Detector Support Group

We choose to do these things "not because they are easy, but because they are hard".

Weekly Report, 2020-09-23

Summary

Hall A – SoLID Magnet Controls

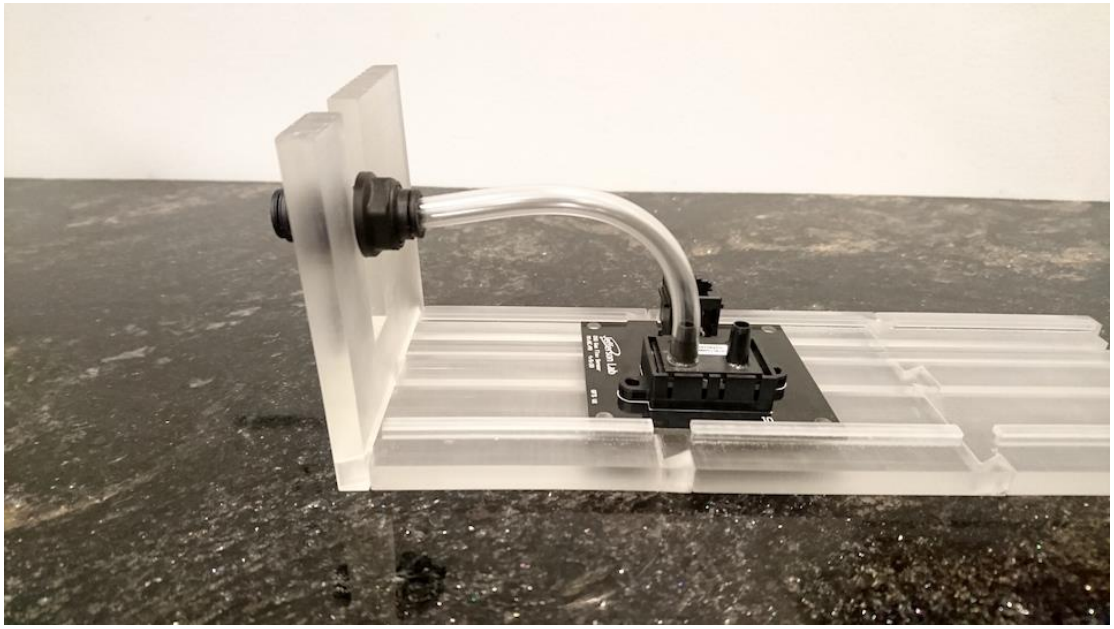
Mary Ann Antonioli, Peter Bonneau, Aaron Brown, Pablo Campero, Brian Eng, Tyler Lemon, Marc McMullen

- Completed *Solenoid JT Valve* HMI screen which controls and monitors valve position for heat exchanger valves
- Completed modifications, using AutoCAD, to *Instrumentation Rack Layout* drawing

Hall A – GEM Detector Gas System

Peter Bonneau, Brian Eng, George Jacobs, Mindy Leffel, Tyler Lemon, Marc McMullen

- Tested three flow sensors on a single multiplexer board; no issues found
- Assembled fixture to test tubing lengths in the chassis
  - ✶ Fixture was 3-D printed



Testing assembly for chassis tubing lengths. Four inch tubing shown here.

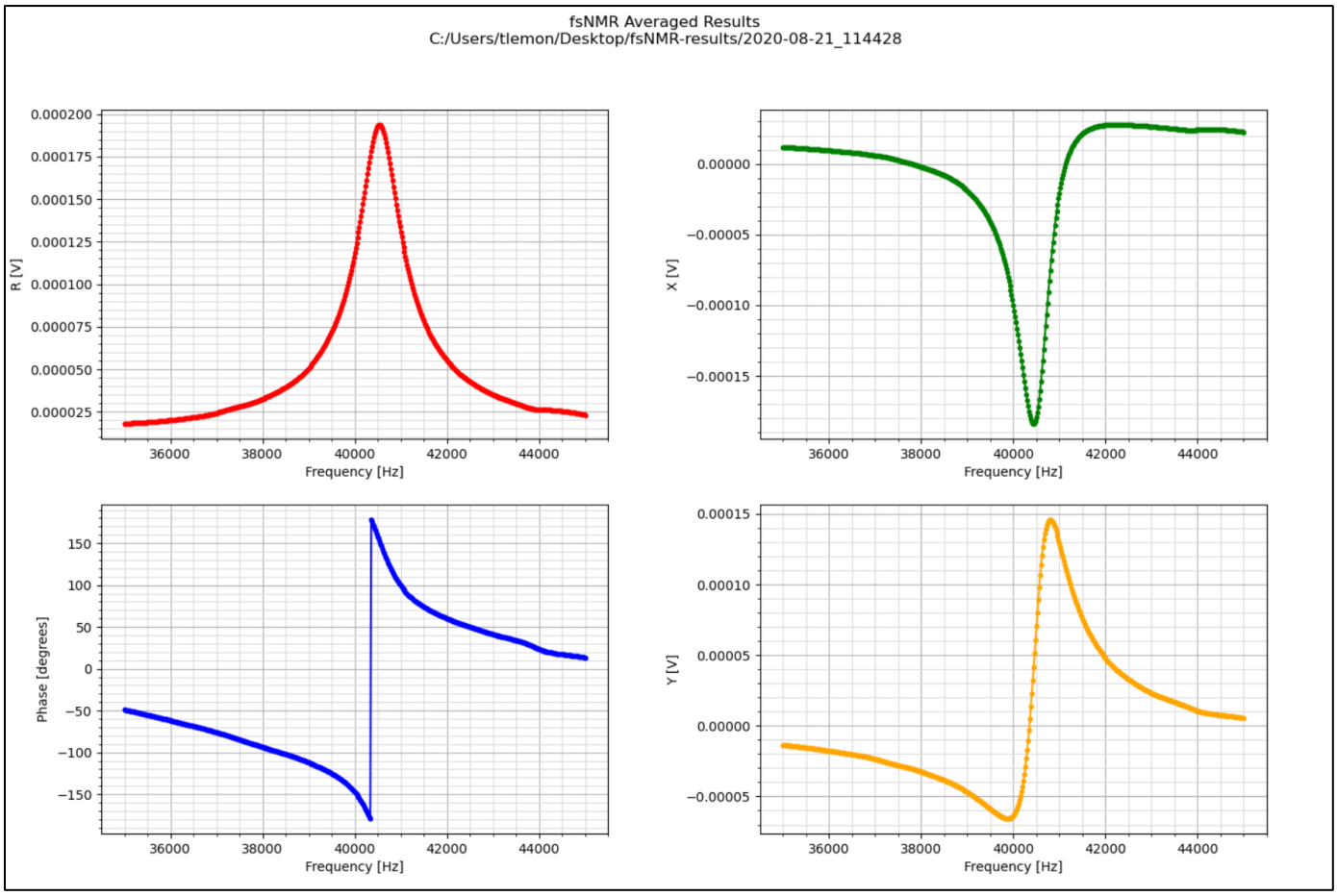
- Modeled exhaust sensor box with Bud Industries CU-1947 box
  - ✶ CU-1947 box is able to fit two gas flow sensors or one multiplexer

HDice – fsNMR Program

Peter Bonneau, Tyler Lemon

- Investigated options and applications of the Zurich UHFLI Lock-in amplifier
- Tested Zurich lock-in amplifier's sweep module in averaging mode
  - ✶ Lock-in amplifier has built-in capabilities to take several samples at each frequency in a sweep and average the results
- Developed, using Python, a program to generate plots for averaged fsNMR results

- Program utilizes Python's tkinter package as a GUI allowing users to select data and interact with status messages without needing knowledge of Python



Output of fsNMR results plotter. Top Left: Amplitude (or R) vs Frequency, Bottom Left: Phase vs Frequency, Top Right: X vs Frequency, Bottom Right: Y vs Frequency

Hall C - NPS

Mary Ann Antonioli, Peter Bonneau, Aaron Brown, Pablo Campero, George Jacobs, Mindy Leffel, Tyler Lemon

- Completed 132 of 1080 PMT voltage and current limit settings CSS-BOY screens
- Analyzing HV (with load) stability test current and voltage data; 27 of 32 modules' voltage data analyzed
- Eight hundred of 1100 high voltage divider cables fabricated
- Developing, in EPICS, CAEN HV trip test
  - Current trip test is automated
  - Automating voltage trip test
- Developing, in EPICS, CAEN HV ramp test
- Reviewed and compiled research documentation on the three most commonly used temperature sensors.

Typical values	RTD	Thermistor	Thermocouple
Accuracy	±0.1 to ±1°C	±.05 to ±1.5°C	±1 to ±2.2°C
Stability	0.05°C/year	0.2°C/year	1.5°C/year
Excitation	Required	Required	None
Output	resistance	resistance	voltage
Output Linearity	linear	non-linear	non-linear
Response time	1 to 10 sec	0.12 to 10 sec	0.5 to 10 sec
Range	-200 to 650°C	-100 to 325°C	-270 to 1800°C
Relative Cost	High	low to moderate	low
Signal conditioning needed (long leads)	No	No	Yes
Self-heating	Yes, minimal	Yes, highly	No
Detector Example	Hall D Comcal	CMS ECAL	Primex HYCAL
Overall Advantages	Stable Accurate Linear	Fast Accurate Lower cost	High temps Low cost

EIC

Brian Eng

- Attended first of two Earned Value Management System (EVMS) trainings

DSG – Website Design

Mary Ann Antonioli, Peter Bonneau, Aaron Brown

- Continued updating all DSG technical documentation sections