# PMTDaq

A compact data acquisition system for PMT Gain measurements

# Personal Update!



- 6 New River Diving athletes qualified to USA Diving Junior Nationals this weekend!

- New River Diving may have a new coach coming to join in the next week or so
  - This should relieve me from many of the responsibilities I have taken on over the last year and will give me more time to work on MOLLER things!

# PMTDaq

- Relies on CAENpy
  - A python wrapper for the CAENDigitizer library
- GitHub link: https://github.com/dvalmassei/PMTDaq

# Network
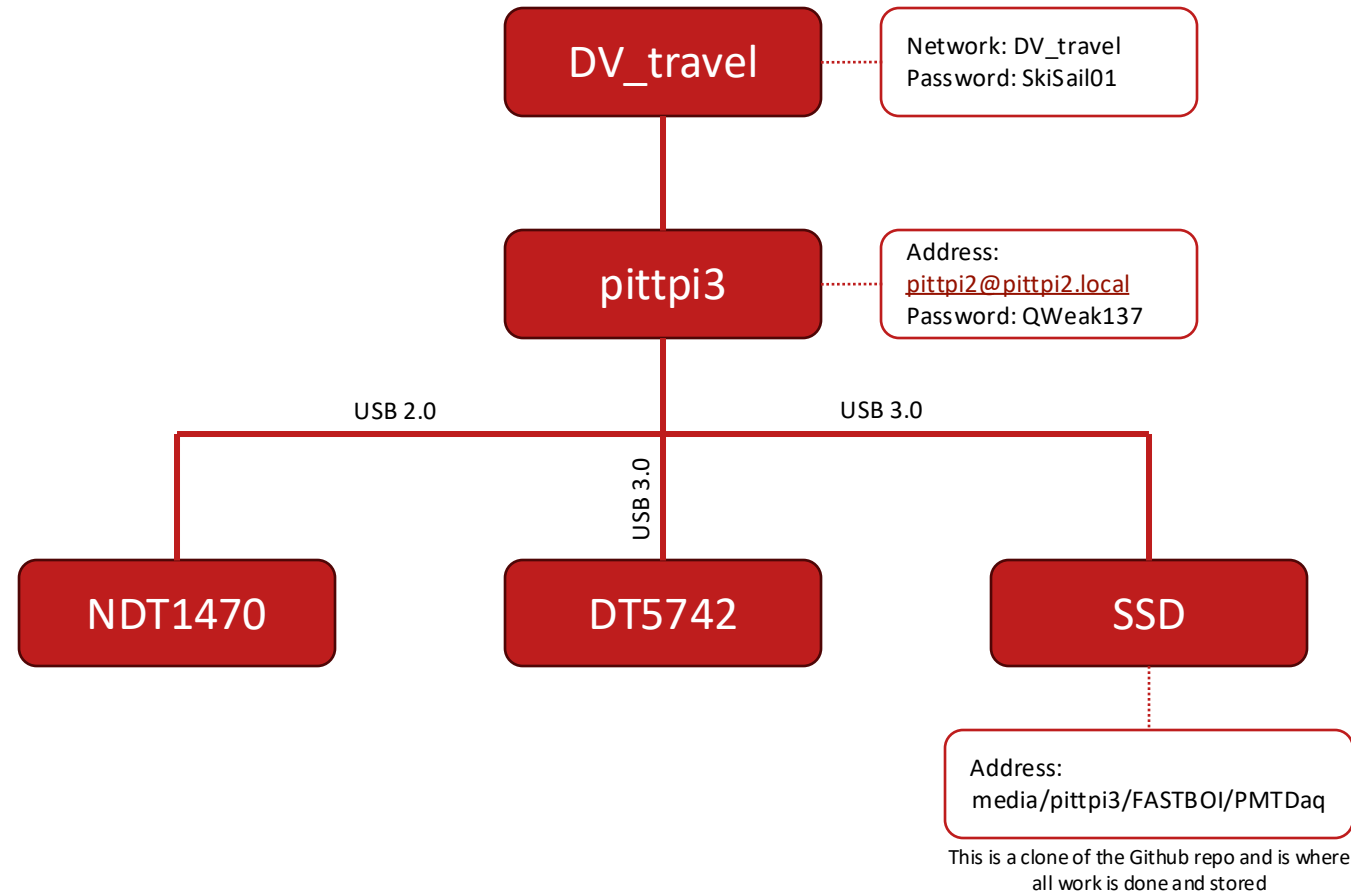
# self_trigger_setup.py

- In the command line: "python self_trigger_setup.py"
- Collects an event in Output Mode with the software trigger, then displays the Ch. 0 baseline
- After closing the pop-up window, user is prompted to set the DC Offset for Ch.0
- Collects an event in Transparent Mode
- Prompts user for Trigger Threshold
  - Note: neither dc offset nor trigger threshold are saved. This is simply an exercise for the user.
- Take note of DC offset and trigger threshold for later use
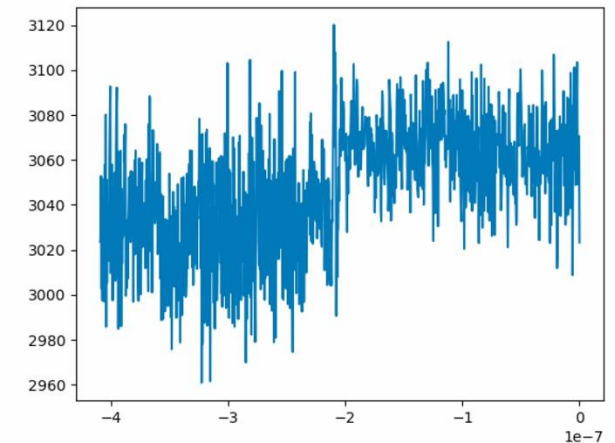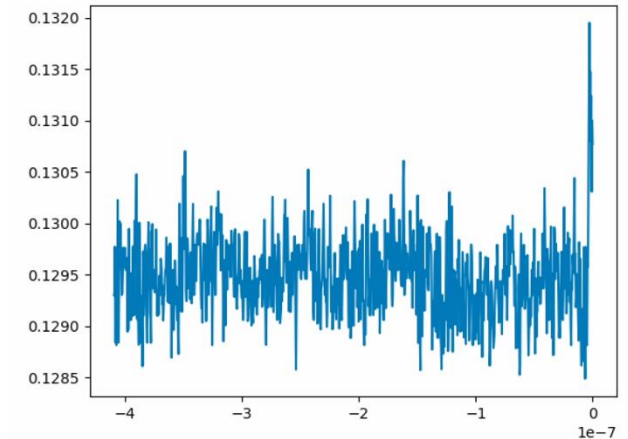
# HV_scan_smaller_data.py

- Acquires Ch. 0 self triggered events

- Read README.md for full description

- Outputs "out.csv" for analysis.py which includes event no., channel no., amplitude (V), time (s), and set voltage
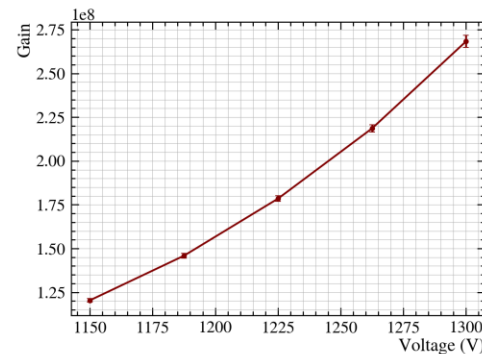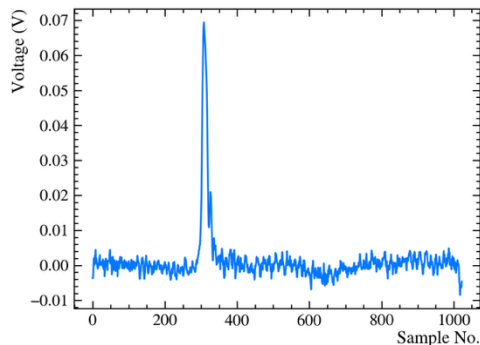
Notes:
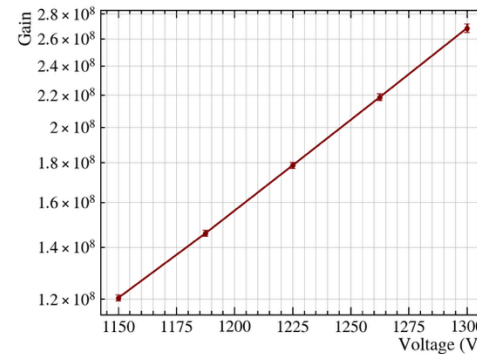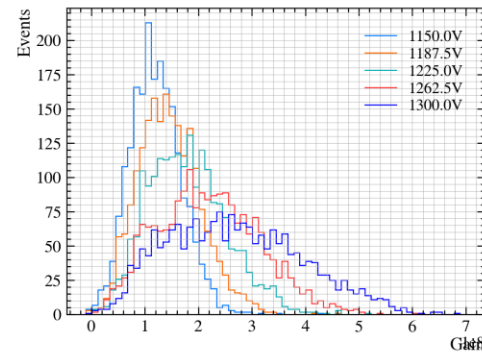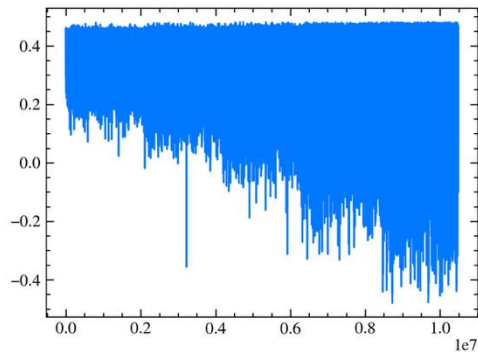- Digitizer can store and transfer up to 1024 events at a time
- Will timeout at a given voltage after n_events/2 s
- Can abort at any time using KeyboardInterrupt

```
pittpi3@pittpi3:/media/pittpi3/FASTBOI/PMTDaq $ python HV_scan_smaller_data.py -0.3 3010 100 1000 13]
00 8
HV connected with: CAEN NDT1470, SN:58466
Ramping voltage. This will take a moment...
Digitizer connected with: CAEN DT5742 digitizer, serial number 1055
Old value of register 0x1080: 00000800
0x1080 now: 00000BC2
Old value of register 0x10A8: 00000000
Writing 00000001 at register 0x10A8.
0x10A8 now: 00000001
Self trigger enabled for Ch.0
Old value of register 0x8000: 00000950
Writing 00000950 at register 0x8000.
0x8000 now: 00000950
Ready for Self-Triggered acquisition in Output Mode
HV ready.
Voltage measured at 1000.0 V and is drawing 233.25 uA and and reset event count...
Digitizer is enabled!
acquired 0 of 100 at 1000.0 V...
acquired 0 of 100 at 1000.0 V...
acquired 0 of 100 at 1000.0 V...
acquired 0 of 100 at 1000.0 V...
acquired 0 of 100 at 1000.0 V...
```

# analysis.py

- Calling "python analysis.py" will analyze "out.csv"
  - Can also call "python analysis.py <filename>" to analyze other files
- Produces plots below and "gain_table.txt", which is formatted close to the ELog table standard

- Network
  - Integrated LED control
  - Integration to existing lab network (ie. printers)
- self_trigger_setup.py
  - Suggest DC Offset
  - Suggest Trigger Threshold
- HV_scan.py
  - Automated DC Offset and Trigger Threshold w/ option for manual control
- Dark Box
  - PMT and LED Stand
  - Amplifier