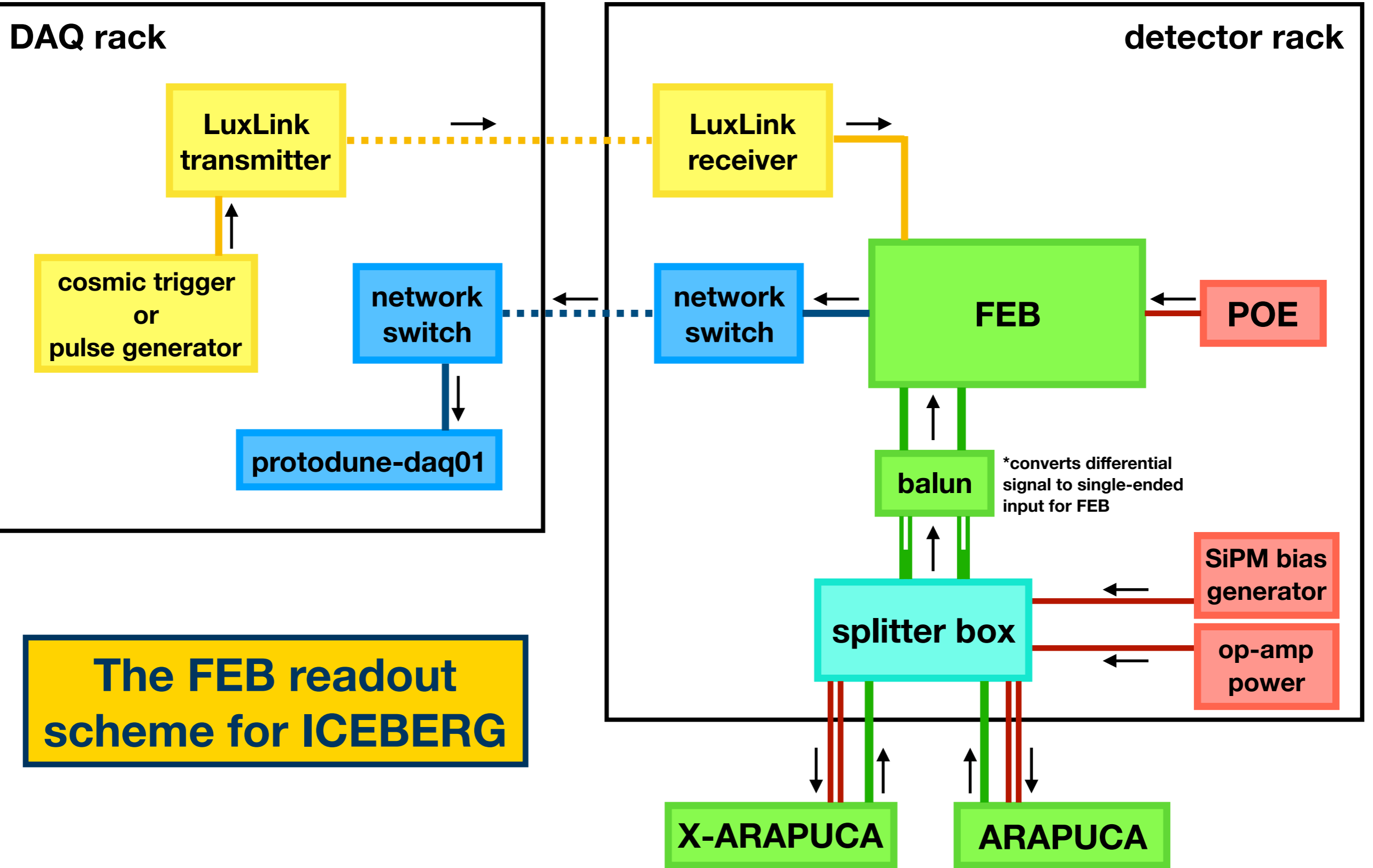
Single cosmic paddle trigger data (3/14/19)

- ~5k triggers with $V_b = 40$ V (ARAPUCA only)
- ~1k triggers with $V_b = 47$ V (ARAPUCA only)
- ~2.5k triggers with $V_b = 48$ V (ARAPUCA only)

On 3/14 I was simultaneously testing how quickly I can read things out. In the next round of data-taking I will be able to accumulate data a little faster.

data-taking plans for tomorrow

- If the schedule current schedule stays on track, the photon detectors will be on all day tomorrow and I plan to take lots of data.
- Accumulated more stats w/ the ARAPUCA at $V_b = 48$ V.
- Collect X-ARAPUCA data w/ $V_b = 40$ V and $V_b = 48$ V to compare.
- Do we want some data taken in 1 V steps b/w 44 V and 48 V, time permitting?
- Start identifying possible noise source and work on offline noise filtering options.
- When ICEBERG is emptied I plan to figure out why the second channel isn't being read out so we're ready for simultaneous readout during the next fill.



The FEB readout scheme for ICEBERG