



# Detector Support Group

## Weekly Report, 2017-04-05

### State of Play

#### Solenoid

- “Hall B Solenoid Magnet and Cryogenic Control Systems” document corrected.

#### Gas System

##### DC

- Existing pumps replaced with new ones.
- Gas lines modified.



New DC gas return pumps, with fittings from old pumps.

- Leak-checking of system-piping at 10 psi started.
  - \* Expected system ready date: 04/30/2017

#### HDice

- First draft of flowchart of NMR program completed.

#### SVT

- Repaired chiller does not work. New chiller ordered.

#### RICH

- Cable tray modified and assembled.
- Support brackets attached to shell.
- Eight Humidity-Temperature-Sensor-Boards fabricated.
- Line for compressed air in clean room installed.
- MVT/FT gas lines removed to make room around air tank and compressor.
- 1000-Kg rated pulley insufficient to lift load, if only winch is used.
  - \* Maximum force on pulley ~16000 N (6000 N more than pulley rating).

#### FT

- Development of EPICS interface started.



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### Hall D Magent

- Heater failure of solenoid vapor-cooled leads on 04/02.
  - \* Ice ball formed on lead.
  - \* Heater fuse measured to be open, fuse replaced.
- On 04/03, Solenoid PLC Ethernet communication failure of “duplicate IP conflict” due to low battery power in UPS.
- DSG notified that PXI was not responding.

### Tracking Detectors

- Noted on 2017-03-30, CDC and FDC gas flow lowered for summer downtime.
  - \* CDC: lowered from 2 slm to 0.2 slm
  - \* FDC: lowered from 100 sccm to ~60 sccm.



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### Antonioli, Mary Ann

- Continued working on **RICH** interlocks code (initialization sequence, message-handling loop, configuration file).
- Completed first draft of flowchart of **HDice** NMR program.

### Arslan, Sahin

- Replaced **SVT** N<sub>2</sub> bottle.
- Modified and assembled **RICH** cable tray.
  
- **DC**
- With Mindy, modified and replaced leaked lines.
- Replaced existing pumps with new ones and modified lines.

### Bonneau, Peter

- Discussed **RICH** interlock system configuration file subroutines with Mary Ann.
- Reassembled and testing **HDice** NMR test station in EEL lab in preparation for synchronization testing.
- Started development of EPICS interface for **Forward Tagger** interlock system (seventh parallel sub-routine in Main real-time program).
  - ★ Investigated advantages and disadvantages of implementing EPICS interface as a server rather than a client.
  
- Held daily meeting on Hall D status and EPICS controls monitoring.
  - ★ Sunday night, heater failed on one of solenoid vapor-cooled leads. Ice ball formed on lead; investigated on Monday. Heater fuse was measured to be open and replaced. Heater operational.

### Campero, Pablo

- Corrected “Hall B **Solenoid** Magnet and Cryogenic Control Systems” document.

### RICH

- Drew in AutoCAD schematic diagrams of rotation.
  - ★ Generated five diagrams for structure at horizontal, 30°, 45°, 60°, and vertical positions.
  - ★ Measured angles and rope lengths for each position.
  
- Monitored and analyzed logbook entries and EPICs screens for Hall D daily.
  - ★ On 04/03, Solenoid PLC Ethernet communication failure of “duplicate IP conflict” was due to low battery power in UPS.
  - ★ Solenoid VCL heater failure caused vapor upper cooled lead temperature to start going lower on 04/02.
  
- Wrote LabVIEW program to test analog ADC channel A on VME-V450 board
  - ★ Writes data measurement to text files.

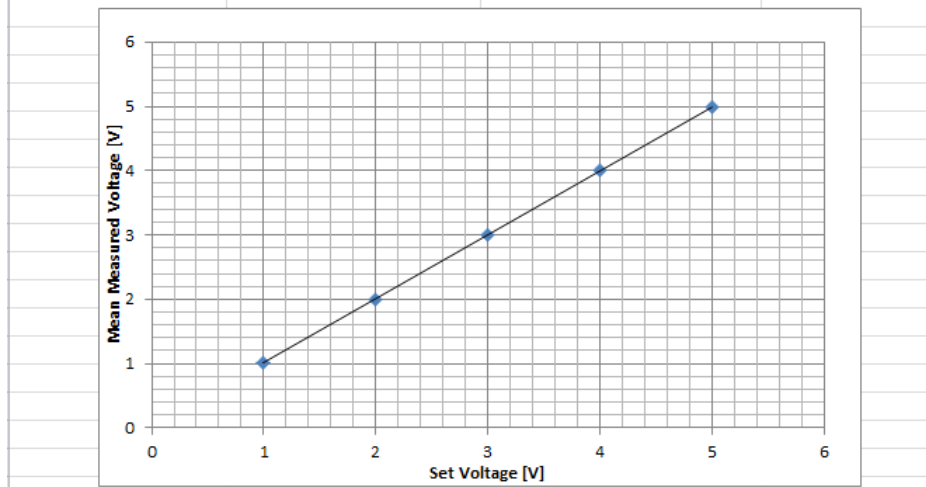


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- \* Analyzed voltage measurements.

Set Voltage [V]	Mean Readback Voltage [V]	Standard Deviation	Error %
1	1.0029004	9.99992E-05	0.29004
2	2.0017461	0.000459788	0.087305
3	3.0056456	0.005686523	0.188186667
4	4.0040607	0.005803801	0.1015175
5	4.9973276	6.85437E-05	0.053448



Mean measured vs set voltage and error Vs set voltage; 1000 measurements taken at 1V steps in range of 0 – 5 V.

### Eng. Brian

- New outlet installed for SVT chiller, but first try with new plug did not work.
- Volker approved buying new chiller of different brand (Anova, same as used for HPS). Bob needs to approve final model.

### Gas System

- DC controls and SVT added to stand-alone GUI.
- Marc reported that some mixing MFCs were not flowing properly. After testing, found that all four mixing MFCs do not control flow properly when valve is in normal position (open and closed work as expected though). Contacted MKS.

### Magnet

- Was notified that PXI was not responding.
    - \* Initial issue was due to switch going down, which affected PLCs on same switch, causing PXI not to get an IP address after being power-cycled.
    - \* After networking was restored, PLC had fatal error, which halted PXI; another power cycle fixed problem.
    - \* Will need to monitor. If exception occurs again, will need to set up remote console logging to get more detailed error.
- <https://logbooks.jlab.org/entry/3469077>

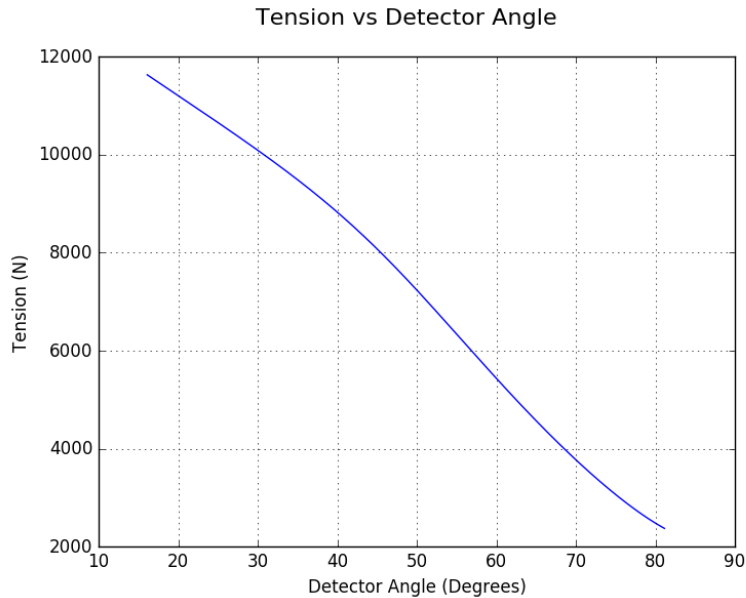


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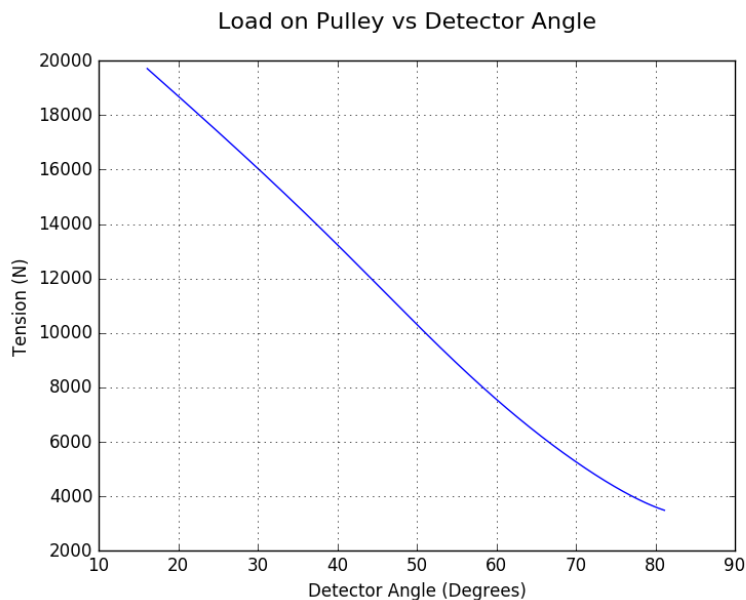
## Weekly Report, 2017-04-05

### Hoebel, Amanda

- Using Python, calculated rope tension and load on pulley from raising **RICH** to vertical position.



Tension in rope due to lifting RICH detector from horizontal to vertical position, with equipment installed, vs angle of detector from floor. Assuming total mass (RICH + stiffener) 1200 Kg, plus 25% safety factor 1500 Kg.



Weight on pulley due to lifting RICH detector from horizontal to vertical position, with equipment installed, vs angle of detector from floor. Assuming total mass 1500 Kg.

- Installed JAlbum on computer with Pablo.
  - ★ Recreated DSG photo album.



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### Jacobs, George

#### Gas Systems

- Wrote procedure for pressure-testing DC gas piping; forwarded to DA for approval.
- Updated DC P&I diagram with correct locations for DC09, DC12, and DC15.
- Began leak-checking DC system piping at 10 psi.
- Fixing leaks by replacing piping and redoing connections.
- Received quote on pre-mix gas for MVT testing from Praxair.
- Ordered 10 cylinders of 10% C<sub>4</sub>H<sub>10</sub> in Ar pre-mix for MVT testing.
- Met with ODU and W&M BONUS detector team members in preparation for May ERR.

### Leffel, Mindy

#### DC

- Worked with Sahin.
  - ★ Removed tubing and fittings from old gas return pumps, installed on new.
  - ★ Repairing leaks in original gas system.

#### RICH

- Working with Sahin, attached support brackets to shell.
- Completed fabrication of first section of eight HTSBs.

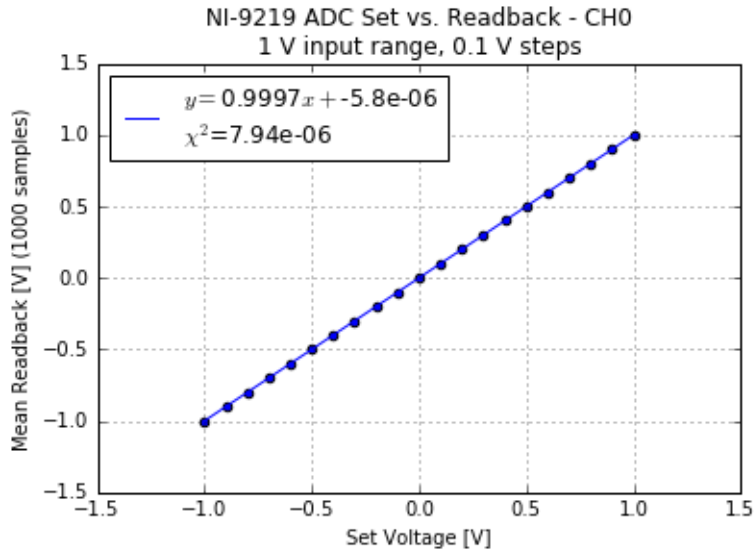
### Lemon, Tyler

- Collaborated with Amanda and Pablo to calculate forces during RICH rotation.
  - ★ Determined that 1000-kg rated pulley will not be sufficient if only winch is used.
    - Maximum force on pulley is ~16000 N (6000 N more than pulley rating).
  - ★ Calculating force on winch to determine if new winch is really needed.
- Monitored Hall D logbook and EPICS on daily basis.
  - ★ Noted on 2017-03-30, CDC and FDC gas flow lowered for summer downtime.
    - CDC: lowered from 2 slm to 0.2 slm
    - FDC: lowered from 100 sccm to ~60sccm.
- Modified NI-9219 ADC LabVIEW program to allow testing of full module input range.
  - ★ New version automatically steps through user-set module voltage input range.
  - ★ At each step, program takes 1000 voltage measurements on each channel and calculates mean, standard deviation, and accuracy for each measurement set.



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Results from NI-9219 ADC Range Test for CH 0. Test used 1 V input range and covered -1 V — 1 V at 0.1 V steps.

### McMullen, Marc

- Wrote status update of MVT gas, sent to mailing list, and requested update.
  - ★ MVT (Maxim Defurne) will arrive at Jlab soon. Hall B's contact will meet with him, and try to assess current status and update mailing list.
- Installed Brian's MFC OPEN VI on gas shed cRIO to get it to stay on after logging out of the VI.

### RICH Assembly

- Ran gas line for compressed air in clean room.
- Removed MVT/FT gas lines to make room around air tank and compressor.
- Met with Facilities Management engineer (T. Renzo) to discuss stiffener.
- Continued work on gas interface chassis.
  - ★ Completed cabling pinout.

### RTPC

- Meeting with George and Amrit, and Gabriel and Carlos of RTPC group to discuss detector gas/control needs.
  - ★ Started gas controls components list.