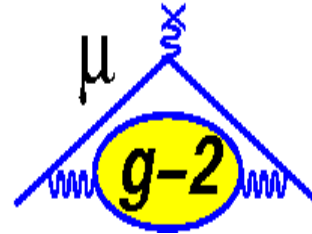


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# WP3: Muon $g-2$ Calibration System Update

The online monitor

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# Laser calibration system elements

- 6 pulsed diode lasers
- One source monitor (SM) per laser
  - monitors and corrects for laser fluctuations
  - provides a reference signal to local monitors
  - total 6
- Optics to divide each laser beam in 4 sub-beams
  - total of 24 sub-beams, one per calorimeter
- One launch fiber and diffuser per sub-beam
  - total 24, one per calorimeter
- One local monitor (LM) per sub-beam
  - receives one light signal from a calorimeter and one from a SM
  - by comparing the two intensities, it monitors and corrects for instabilities due to the light distribution
  - total 24, one per calorimeter

# How to reach the Laser Monitors from the DQM main page

The screenshot shows the Muon g-2 DQM main page. At the top, there is a dark header with the text "Muon g-2 DQM", "Run 3232 Event 13410", and "80% of events processed". Below this is a navigation bar with links for "ctag", "islands", "daq", "recon", and "kicker timing". On the right side of the navigation bar, there is a "Subsystem" dropdown menu. The dropdown menu is open, showing a list of subsystems: "Calo", "Tracker", "Fiber Harps", "Laser Monitors", "T0", "Fixed Probes", "Trolley", "Kickers", "Quads", and "IBMS". The "Laser Monitors" option is highlighted with a blue box, and a blue arrow points to it from the text "Select Laser Monitors from Subsystem drop down menu".

Muon g-2 DQM Run 3232 Event 13410 80% of events processed Subsystem -

ctag islands daq recon kicker timing

island overview

islands island h

**Select Laser Monitors from Subsystem drop down menu**

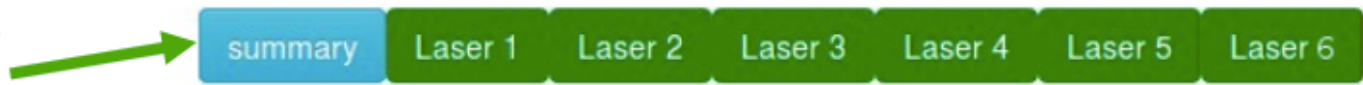
Calo  
Tracker  
Fiber Harps  
Laser Monitors  
T0  
Fixed Probes  
Trolley  
Kickers  
Quads  
IBMS

# In normal working conditions

- all laser buttons are green

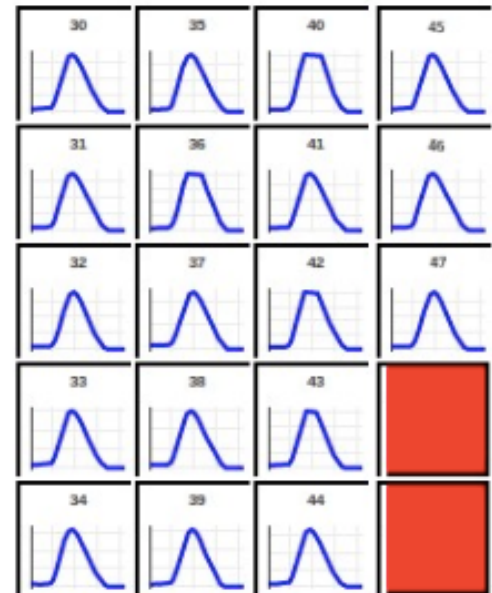
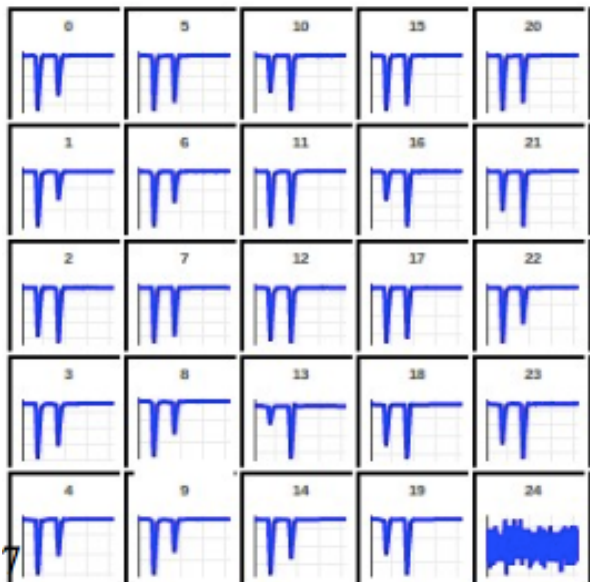
## Laser Crate 25 summary plots

Status bar



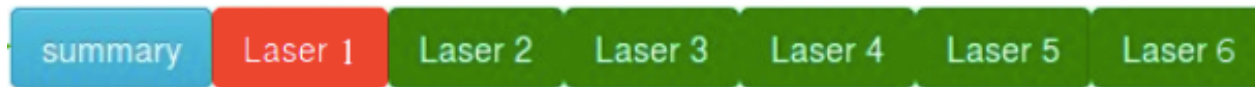
NUMBER 900 EVENT 35 N. ISLANDS (for each channel)14

- local monitor traces show two negative peaks
- source monitor traces show one positive peak



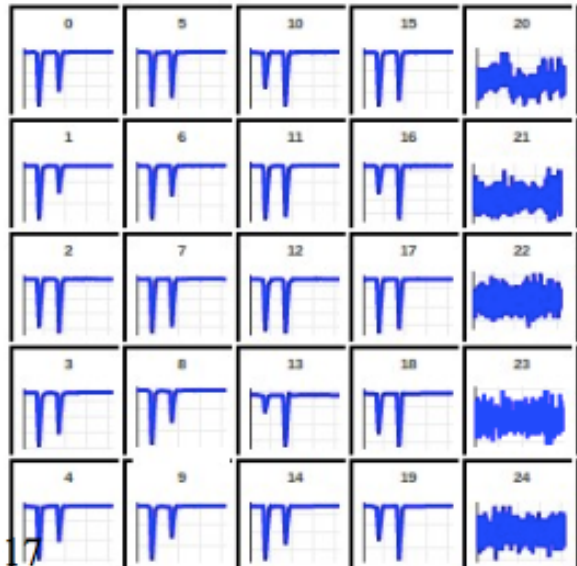
# When something goes wrong

## Laser Crate 25 summary plots



NUMBER 5269 EVENT 197 N. ISLANDS (for each channel)14

- When one or more signals of a laser chain became null, the relative button becomes red***



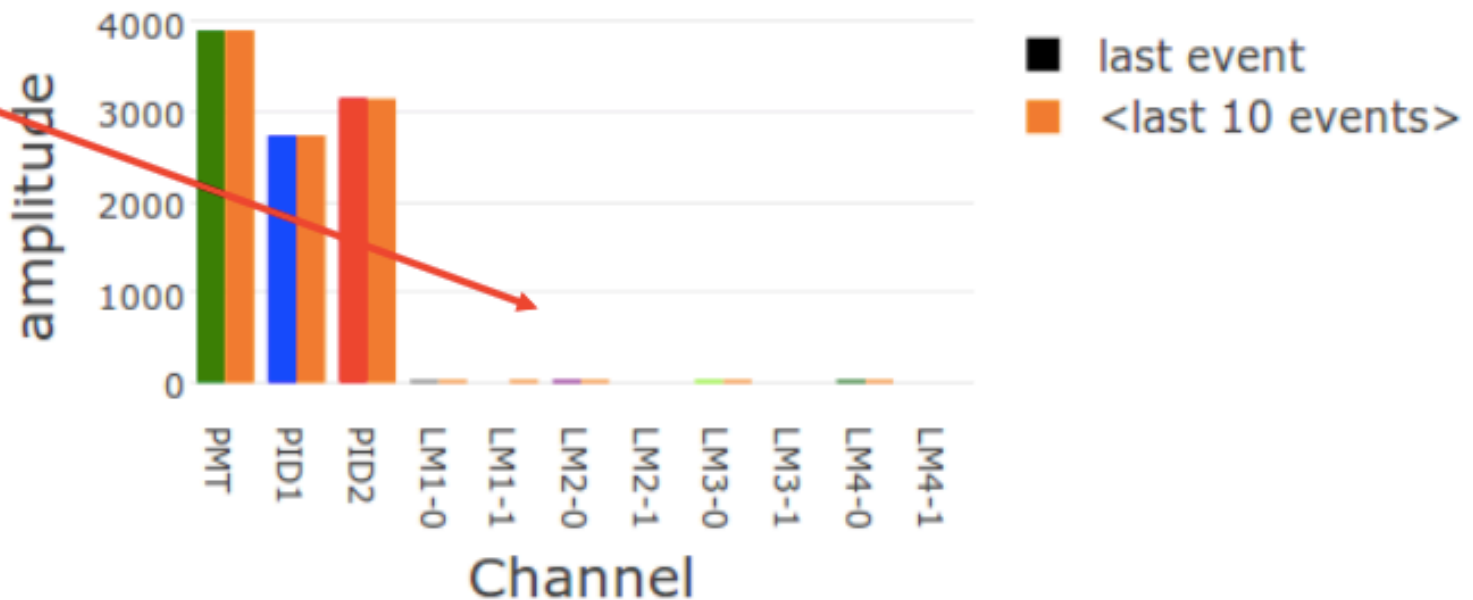
# Laser Crate 25 summary plots for Laser 1



NUMBER 5269 EVENT 319 N. ISLANDS (for each channel)14

Click on red button to see which signal is missing

sync pulse amplitudes for laser 1  
(click on bars to change channel in other plots)



- For each laser we monitor
  - 1 source monitor (1 PMT + 2 PIDs): 3 plots
  - 4 local monitors (1 PMT each): 4 plots, will be doubled, 2 PMTs per LM, total 8 plots

### Laser Crate 25 summary plots for Laser 1

summary Laser 1 Laser 2 Laser 3 Laser 4 Laser 5 Laser 6 Laser 1 stability

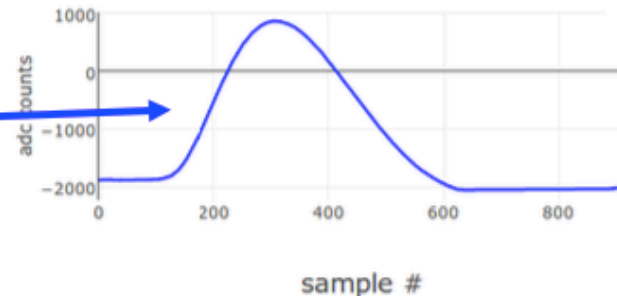
RUN 5617 EVENT 526 N. ISLANDS (for each channel)4

Red color means that one of the amplitudes is below threshold

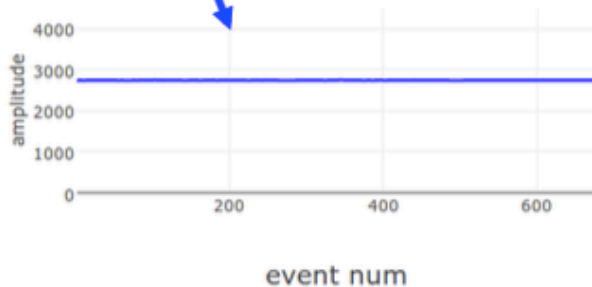
sync pulse amplitudes for laser 1  
(click on bars to change channel in other plots)



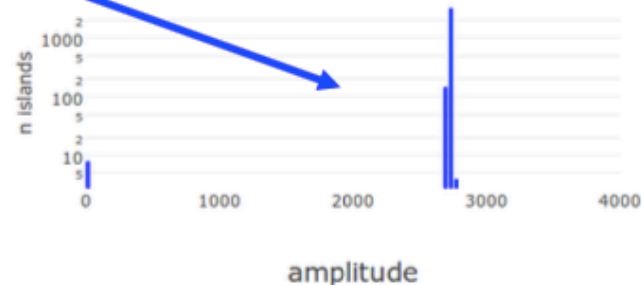
PID1 channel 37 sync Trace for laser 1



PID1 channel 37 sync amplitude history for laser 1



PID1 channel 37 amplitudes for laser 1

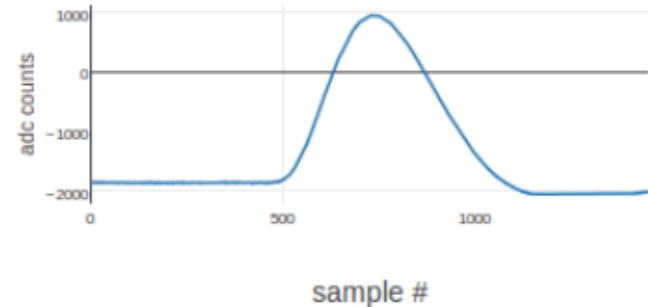


Double click

sync pulse amplitudes  
(click on bars to change channel in other plots)



Channel 0 sync Trace

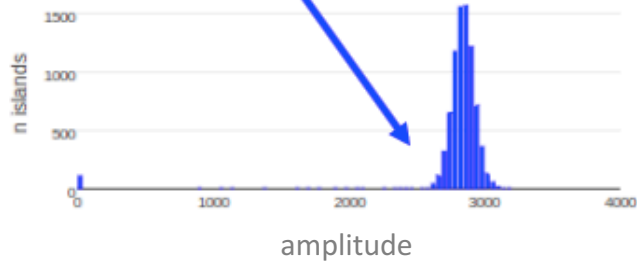


Double click

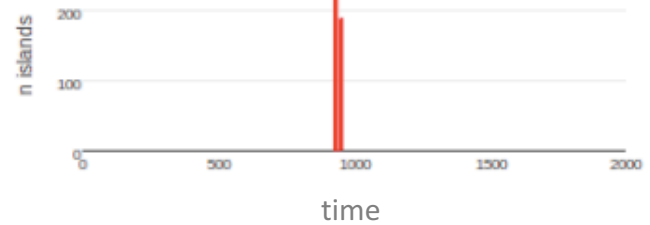
Histograms over all islands

log scale

Channel 0 amplitudes



Channel 0 times at maximum



Bottom of laser page



# Laser Crate 25 light chain stability for Laser 1

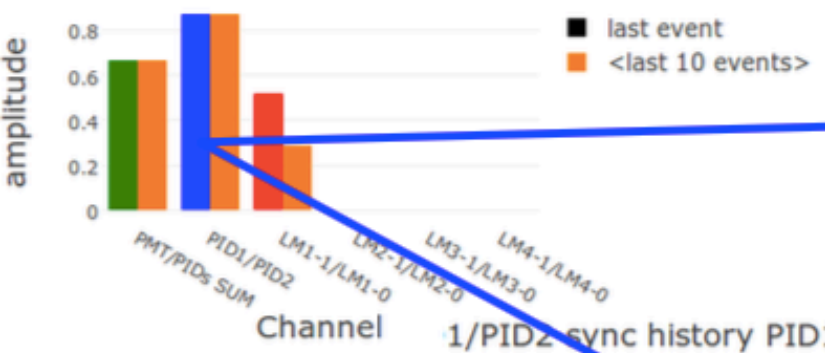
summary Laser 1 Laser 2 Laser 3 Laser 4 Laser 5 Laser 6 Laser 1 stability

Click on Laser stability button to show related plots

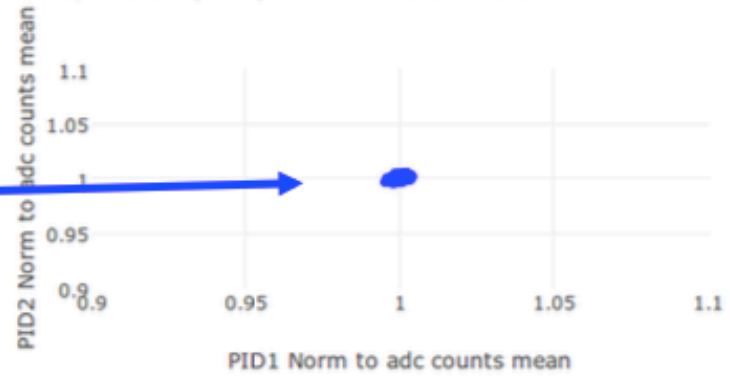
RUN 5617 EVENT 1142 N. ISLANDS (for each channel)4



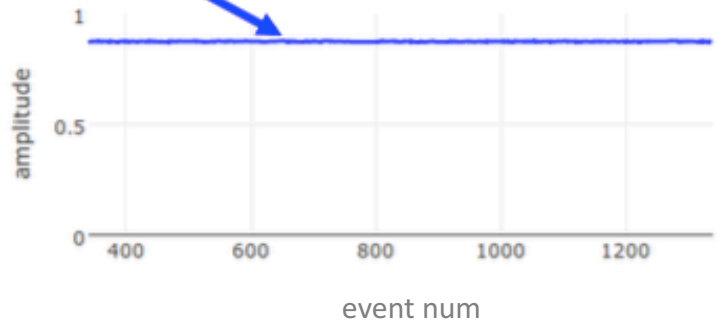
sync pulse amplitudes for laser 1  
(click on bars to change channel in next plot)



PID1/PID2 sync pulse - PID1-PID2 channels: 37-38



1/PID2 sync history PID1-PID2 channels: 37-38 for laser 1



# First version of the **Laser slow controls** is now available in the DQM

- Subsystem ▾
- Calo
  - Tracker
  - Fiber Harps
  - Laser
  - Monitors
  - Slow Control**
  - T0
  - Kickers
  - Quads
  - IBMS
  - Fixed Probes
  - Trolley
  - Field Monitors
  - Fluxgates



Muon g-2 DQM Run 10953 Event 1497 2018-02-02 04:36:37 62% of events processed Subsystem ▾

Connected

## Laser Slow Control

Laser traces - Muon Fill view

Last update Fri Feb 02 2018 04:36:25 GMT-0600 (CST)

### Source Monitor Bias Voltage

Last time Sun Oct 01 2017 00:00:00 GMT-0500 (CDT)

SM DEVICE (DISABLED)	PMT PID 1	PID 2
Laser 1	0.5	0.5
Laser 2	0.5	0.5
Laser 3	0.5	0.5
Laser 4	0.5	0.5
Laser 5	0.5	0.5
Laser 6	0.5	0.5

### Devices reachable on network

Last time

DEVICE (DISABLED)	NETWORK RESPONSE
LASER CONTROL BOARD	OK
SOURCE MONITOR BOARDS	OK
LOCAL MONITOR HV	OK
DELAY GENERATOR	OK
COMPUTER INSIDE LASER HUT	OK

### Laser Driver

Last time Fri Sep 01 2017 00:00:00 GMT-0500 (CDT)

LASER CURRENT SET	CURRENT MONITOR (DISABLED)
1	0.9
2	0.9
3	0.9
4	0.9
5	0.9
6	0.9

### Local Monitor High Voltage Power Supply

Last time Fri Feb 02 2018 04:21:06 GMT-0600 (CST)

HV CH	HV SET	HV MONITOR 1	MON STATUS	POWER
0	635	635.27	148.55	1
1	585	585.29	137.43	1
2	585	585.32	135.79	1
3	555	555.22	130.34	1
4	635	635.17	149.21	1
5	550	550.24	128.78	1
6	545	545.21	127.30	1
7	510	510.13	119.14	1
8	585	585.29	136.74	1
9	590	590.20	137.84	1
10	525	525.34	123.47	1
11	525	525.27	122.51	1
12	535	535.22	124.94	1
13	545	545.35	127.33	1
14	550	550.37	128.57	1
15	540	540.32	126.87	1
16	500	500.33	116.81	1
17	510	510.32	119.87	1
18	510	510.20	119.12	1
19	500	500.30	116.83	1
20	580	580.31	135.60	1
21	535	535.44	125.82	1
22	550	550.28	128.43	1
23	560	560.31	130.76	1
24	650	650.32	151.96	1
25	1100	1100.25	154.68	1
26	1100	1100.27	154.49	1
27	980	980.33	137.72	1
28	1000	1000.28	140.41	1
29	1000	1000.27	140.56	1
30	0	2.54	0.05	0 OFF

### Filter wheels actual position

Last time

NUMBER	1	2	3	4	5	6
POSITION (DISABLED)	6	6	6	6	6	6
TRANSMISSION	0.37	0.37	0.37	0.35	0.35	0.37

### Flip Mirrors actual position

Last time

NUMBER	1	2	3	4	5	6
MIRROR POSITION (DISABLED)	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN

### Temperature Monitor

Last time Fri Feb 02 2018 04:20:59 GMT-0600 (CST)  
Last 24 hours

Additional settings information

Source Monitor setting	Local Monitor setting	Filter wheels transmission reference table	Fibers setting
Last time	Last time	Last time	Last time