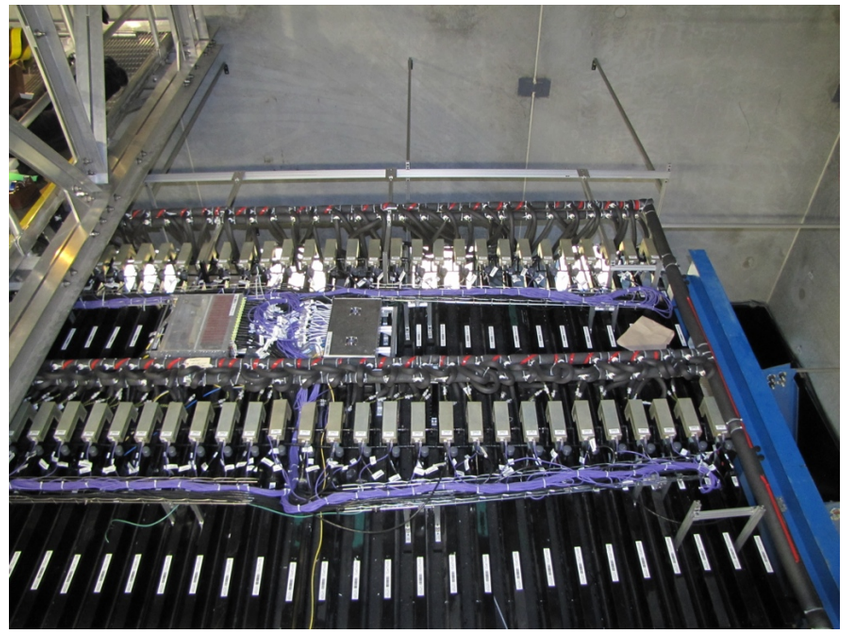
Status of NOvA NDOS



Jonathan Paley
Argonne National Laboratory

Run Coordinator Report
February 21, 2011

Argonne NATIONAL LABORATORY

NOvA

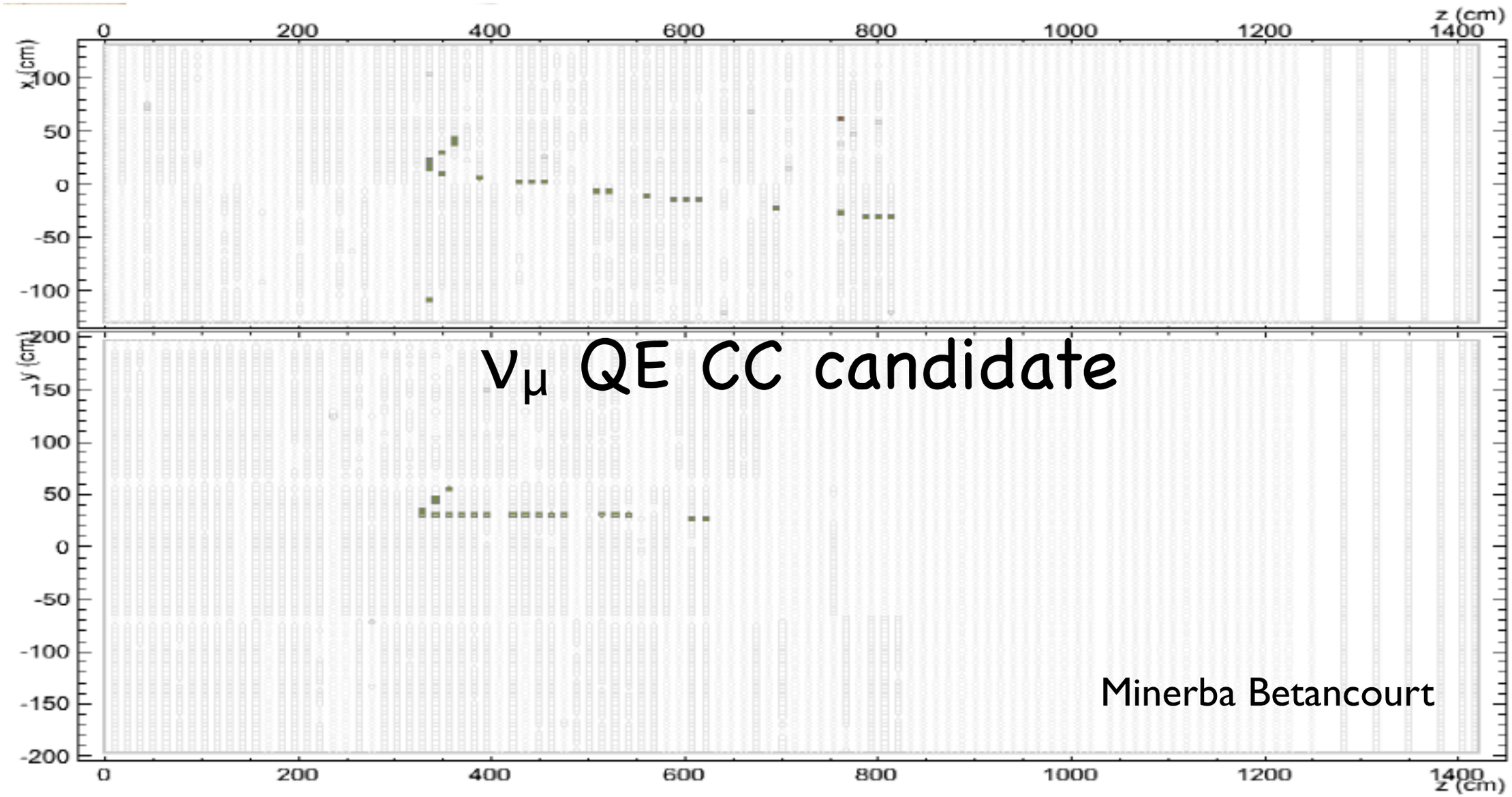
Commissioning Summary

- A great deal of progress has been made since the last AEM report:
  - Dec. 15, 2010: confirmation of observation of NuMI events!
  - DAQ stability has improved enormously (taken from comments by shifters, so it must be true!).
  - DCS environmental data are being collected, monitored and written to the dB.
- Action items for commissioning:
  - Channel recovery: many channels are masked out of DAQ readout due to high noise rates. More on this later.
  - APD cooling: we currently are not cooling APDs on NDOS, although tests indicate that the cooling works as expected. Tools to monitor temperatures are in development.
  - Gain-based channel thresholds (current global threshold is ~1/2 MIP signal). Tools are in place for this.

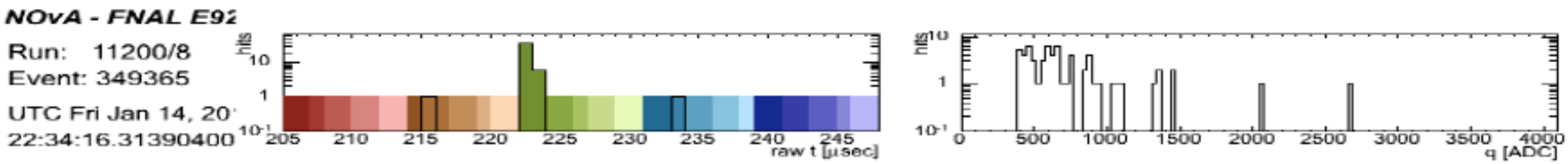
Many thanks to the NDOS installation and commissioning crews for their outstanding work!

- Minerba Betancourt (UMN-Twin Cities)
- Kurt Biery (FNAL)
- Gavin Davies (Iowa St)
- Chad Johnson (Indiana)
- Sue Kasahara (UMN-Twin Cities)
- Rick Kwarciany (FNAL)
- Mark Messier (Indiana)
- Leon Mualem (CalTech)
- Mat Muether (FNAL)
- Andrew Norman (FNAL)
- Denis Perevalov (FNAL)
- Ron Rechenmacher (FNAL)
- Peter Shanahan (FNAL)
- Rick Tesarek (FNAL)
- and many others from FNAL CD CET, CD ESE, etc.

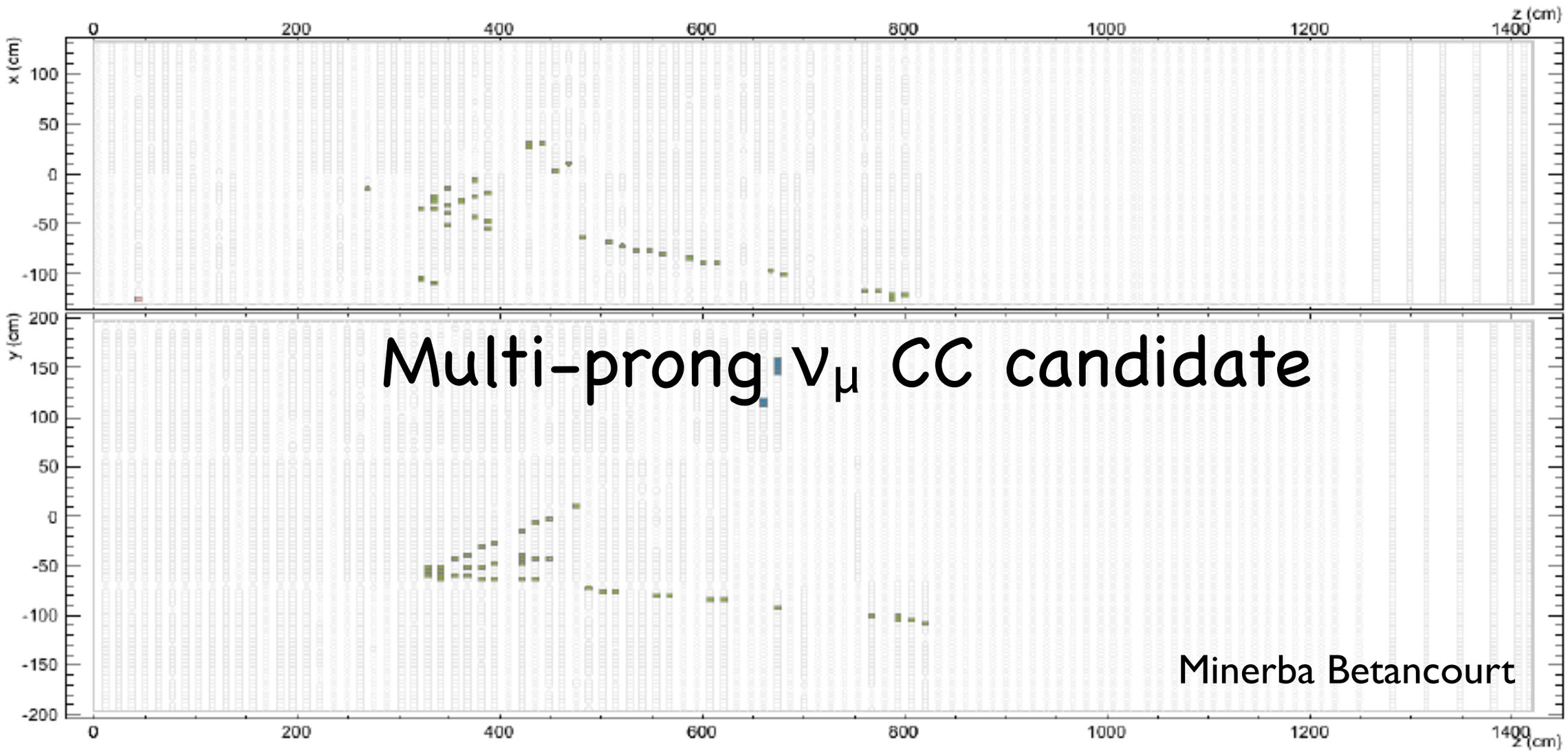
Neutrino Events in the NDOS

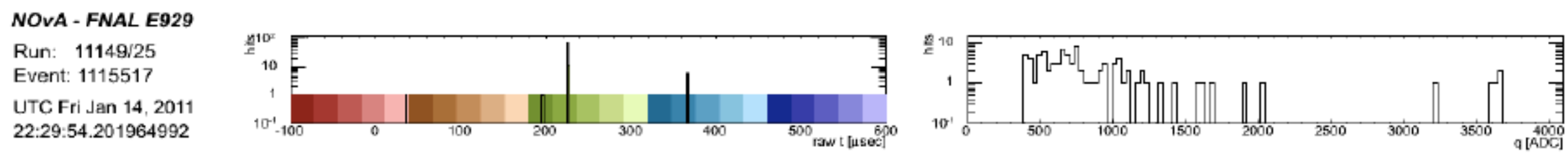


ν_μ QE CC candidate

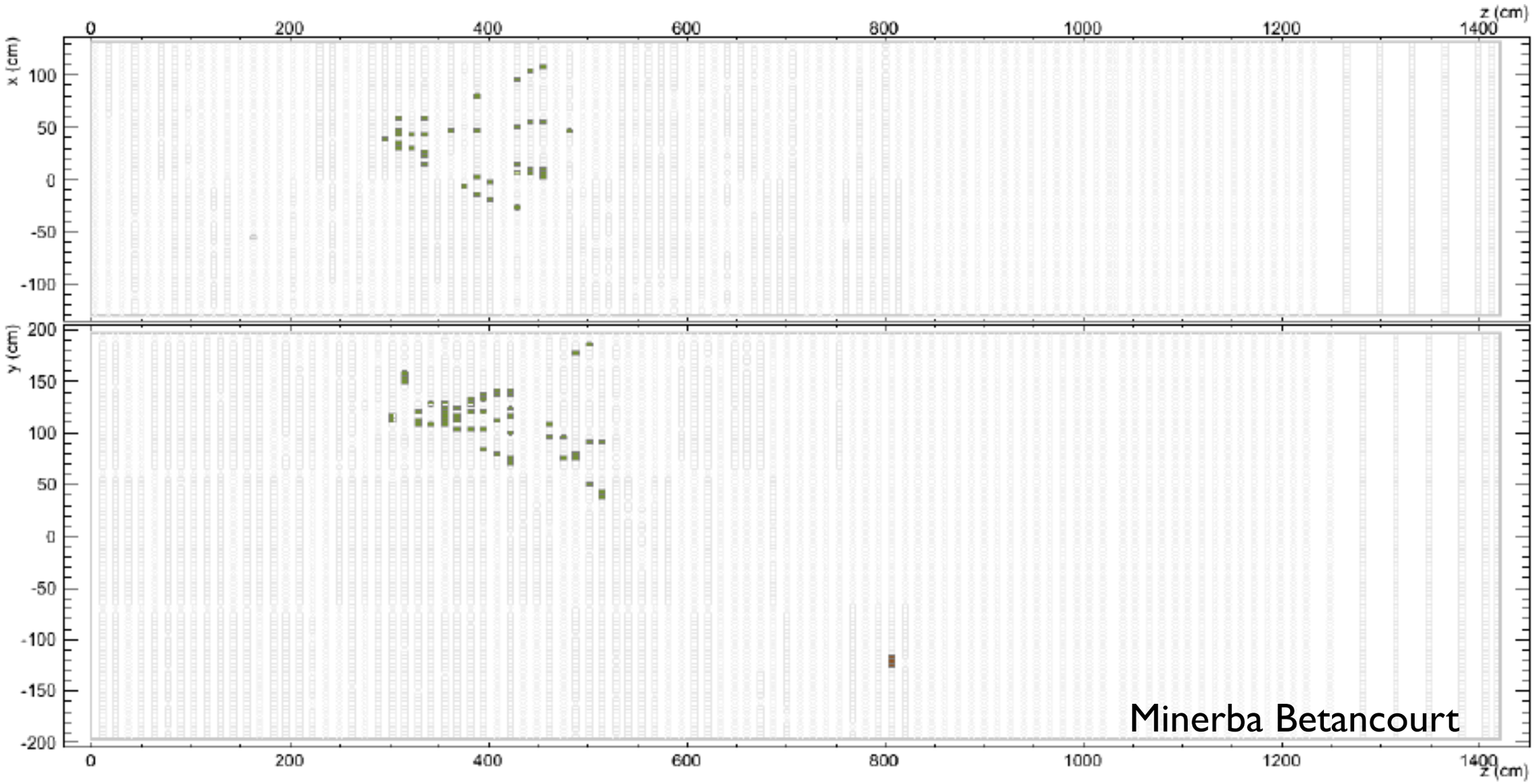


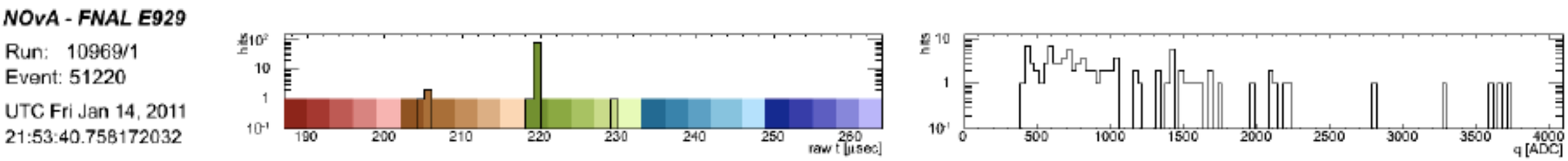
Neutrino Events in the NDOS



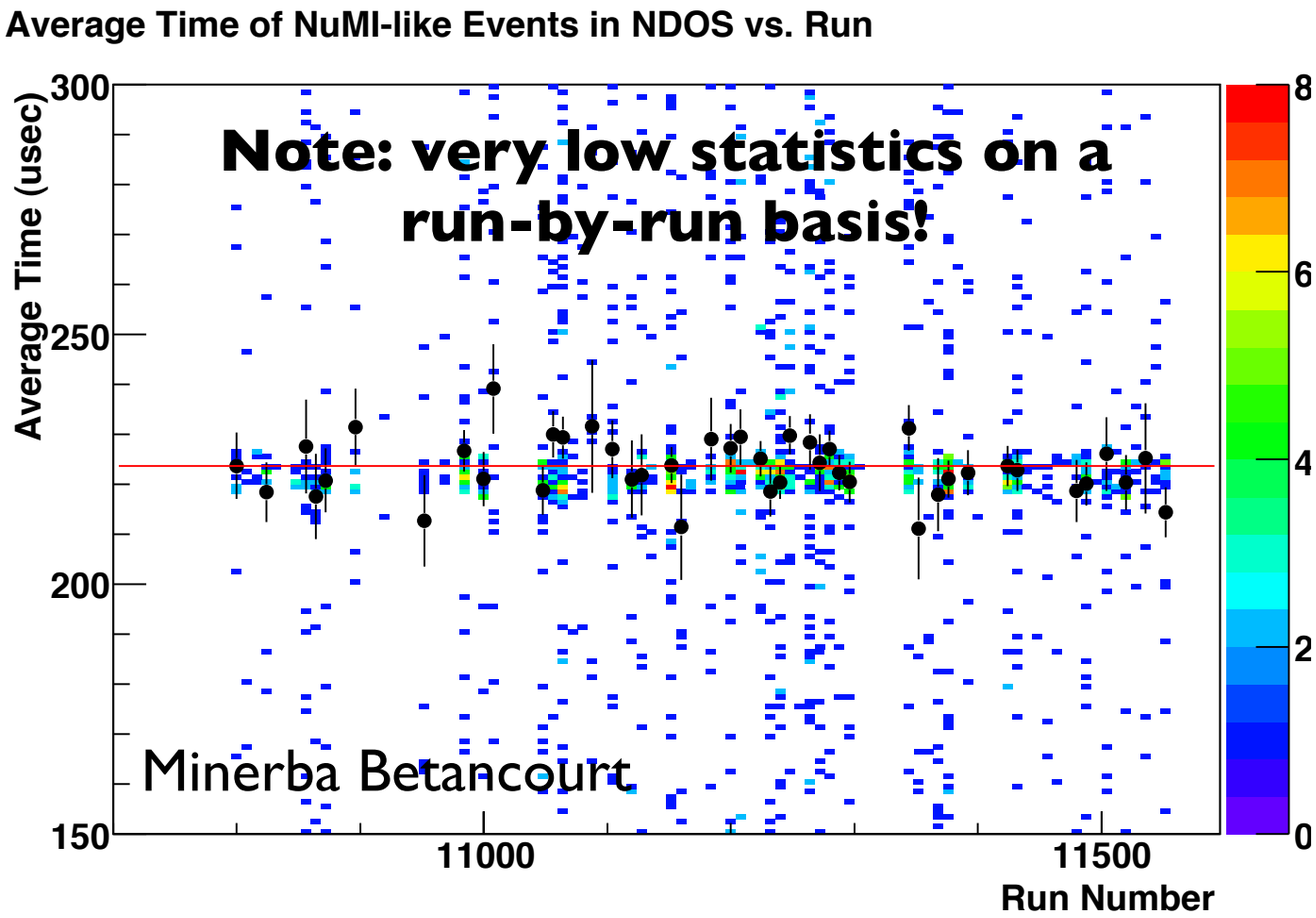


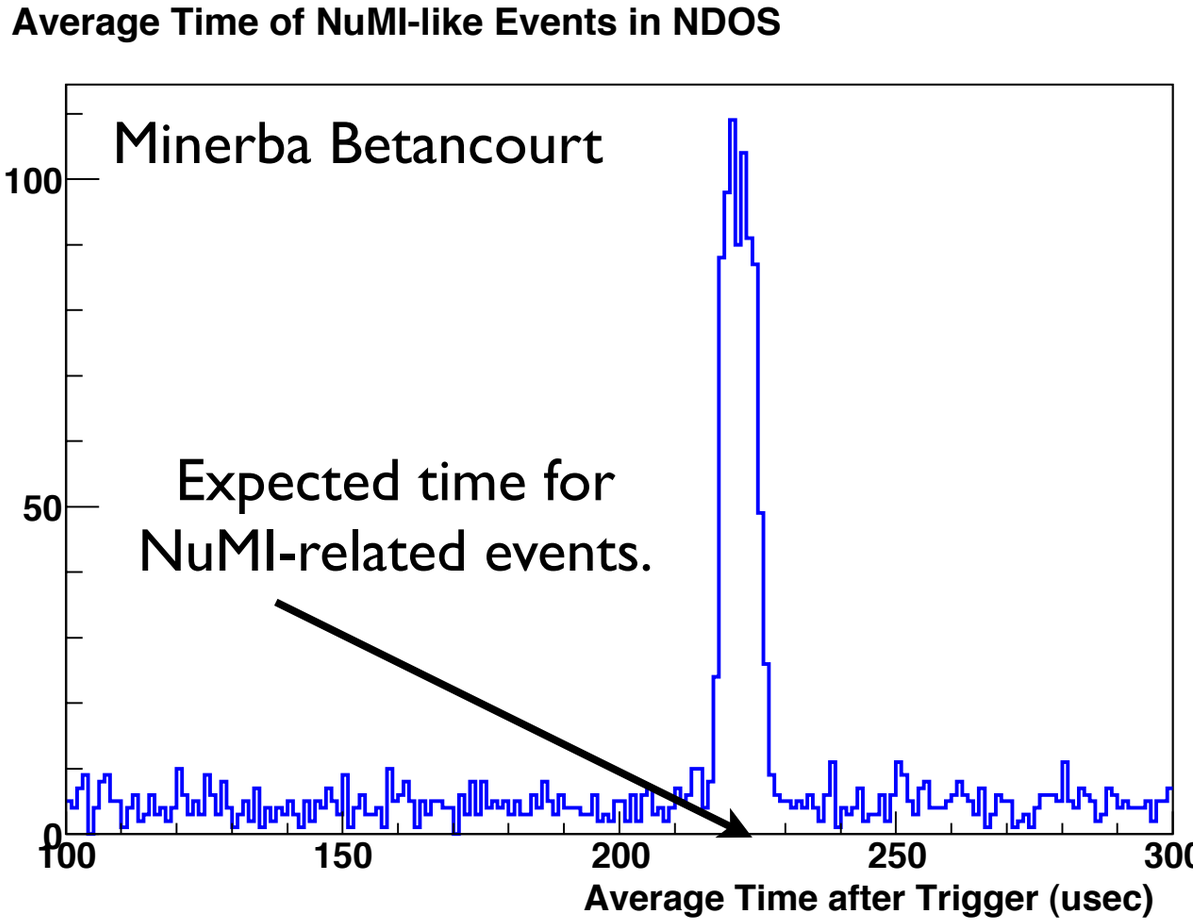
Neutrino Events in the NDOS





Neutrino Events in the NDOS



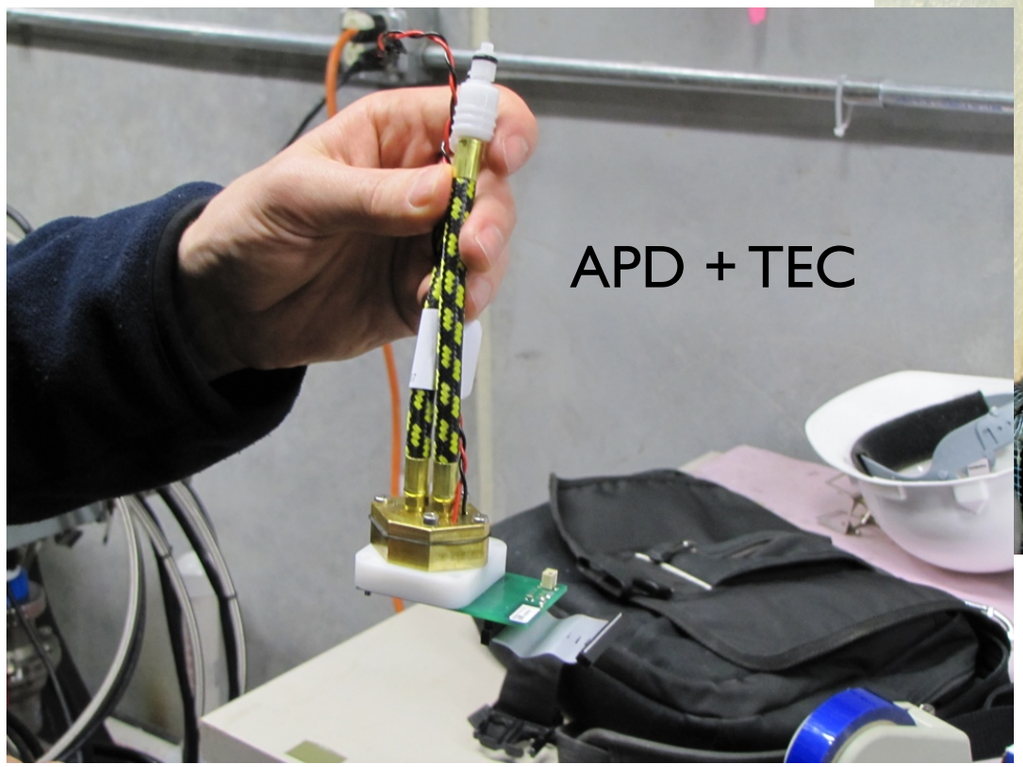


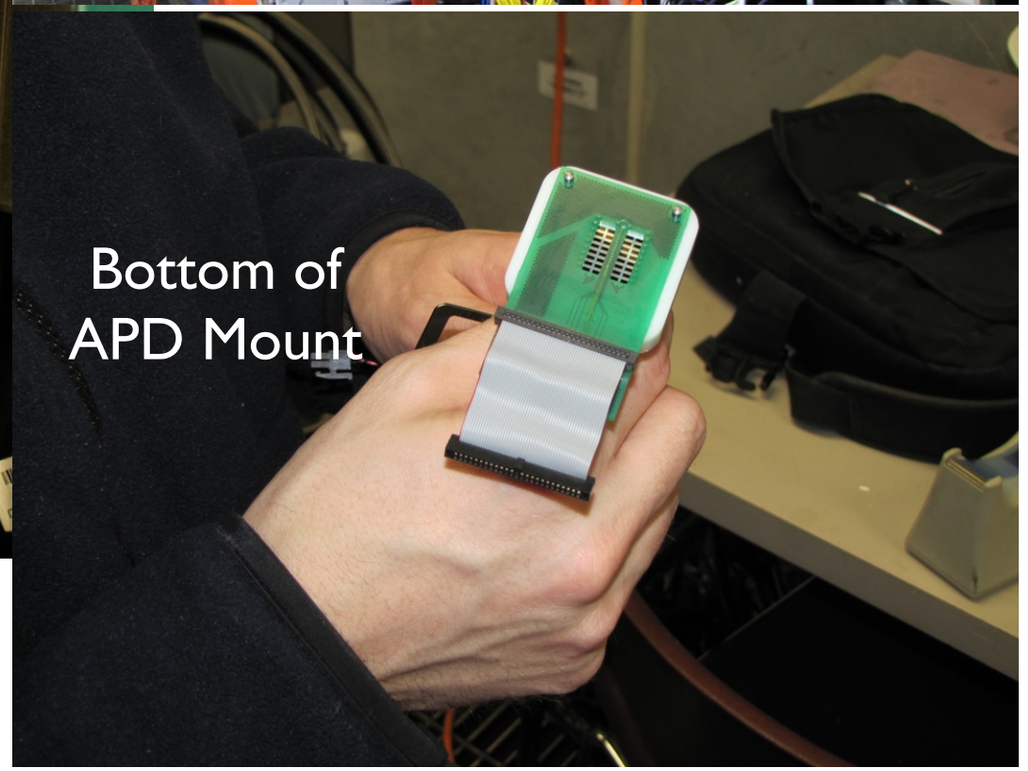
- Neutrino events are clearly observed in the NDOS
- Peak in time distribution found where NuMI events are expected.
- After much searching, Booster neutrinos not yet observed; these are being actively pursued by a dedicated group of both DAQ and offline analysis experts.

Channel Recovery

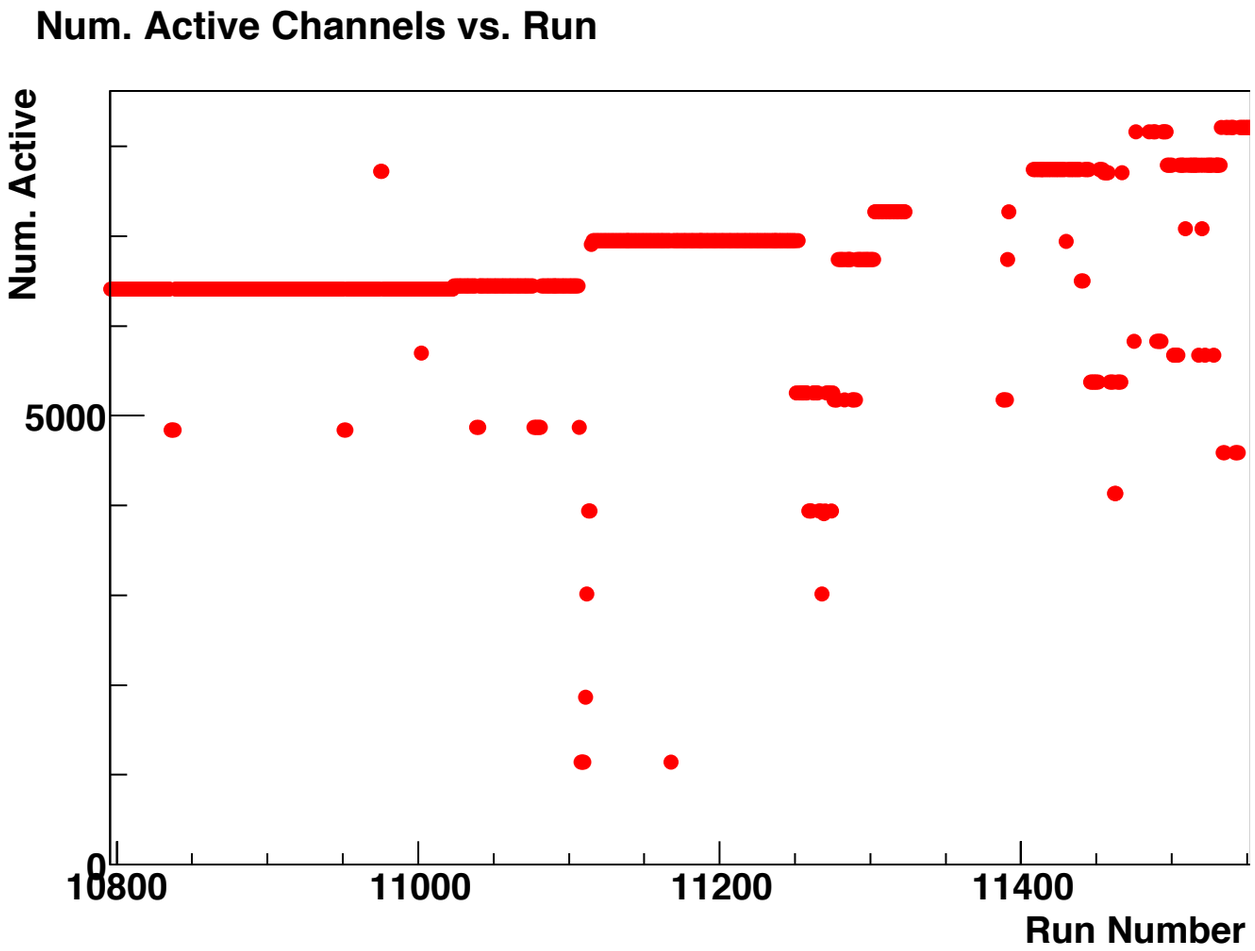
- Many FEBs have been removed from the DAQ readout because they were found to produce too much noise.
- We cannot claim we know the cause of all of the problematic FEBs, but:
  - Some APDs and fibers were found to have oil on them, some APDs were found to be very dirty, some APDs were found to have imprints of fibers on them.
  - ~60 oily/dirty APDs have been removed from the detector. The WLS fibers were cleaned, and most were replaced by new APDs (nearly all of which are reading out fine since).
  - A handful of APDs were also cleaned and reinstalled, but these have shown degradation in noise levels over time since reinstallation.
- Pedestal scans are used to identify bad channels; we see large changes in the bad channel map from one scan to another. This is being investigated.

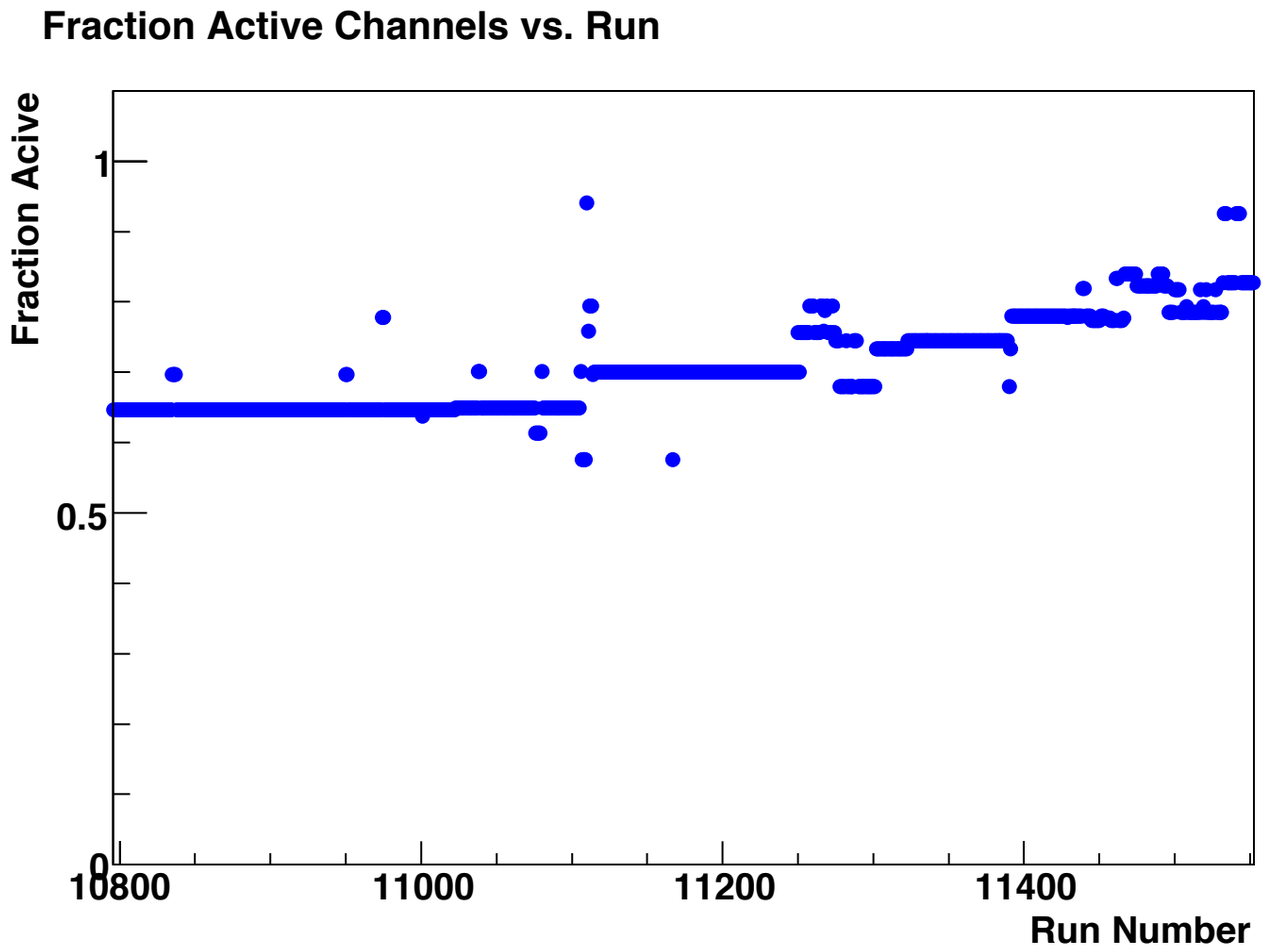
NDOS Channel Recovery





NDOS Channel Recovery

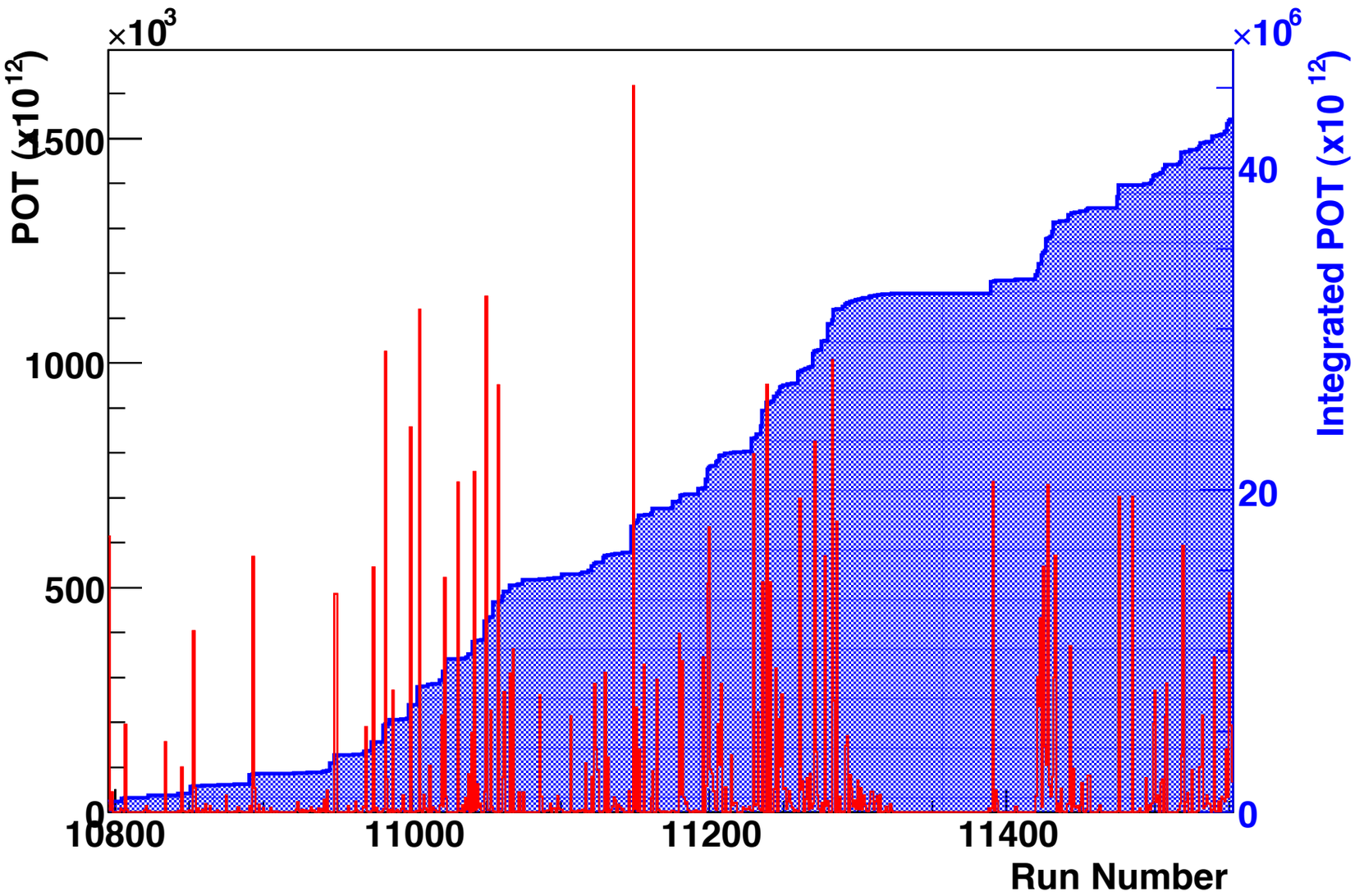




- Overall channel count is increasing over time; sudden drops are usually due to entire sections of the detector being left out of the readout for special tests or during channel recovery tasks.

- Fraction of active channels vs. run is increasing over time; note that this plot does not include efforts over this past weekend, so fraction is expected to go higher today or tomorrow.

NDOS Live Time



- "Uptime" is a bit hard to define during commissioning; when not collecting data in a "run", we are collecting other, very useful data.

- Show above: NuMI POTs (sorry, I don't have convenient access to the Booster spill information at this time).

Summary

- Commissioning is progressing well, with huge improvements in the DAQ software (and firmware).
- There are some critical issues that need to be resolved (channel recovery, APD cooling), but good progress is being made on these fronts.
- This week's installation and commissioning goals:
  - installation of the Muon Catcher
  - reinstallation of ~20 more APDs (640 channels)
  - many improvements in DAQ software
  - enabling of high voltage regulation on the FEBs
  - implementation of channel-by-channel thresholds (at much lower values than the current thresholds).