


LArIAT Weekly Meeting

First Look LArIAT Run 3a Cool-Down Noise Studies

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Fermilab

 *Neutrino Division*

Cool Down Tuesday 2017.03.14

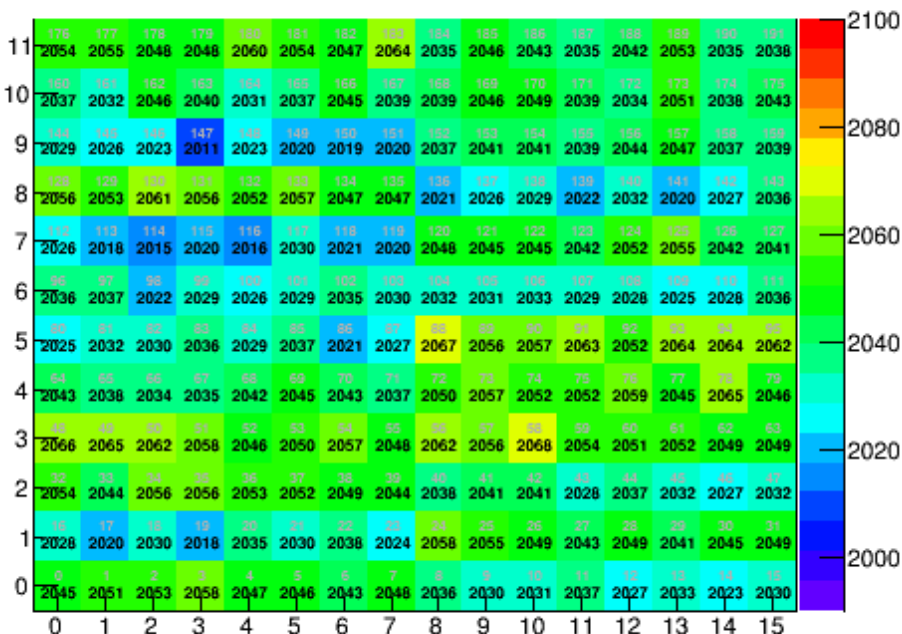
- Cool down began at approximately 09:00 am Tuesday, March 14, 2017
- Fill complete about 17:30 pm same day
- Series of pedestal (mean and RMS) runs taken about every five minutes during this cool-down time
- Raw data and a Root object summary file containing per channel information are archived
- *New* global summary files kept here:
 - /daqdata/pedestals/pedestals.dat
 - /daqdata/cryo/cryo.dat
- Above used to make following plots
- Summary plots and root file on DocDb 2134
 - Please have your own look!

Initial RMS prior to LV

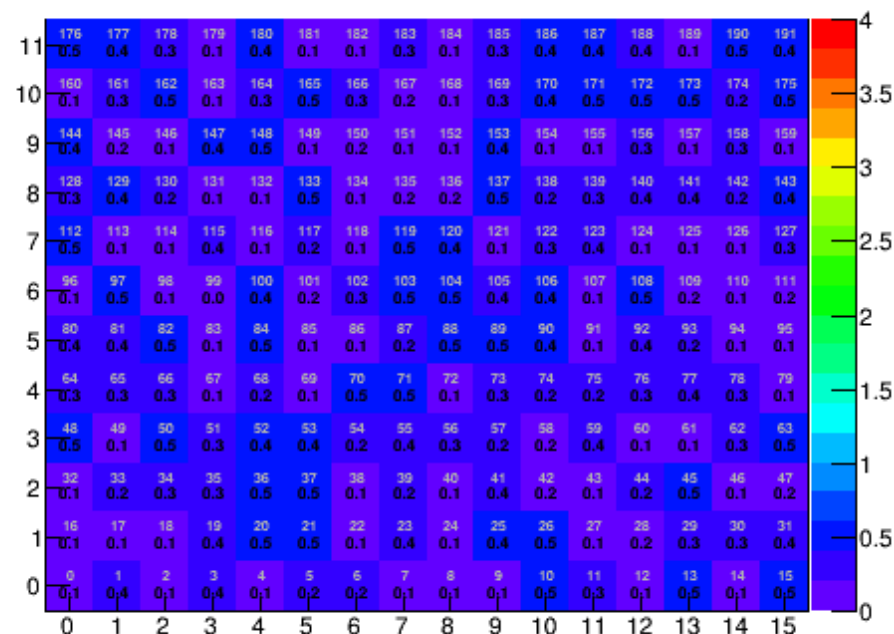
InductionPedestalMean

Pedestal Run 10701 2017.03.14-08:59:15

InductionPedestalRMS



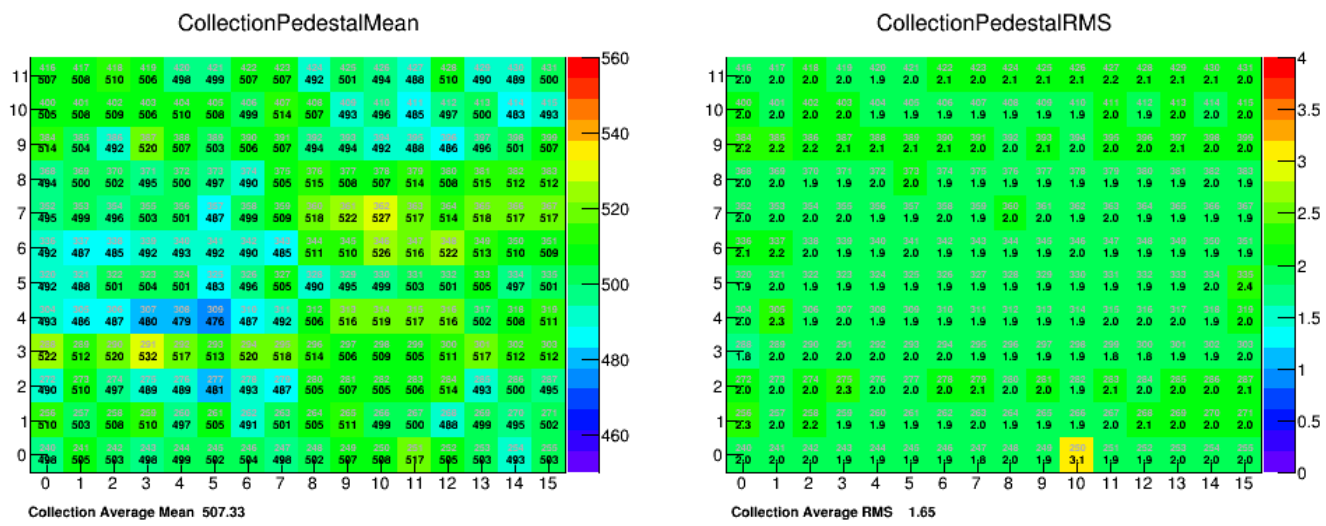
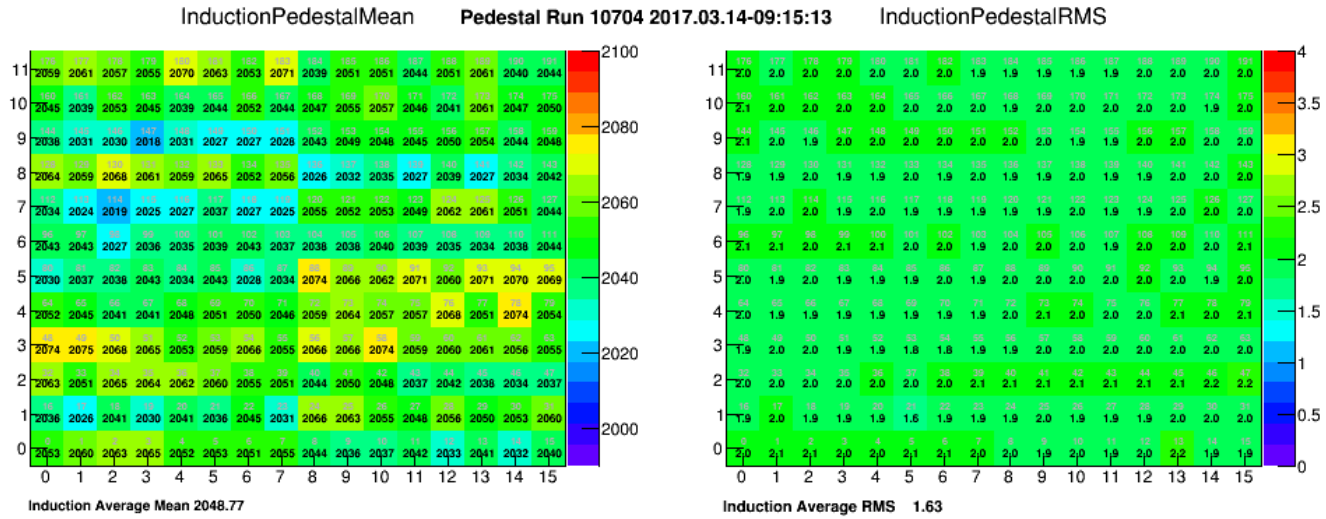
Induction Average Mean 2041.36



Induction Average RMS 0.27

Prior to applying front end LArASIC and WRD power pedestals have very low noise $\sim \frac{1}{4}$ count

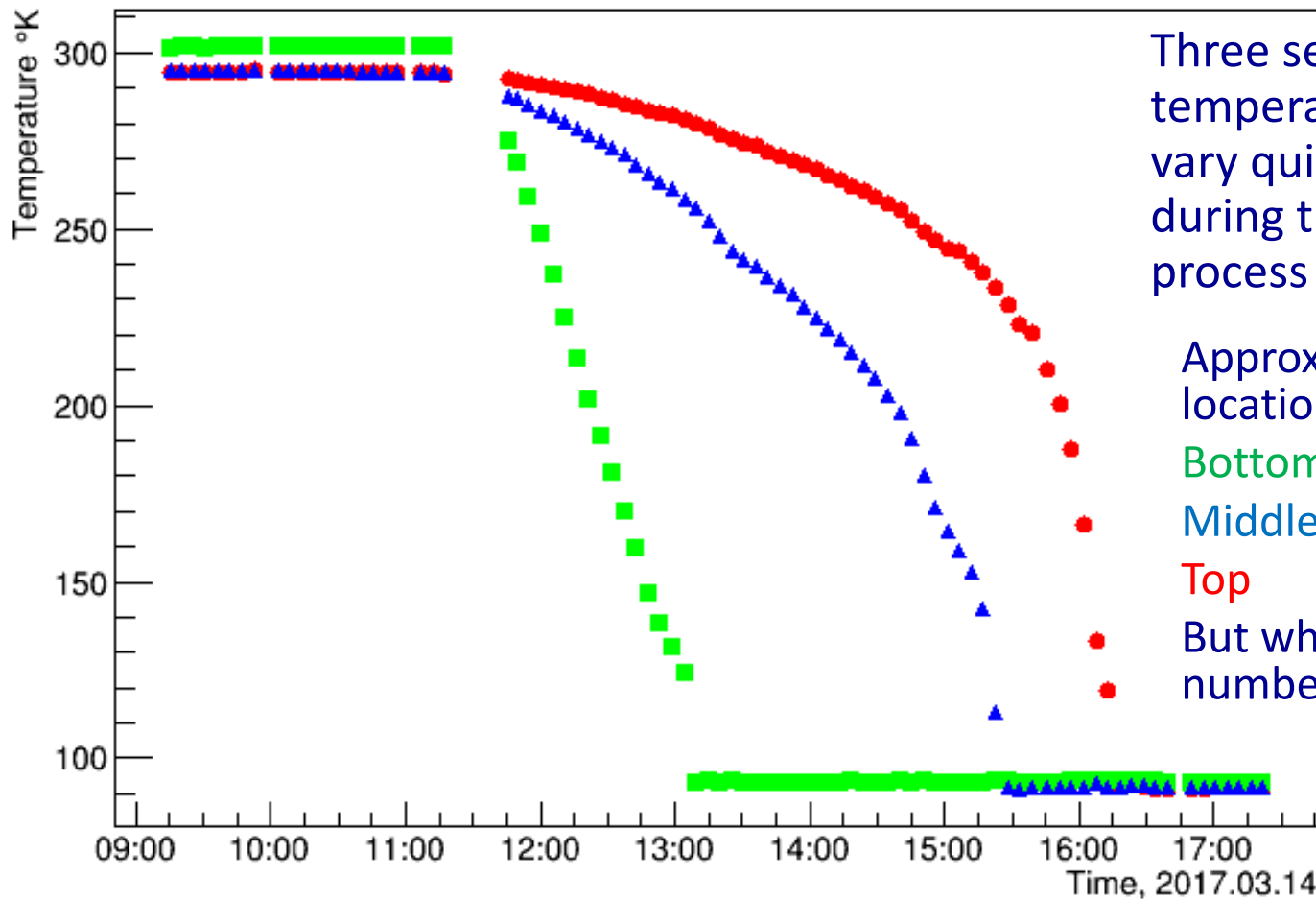
After LV Power Applied



Immediately after LV applied, before cool-down commenced, RMS ~1.65 counts

Dropping Temperature, “das cool”

Cryo Temperature vs. Time Green=Bottom, Blue=Middle, Red=Top



Three separate temperature sensors vary quite widely during the cool-down process

Approximate locations:

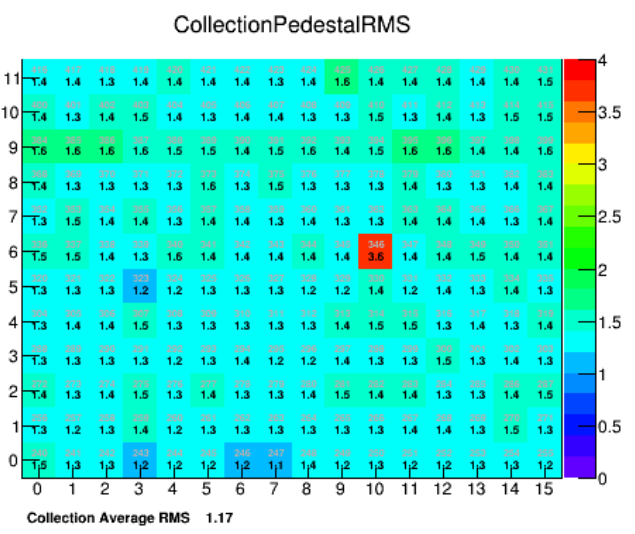
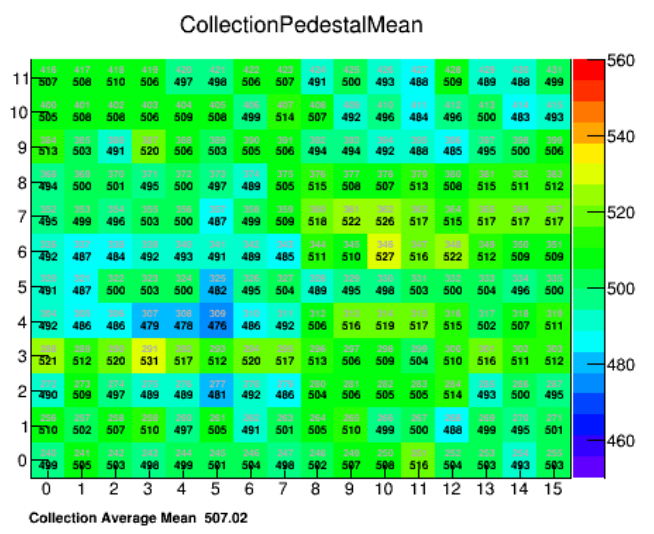
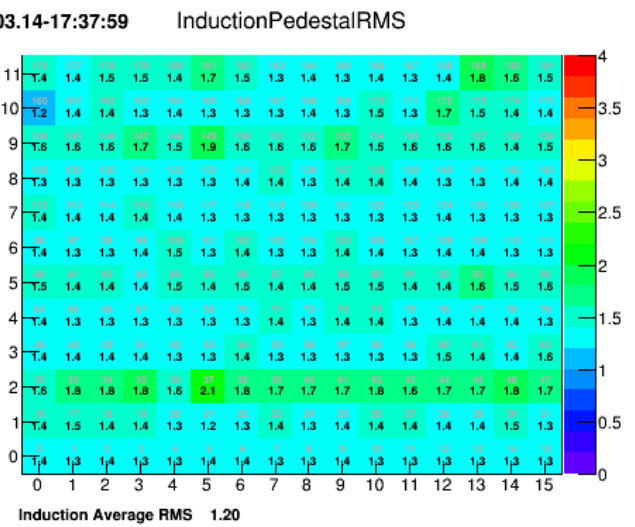
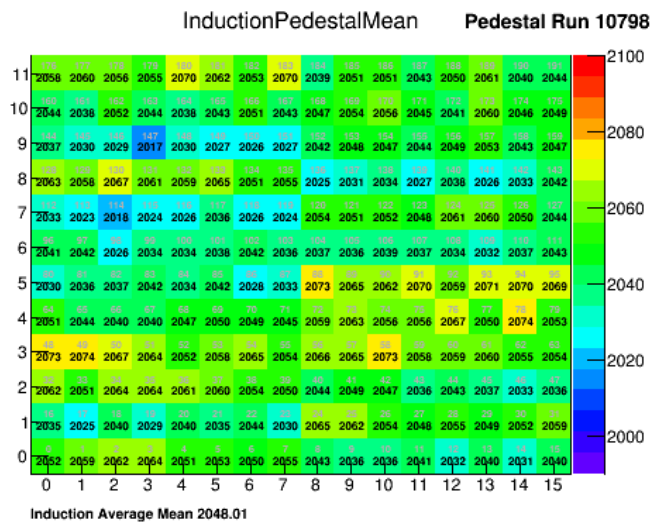
Bottom

Middle

Top

But what is the correct number to consider?

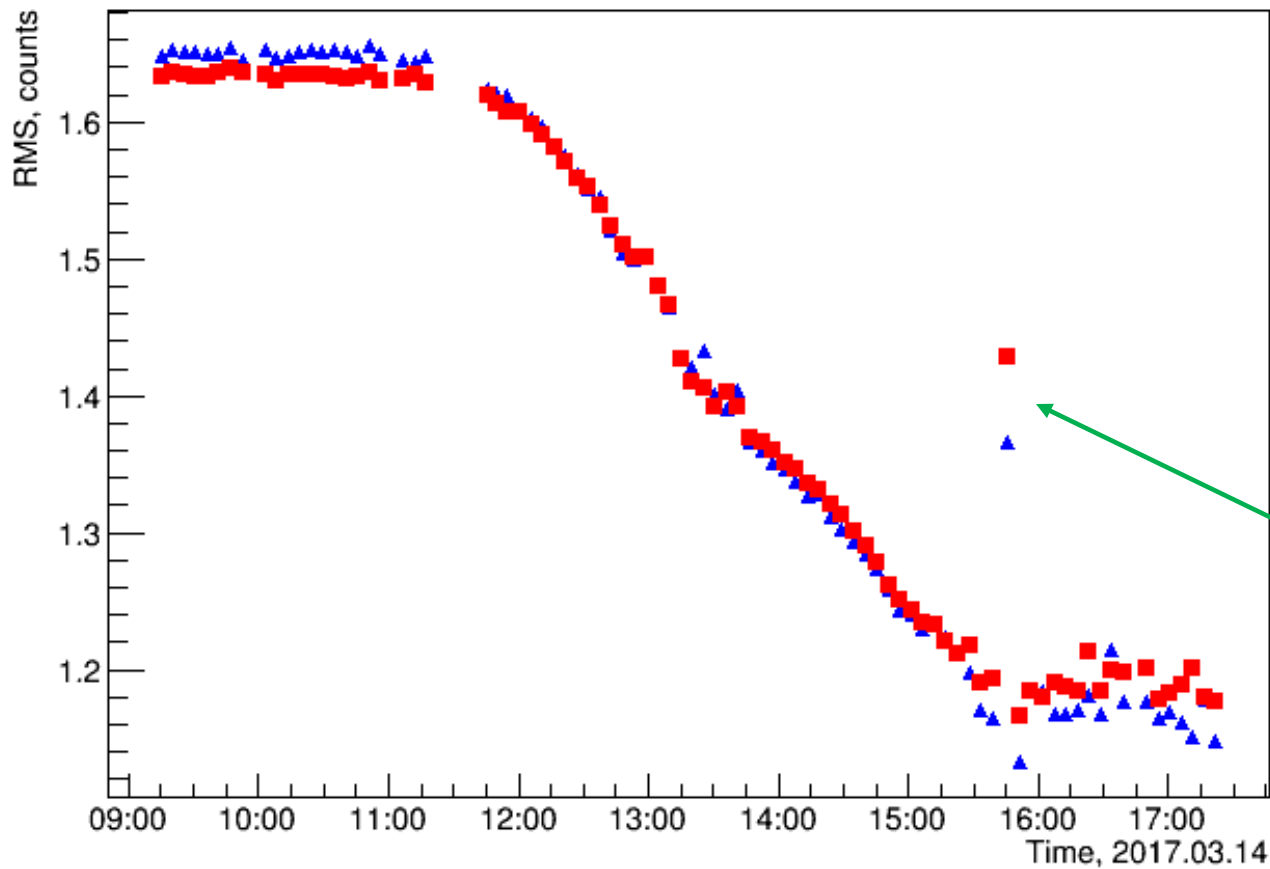
After LAr Fill Complete



Right after cool-down, RMS ~1.18 counts

Noise vs. Clock Time

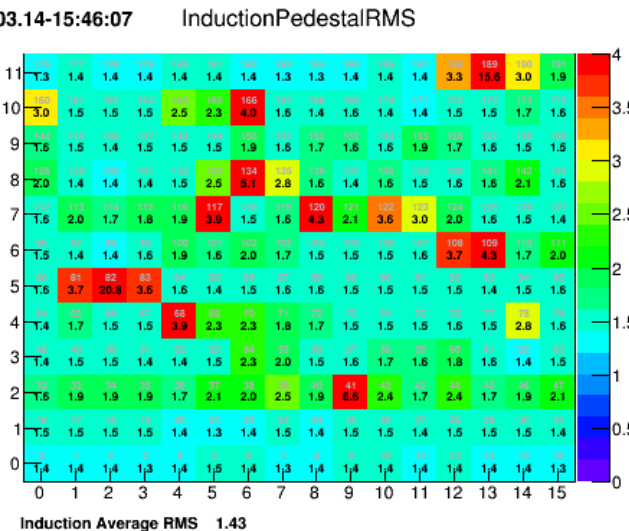
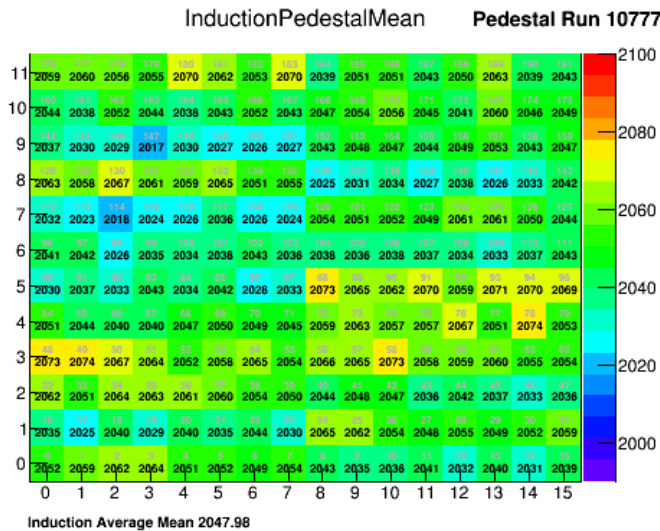
RMS vs. Time Red=Induction, Blue=Collection



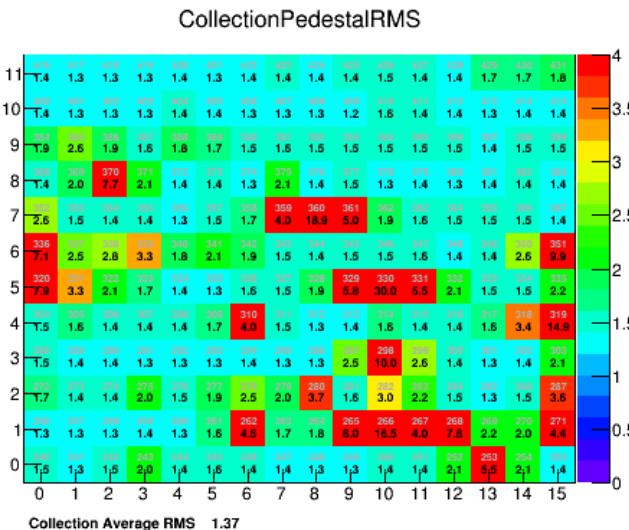
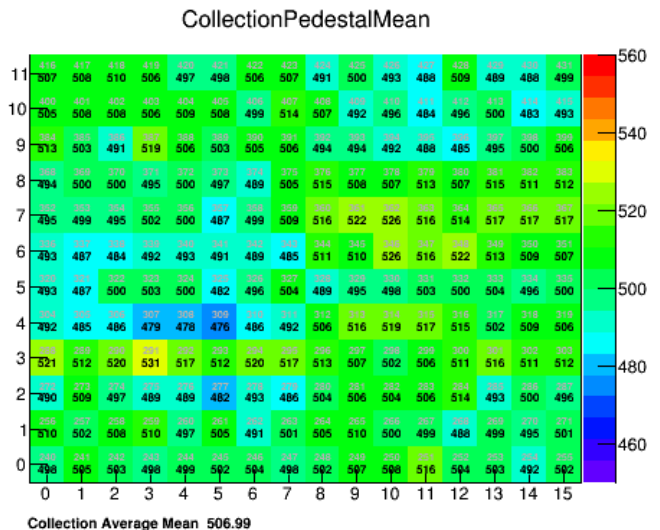
Mostly smooth decline with time

Blip presumably when LAr flow turned off (?)
(See next slide)

One Blippy Point



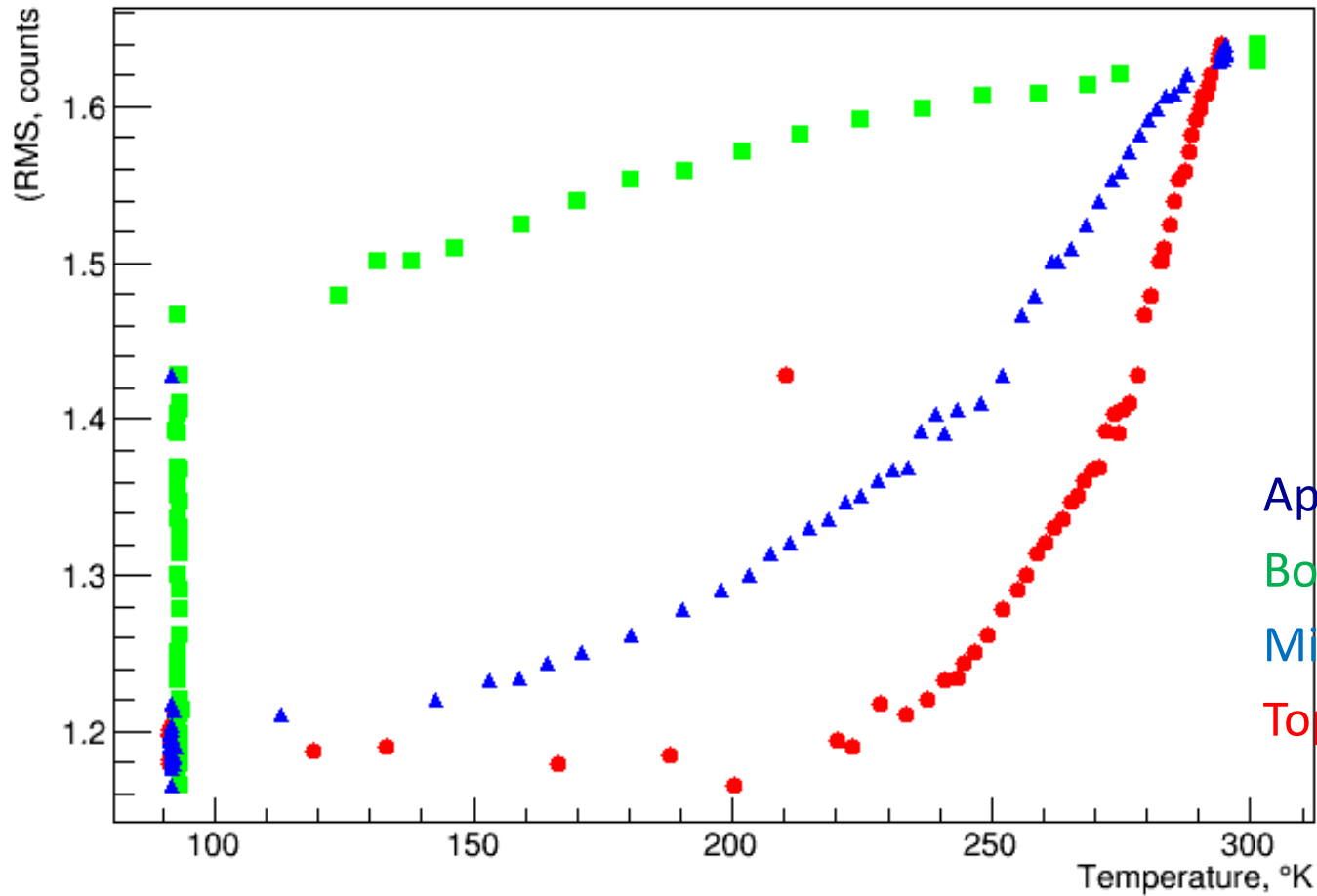
RMS Blip caused by several outlying channels (most OK)



Cryo plumbing actions "known" to cause noise issues

Results, Induction Plane

Induction RMS vs. Temperature Green=Bottom, Blue=Middle, Red=Top



voilà!

Approximate locations:

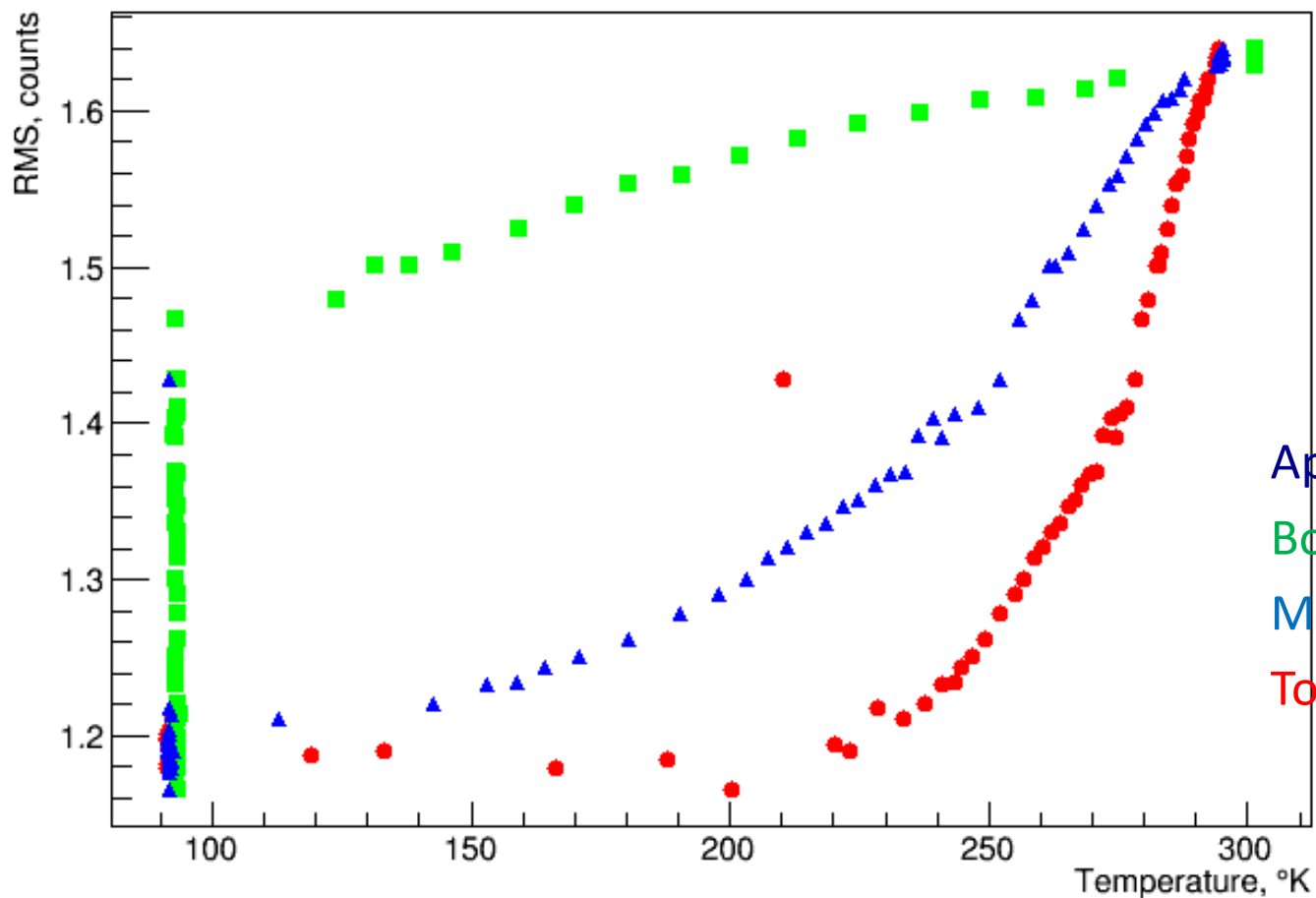
Bottom

Middle

Top

Results, Collection Plane

Collection RMS vs. Temperature Green=Bottom, Blue=Middle, Red=Top



voilà! (2)

Approximate locations:

Bottom

Middle

Top