CRP #6 + PDS processing with LArSoft

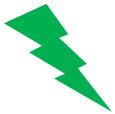
Yoann Kermaïdic

ProtoDUNE-VD

June 14th, 2024

IJCLab Irène Joliot-Curie Laboratoire de Physique des 2 Infinis
université PARIS-SACLAY
cnrs

Recap from May 3rd meeting

- Will approve the current PRs 
- Look into recent CRP light files decoding and reconstruction 
- Then request production of valid BDE runs 

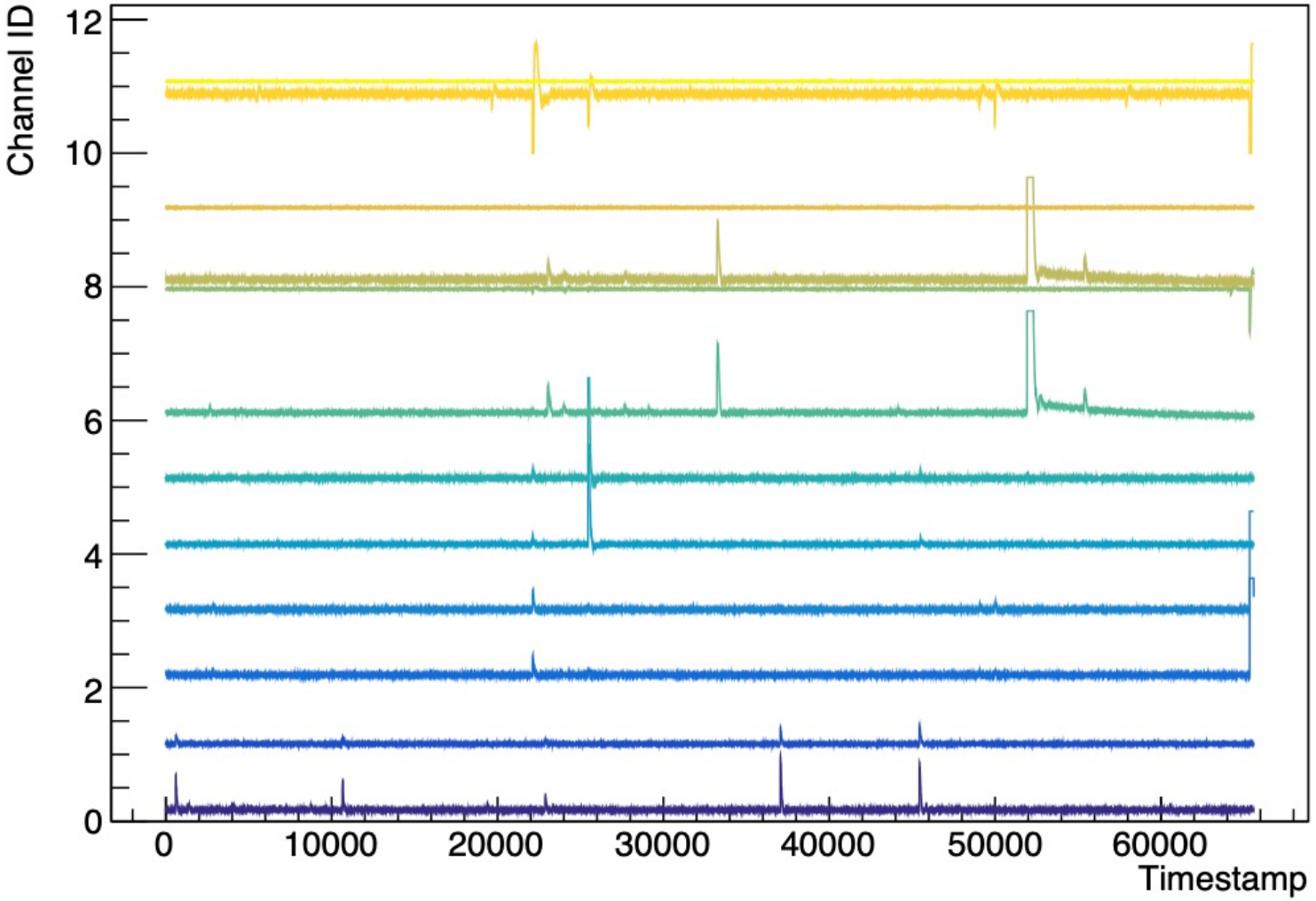
PDS DAPHNE decoder

- Worked out the latest DAPHNE version data decoder with Jake
- Setup a proper PDS channel with Ajib

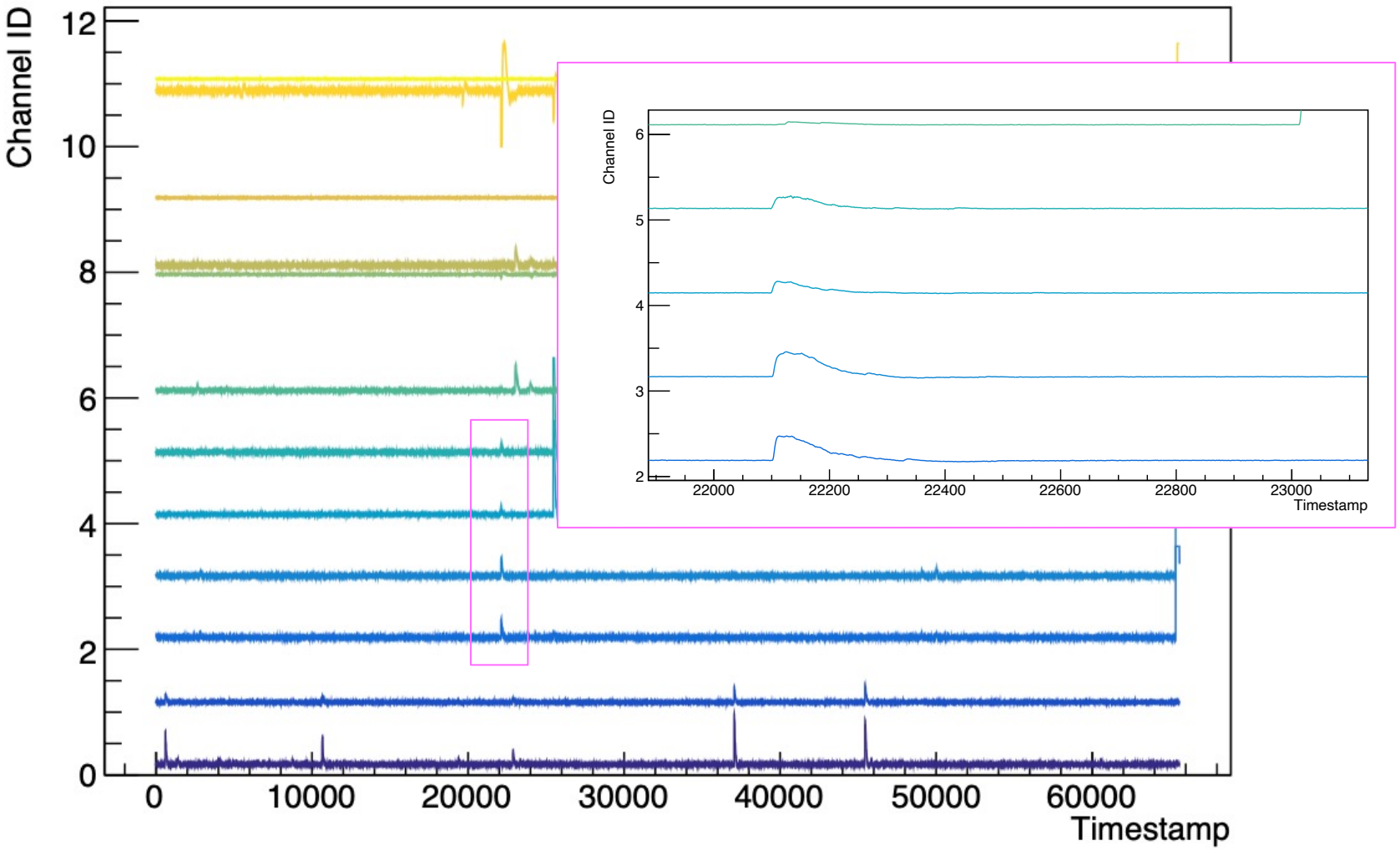
```
DAPHNEChannelMapService: {
 FileName: "temp_vdcb_channelmap.txt"
 IgnoreLinks: true
}
```

```
physics: {
 producers: {
      rns:              { module_type: "RandomNumberSaver" }
      #Decoders
      tpcrawdecoder:     @local::PDHDTPCReaderDefaults
      pdhddaphne:        @local::DAPHNEReaderPDHD
```

PDS raw waveforms



PDS raw waveforms



PDS deconvolution

- LArSoft PDS pipeline relies on conversion from `raw::OpDetWaveforms` to `recob::OpWaveforms`
- Done by the deconvolution step

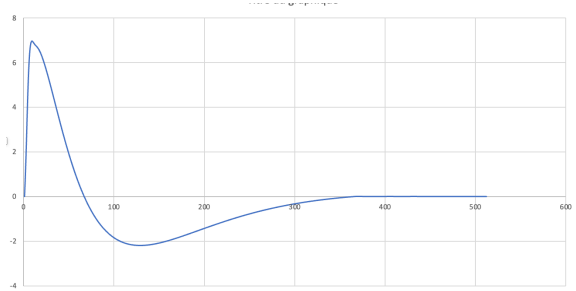
```
physics: {
  producers: {
       rns:              { module_type: "RandomNumberSaver" }
       #Decoders
       tpcrawdecoder:      @local::PDHDTPCReaderDefaults
       pdhddaphne:         @local::DAPHNEReaderPDHD
       #PDS reco
       opdec:              @local::dune_deconvolution
       ophitspe:           @local::dune_ophit_finder_deco
       opflash:            @local::protodune_opflash
       opslicer:           @local::protodune_opslicer
```

PDS deconvolution

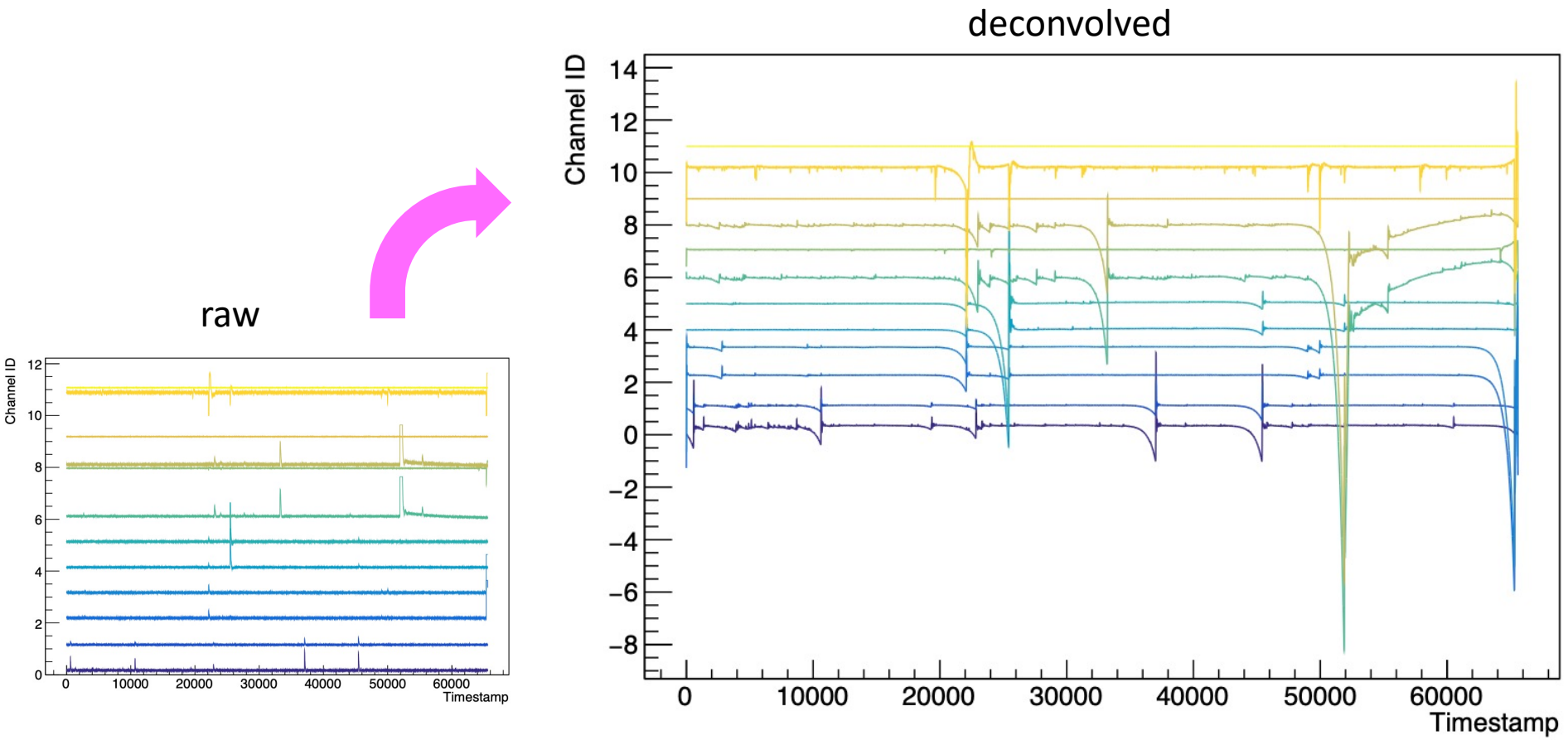
- LArSoft PDS pipeline relies on conversion from `raw::OpDetWaveforms` to `recob::OpWaveforms`
- Done by the deconvolution step

```
physics: {
  producers: {
       rns:              { module_type: "RandomNumberSaver" }
       #Decoders
       tpcrawdecoder:      @local::PDHDTPCReaderDefaults
       pdhddaphne:         @local::DAPHNEReaderPDHD
       #PDS reco
       opdec:              @local::dune_deconvolution
       ophitspe:           @local::dune_ophit_finder_deco
       opflash:            @local::protodune_opflash
       opslicer:           @local::protodune_opslicer
```

- Which makes use of a default template waveform
- Obviously not adequate for the PDS R&D runs in CRP6



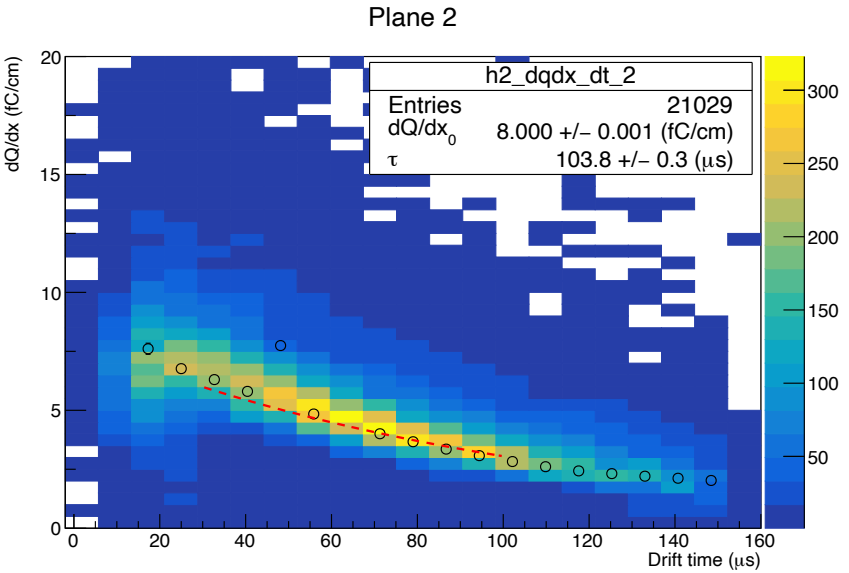
PDS deconvolution

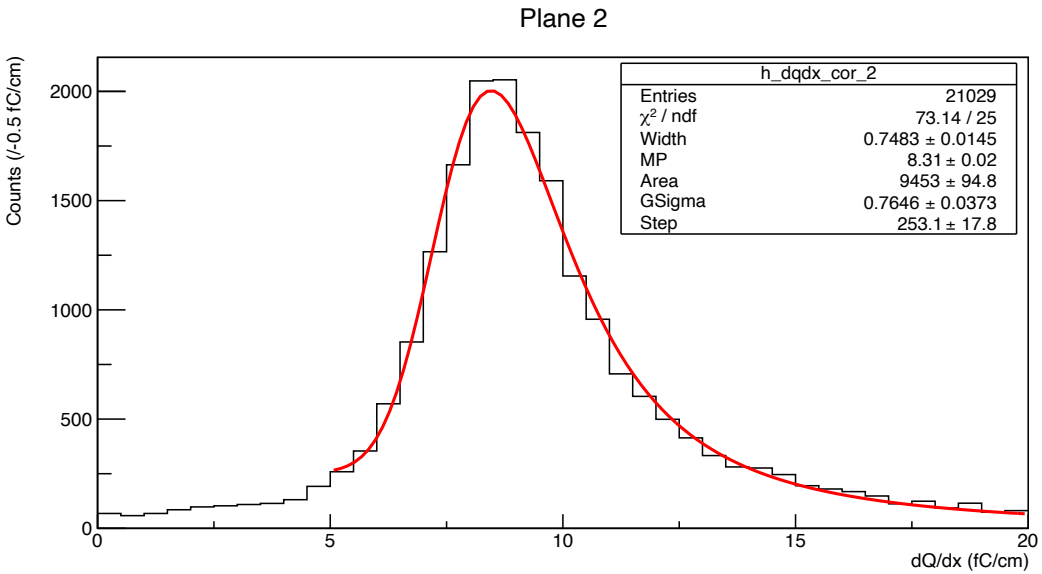


- Need to by-pass this step and run hit/flash finder on raw Wf

CRP data analysis

- Quick look at ongoing production (run 25086) shows no particular issues in terms of reconstruction pipeline
- More exhaustive studies made by Laura Z. with LARDON





Outlook

- First CRP+PDS data reconstruction chain implemented in LArSoft for VD prototypes to my knowledge
- Proper PDS configuration to be implemented

- Next:
  - Look at charge + light coïncidences
  - PNS data to be studied
  - …