

Lab Status/ AEM Meeting Notes

Monday Oct. 16, 2017

<https://indico.fnal.gov/conferenceDisplay.py?confid=15504>

Incidents:

- None.

Accelerator Operations:

- Shutdown progress reported. Marx modulator work continues this week in Linac. Booster power supplies to be turned on later in the week for system checkout. Lambertsons installation, LCW leak repairs in MI/RR. Will start commissioning RF system by the end of the week. NUMI power-supply testing. MS2 water system commissioning in SY.
- Next week: Beam start-up in proton source expected. MI/RR power supply studies and system checkout begin.
- NUMI target scans planned for early in the week of Oct. 30th.

Special Topics:

- [IARC Report](#)
- [Dark Matter Report](#)

PPD Operations:

- DES
 - o DES announced observation of an electromagnetic counterpart to the recent LIGO/Virgo event that has been identified as a neutron-star merger. There was a press conference, and Marcelle Soares-Santos who recently left the lab was on the panel. She has been a leader in the DES coordination with LIGO. Marcelle is giving the wine and cheese seminar on this topic this Friday.
- Muon g-2
 - o Completed testing of Quads/Kicker integration. Successful operation of quads at both set-points, with realistic vacuum, and kickers at 100% of the design, with acceptable integrated spark rate (few per day --> 98% uptime).
 - o This week --> storage ring vacuum integration tests (trackers/fiber harps), systematically installing and testing while measuring the vacuum. Installing infrastructure for cryopump LN2 vent line
- CMS
 - o CMS continues to run well. Data-taking efficiency last week was 94%.
 - o LHC peak luminosity $\sim 1.8E34$, leveled at $1.5E34$.
 - o Approximately 1 week ahead of schedule to make the goal of 45 fb^{-1} this year.
 - o One day of Xenon heavy ion running last week.
- Mu2e
 - o Production Solenoid/Detector Solenoid
 - GA (Tupelo, MS & San Diego) successfully tested the curved splice tooling using PS conductor. Splices have been sent to FNAL for testing. The PS to DS splice was kludged. GA did not use splice tooling since the model coil is the only coil needed to splice two different types of

- conductors. GA also successfully did a “joggle” from layer 1 to layer 2 of the model coil.
- GA is continuing to wind the model coil. The model coil is a 3-layer, 10 turn coil. First layer is PS conductor, 2nd and 3rd layers are DS conductor. GA finished winding the 2nd layer last week and is starting on layer 3 this week.
 - The model coil Vacuum Pressure Impregnation (VPI) was shipped from San Diego last week. It is scheduled to arrive at Tupelo later this week.
 - Members of the Mu2e Solenoid team were present in Tupelo over the last 1.5 weeks to witness the model coil work.
- Transport Solenoid
 - ASG (Genoa, Italy) has completed the final machining of the aluminum shell of the TS first article. The coil insertion is scheduled for Oct 23rd. Members of the Solenoid Team will be present at ASG to witness the coil insertion.
 - TS Assembly tooling has arrived at Fermilab.
 - HAB - Finished cool down of the old TS prototype coil. Plan to power up the coil today (Monday).
 - Accelerator
 - The prototype AC Dipole (Extinction System) undergoing electrical and vacuum tests; 40% less efficient at 5 MHz than expected based on scaling of 0.5m prototype. Inefficiency not understood. Moving from IB2 to XGallery for 300 kHz test to see if the problem is with the set-up at IB2. In addition to electrical performance issues, the vacuum level for the system does not meet spec (10^{-2} torr vs spec of 10^{-7} torr). Poor vacuum likely due to wrong ferrites used. The ferrites took a long time to procure, perhaps because Mu2e spec'd vacuum compatible ferrites on the P.O. Ferrites for vacuum are machined with water and are baked out. Standard ferrites are machined with oil and have no special cleaning/post-processing. The company asked whether to send the ferrites they had on hand, which were the non-vacuum spec'd ones, in order to expedite the order. TD procurement agreed that the vendor could ship us what they had. The Mu2e L2/L3 were not contacted during this process. This was only discovered when vacuum problem arose. Cannot change out the ferrites, but will continue to use the prototype for electrical tests.
 - Cosmic Ray Veto
 - Pre-production Hamamatsu SiPM photodetectors (~1000) delivered; being tested at NIU. Performance looks good so far. A small subset to undergo radiation testing to verify meeting of specs of E11 neutrons/cm².
 - Tracker
 - After some initial issues with leaks, the winding manufacturer (PPG) has successfully wound ~4000 gold-on-aluminum straws. These being

tested at University of Minnesota. 96 straws being prepped. After qualifying initial batch of 4000, remaining ~20k straws will be made. Run scheduled to start Nov 6th and will take ~10 days to fabricate.

- Upcoming Reviews
 - Construction Readiness Reviews (CRR)
 - Oct 16 - External Beamline/Rad Safety/Instrumentation & Controls (today)
 - Oct 17 - Trigger/DAQ Rack & Rack Infrastructure CRR
 - Oct 30 & 31 - Heat & Radiation Shield Shipping Frame/ Lifting Fixture & Installation Machine (10/30/17-10/31/17)
 - Final Design Review
 - Oct 17 - TS outer cryostat
- Test Beam is ready for beam. Already ~100% booked with primary users for FY18.
- Last week many PPD personnel participated in the CPAD meeting at the University of New Mexico. It included discussion of many R&D areas where Fermilab is engaged, including: Quantum sensors, CMB sensors, Ultra-fast timing, Dark Matter & Dark Energy technologies, TDAQ, LAr technologies and ASIC technologies. The day before was a Fermilab-led workshop on Trigger/DAQ R&D for future experiments. This workshop was led by Kurt Biery and Alan Prosser from SCD (with PPD participation) and successfully identified critical TDAQ R&D for future experiments and explored avenues for further R&D collaboration between universities and labs.
- EED
 - From Mike Matulik: Last week we succeeded in correcting the Detector Ground reference connections for two MicroBooNE electronics racks on the LArTF Platform. It's too early to know if this grounding correction will lead to reduced noise in the experiment.

ND Operations:

- SBN: Director's review scheduled for Nov. 1-2.
- ICARUS: CERN and INFN personnel made entry into one of the ICARUS TPC vessels to reinstall cathode mounting brackets which came loose during transport from CERN. All were successfully reinstalled and all brackets checked for tightness. The brackets will be checked in the 2nd vessel in the coming week.
- SBND: Continued progress on testing of commercial ADCs in cold for TPC readout. One model, Analog Devices AD7374, has shown no appreciable degradation in performance during stress tests at BNL and FNAL.
- DUNE
 - AT CERN, leak testing of the protoDUNE-SP complete. All scaffolding removed, cleaning of the cryostat expected through October 19.
 - First APA moved to the cold box on Friday and closed up. Will go cold soon. Planning underway for shipping APA #2. Crate to be delivered to UW-PSL the week of Oct. 30 and air shipment planned for Nov. 14.
 - At Fermilab, continue HV tests with 35 ton cryostat. Problem encountered in raising voltage significantly.
 - Exploratory work ongoing with simulations of GARTPC ND option.
 - Figuring out calibration possibilities for DUNE FD underground with cosmic rays.

LBNF Project:

- No report.

TD Operations:

- Muon g-2
 - o g-2 Inflector inner coil winding is complete. Re-tooling for outer coil winding is complete and outer coil winding will begin shortly.
- Mu2e
 - o Transport Solenoid (TS) test facility in HAB is cold, powered commissioning is starting 10/16. Mu2e magnet team witnessing and supervising coil fabrication in Italy and cable fabrication in Brazil.
 - o AC dipole prototype moved to AD for 300 kHz tests.
 - o Mu2e beamline extinction workshop organized this week.
- LCLS-II Magnets
 - o Qualification of quadrupoles continue, SPQA114 cold test in progress, SPQA118 incoming inspection done, SPQA119 to be shipped back to vendor for repairs.
- AS
 - o EDWA is completed and installed for MTF measurements. A leaking MDCC magnet was disassembled. New coils will be wound.
- MDP 15-17 T dipole R&D
 - o Fabrication of 15 T dipole coils in progress; Preparing to wind the inner layers 1 and 2 of the inner coil.
- LARP/HL-LHC-AUP
 - o Coil production in progress, QXFA106 (4.2m) coil impregnated, QXFA107 inner layer curing done, EVMS training in progress for control account managers.
- Infrastructure
 - o MTF, Preparing for VTS3 floor trenching for installation of Klystron.
- SRF Sector Update
 - o R&D: 2.6 GHz doping started after high gradient run. 1.3 GHz N-infusion and doping studies continue. Nb3Sn coating re-started with new Sn-heater.
 - o **LCLS-II** : CM03 leak check found the BPM feedthroughs leaked. Leak too big and cryomodule will be completely disassembled and rebuilt. CM01, CM02, CM04 are pending retrofit work related to microphonics mitigation. CM06 is ready to transport to CMTF test cave. CM05 is finishing final welds and pressure test. CM07 experienced upper cold mass alignment issue due to vendor related non-conformance parts, retrofit is in progress at WS3. CM08 is in WS2 to complete. CM09 completed WS0 and waiting for tooling freed from CM08. Jlab pCM test was concluded. Gradient and field emission was consistent from JLAB results. However, Q0 result was much higher than JLAB results. 2.07 K test appears to be a reasonable cryomodule acceptance test.
 - o **PIP-II**: Another 650 MHz 5-cell cavity was qualified (B9A-AES-007). STC test of integrated spoke cavity (S112) had strong field emission and needs re-HPR and a re-test. STC test of spoke cavity (S113) had multipacting and field emission, needs re-HPR and a re-test.
 - o **LARP Deflecting Cavity**: First vertical test of a deflecting cavity was completed. Measurement was successful. Cavity is qualified.

Computing Operations:CCD:

- Generally good week.
- Some problems with uBooNE router – crash on 10/13 at 1:30 am, fixed partly by 4:30 am. Later needed to do forced reload of entire uBooNE network following another crash at 2:30 pm. Service back at 4 pm. No issues over the weekend.

SCD:

- Good week.
- CMS: Smooth operations.
- FIFE:
 - o Efficiency data not reported since downtime on 9/19. Fixed at HTCondor level.
 - o Head nodes being upgraded Tuesday. Worker nodes to have a rolling upgrade.
 - o Low-level problem of losing mount points fixed on 10/10.
 - o Not yet open for OSG access. Waiting for operations to stabilize.

Office of Communication:

- No report.

Directorate:

- No report.

Facility:

- Abri Credit Union repairs being completed. It is expected to reopen in its original location on Monday, October 30.
- West side parking lot to get renovation over the next few years in portions. The kidney pond parking lot would be the first.