

ProtoDUNE missing FEMBs

DUNE DRA

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Introduction

The protoDUNE detector is being commissioned

- Filling with LAr this month
 - Close to full by now
- Data taken sporadically as detector cools
 - List of runs I have studied is at [https://wiki.dunescience.org/wiki/ProtoDUNE_commissioning_runs_\(dla\)](https://wiki.dunescience.org/wiki/ProtoDUNE_commissioning_runs_(dla))
 - DQM plots (Channel-tick, metric vs. channel) for many runs at <http://home.fnal.gov/~dladams/protodune/dqm/index.html>
 - DFT of noise for one run is at <http://home.fnal.gov/~dladams/protodune/dftplots/run003775/tps0/plots.html>

I notice missing FEMBs as I look at data

- I try to look at a “Noise” run each day
 - Often I just try to make display for one event
 - But I skip tens of events of events a few times to get on that looks complete—others are missing data from few or many FEMBs
- I have added AdcEventViewer to study this
 - Plots distribution and event dependence of #FEMBS with data each event

AdcEventViewer results

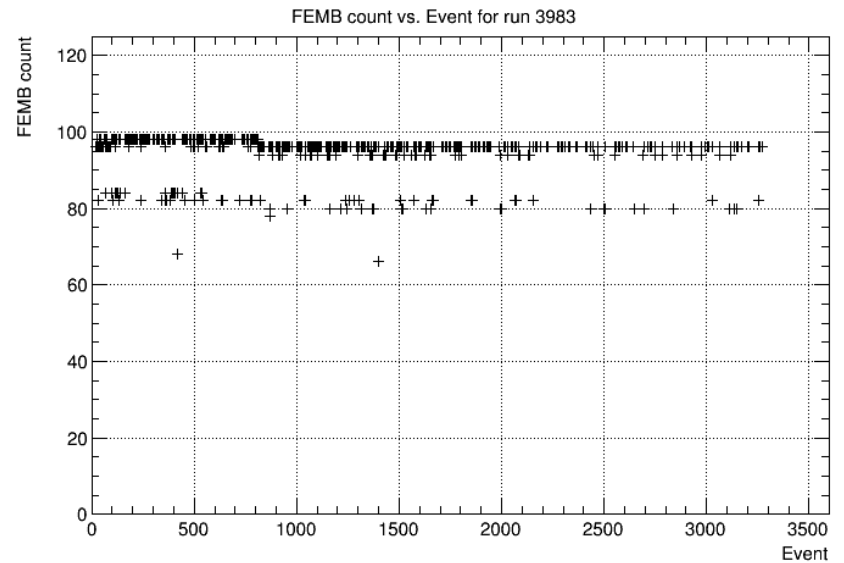
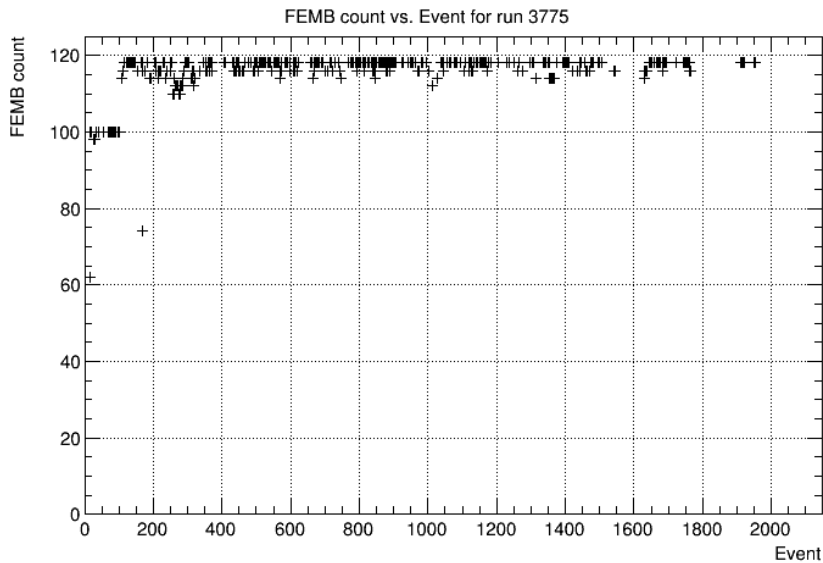
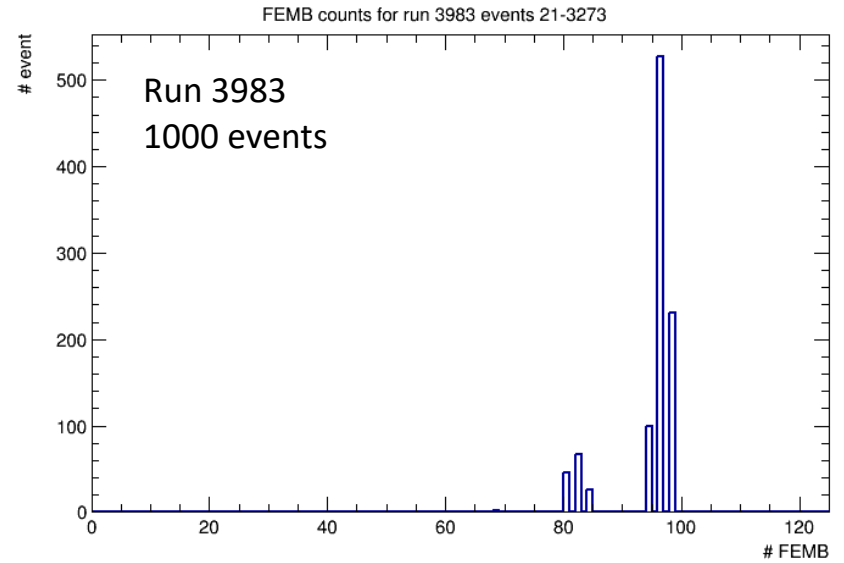
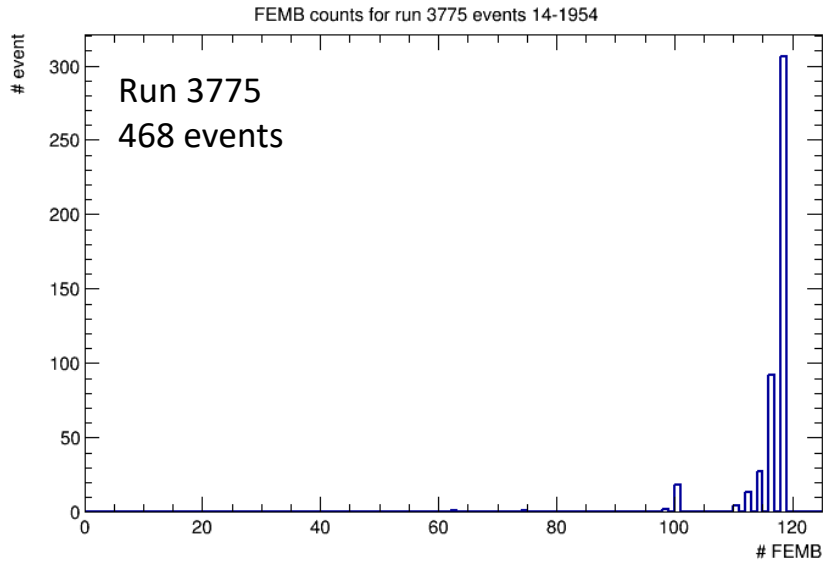
I processed a couple runs with AdcEventViewer

- Run 3775 is recent noise run that looks pretty good
- Run 3981 was taken yesterday and is missing one APA
- Tried to process 1000 events for each
 - Using selected files below
 - Run 3981 succeeded right away (1.3 hours)
 - Run 3775 restarted twice due to bad file crashes
 - Results here are at second crash (468 events)
- Plots are on the following page

np04_raw_run003775_0001_d11.root
np04_raw_run003775_0001_d12.root
np04_raw_run003775_0001_d13.root.BAD
np04_raw_run003775_0001_d14.root
np04_raw_run003775_0001_d15.root.BAD
np04_raw_run003775_0001_d16.root
np04_raw_run003775_0001_d17.root
np04_raw_run003775_0001_d18.root

np04_raw_run003983_0001_d11.root
np04_raw_run003983_0001_d12.root
np04_raw_run003983_0001_d13.root
np04_raw_run003983_0002_d11.root
np04_raw_run003983_0002_d12.root
np04_raw_run003983_0002_d13.root
np04_raw_run003983_0003_d11.root
np04_raw_run003983_0003_d12.root
np04_raw_run003983_0003_d13.root

FEMBs each event



Identifying missing-FEMB events

FEMBs are often missing in a event

- See preceding slide
 - 30% of events in run 3775
 - 20-80% in run 3983 (FEMB pair went bad during the run)

Want to identify the missing-FEMB events

- Might use FEMB count
 - But need to know how many to expect
 - And what if one goes out and another comes in (same count)?
- Raw data unpacker should know if there are problems
 - Recently upgraded to write out raw data status (RDStatus)
 - Has two flags:
 - » Corrupt data retained
 - » Corrupt data dropped
 - I looked at first file in run 3775
 - All events have corrupt data retained
 - Count of data dropped events looks close to count of missing-FEMB events

Skipping missing-FEMB events

I try to modify the DataPrep module to skip missing-FEMB events

- For now, skip those where RDStatus indicates data was dropped
 - Better to do this in unpacker?
 - Does option already exist
- Not easy to “skip events”
 - Module is a producer (rather than filter?) and is required to produce its data products
 - Event loop exits if I return from producer before storing products
 - So I “skip events” by storing empty products (recob::Wire)
 - AdcEventView plots without and with skipping events are shown on the following page
 - For first file in run 3775
 - We are not selecting the right events!

