

Weekly Activities at the NP

Alessandro Minotti on behalf of the Team @ CERN

NP04 PDS Data Taking Planning Meeting



This Week at the NP

- People: Anna, Michaela, Renan, Manuel, Fatma and I
- Focussing on
 - Data taking – IV curves and a few waveforms
 - Data analysis – IV curves automatization and V_{bd} extraction
 - Definition of a protocol for taking a waveform run
 - Data handling and sharing
 - Planning (next weeks, daq operation and integration)

IV Curves – Data Taking

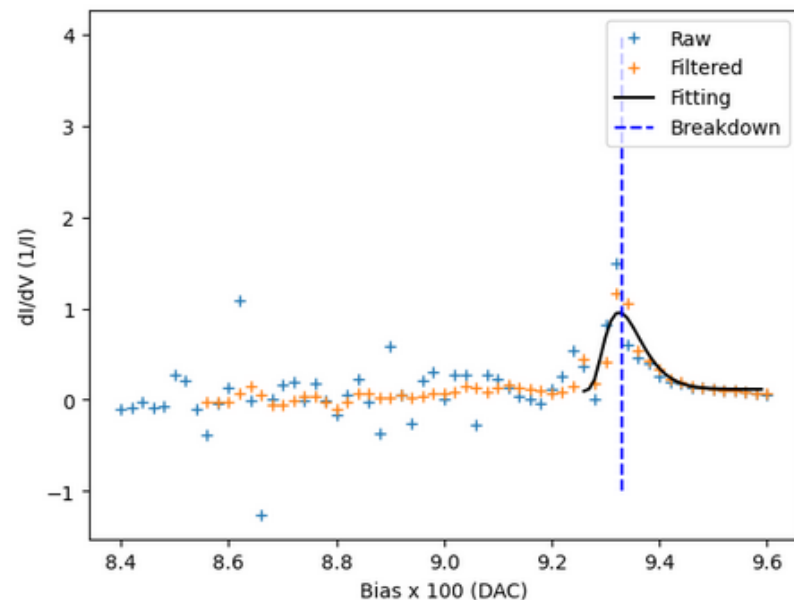
- Taking roughly one run per day
- Main concern: avoiding exposing channels at different temperature to the same voltage range
 - First method (in place): scan using bias, and set the trim to all channels except the one we're interested in to the maximum
 - Second method (tested today): same criteria, but do a coarse scan using bias and then a reverse scan using the trim -> more points around the V_{bd}
- Each scan takes around ~30 minutes for all channels and endpoints
- The data is shared in a common folder inside the server, and then transferred manually to and eos commissioning folder for anyone to analyze

/eos/experiment/neutplatform/protodune/experiments/ProtoDUNE-II/PDS_Commissioning

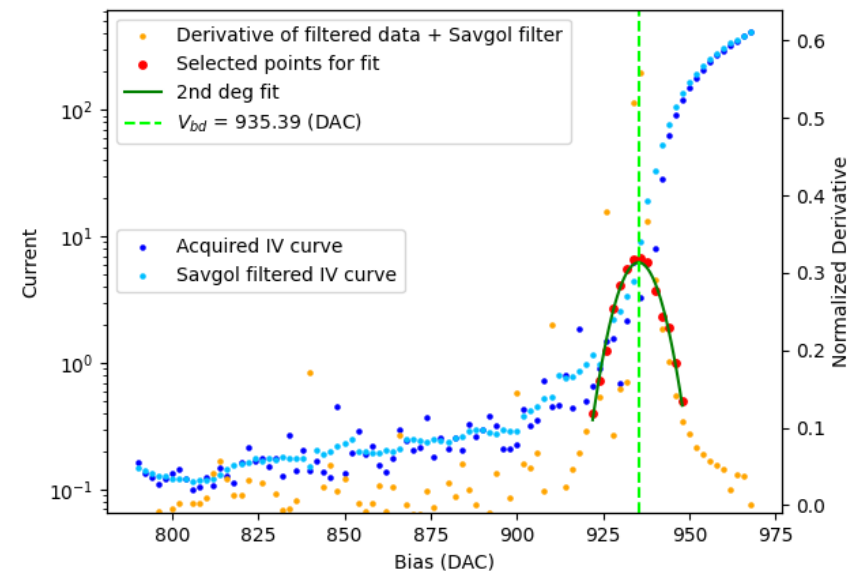
IV Curves - Analysis

- Two methods for filtering the data and finding the best value for V_{bd}
 - Renan's method, using an iterative gaussian filter on the derivative plus a waveform fit
 - Anna's method, using a segov filter on data and then on the derivative, plus a parabolic fit
- The V_{bd} is then saved to a json file

Mar-11-2024_1930_IvCurves_trim_np04_apal_ip10.73.137.104_apal_1_afe_0_ch_4.root



REV IV - ENDPOINT:104 APA:1 AFE:0 CH:3 SiPM:fbk



IV Curves and Bias Set Protocol

- The V_{bd} are used for two purposes
 - Study the evolution with the cooldown and compare with values measured in the lab (we have liaisons with the HWDB and CACTUS)
 - Define the operation V for each channel in combination with the voltage calibration
- A structure is being set up, with data systematically analyzed, and the $V_{operation}$ and V_{bd} extracted and saved in dictionaries
- All this will be automatized and is being documented

Waveforms and DAQ

- We also took a few runs for the waveforms using the daq environment
- There's still quite some work to do to integrate DAPHNE with the daq
 - This Friday we will finalize the structure of the configuration (including $V_{\text{operation}}$), and next week we will implement them and test them in the nanorc
 - We already have the monitoring in place (fully integrated)
- We need to start reading data using the daq (HDF5 + RUCIO); this is a crucial task for which we need workforce (Jose and Fatma are on this)

Calibration, Gain, and DCR

- To take the data
 - Manuel is gonna test the ad-hoc trigger to calibrate the modules in self-trigger mode
 - Once we have that, we want to do several runs for each LED intensity
- To analyze the data
 - We need to define an analysis protocol and workforce for the DCR and Gain analysis (we already have some candidates)

Documentation

- The two Annas (from Ferrara and Milano Bicocca) prepared a shared document for the expert training that we expanded since then
- We need to work soon on a shifter's module, with fewer information and clear instruction
- Also, working on a routing schedule for data taking to apply in the future during regular shifts

Tentative Run Plan

- IV runs
 - 2X day (0.5 hours each) for V_{bd}
 - 1X week for voltage linearity
 - Combined they allow to set the $V_{operation}$ for each channel
 - This should soon be up to speed
- Calibration runs
 - Once the procedure is set we can do several per day at least in the first phase
 - We don't need a pure argon to do it
- Ready for official shifts by mid May?