

Weekly Report for 04/27/2015

Highlights

- This is a three-week report. (Kathy Harkay)
- Paper published in PRSTAB: "Development and operating experience of a short-period superconducting undulator at the Advanced Photon Source" (second author). (Kathy Harkay)
- Presented three posters at IPAC15: abort kicker, SCU1 (for Y. Ivanyushenkov), and beam loss monitors (for J. Dooling). Served as session chair, and served as student poster judge. (Kathy Harkay)
- Wrote and submitted a paper entitled "Fast Beam Loss Diagnostic to Quantify Charge Deposition in APS Superconducting Undulators" for the ICFA Beam Dynamics newsletter, with J. Dooling and Y. Ivanyushenkov. (Kathy Harkay)

APS Renewal and Upgrade

- Participated in two meetings to discuss PAR vacuum modeling, with J. Carter, B. Stillwell, L. Morrison, CY Yao, and J. Calvey. (Kathy Harkay)
- Participated in weekly APS-U vacuum group meeting. (Kathy Harkay)
- Continued discussing Booster upgrades with C-Y Yao, and continued organizing the Injector Working Group. (Kathy Harkay)
- Attended APS-U Physics meeting. (Kathy Harkay)
- Discussed with USPAS Director W. Barletta a request from H. Cease for APS-Upgrade-related course offerings in the next few years. (Kathy Harkay)

MCR Operations

Storage Ring Operations

- Investigated beam losses (Karen Schroeder)
- Assisted MCR with orbit control issues. Removed BPMs which were suspect from orbit control and/or RTFB. Informed Diagnostics Group of suspect BPMs. (Karen Schroeder)
- Investigated beam instability complaint for 31-ID during off-shift, since the MCR reported they wanted this escalated to me. Spoke to the User and reported that there was nothing apparent on our end. Passed the information on to Emery/Sereno for additional help. (Karen Schroeder)
- Prepared draft list of abort kicker controls and operations requirements and circulated for feedback to J. Wang, K. Schroeder, R. Farnsworth, F. Lenkszus, V. Sajaev, L. Emery, R. Soliday. Organized a meeting with physicists (L. Emery, V. Sajaev, J. Dooling) and Ju Wang to discuss requirements. Met with Richard Farnsworth and Shifu Xu to discuss the abort kicker control screens. (Kathy Harkay)
- Discussed one of the steps in abort kicker commissioning with D. Horan, relating to un-muting the rf system to test MPS trigger of kicker. Prepared a memo to A. Nassiri, for A. Zholents, on how we will do this safely. Feedback from K. Schroeder: do muted test with kicker first, then unmuted. (Kathy Harkay)
- Revised the SCU1 Commissioning Readiness checklist, added new items under ID1 power limiting system interlocks, and circulated to signatory list for final feedback. Posted checklist in MCR and reminded all to sign. (Kathy Harkay)
- Discussed SCU1 warm transition thermocouple installation with J. Stevens, M. Smith, J. Zientek. (Kathy Harkay)

Linac Operations

- On Tuesday, worked with Yuelin Li (XSD) to optimize regen output and doubling efficiency. (Jeff Dooling)
- Found problem with one or both of the Pockels Cells (PCs). Multiple pulses out of the regen were observed. This helps to explain the poor doubling efficiency observed. (Jeff Dooling)
- Also a problem with the EM2 power meter; the unit appears to respond intermittently. (Jeff Dooling)
- Even so, at the end of the day recorded uv levels in the tunnel 2-3 times higher than measured at the beginning of the day. (Jeff Dooling)
- Raised diode pump current setting to 205 A. (Jeff Dooling)
- Arranged for cleaning of lab space L3119. Coordinated with Yuan Gao (XSD-AMO) who shares this space. (Jeff Dooling)
- Received report from McCrone on corrosion residue in the 3G3 gun. Forwarded this to Wright, Sun, and Pasky. (Jeff Dooling)

MCR Operations administrative/misc.

- Reviewed and approved SR non-RSS work requests. (Karen Schroeder)
- Produced the downtime report for OPS Directorate and either gave to Flood for presentation or presented myself. (Karen Schroeder)
- Produced a SCU1 alternate LOTO form. Met with Lang, MD personnel, Puttkammer to discuss setting this up so that SCU1 power supplies could be used for training quenches. (Karen Schroeder)
- Updated the long-range schedule to change the standard 24 singlets to RHB 24 singlets in the 2015-2 run. (Karen Schroeder)
- Reviewed updated procedures for inclusion in Operator Required Reading (Karen Schroeder)
- Performed first time steering optimization and gap scans for S24 and S23 during User Operations. (Karen Schroeder)

APS Machine Studies

Storage Ring Studies

- Performed gap scans to update Gap Feedforward Tables. Restored X-ray BPMs back into orbit control which had been removed during steering. (Karen Schroeder)
- Updated PV monitors for 130mA studies and assisted Harkay with the study. (Karen Schroeder)
- Set up a quick monitor to record RMS motion faster than the data loggers during the plinth movement study.. Sent out notice to resident Users regarding such. (Karen Schroeder)
- Investigated why four sectors were found not standardized and MCR had difficulty injecting. Operator who standardized after non-beam studies did not select the four sectors even though work had been done by P.S. group during that period. (Karen Schroeder)
- Organized and participated in 130 mA, 24-bunch high current studies. Acquired data relevant to SCU0 operation: chamber equilibrium temperature (14.8 K) and linear rise rate of LHe pressure with 650 A main coil current (4.8 Torr/h). Using the operational data analyzed below, estimated

equilibrium pressure for SCU0 at 650 A is 900 Torr (130 mA in 24 bunches). Presented results at weekly AOP Machine Studies meeting and emailed to ASD/MD/SCU group. (Kathy Harkay)

Linac Studies

- On Monday, participated in pc gun studies with Yine Sun; had difficulties with magnets and relatively low energy out of the laser. (Jeff Dooling)
- Unable to steer the beam through the L1AS1 structure. (Jeff Dooling)
- Replaced the compressor grating, but efficiency through the compressor remained about the same. Needed significant current (~1.0 A) on vertical corrector to steer the beam to the center of YAG-2 screen. (Jeff Dooling)
- More laser energy and charge would help. (Jeff Dooling)
- Yine believes the laser is not striking the magnetic center of the pc gun; however, at least once it was observed that the position of the beam did not change as the solenoid current was varied. (Jeff Dooling)
- Beam motions were sometimes erratic as magnet corrector currents were varied. (Jeff Dooling)

APS Machine Research and Development

Storage Ring Research and Development

- Presented seminar on Fast BLMs at the AOP Physics meeting Thursday. (Jeff Dooling)
- Finalized 130-mA high current studies plan and circulated it to all interested parties. (Kathy Harkay)
- To determine whether we can estimate the equilibrium pressure from the initial pressure rise, analyzed 2 yrs of user operation data and plotted the results. Fit 5 hrs to determine the linear pressure rise and at least 4-5 days to do the exponential fit. The data are linear. Limited the data to cases where the starting pressure was 770 Torr or less, and where operation was stable over about a week (constant main coil current). Since there were relative few cases like this, kept a few where there was a quench in between, but only if the exponential fit was still valid. Cases where the starting pressure was high (>780 Torr) do not appear to follow the trend, but will look at this more closely. (Kathy Harkay)
- Calculated ID6 FE heat load with 130 mA for SCU0 at 0.8 T (666 A main coil), and found that the total power and peak power are both within the FE heat load limits. Requested approval from M. Ramanathan for plan to lock out upstream ID while we run SCU0 for the high-current studies. Calculated ID6 FE heat load for the upstream U33 device and found that both the total power and peak power FE limits are exceeded. For the future, if we run at 130 mA, only SCU0 can operate in ID6 unless the FE is upgraded. (Kathy Harkay)

Publications, papers and report

- Completed poster TUPJE064 for IPAC15. (Jeff Dooling)
- Submitted IPAC15 paper on abort kicker. (Kathy Harkay)
- Completed and submitted a paper entitled "Fast Beam Loss Diagnostic to Quantify Charge Deposition in APS Superconducting Undulators" for the ICFA BD newsletter with Jeff Dooling and Yury Ivanyushenkov. (Kathy Harkay)
- Reviewed proofs and submitted comments (to Yury) on PRSTAB paper. (Kathy Harkay)

Meetings, workshops, conferences, committees, LMS related, and reviews

- On Friday, participated in a review of pc gun laser trying to understand why the output power has dropped and doubling efficiency is low. (Jeff Dooling)
- In conclusion, the attendees decided a combination of failing pump diodes and poor Pockels cell performance were at the root cause. (Jeff Dooling)
- Will begin testing pump diodes at Jinhao Ruan's laboratory at Fermilab next week. (Jeff Dooling)
- Attended Beam Stability Working Group meetings, one to give operational information and the other because of availability of committee personnel from AOP. (Karen Schroeder)
- Attended shutdown planning meetings. (Karen Schroeder)
- Attended AOP studies meetings. (Karen Schroeder)
- Attended IPAC15 in Richmond, VA. Presented three posters, served as session chair for contributed oral session, and served as judge for student poster session (on Sunday, May 3). (Kathy Harkay)
- Attended IEEE ExComm (executive committee) meeting, as elected Member-at-Large. (Kathy Harkay)

Safety and Required Training

- Completed ESH 223 Cyber Security training. (Jeff Dooling)
- Successfully completed the following required safety training: Acis Controlled Access Procedure, Tunnel Safety Training, Controlled Access Training for Operators and Lockout/Tagout Training. (Karen Schroeder)

Miscellaneous

- Made final preparing on IPAC paper and posters. (Aimin Xiao)
- Took 2 days vacation leave. (Aimin Xiao)
- Compiled a list of IOCs on which yearly annual BPLDs will be done for Diagnostic personnel to do maintenance of fibers. (Karen Schroeder)
- Provided MCR with "gentle shutdown" instructions for the start of the shutdown period. (Karen Schroeder)
- Provided MCR with updated changes on panel and breaker names so they could make changes to LOTO sheets. Followed electrical lines for verification. (Karen Schroeder)
- Reviewed all SCU1 alarm limits and compared them to the expected values on Kasa's spreadsheet. Sent information as to the ones which did not match. (Karen Schroeder)
- Sent announcement for Beams and Applications seminar by S. Sasaki, scheduled for May 13. (Kathy Harkay)