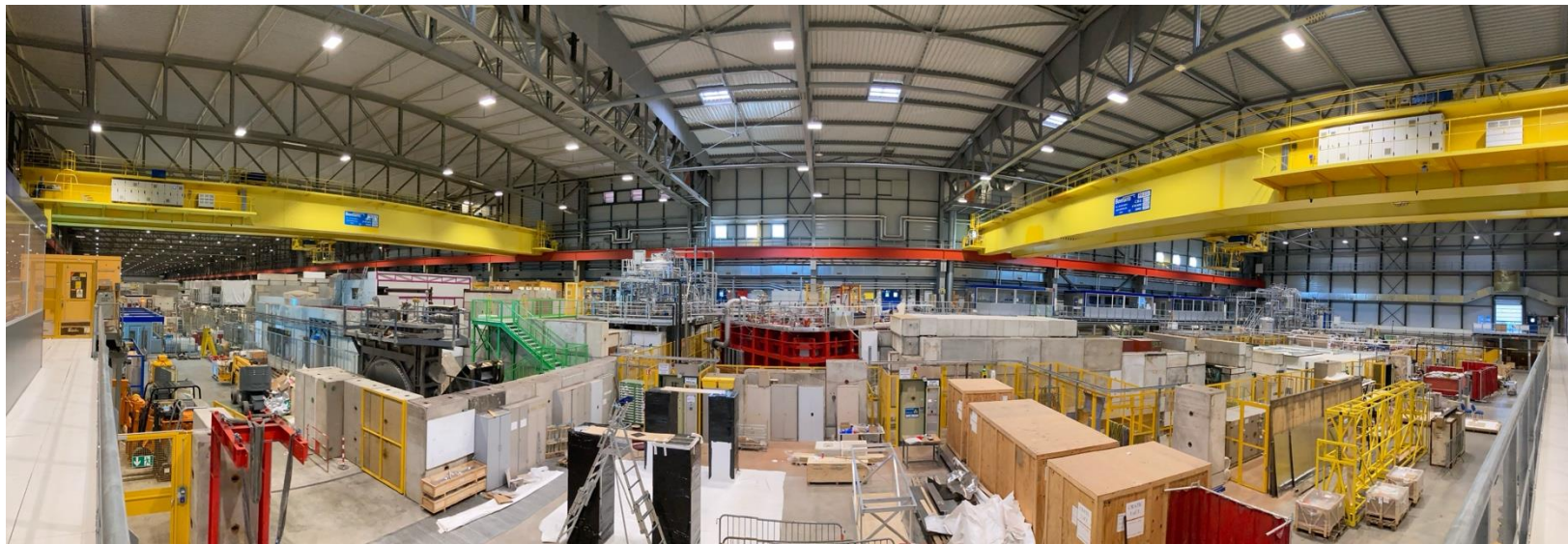


Data-quality checks

F. Galizzi and so many others - CERN



DISCLAIMERS

You will not find results here!

But you may find some puns

How to access files

Waffles style

- Folder: /eos/experiment/neutplatform/protodune/experiments/ColdBoxVD/December2024run
 - **CAEN**: usual binary files ([log](#))
 - **Daphne_DAQ**: here we are storing binary files (we can store also file.pickle for Waffles lovers) [log](#)
 - **Daphe_StandAlone**: file.csv (like in April coldbox)
 - In case you don't know how to read them, ask me (I have c++ functions, ChatGPT can give you the python version 😊)

```
fegalizz@lxplus902 /eos/experiment/neutplatform/protodune/experiments/ColdBoxVD/December2024run
☺ ls
CAEN Daphne_DAQ Daphne_StandAlone files_location_cb hdf5_to_binary_pickle.py TestStand_data
```

This folder contain all the file.txt with the Rucio path of each Daphne_DAQ run

(as /eos/experiment/neutplatform/protodune/experiments/ProtoDUNE-II/PDS_Commissioning/waffles/1_rucio_paths for ProtoDUNE-HD)

```
fegalizz@lxplus902 /eos/experiment/neutplatform/protodune/experiments/ColdBoxVD/December2024run
☺ ls files_location_cb
032992.txt 033107.txt 033208.txt 033310.txt 033414.txt 033518.txt 033623.txt 033727.txt 033828.txt
032993.txt 033108.txt 033209.txt 033311.txt 033415.txt 033519.txt 033625.txt 033728.txt 033829.txt
032994.txt 033109.txt 033210.txt 033312.txt 033416.txt 033520.txt 033626.txt 033729.txt 033830.txt
032995.txt 033110.txt 033211.txt 033313.txt 033417.txt 033521.txt 033627.txt 033730.txt 033831.txt
032996.txt 033111.txt 033212.txt 033314.txt 033418.txt 033522.txt 033629.txt 033731.txt 033832.txt
032997.txt 033112.txt 033213.txt 033315.txt 033419.txt 033523.txt 033630.txt 033732.txt 033833.txt
032998.txt 033113.txt 033214.txt 033316.txt 033420.txt 033524.txt 033631.txt 033733.txt 033834.txt
032999.txt 033114.txt 033215.txt 033317.txt 033421.txt 033525.txt 033632.txt 033734.txt 033835.txt
033000.txt 033115.txt 033216.txt 033318.txt 033422.txt 033526.txt 033633.txt 033735.txt 033836.txt
033001.txt 033116.txt 033217.txt 033319.txt 033423.txt 033527.txt 033634.txt 033736.txt 033837.txt
033002.txt 033117.txt 033218.txt 033320.txt 033424.txt 033528.txt 033635.txt 033737.txt 033838.txt
033003.txt 033118.txt 033219.txt 033321.txt 033425.txt 033529.txt 033636.txt 033738.txt 033839.txt
033004.txt 033119.txt 033220.txt 033322.txt 033426.txt 033530.txt 033637.txt 033739.txt 033840.txt
033005.txt 033120.txt 033221.txt 033323.txt 033427.txt 033531.txt 033638.txt 033740.txt 033841.txt
033006.txt 033121.txt 033222.txt 033324.txt 033428.txt 033532.txt 033639.txt 033741.txt 033842.txt
033007.txt 033122.txt 033223.txt 033325.txt 033429.txt 033533.txt 033640.txt 033742.txt 033843.txt
033008.txt 033123.txt 033224.txt 033326.txt 033430.txt 033534.txt 033641.txt 033743.txt 033844.txt
033009.txt 033124.txt 033225.txt 033327.txt 033431.txt 033535.txt 033642.txt 033744.txt 033845.txt
```

The script to convert files.hdf5 to binary and/or pickle
- next slide -

File conversion

HDF5 -> .dat / .pickle

It's enough to edit these lines according to you need

Launch it inside a [DAQ env](#) after installing waffles with the cpmmand

- python hdf5_to_binary_pickle.py

I suggest to convert data only
from interesting channels to save space

We have >1500 runs 😊

(which means: a lot)

There is no



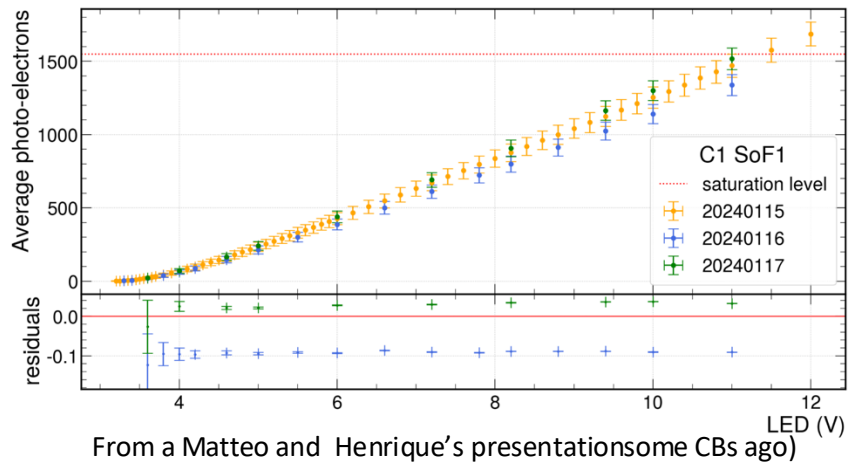
/eos/ B

```
11 #####
12 ### HARD CODE HERE #####
13
14 # Outputs format (can be both True)
15 save_pickle = False
16 save_binary = True
17
18 runs_to_convert = [34239]
19
20 #active_channels = [0, 1, 2, 3, 20, 21, 26, 27]
21 active_channels = [20, 21, 26, 27]
22
23 # All the channels of the December24 coldbox
24 #active_channels = [0, 1, 2, 3, 20, 21, 26, 27,
25 #
26 30, 31, 36, 37, 40, 41, 46, 47]
26 #####
```

The data we have

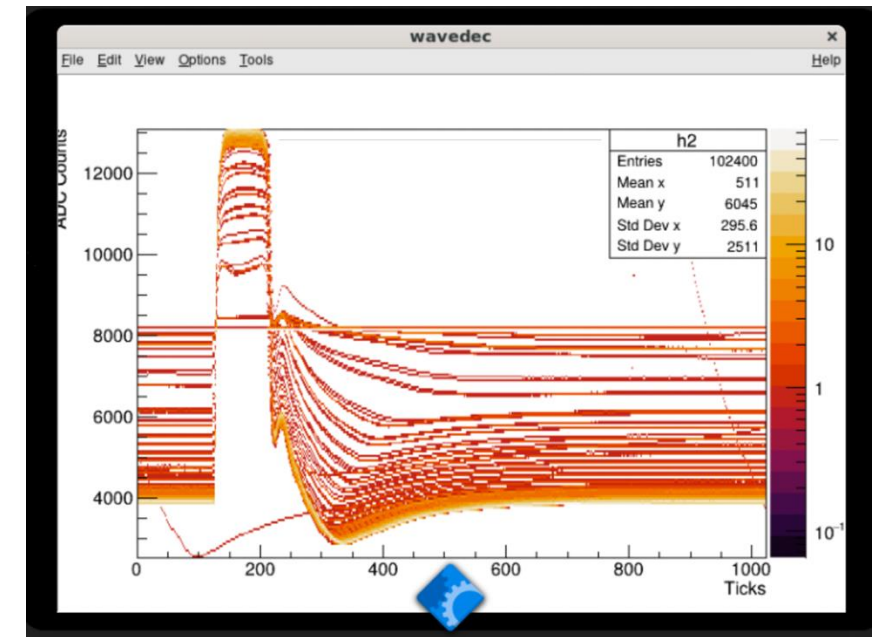
A record for a coldbox

- VGain scans (DAPHNE attenuation) nested in Vbias (SiPMs') scans
 - SNR vs Dynamic Range
 - SNR vs Overvoltage
 - Noise FFT vs total gain
 - Breakdown
- LED scans
 - Linearity and pulse-shape studies / CX studies
- Saturation runs
 - Cold Electronics dynamic range



We ensured good module illumination

Good SPE level LED intensity				
Module	CH	MASK	Pulse width	LED intensity
M1	20-27	1	5 ticks	1175
M2	21-26	1	5 ticks	1160
M3	0-2	1	5 ticks	1250
M4	1-3	1	5 ticks	1200



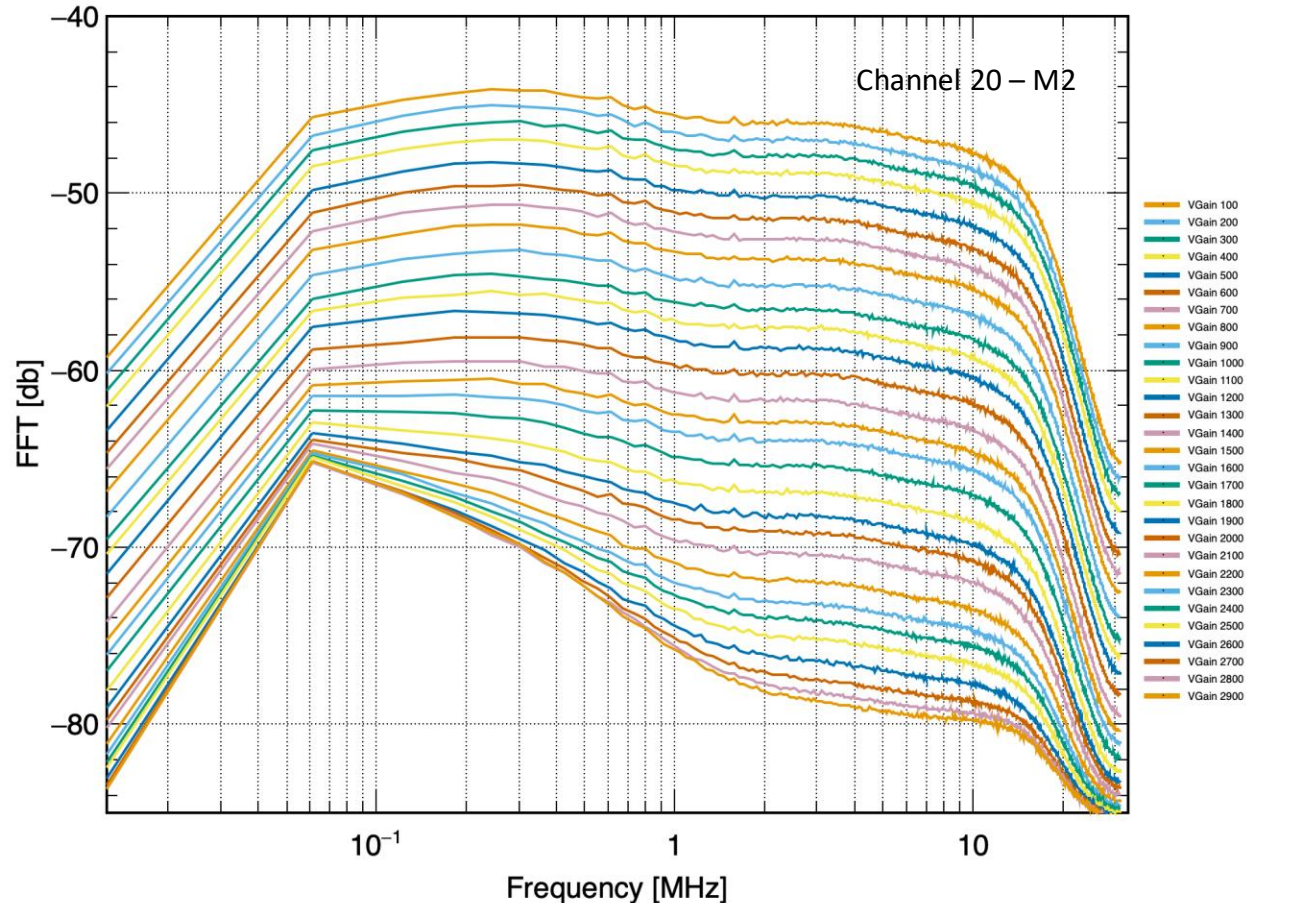
A matrix of parameters

The zoo of scans

We have already characterized the level of noise for 30 VGain settings

Now we need to validate the calibration analyses

Run	VGain	Ch	Rms
33309	100	0	95.2206
33309	100	1	107.55
33309	100	2	100.653
33309	100	3	116.037
33309	100	20	71.8572
33309	100	21	76.4192
33309	100	26	78.7486
33309	100	27	71.8572
33311	200	0	84.5368
33311	200	1	95.805
33311	200	2	89.4957
33311	200	3	103.788
33311	200	20	64.269
33311	200	21	68.4927
33311	200	26	70.6453
33311	200	27	62.6161
33313	300	0	75.8573
33313	300	1	85.9845
33313	300	2	80.5905
33313	300	3	92.2558
33313	300	20	58.0219
33313	300	21	61.6091
33313	300	26	63.8171
33313	300	27	56.6019
33315	400	0	66.9101
33315	400	1	75.7047
33315	400	2	70.8775
33315	400	3	81.5157
33315	400	20	51.8656
33315	400	21	55.1318
33315	400	26	57.378



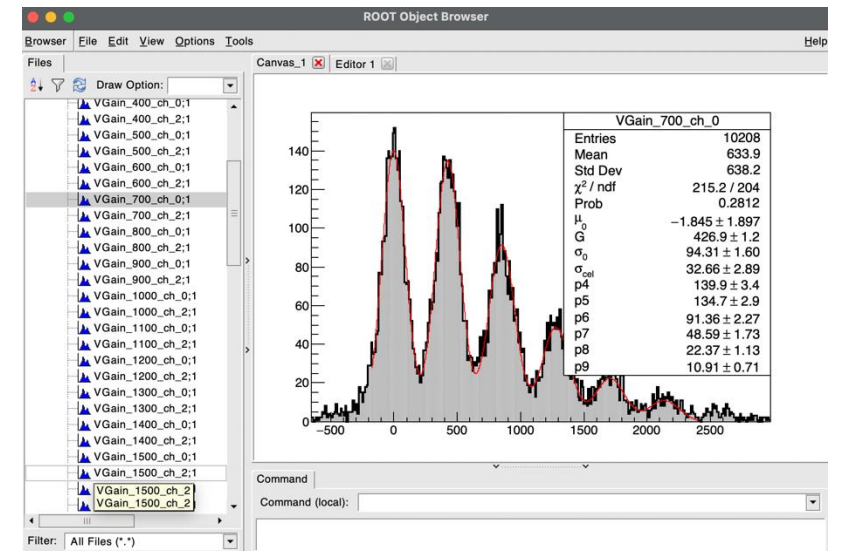
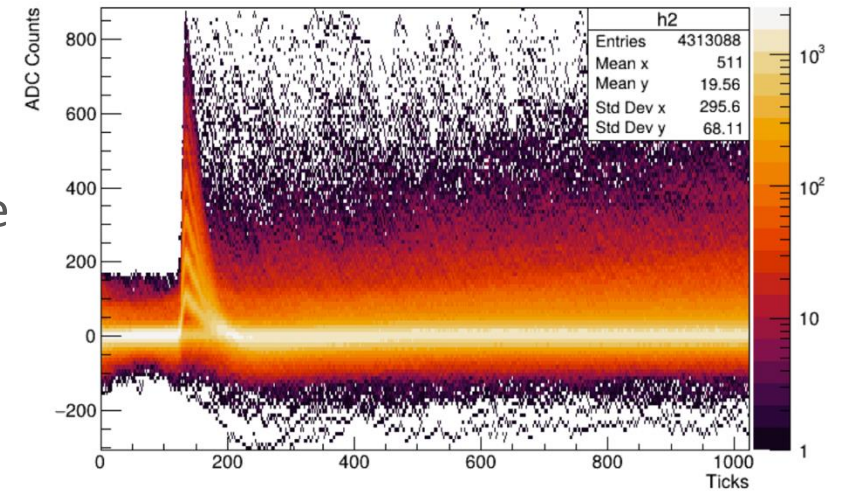
Channel	VGain	Spe ampl	DR	SNR
0	100	55.7439	293.916	
2	100	57.6263	284.315	
0	200	47.5963	344.229	
2	200	51.0573	320.894	
0	300	42.5242	385.286	
2	300	43.5794	375.958	
0	400	36.6723	446.768	
2	400	38.302	427.758	
0	500	31.3542	522.545	
2	500	32.2189	508.521	
0	600	26.4517	619.393	
2	600	28.3774	577.361	
0	700	23.3916	700.421	
2	700	23.6545	692.637	
0	800	19.8432	825.671	
2	800	20.8406	786.156	
0	900	16.8489	972.405	
2	900	16.9241	968.089	
0	1000	14.1615	1156.94	
2	1000	14.896	1099.89	
0	1100	12.4803	1312.79	
2	1100	12.9637	1263.84	
0	1200	10.873	1506.85	
2	1200	10.8756	1506.5	
0	1300	8.98369	1823.75	
2	1300	9.38399	1745.95	
0	1400	7.59219	2158.01	
2	1400	7.90063	2073.76	
0	1500	6.60207	2481.65	
2	1500	6.99366	2342.69	
0	1600	5.70326	2872.74	
2	1600	6.07554	2696.71	
0	1700	4.9041	3340.88	
2	1700	5.07812	3226.39	

Too preliminary to show

Conclusions

...and to dos

- We never took so many runs in a Coldbox
- The modules' characterization is (going to be) almost as complete the one of PDHD
- The quality checks shows encouraging results
- A bit of room for extra data-taking
- The Bicocca, Lecce, APC and some US groups will go through the analyses in the following weeks
 - (Forgot someone?)
- Good data to learn how to use Waffles with



THANK YOU! MUCHAS GRACIA! GRAZIE MILLE!

Manuel, Dante, Esteban, Francesca, Gloria, Valeria, Sabrina, Carla, Matt
and many others



Me in 2070 telling the story of the most crazy coldbox data-taking (so far)