



## Detector Support Group

### Weekly Report, 2016-03-02

Glossary: EDC = Estimated Date of Completion.  
MFC = Mass Flow Controller.

## Ongoing Projects

### I. Hall B Magnet Slow Controls (Brian, Peter, Tyler, Amanda)

Task: Test Power supply PLC to EPICS interface.

EDC: 3/15/2016

Work done: Procurement

1. Peter submitted PR for PLC computer to be located in EEL/121C, has been assigned a buyer.

Status of PLC to Danfysik Magnet Power Supply (MPS) Communication

1. Verified reading/setting current, changing local/remote modes, turning on/off supply.
2. Testing completed on 2/22 using PLC tags and Solenoid MPS.

MPS EPICS screens

1. Wesley finished initial implementation of GUI in CSS (3/1).

Comments: MPS EPICS screens:

1. Waiting for a MPS to have short reattached (water cooled lead has been removed from Solenoid).
2. Ruben has jumpers that can take full current that he will take to Hall B.
3. Will probably do the testing on Solenoid MPS again since it is closer to being ready, magnet group still working on Torus dump switch.

Distribution Box

1. Still on schedule to arrive next week, then ~2 weeks of testing in Test Lab before moving to Hall B.
2. Need ~1 week for cabling in Hall, so DSG should be able to begin testing with PLC early April.
3. Josh will provide checkout list.

Torus Service Tower

1. Service tower expected to be in Hall early next week.
2. Plan is for Josh to do PLC testing on it, might need DSG help.

Status: **Task 1a started of original list started.**



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#### II. Hall B Gas System Hardware (George, Marc, Sahin, Mindy, Anatoly)

Task: Install Gas System hardware.

EDC: **TBD**

Work done:

1. Ordered rails and trays for forward carriage instrumentation rack.
2. Rack is in position.
3. Attached LTCC pumps to manifolds.
4. LTCC valve panel mounted on level 1.
5. Modifying gas supply cabinets for the DC.

Comments:

1. **Gas mixing system cannot be checked until ASME approved valves are installed.**
  - 1.1. Saptarshi, upon his return from vacation, is expected to address this issue.
  - 1.2. To check the gas mixing system DSG needs about 2—3 weeks, after the valves have been installed.
  - 1.3. DSG is of the opinion that the scheduled is tight, and *most probably cannot be met.*
2. To run DC gas lines, the gas manifolds and the cable trays have to be installed on the Torus by Hall B Engineering.
3. No news about procurement of C<sub>4</sub>F<sub>10</sub> for LTCC.
  - 3.1. **Lead time for C<sub>4</sub>F<sub>10</sub> is about six to nine months.**
4. Argon for DCs yet to be ordered.
  - 4.1. Lead time is one month.
  - 4.2. Should place order by 5/15.
5. Four of the existing DC pumps have failed.
  - 5.1. DCGAS needs 6 new pumps (\$18,000), two are to be spares.
  - 5.2. **DSG recommends phased procurement, starting March 2016 two pumps every four months.**

**Status:** Work in progress.

#### III. Hall B SVT (Amanda, Brian, Mary Ann, Peter)

Task: Monitor long term test of the eight modules.

EDC: Test is expected to run till end of July 2016.

Work done: Looked at the change in current of each module between two consecutive weeks.

Current of all the channels is increasing at a rate of about 17 [nA/week].

Comments: For details, see Amanda's section in the weekly report.

**Status:** Analyzing data on a weekly basis.



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- IV. Hall D PLC Systems (Peter, Tyler, Amanda, Mary Ann, Marc)  
Task: Locate and document (including spares) the eight PLC systems in use.  
EDC: 03/15/2016  
Work done: Reports and Excel sheets completed.  
Comments: DSG still needs to acquire photo of Tagger, Target, BCAL\_DS Point I/O, BCAL\_U Point I/O, FDC/CDC Point I/O.  
**Status: Work in progress.**
- VI. Hall B Gas System Slow Controls (Brian, Marc, George, Mary Ann.)  
Task: Deploy all LabVIEW based slow controls software system  
EDC: 07/31/2016  
Work done: Developing *Sub Vis.*  
Read from configuration file.  
Write to MFC and update configuration file.  
Comments: Six D-sub cables to be made for LTCC MFCs  
**Status: Work in Progress.**
- VII. Hall B HDICE (Peter, Brian, Mary Ann, Amanda, Tyler, Mindy, Sahin)  
Task: Fabricate RF box.  
EDC: TBD  
Work done: AutoCad drawing of the front and back panel RF attenuation and distribution box done.  
Writing drivers for Kron-Hite Model 523, DC source 110 mA, (10/18 completed), Fluke 52120A Transconductance Amplifier (6/18 completed), Digital I/O modules reviewed.  
Comments: Waiting for test regarding RF cables.  
**Status: Work in Progress**
- VIII. Hall B HTCC (Mary Ann, Mindy, Anatoly, Sahin)  
Task: Fabricate cables.  
EDC: 07/31/2016  
Work done: All 100 signal cables done.  
Comments: No news on compensation cables and connectors.  
**Status: Work in progress.**



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#### Antonioli, Mary Ann

##### Hall B

###### HDice

- Completed drawing of front panel of RF/attenuation distribution box; began back panel.

###### SVT

- Input module data into spreadsheet.

##### DSG

- Formatted and edited Gas System PID Test note in InDesign.
  - ★ Posted to DSG website as Note 2016-002.
- Made final edits to SVT module performance note and posted as Note 2016-001.
- Made final edits to DC Gas System Development note and posted as Note 20160003.

#### Arslan, Sahin

##### Hall B

###### SVT

- Replaced (Brian and I) N<sub>2</sub> gas bottle for SVT.

###### LTCC

- LTCC Valve panel moved L1 forward carriage.
- Removed old DC pump to be excessed.
- Cut 2.5"x13 tubing for LTCC input and output
- Installed fittings on new pumps for LTCC and attached to manifold
- Secured the pipes and reinforced with unistruts.

#### Bonneau, Peter

Absent – sick leave

#### Eng, Brian

##### Hall B

###### Gas System

- Dealing with NI technical support about EPICS Server.
  - ★ So far no solution to not retaining values between reboots.
- Testing shared variables to EPICS and different format initialization file.

###### Magnets

- Corresponding with Danfysik technical support about slew-rate.
  - ★ Documentation has at least 3 different ways to set it.
  - ★ Trying to determine best/most appropriate method.
- Changed PLC code to use default method until Danfysik gives clear answer.
  - ★ However this only has 8-bits of resolution instead of the potential 12-bits.
- Updated documentation on PLC networking.



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- Working with Wesley & Josh on getting initial CSS EPICS screen working.
  - ★ Had some issues with the boolean arrays not being parsed properly which has been fixed.

#### RICH

- Meeting to discuss upcoming schedule.

#### SVT

- Meeting to discuss current progress on problematic modules (all the testing [bend tests on HFCB, only supplying HV] so far hasn't revealed anything) as well as upcoming software tasks.

### Hoebel, Amanda

#### Hall B

##### HDICE

- Created GPIB write and read vi for Fluke 52120A Transconductance Amplifier
  - ★ Command \*IDN? outputs model information from amp.

##### SVT

- Monitored currents and voltages from 8 spare modules.
  - ★ Created histograms for current value differences; present week current minus previous weekcurrent.

#### Delta Current Values

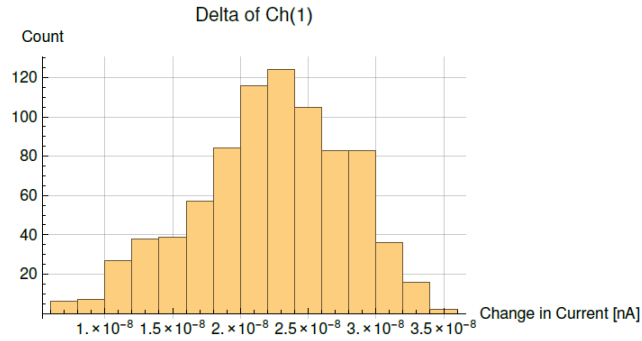
Changes in HV current for the 16 channels are displayed below. Values are the difference of current (present week data –previous week data) of each measured point (once ever 10 [s]) for each channel (1—16). Channels 1-16 represent modules: P62T, P62B, P75T, P75B, P21T, P21B, P40T, P40B, P45T, P45B, P64T, P64B, P66T, P66B, P50T, P50B.

Channels with smaller change in current and small variations of the current should have a mean value and standard deviation close to 0[nA]. The mean of all the 16 channels is: 16.8 [nA] and the standard error of the mean is 6.8 [nA].

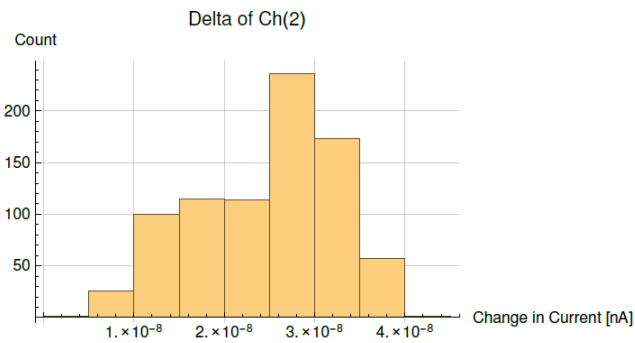


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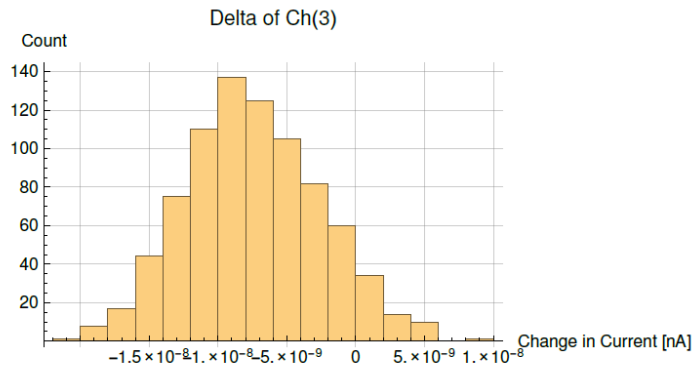
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Standard Deviation  $\{5.49314 \times 10^{-9}\}$  and Mean  $\{2.22427 \times 10^{-8}\}$  for Ch1



Standard Deviation  $\{7.73353 \times 10^{-9}\}$  and Mean  $\{2.46305 \times 10^{-8}\}$  for Ch2

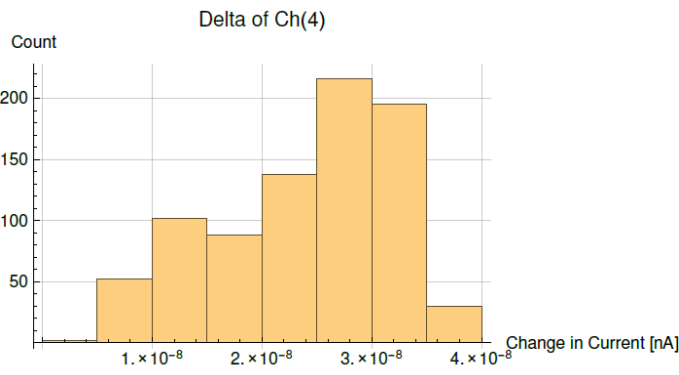


Standard Deviation  $\{4.84913 \times 10^{-9}\}$  and Mean  $\{-7.43504 \times 10^{-9}\}$  for Ch3

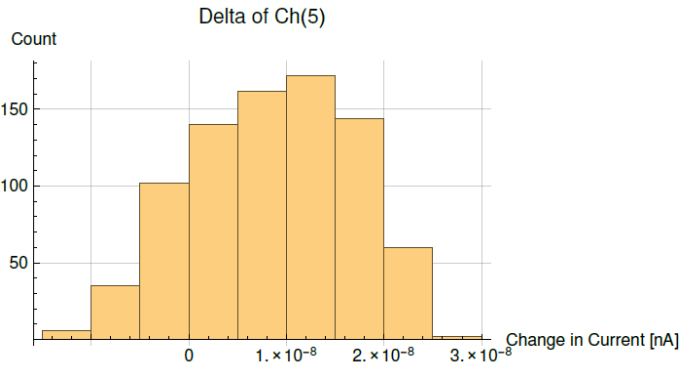


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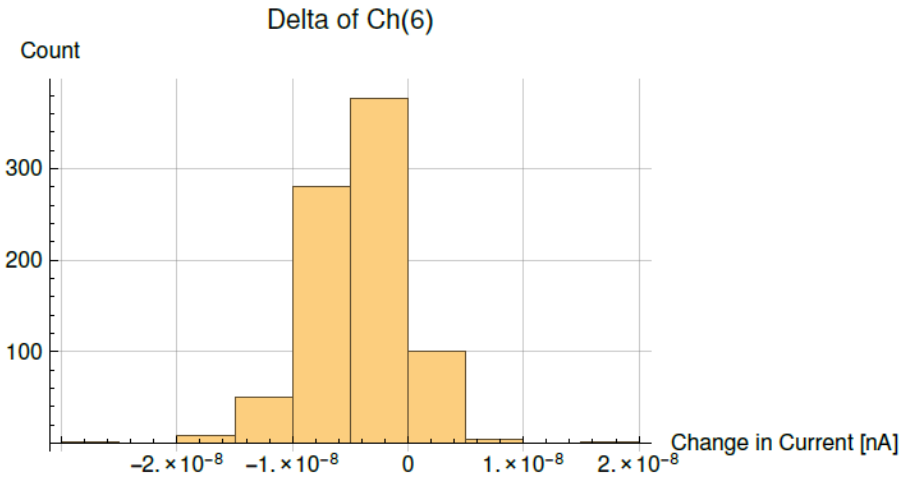
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Standard Deviation  $\{8.10318 \times 10^{-9}\}$  and Mean  $\{2.39439 \times 10^{-8}\}$  for Ch4



Standard Deviation  $\{8.2275 \times 10^{-9}\}$  and Mean  $\{8.52202 \times 10^{-9}\}$  for Ch5

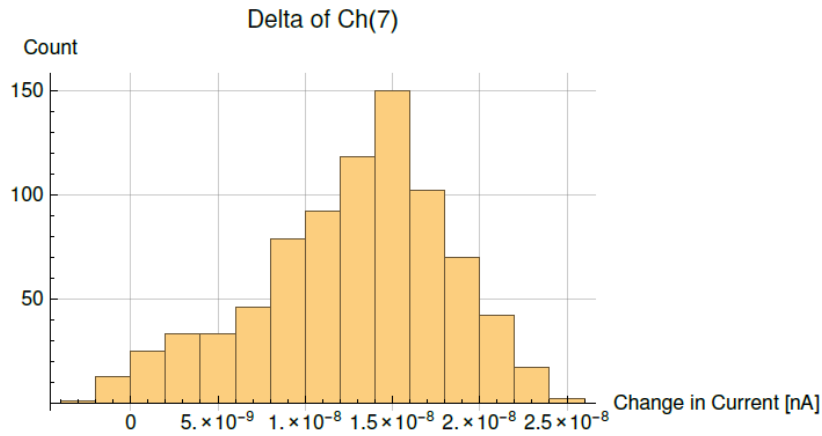


Standard Deviation  $\{3.98189 \times 10^{-9}\}$  and Mean  $\{-4.30479 \times 10^{-9}\}$  for Ch6

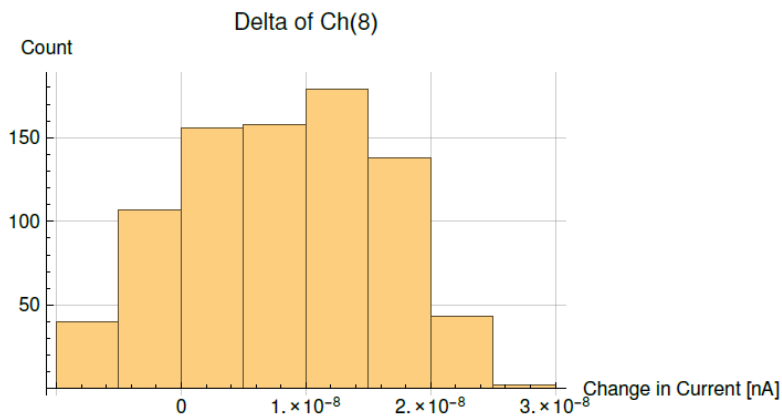


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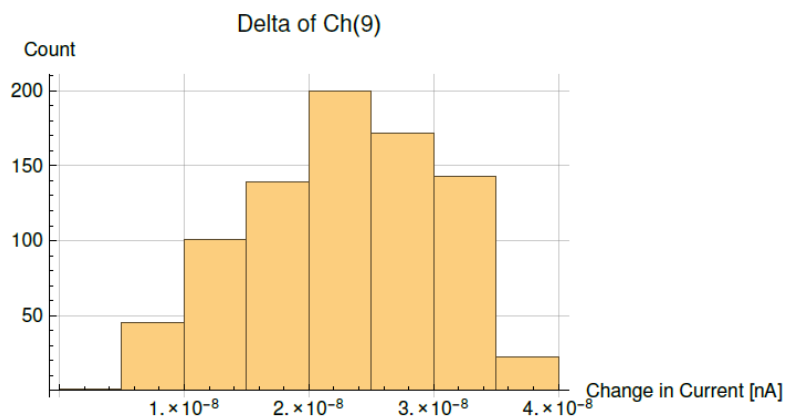
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Standard Deviation  $\{5.42546 \times 10^{-9}\}$  and Mean  $\{1.27606 \times 10^{-8}\}$  for Ch7



Standard Deviation  $\{7.86808 \times 10^{-9}\}$  and Mean  $\{8.13949 \times 10^{-9}\}$  for Ch8

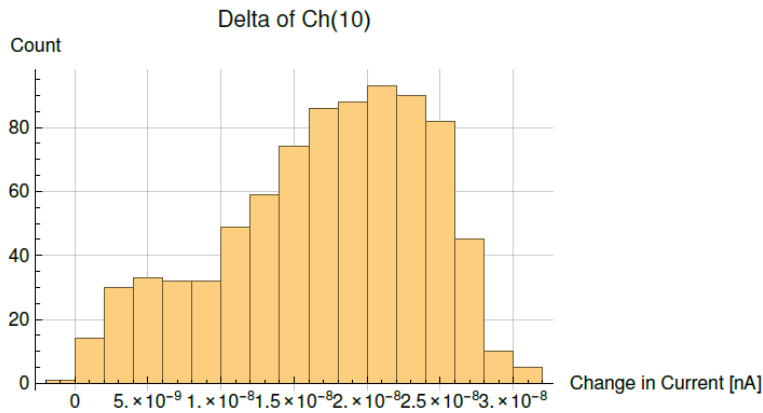


Standard Deviation  $\{7.48945 \times 10^{-9}\}$  and Mean  $\{2.26672 \times 10^{-8}\}$  for Ch9

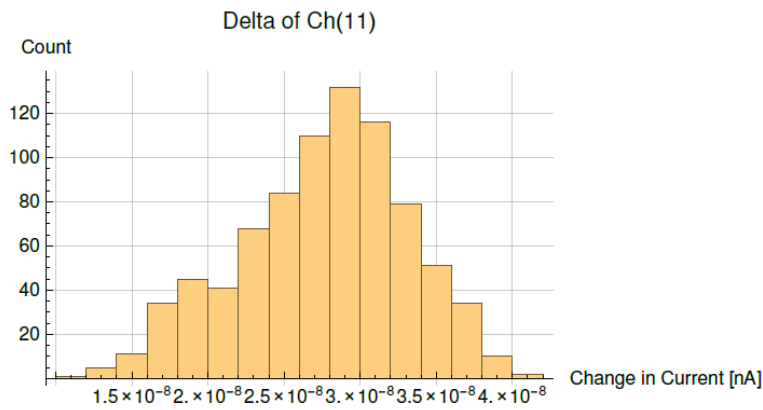


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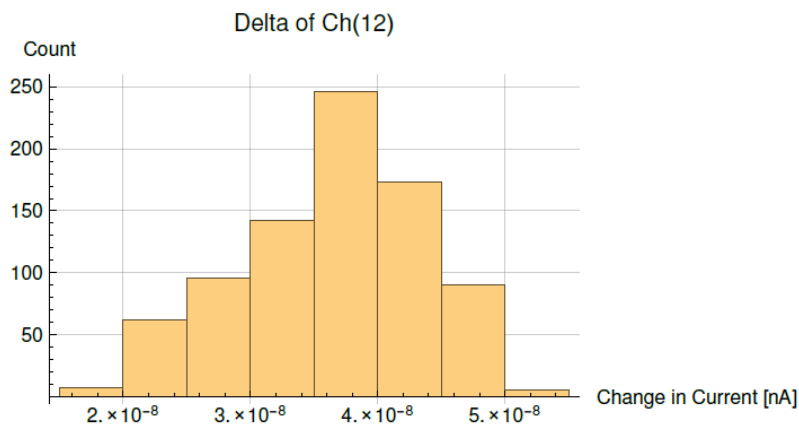
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Standard Deviation  $\{6.95732 \times 10^{-9}\}$  and Mean  $\{1.71063 \times 10^{-8}\}$  for Ch10



Standard Deviation  $\{5.50176 \times 10^{-9}\}$  and Mean  $\{2.75976 \times 10^{-8}\}$  for Ch11

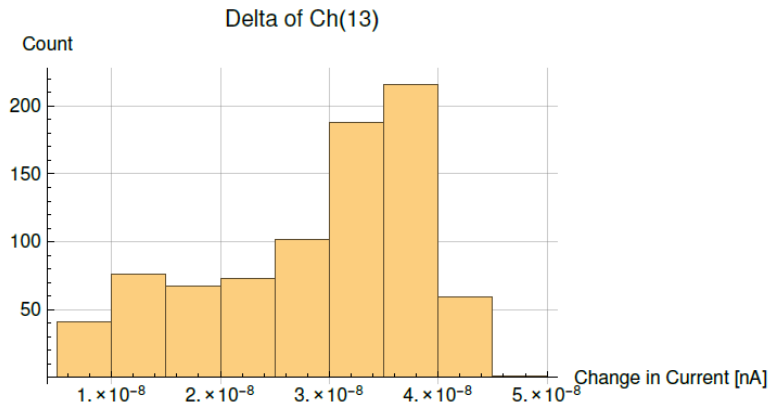


Standard Deviation  $\{7.13125 \times 10^{-9}\}$  and Mean  $\{3.63721 \times 10^{-8}\}$  for Ch12

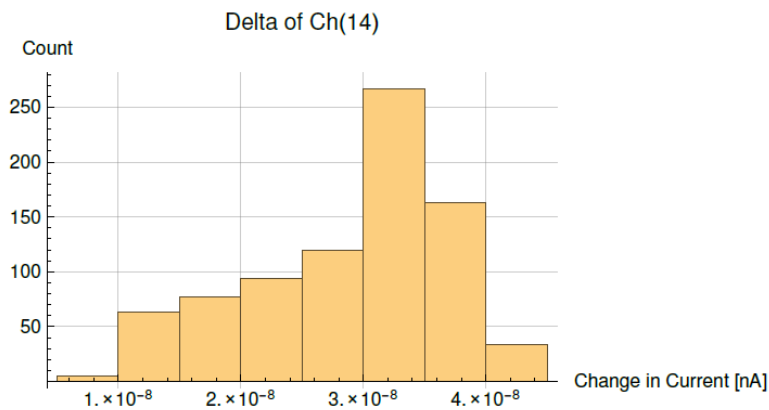


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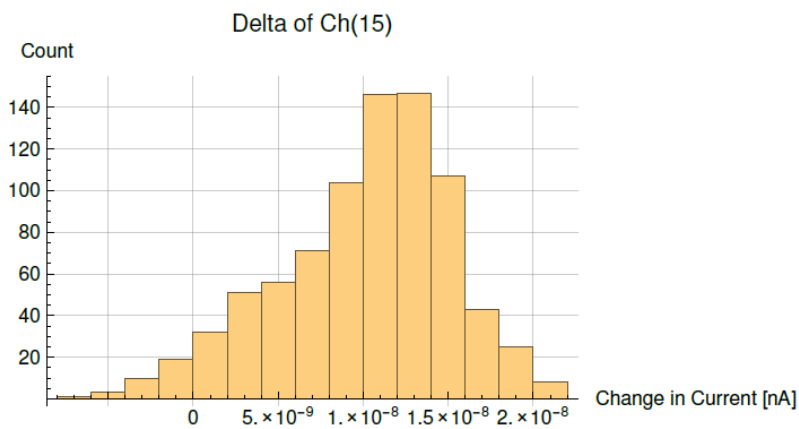
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Standard Deviation  $\{9.85665 \times 10^{-9}\}$  and Mean  $\{2.87541 \times 10^{-8}\}$  for Ch13



Standard Deviation  $\{8.05013 \times 10^{-9}\}$  and Mean  $\{2.89345 \times 10^{-8}\}$  for Ch14

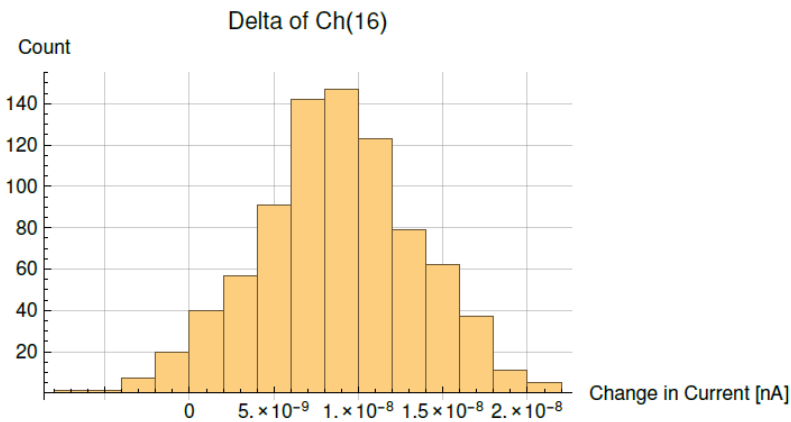


Standard Deviation  $\{5.08094 \times 10^{-9}\}$  and Mean  $\{1.01117 \times 10^{-8}\}$  for Ch15



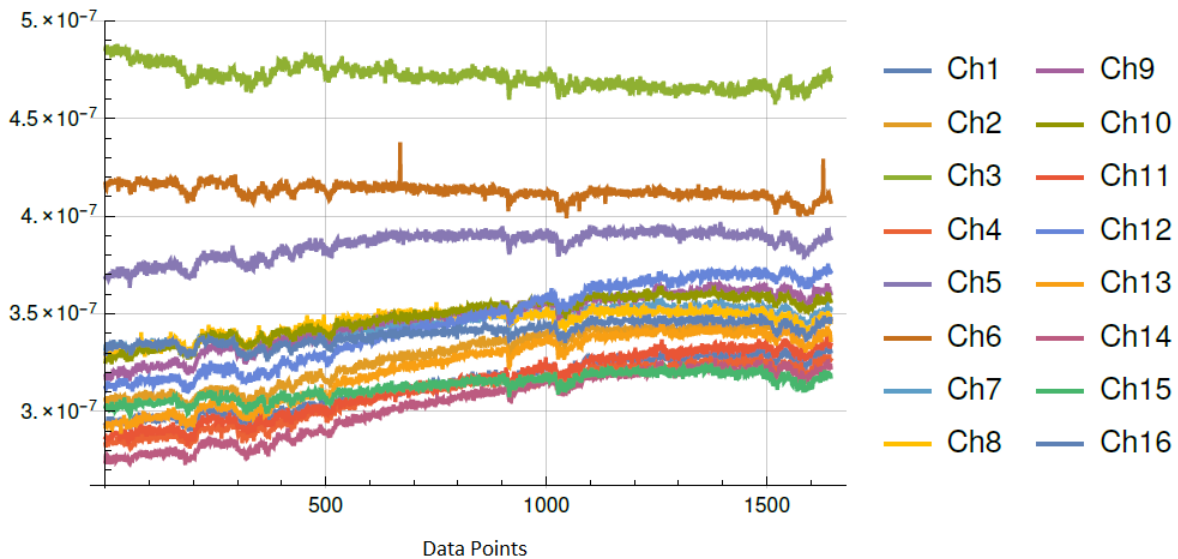
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Standard Deviation  $\{4.66704 \times 10^{-9}\}$  and Mean  $\{8.71221 \times 10^{-9}\}$  for Ch16

★ Strip chart created weekly for current values (below), includes data for 2 weeks.



- Wrote program to read voltage and current values from modules in SVT assembly.
  - ★ Program puts voltages and currents into SQLite database.
- Created Mathematica program to analyze SVT SQLite database.
  - ★ Outputs modules that have performed poorly ( $>1\sigma$  from mean value).
  - ★ 8 modules are shared by all 5 runs (from December to March).

#### Detector

- Attended CLAS Collaboration Meeting.
  - ★ Discussed status of CLAS and non-CLAS experiments and 12 GeV upgrade.



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#### Hall D

##### Detector

- Monitored logbook.
  - \* Baselines from one of the FADCs were not set up properly and caused very high trigger rates for BCAL and FCAL.

#### DSG

- Met with Peter and Tyler to discuss PLCs.
  - \* Created voltage alarm.

#### Jacobs, George

##### Hall B

##### Gas Systems

- Replaced the LTCC MFCs in the valve panel.
- Pre-job walk thru and planning for LTCC gas system work.
- Meeting with Bob Miller. in Hall B for LTCC gas lines and equipment relocation.
- Connected LTCC pumps to manifolds.
- Updated RICH N2 purge system diagram.
- Updated LTCC gas system diagram, extensive changes to drawing to add controls connections.
- LTCC valve panel now mounted on L1 Fwd Carriage.
- Removed broken R3 DCGAS pump from system.
- Multiple discussions about the gas mixing system for the MVT.

#### Leffel, Mindy

##### Hall B

##### HTCC

- Finished terminating the last 50 of 100 signal cables.

#### Lemon, Tyler

##### Hall B

##### Magnet

- Attended Torus Magnet Controls Status meeting.
  - Discusses schedule for testing of distribution box, Torus service tower and MPS EPICS screens.

##### HDICE

- Wrote drivers for Krohn-Hite Model 523 Calibrator.
  - \* Communicates to Model 523 through GPIB.
  - \* Writes commands to Model 523.
  - \* Reads any reply from Model 523.
- Attended Collaboration meeting.



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- ★ Hall Status talk by Volker Burkert; status of detectors that are part of 12 GeV upgrade.
- ★ Lab Status talk by Robert McKeown; status of laboratory, 2017 budgeting and future projects.
- ★ 12 GeV Status talk by Glenn Young; upgrade status of Hall B and Hall C, when detectors and magnets will be installed.

### Hall D

- Monitored logbook and EPICS screens.
  - ★ Noted in the logbook that CDC HV ch. L7 and CDC HV ch. H6 had tripped, EPICS showed that these channels had already been reset.
  - ★ Noted in logbook FDC HV:2:c5:4 was turned off due to it tripping every few minutes.

### DSG

- PLC programming with Peter and Amanda.
  - ★ Created a function block diagram for a voltage limit alarm and temperature limit alarm.

### McMullen, Marc

#### Hall B

##### Gas System

- Modified the inputs to the Gas Shed controls chassis to accept the moisture sensors for the drift chamber supply and exhaust.
- Worked with Anatoli on cables for the Gas Shed controls chassis.
  - ★ Cables for moisture sensors extension and cRIO analog inputs were completed.
- Started reorganizing the LabView code by separating out the signals/variables for the gas shed from the space frame.
  - ★ Started breaking down code into separate VIs which will be portable between cRIOs.
- Measured MFC cable runs for the LTCC.
- Ordered LTCC gas controls rack accessories.

### Sitnikov, Anatoly

#### Hall B,

- Fabricated a cable for DC MIX GAS PRESSURE and labeled.
- Labeled seven cables for GAS CONTROL system.
- Produced two DC GAS CONTROL ANALOG INPUT cables and labeled (140 pins).