

READING COLD BOX DATA WITH LARDON

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Liquid Argon Reconstruction Done in pythON



-> Code originally written to read & reconstruct protoDUNE dual phase data
[2 orthogonal collection views with 'top' electronics]

Runs faster for similar performances as LArSoft

[pyHEP 21 talk](#)

[github](#)

A LARDON version has been coded to be able to read the 50L data
[2-3 views with collection & induction, using 'bottom' electronics]

[GitHub](#)

Now we plan to make a 'cold box' version of LARDON which could read both top & bottom data

Reading Cold Box Data (bottom)

We managed to make a basic code which can decode the hdf5 file, rearrange the channels read in each link to 'DAQ' channels or View channels.

-> Many thanks to Giovanna for the help regarding the decoding part & Tom for the channel mapping file

This python basic code needs the following librairies :

numpy, matplotlib, numba [to compile one function so it runs faster], and pytables [to read the hdf5]

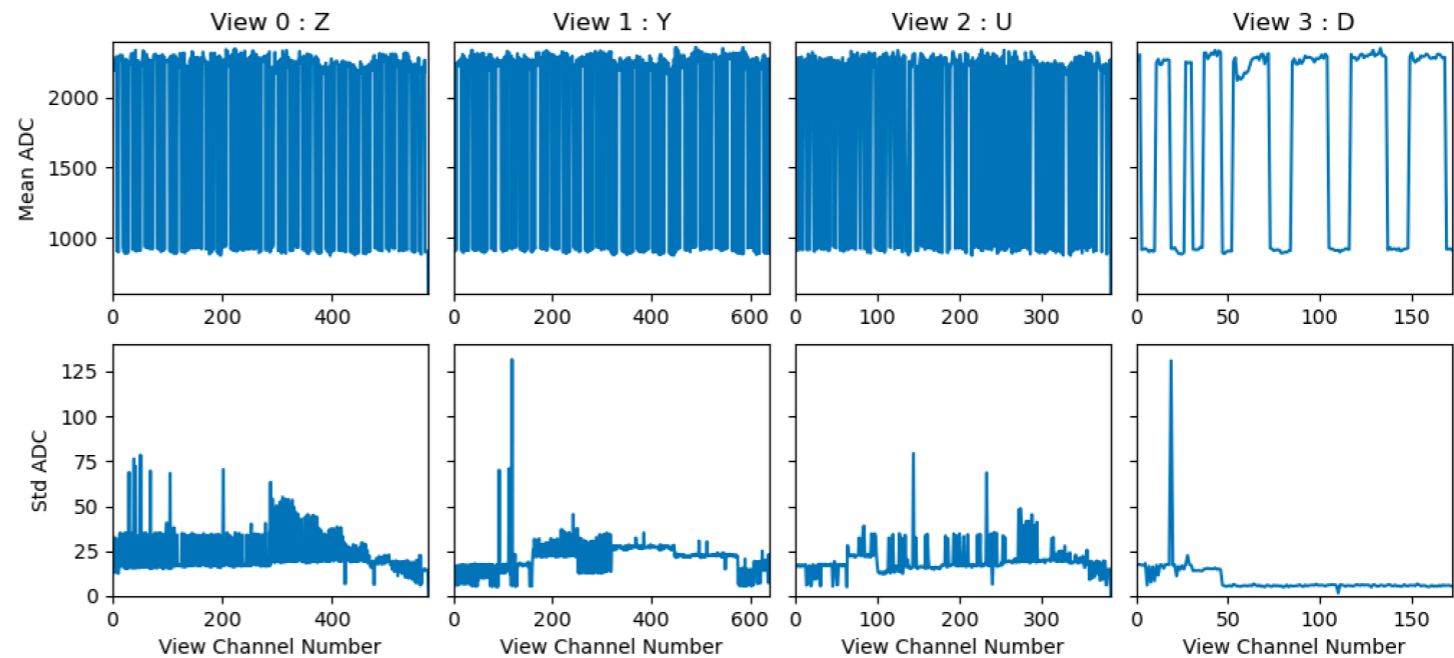
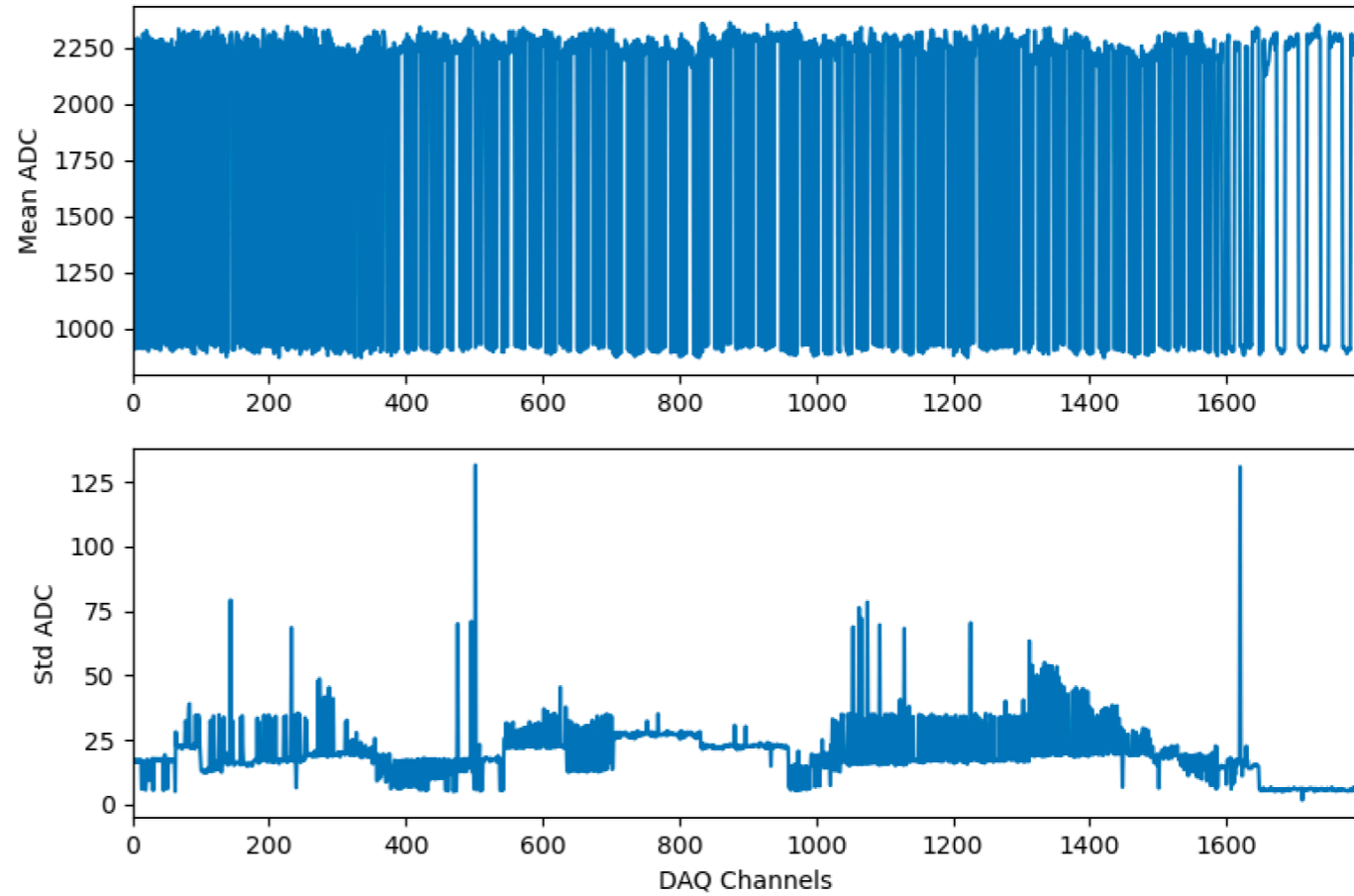
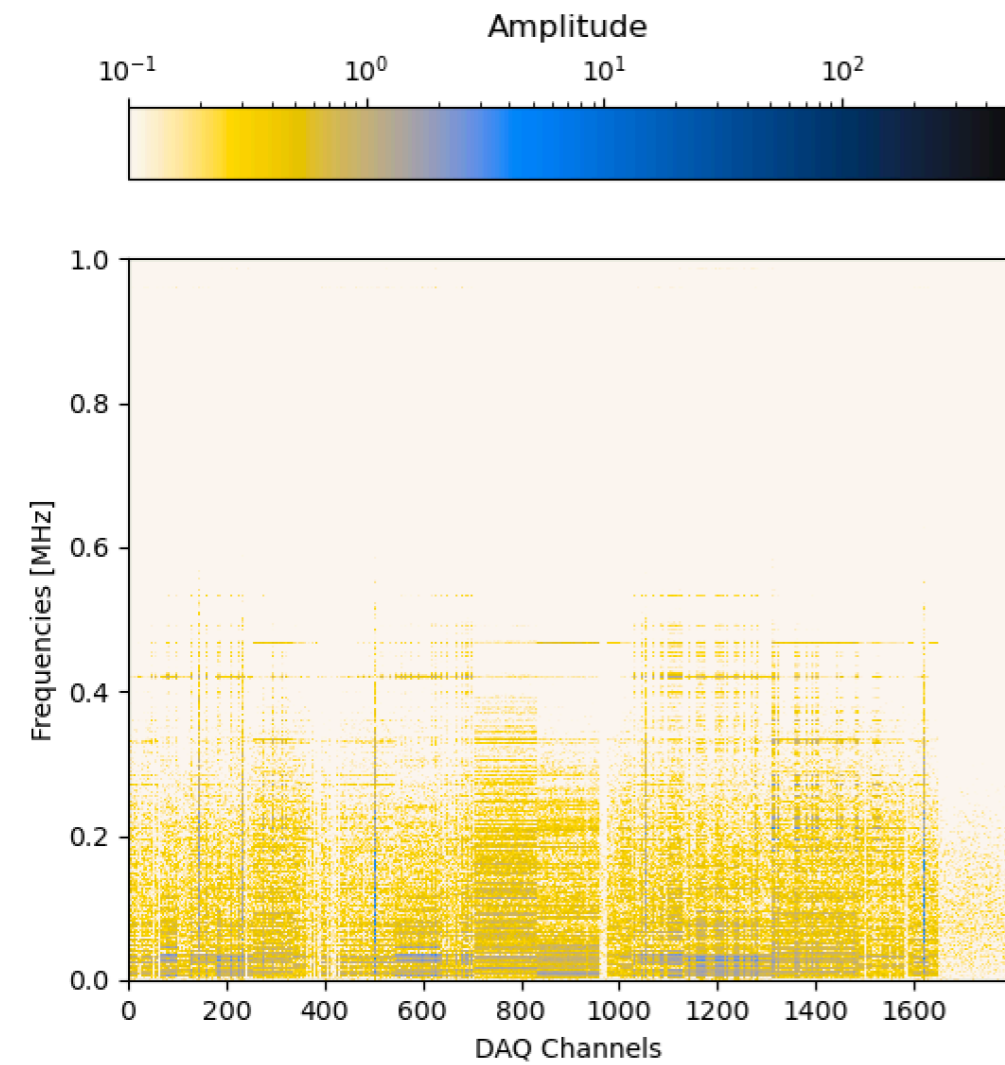
If you're interested we can of course share it as it is now, although we will make a more general code soon

It runs as :

```
python basic_bde.py -file your_file.hdf5 -n nb_of_events_to_process
```

Reading Cold Box Data (bottom)

Example for run 11972 event 1 with the channel mapping v1



[NB: add 1600 to get the official DAQ channel numbering]

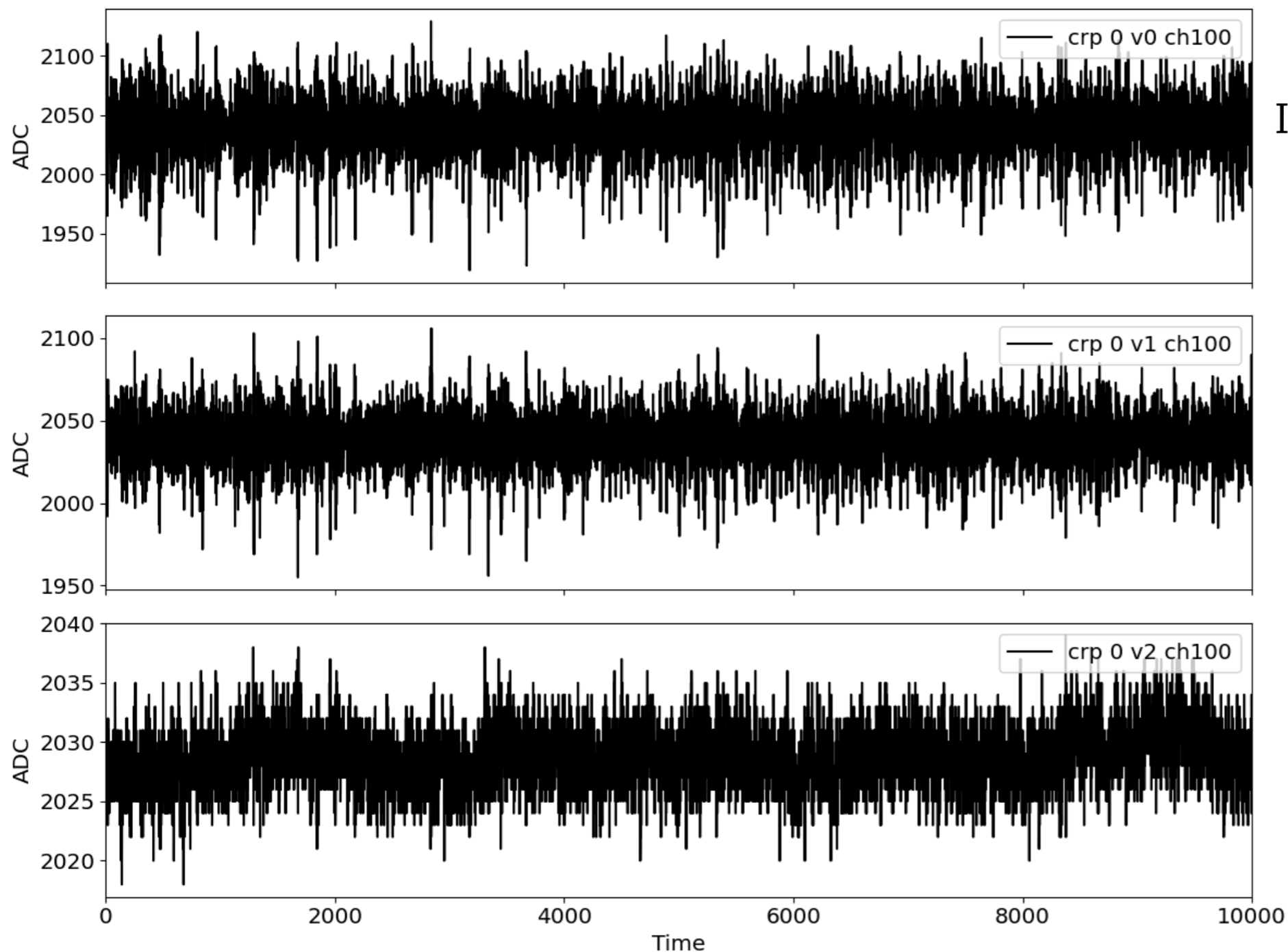
Reading Cold Box Data (top)

We just started working on the top electronics data.

The files have a very similar structure as for protoDUNE, so it's easier for us to understand.

The channel mapping ('DAQ' to view channels) is not finalized

Some raw waveforms of event 1 of run 300 :



Induction Diagonal (U)

Induction vertical (Y)

Collection (Z)

In conclusion

Have to finalize our conventions

Merge the two decoders into one brand new lardon

Understand both channels mappings

And many noise & reconstruction-related work !

The code will be available on GitHub

Probably here : https://github.com/lzambell/lardon_cold

If you're interested in these python developments, don't hesitate to reach to us, or join our new #lardon slack channel !