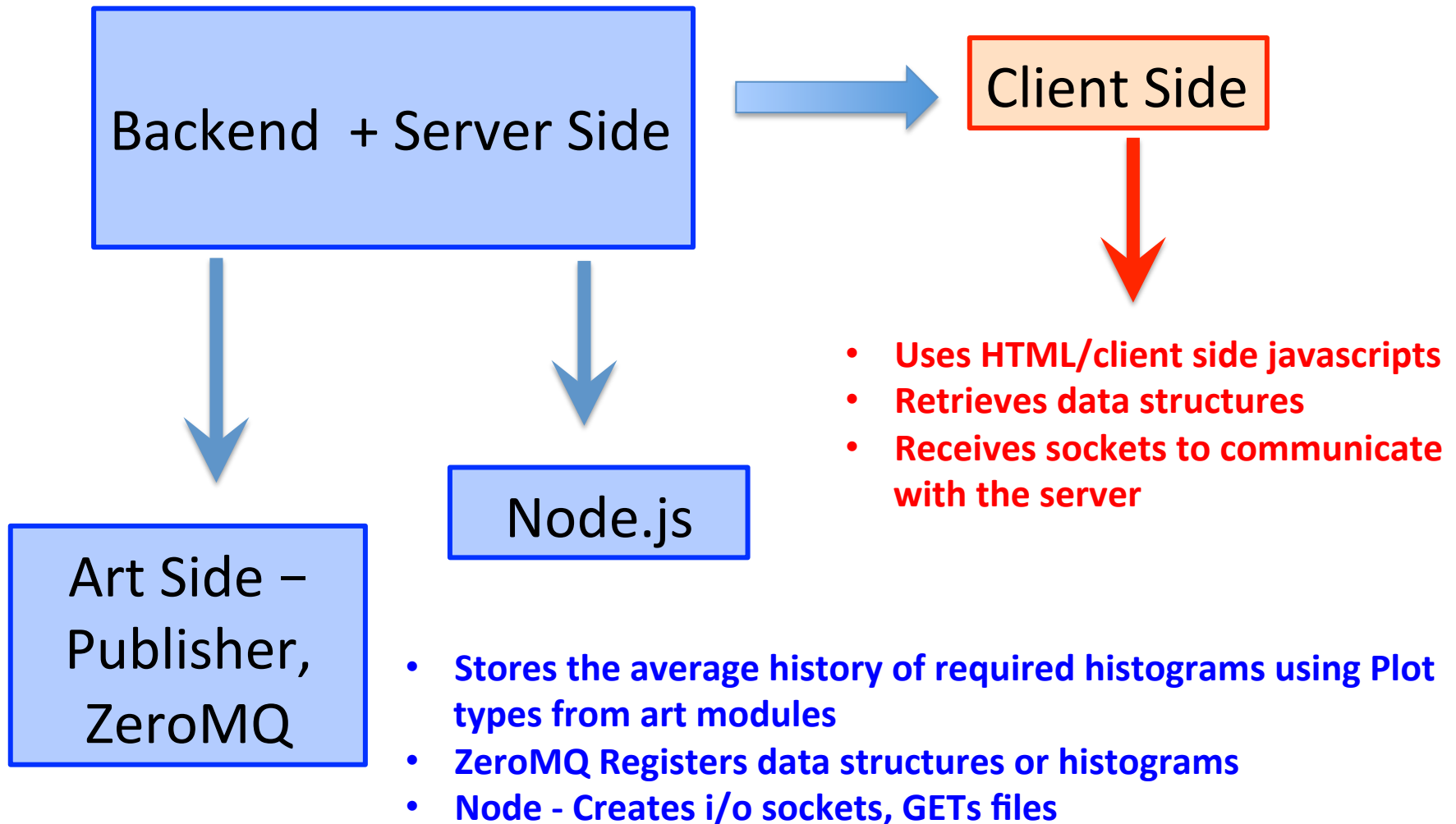# DQM and Database

Nandita Raha, Antonio Gioiosa

Summary

- Current Status of the DQM
  - ✧ Brief Architecture of the DQM
  - ✧ Source monitor plots – run summary (actual values)
  - ✧ Normalized plots of PMT, PiDs

- Conditional Database
  - ✧ Uses of this database
  - ✧ Future plans

Brief Architecture – Basics of DQM

Backend + Server Side

Client Side

Node.js

Art Side – Publisher, ZeroMQ

- **Uses HTML/client side javascripts**
- **Retrieves data structures**
- **Receives sockets to communicate with the server**

- **Stores the average history of required histograms using Plot types from art modules**
- **ZeroMQ Registers data structures or histograms**
- **Node - Creates i/o sockets, GETs files**

Overall picture – my contribution

✧ Run summary - Source monitor plots (actual values)

| Muon g-2 DQM | Run **18150** Event **12476** | 2018-12-06 22:41:22 | Subsystem ▾ |

Not connected

Laser Crate 25 Muon Fill summary plots

| Laser Fill view | Laser Slow Control | summary | Laser 1 | Laser 2 | Laser 3 | Laser 4 | Laser 5 | Laser 6 |

✧ Normalized plots of PMT, PiDs, and PiD2:PiD1

| Muon g-2 DQM | Run **18150** Event **12476** | 2018-12-06 22:41:22 | Subsystem ▾ |

Not connected

Laser Crate 25 Muon Fill summary plots for Laser 2

| Norm Summary | Laser 1 | Laser 2 | Laser 3 | Laser 4 | Laser 5 | Laser 6 | Laser 2 stability |

RUN **18150** EVENT **12476** N. LM ISLANDS (for each channel)**5** N. SM ISLANDS (for each channel)**5**

Run summary plots of SM signals − PiD1, PiD2, PMT

Laser 1 sync amplitude history
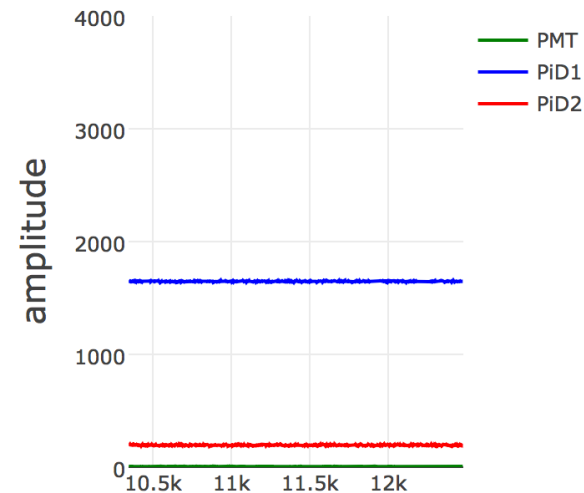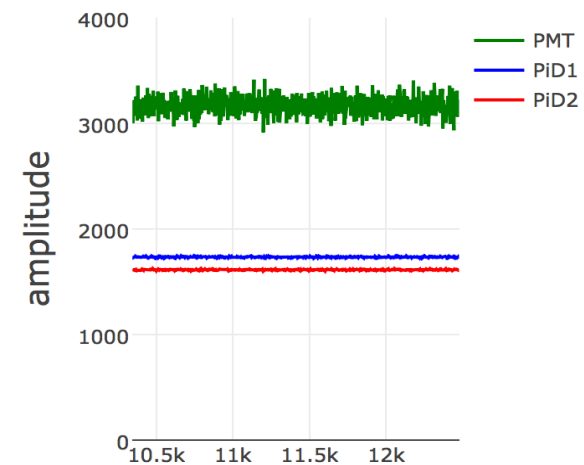

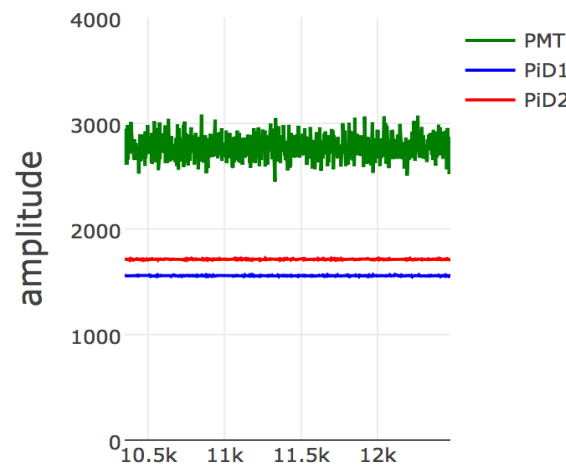### Laser 2 sync amplitude history
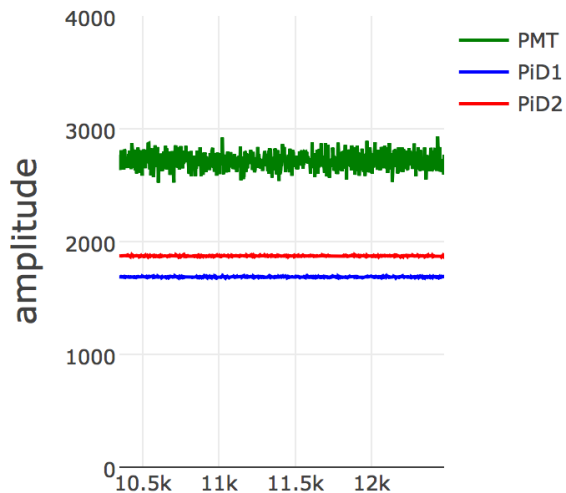
Laser 3 sync amplitude history
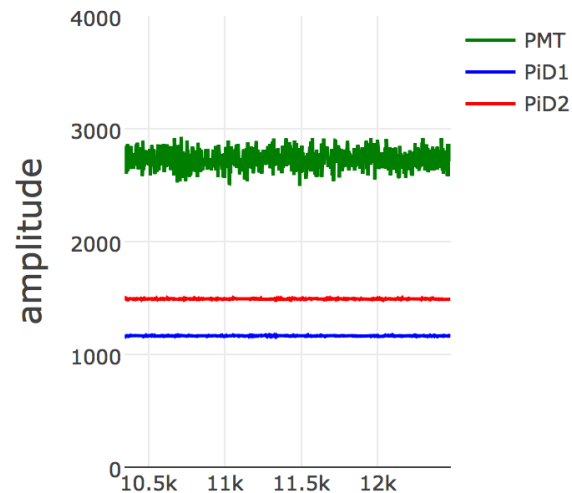
Laser 4 sync amplitude history

Laser 5 sync amplitude history
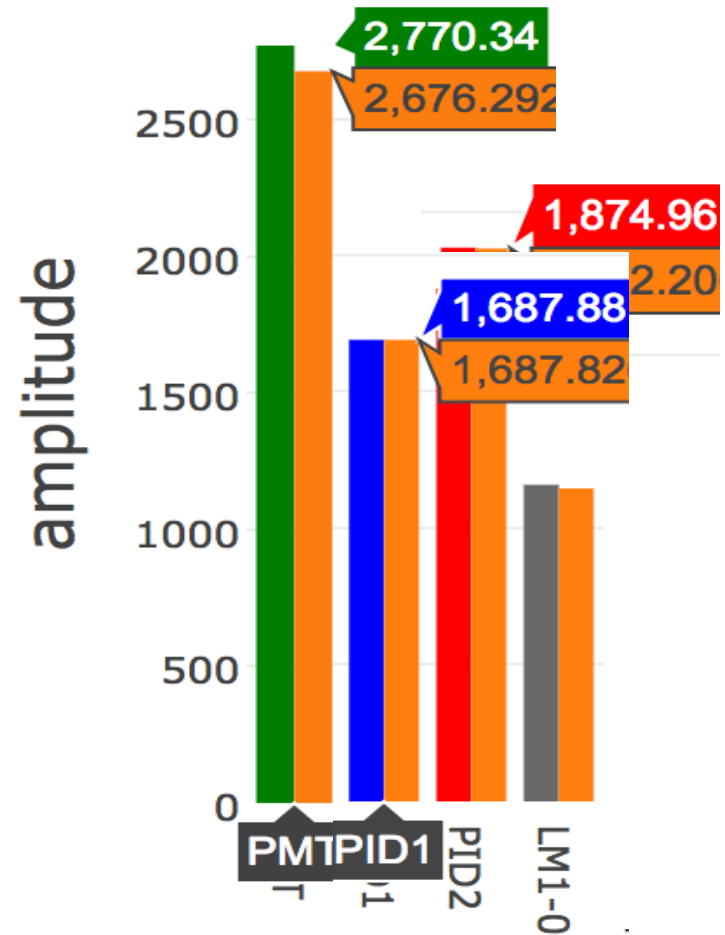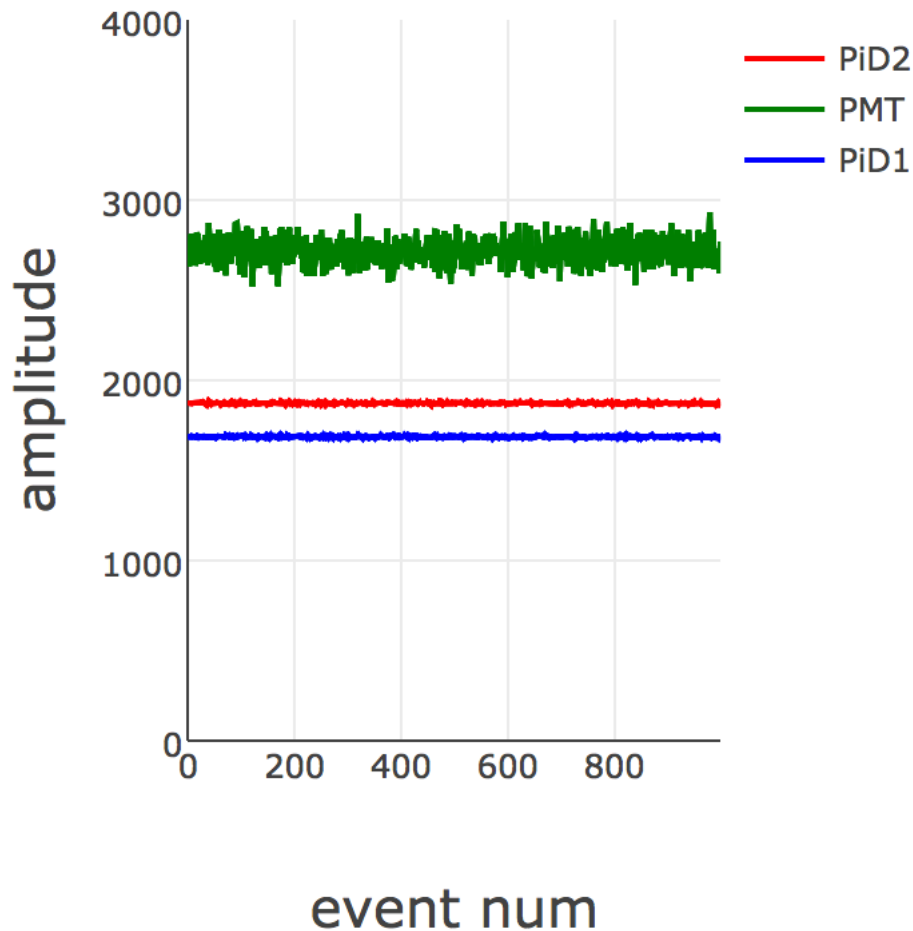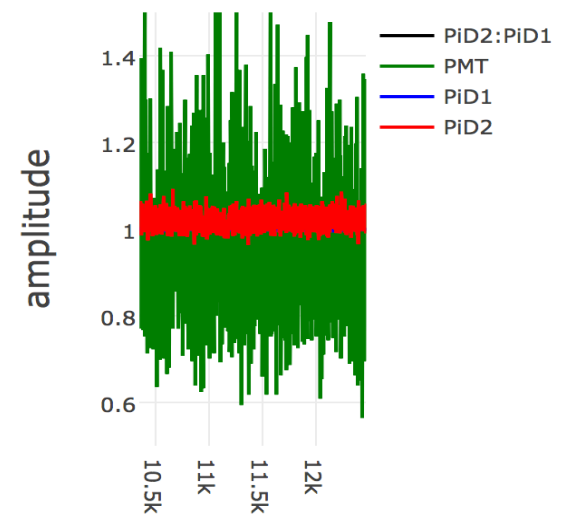

Laser 6 sync amplitude history
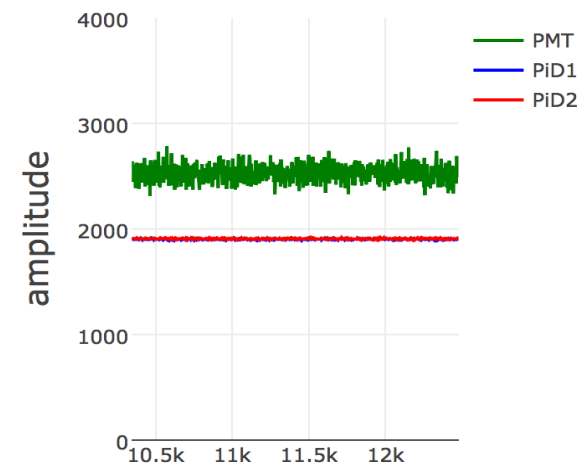
Verification SM signals – Laser 2

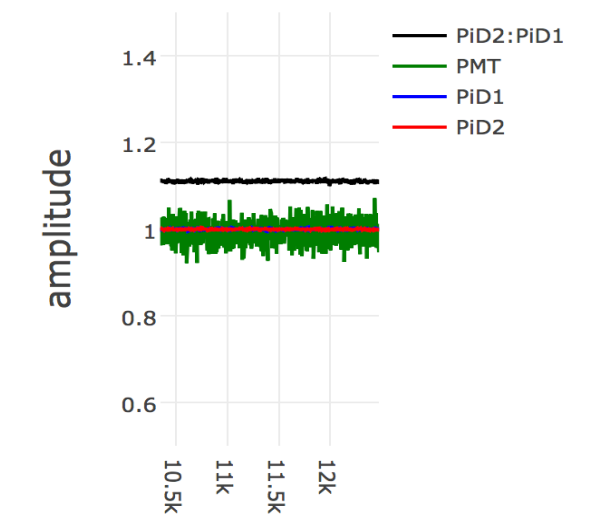Laser 2 sync amplitude history

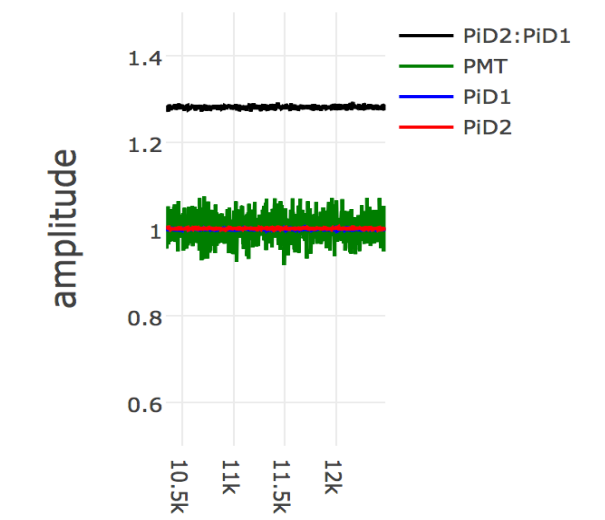# Overlaid SM signals –PiD2:PiD1, Normalized PiD1, PiD2, PMT
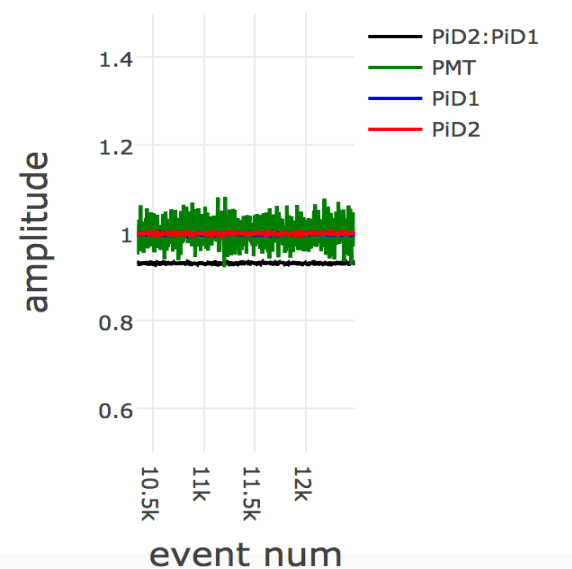

Laser 1 normalized sync amplitude history
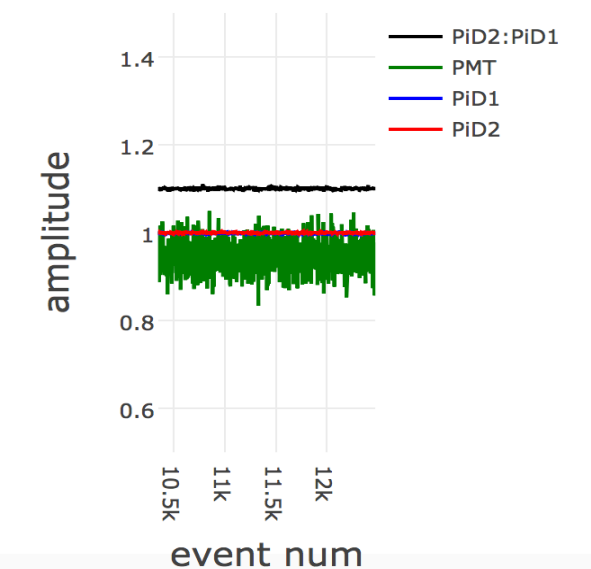
Laser 2 normalized sync amplitude history

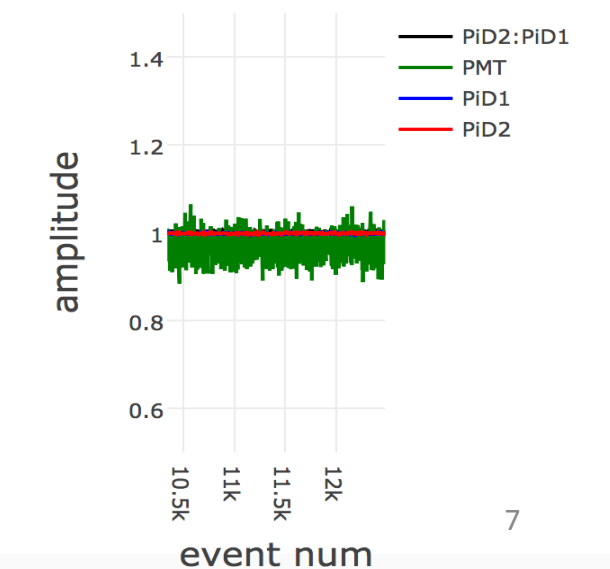Laser 3 normalized sync amplitude history
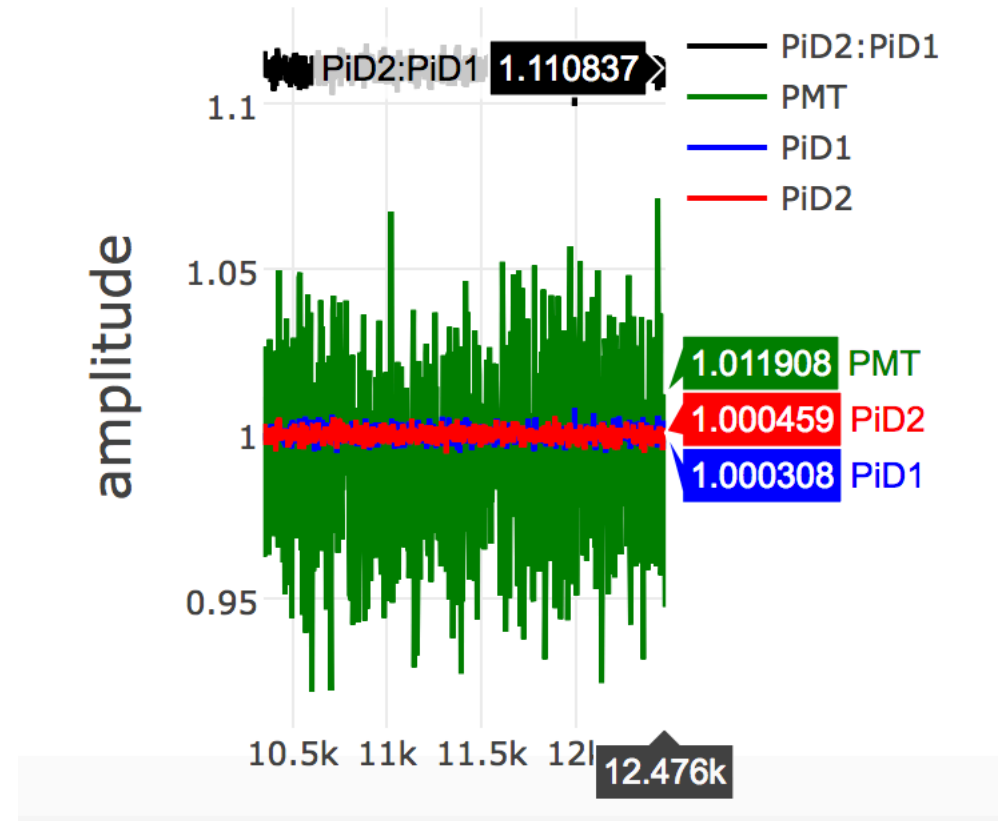
Laser 4 normalized sync amplitude history

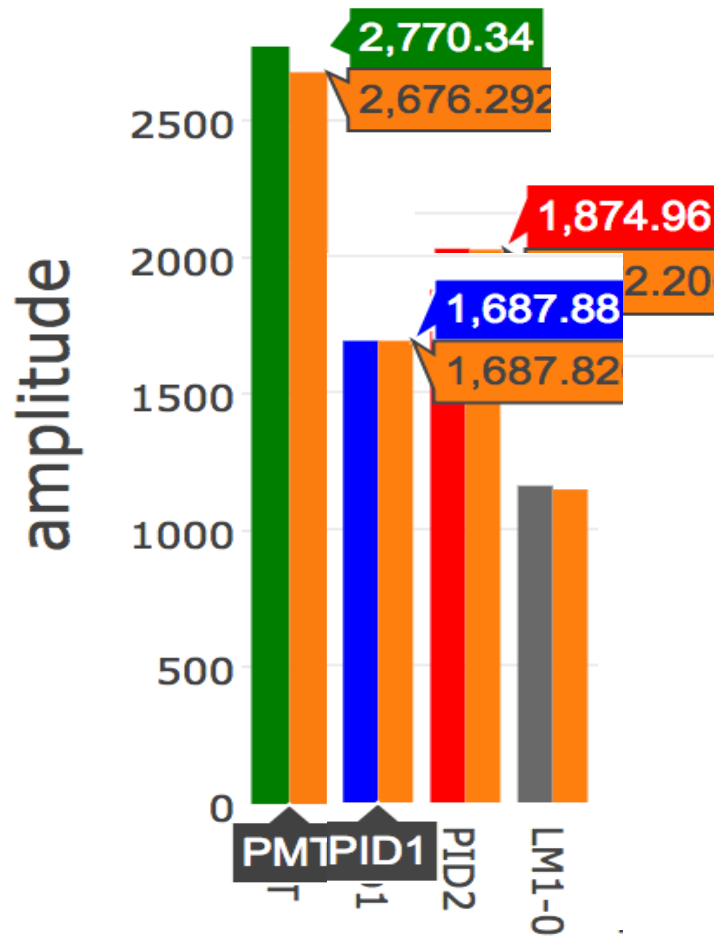Laser 5 normalized sync amplitude history

Laser 6 normalized sync amplitude history

Verification for Laser 2

PiD2:PiD1 = **1874.96**/**1687.88**

1.11084

ConDB – Conditional DataBase

Conditional Database

- ✧ Definition and uses of this database
- ✧ Current work and future plans

ConDB − Conditional DataBase

- Conditions data record the state of the system at the time events were collected.
- Conditions data vary with time. Each value, or set of values, describes the state of the system during a limited interval of time and referred to as the Interval Of Validity (IOV.)
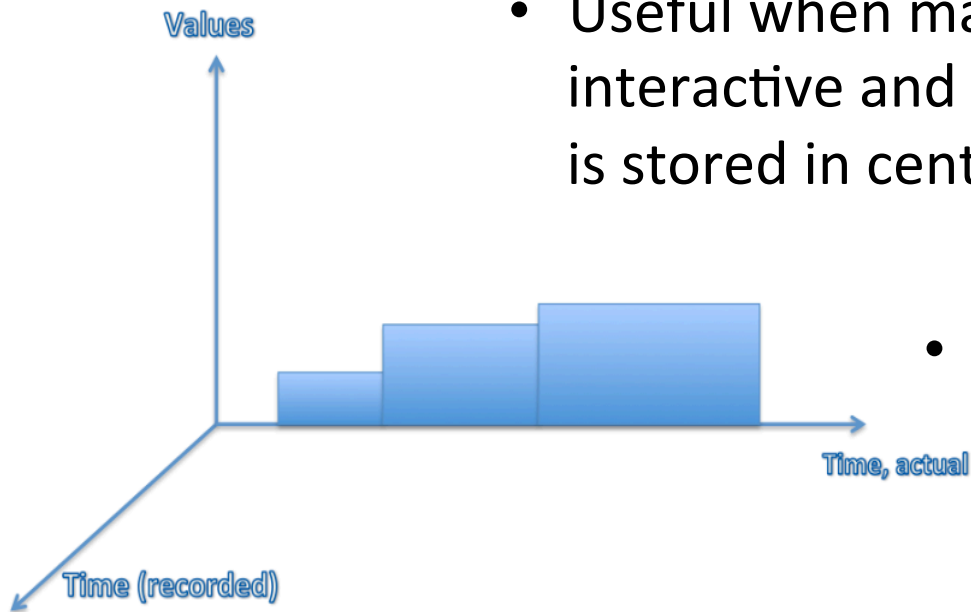
- Useful when many clients run simultaneously on interactive and GRID resources − so read this data is stored in central databases or files.

- Well applicable for data changing with time − like as **calibration**, alignment, attenuation, pedestal, etc. for detector channels.

Laser Calibration from FHICL files to ConDB

Laser OOF calibration data in a zillion FHICL files. Use cat:

> cat /cvmfs/gm2.opensciencegrid.org/specials/OOFDB/60h/
run15974/subrun99.fcl

> xtalCorr: [0.93647, 0.947338, 0.935881, 0.938746, …1]

Array size 1297 (24 calo x 54 crystals + 1 bool)

Transfer these to the conDB using some scripts (by Igor)

Current Status:

Look at data at

http://dbweb5.fnal.gov:9090/gm2_con_prod/app/data
f=oofgain_condb_test&t=15921000000

t has run and subrun number. 15921000000 => run 15921 subrun 0.

Structure of the data table

The structure of calibration table is currently like:

15921000000.000000
15921000001.000000
channel, corrconst, isgood
bigint, double precision, boolean
100, 0.982577, True
101, 0.986715, True
102, 0.982656, True

....
1st column **channel**: last 2 digits – xtal index (0 to 53); First 1 or 2 digits - calorimeter index.
2nd column **corrconstant:** the gain constant.
3rd column **isgood**: a flag marking if this row is valid. Currently the third column is read from the last number in the 1297 number arrays from the out-of-fill constants FHiCL files stored on cvmfs.

ConDB - Tags

Tagging:

Users can put a text tag on a particular condition, like version "v1.0" on the database.

Users can tag before recalibrating, to remember their current state, and they can tag after recalibration – version control

Supersede a calibration set with a better one and keep it all straight in the DB

Uses and Future Steps

- DQM - helpful for debugging purposes, checking stabilities, comparing with averages etc.
- DQM - Summary histograms for debugging purposes for SM implemented (can add LM?)
- ConDB – only a few subruns have been added - ongoing work in progress
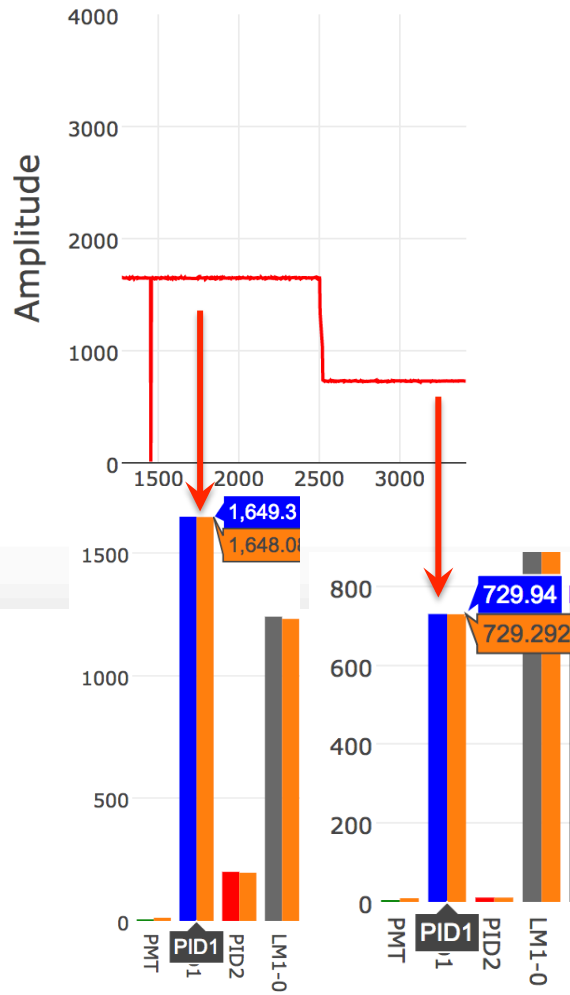- Plan to tag calibration sets for various run groups in ConDB

Back up

Unstable – SM PiD1 for laser 1, Run 18151??

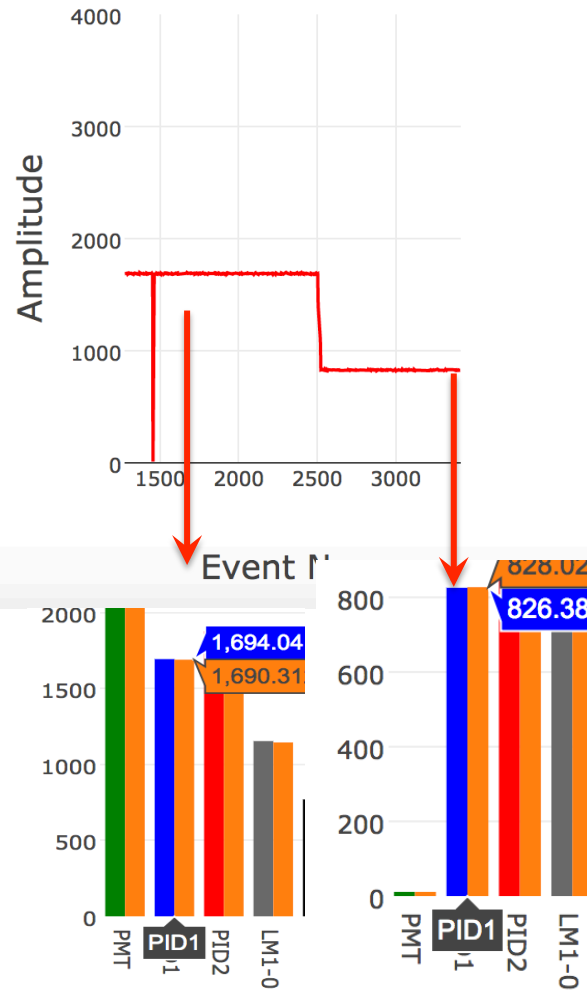NUMBER **18151** EVENT **3412** N. LM ISLANDS (for each channel) N. SM ISLANDS (for each channel)