

Dataprep code status for vertical drift

VD coldbox analysis

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Outline

CRPs

Analysis SW

DUNE SW: dataprep and prototype-specific

Extras: Hdf5 streaming and EAF

CRPs

The CRP variations (as I understand them—please correct)

- CRP1 data taken in late 2021 and Spring 2022
 - Half top electronics and DAQ: CRP1T
 - Half bottom electronics and DAQ: CRP2B
- CRP2 data: Top electronics and DAQ, July 2022
- CRP3: Future top electronics
- CRP4: Future bottom electronics
- CRP5: Future bottom electronics
- ProtoDUNE: Like CRP3 and CRP5?
 - Separate top and bottom DAQ???

Analysis SW

Vertical drift analysis packages

Top-level analysis package is [*vdcoldbox*](#)

- Follow link for instructions
- Check it out and use that area as your working directory
- Includes scripts and fcl for single-event analysis of the CRP1 (Dec 2021 vertical drift) bottom and top data.
 - Example commands:
 - Bottom: `./doOneEvent vdtype 11990 5`
 - Fcl config file (points to `vdproc`)
 - Run number (points to `11990`)
 - Event number (points to `5`)
 - Top: `./doOneTopEvent vdtype 429_1 1`
- Plots from the second command are shown on the following pages
 - Note plots include plane and adapter board boundaries
 - Plots for bottom data may be found in the talks I gave to this group in late 2021 and early 2022
 - The tools and configs used to make the plots are in *dunedataprep* and the plots can be made without use of *vdcoldbox*
- Add support for CRP2 as it is added to *dunesw*
- Same for CRP3, 4, 5 and ProtoDUNE 2V as those data appears

Example top-level config

Here is vdcoldbox/vdtproc.fcl:

```
# vdtproc.fcl

#include "vdcoldbox_raw_tdedataprep.fcl"
#include "vdcb_tools.fcl"

physics.producers.caldata.LogLevel: 3

services.RawDigitPrepService.ToolNames: [
  digitReader,           # Unpack the digits acd.raw[] and acd.pedestal
  cht_vdtcbu_raw,
  cht_vdtcby_raw,
  cht_vdtcbz_raw,
  vdtcb_adcChannelPedestalPlotter,
  vdtcb_adcChannelRawRmsPlotter
]

# So we don't get warnings when trying to write non-existent wires.
services.RawDigitPrepService.DOWires: false
physics.producers.caldata.wireName: ""

tools.adcScaleAdcToKe.ScaleFactor: 0.025

#include "evsel.fcl"
```

Example top-level config

Here is vdcoldbox/vdtproc.fcl:

```
# vdtproc.fcl
# Configure modules and services to read CRP1T data
#include "vdcoldbox_raw_tdedataprep.fcl"
#include "vdcb_tools.fcl"           Vertical-drift tool configs

physics.producers.caldata.LogLevel: 3      Too noisy?

services.RawDigitPrepService.ToolNames: [  Dataprep tool sequence
  digitReader,                          # Unpack the digits acd.raw[] and acd.pedestal
  cht_vdtcbu_raw,
  cht_vdtcby_raw,      Event displays
  cht_vdtcbz_raw,
  vdtcb_adcChannelPedestalPlotter,      Metric vs. channel plots
  vdtcb_adcChannelRawRmsPlotter
]

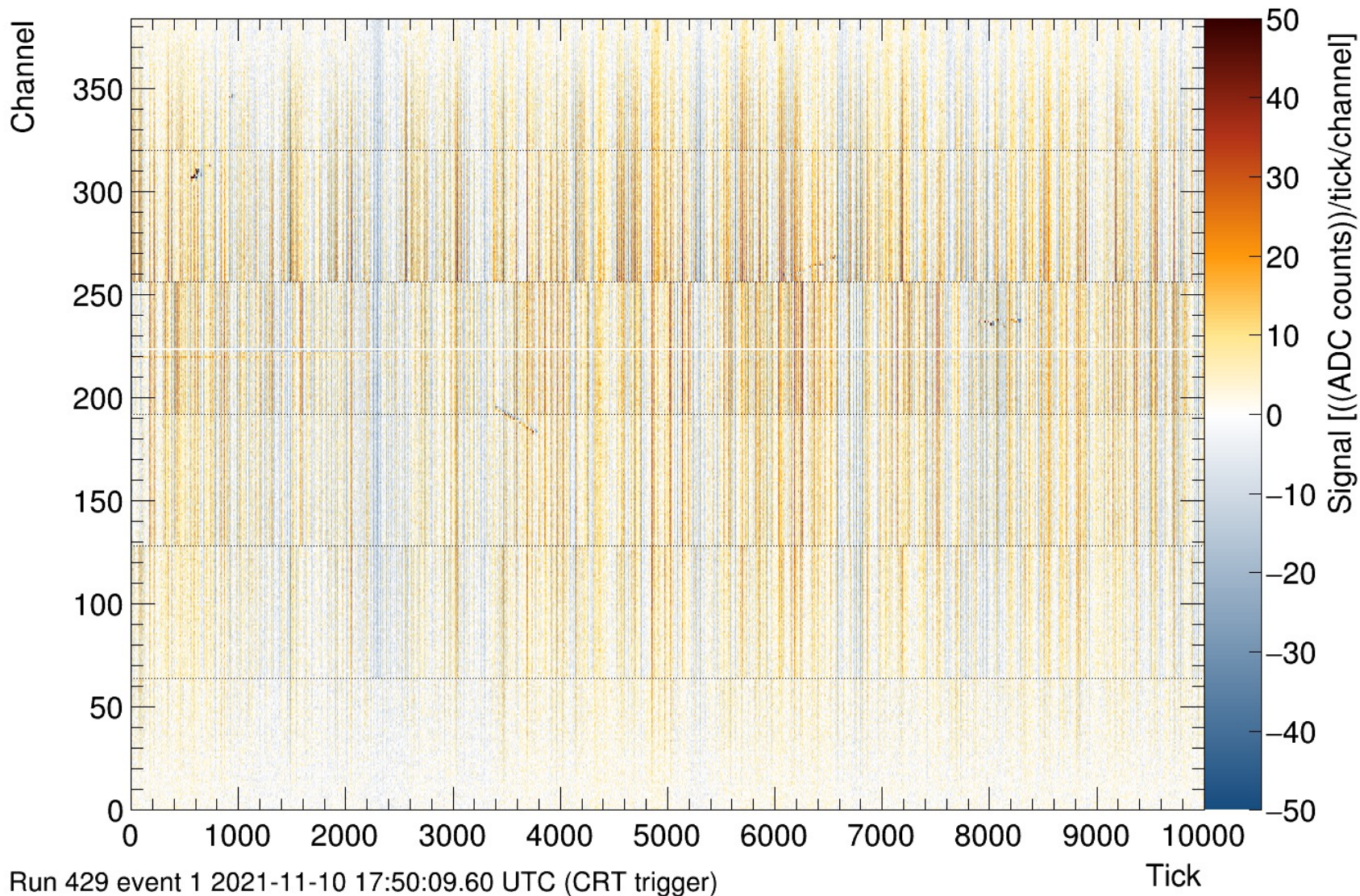
# So we don't get warnings when trying to write non-existent wires.
services.RawDigitPrepService.DOWires: false
physics.producers.caldata.wireName: ""

tools.adcScaleAdcToKe.ScaleFactor: 0.025  ADC to charge calibration factor. Not
correct and not (yet) used.

#include "evsel.fcl"      Skip over all but the one event of interest
```

CRP1T event display U

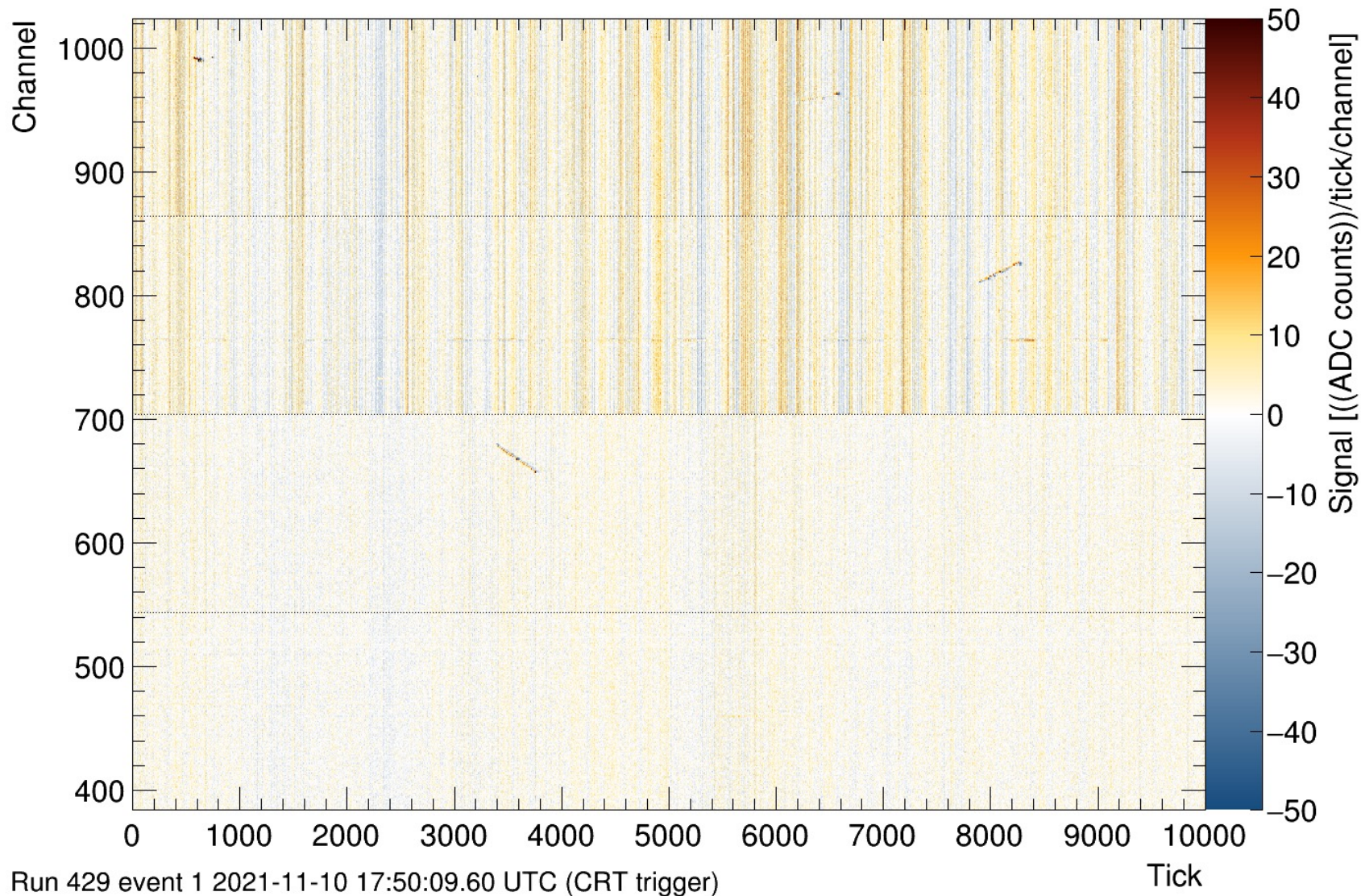
Pedestal subtracted ADC



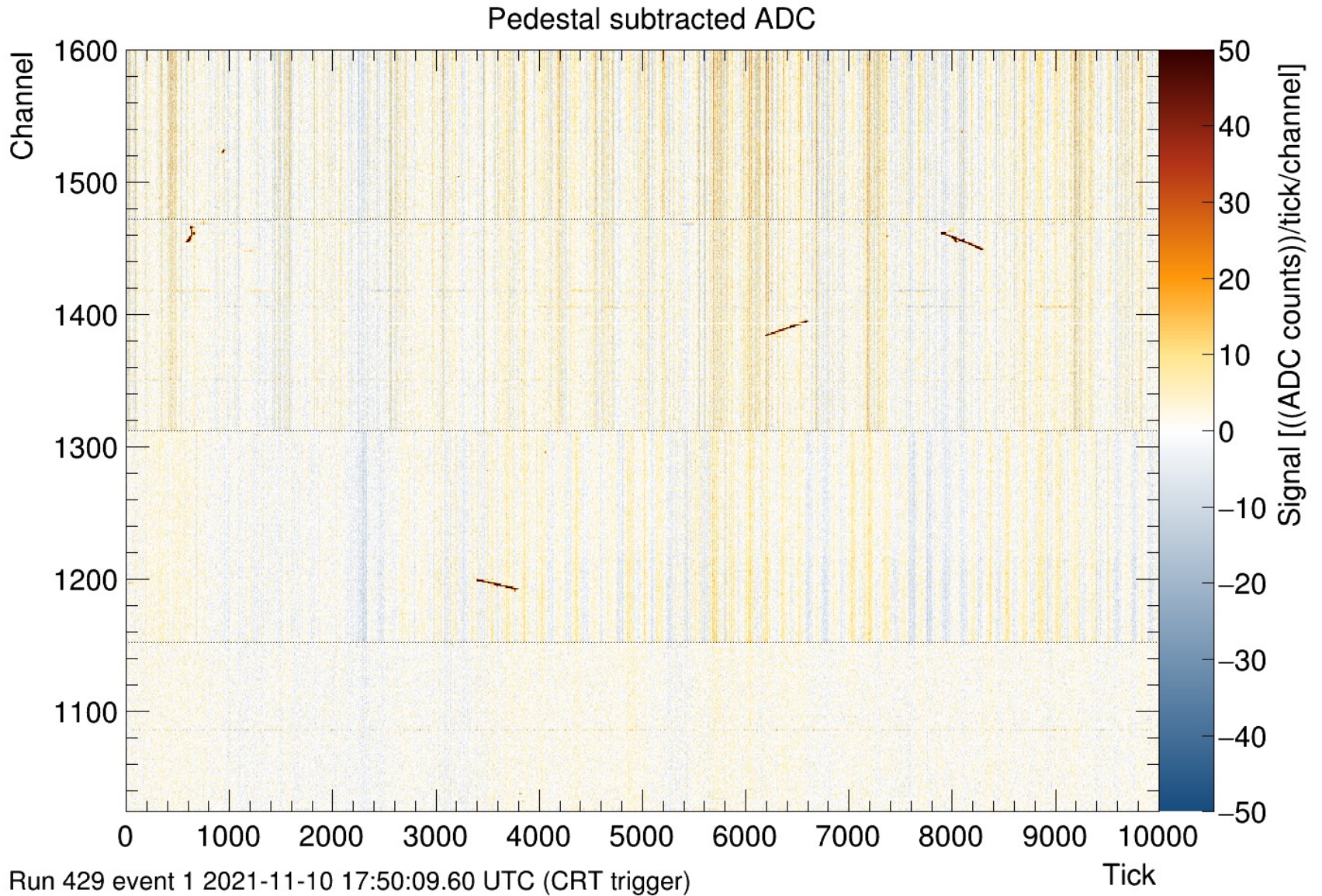
Run 429 event 1 2021-11-10 17:50:09.60 UTC (CRT trigger)

CRP1T event display Y

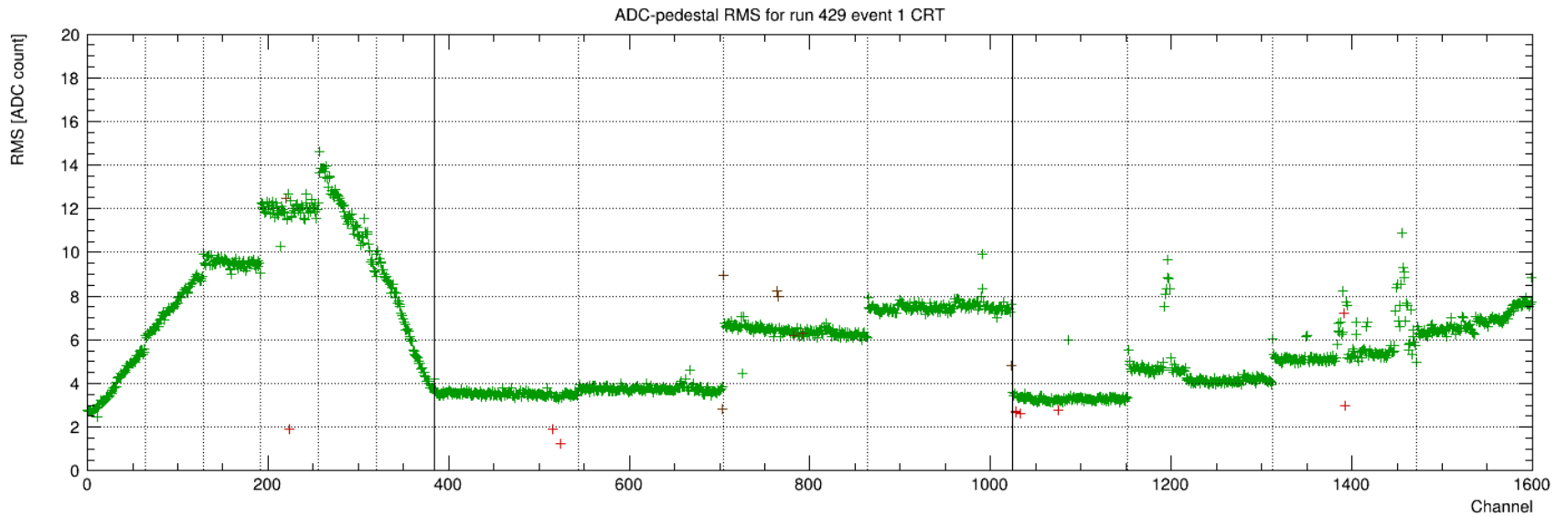
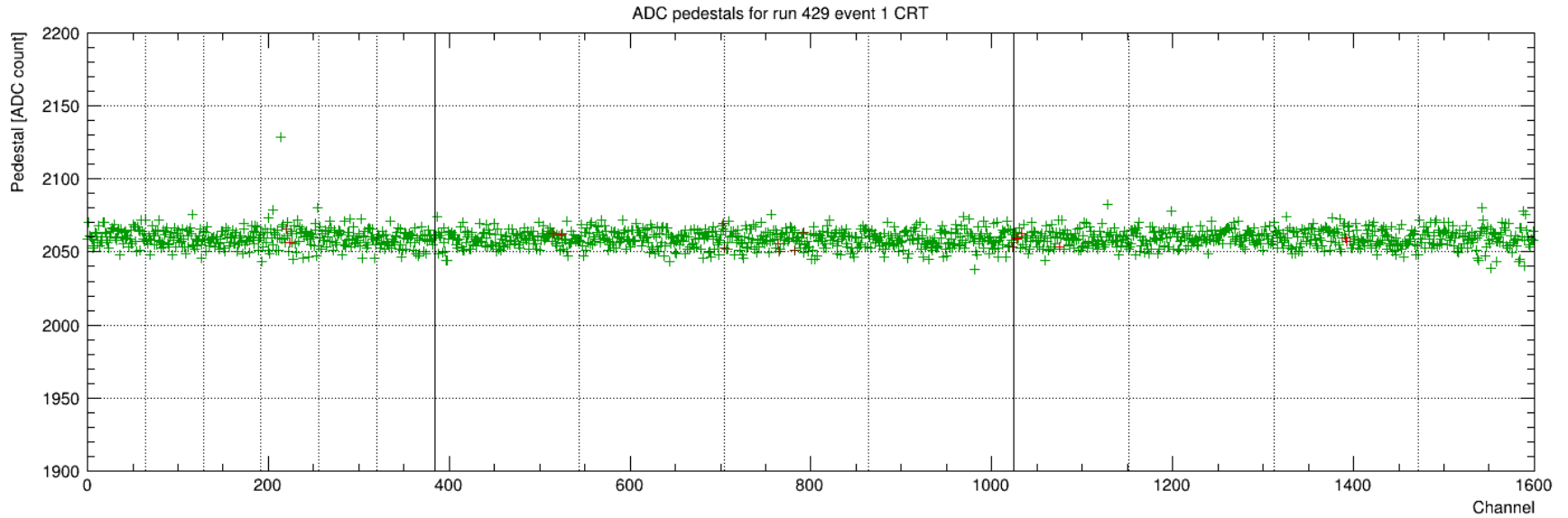
Pedestal subtracted ADC



CRP1T event display X



CRP1T pedestal and RMS



DUNE SW

DUNE SW for processing vertical drift data

Decoding module

- In place for both bottom and top electronics and data formats?
- Is this unchanging for CRP1-5 through protoDUNE?

Channel maps

- Have for CRP1B, CRP1T, CRP2 (new)
- Same for CRP3,, protoDUNE?

Channel range and group tools

- Have for CRP1B and CRP1T (?)
- Need to add for CRP2 and so on

Dataprep tool configs

- Event display, metric vs. channel, CNR, DFT power, ...
- Have all these for CRP1B
- Have first two for CRP1T
- Need some or all for CRP2 and so on

CRP naming conventions

There are many vertical-drift variants planned

- Different CRPs, top/bottom electronics, data format, channel maps
- Naming conventions can help us keep track of which tool configs and plots correspond to each variant

Present naming convention:

- Now using labels vdcb and vdbcb for CRP1 bottom data
- And vdtcb for top data

What to use for CRPX (X=2,3,4,5) & ProtoDUNE (same as CRP5?)?

- My 1st suggestion: crpX, crppd
 - Better crpcbX, crppd?
- Slavic suggests (I think): crpXpd
- May be if map and det boundaries don't change, these can all be the same, e.g. all crppd?

Extras

Hdf5 streaming

- Want to mention it is possible to directly stream hdf5 files from dcache but only if a non-standard Xroot libs are used
 - And those have some side effects

Analysis on Jupyter

- FYI, I have moved most of my analysis from dunegpvm to EAF (FNAL Jupyter server)
- Easy to view and copy image files from a remote terminal (my laptop in NY) as they are produced
- Extra authentication step: connect to EAF with service credentials and then have fetch Kerberos credentials to access data
- And EAF has been less reliable than dunegpvm
 - But support staff has been very responsive (w/o service desk)
 - Lack of a shared file system means we can't easily use both together or switch from one to the other
 - Hos forced me to be mor diligent about pushing mods to github