Weekly Report for 10/05/2015

Highlights

• Continued abort kicker studies and developed a plan to diagnose why beam losses at ID1 and ID6 appear to be higher than expected. (Kathy Harkay)

APS Renewal and Upgrade

• Participated in PAR instability studies with C-Y Yao and J. Calvey. My focus was to measure the longitudinal instability threshold in stored mode. (Kathy Harkay)

• Organized an Injector WG meeting for Oct 26. (Kathy Harkay)

• Read several papers on ion clearing through beam shaking. Trying different combinations of shaking parameters (amplitude, frequency, duration, etc.) in FASTION code. (Joe Calvey)

• Calculated ion instability threshold and growth rates for PAR and APS-U, including frequency spread of ions. (Joe Calvey)

• Attended MBA Radiation Physics and Beam Physics meetings. (Jeff Dooling)

• Summarized simulation results with 3 types collimator scheme. Gave presentations at the beam loss working group meeting. (Aimin Xiao)

MCR Operations

Storage Ring Operations

• Reviewed beam dump data with J. Dooling. (Kathy Harkay)

• Provided input to L. Emery's list of storage ring installations, past three years and three years in the future. (Kathy Harkay)

• ssisted MCR in recovering from steering problems when the operator failed to install a the changes from a previous steering and it appeared that the setpoints did not transfer correctly during the execution of a steering PEM. (Karen Schroeder)

• Investigated beam losses and assisted the MCR with recovery when personnel were limited.. (Karen Schroeder)

• Performed several gap scans during User operation to restore X-ray BPMs back to orbit control. (Karen Schroeder)

Linac Operations

• Completed LACIS Quarterly validation with J. Mazzio on Thursday. (Jeff Dooling)

APS Machine Studies

Storage Ring Studies

• Repeated abort kicker studies with 24 bunches with well-corrected User orbit, with V. Sajaev and J. Dooling. SCU0 did not quench, but SCU1 did. Reported to ASD management. Beam loss locations were acquired with the BPM FPGA system and also the fast FO BLMs. (Kathy Harkay)

• Measured rf cavity beam spectra and HOMS for 48 bunches, 100 mA, for stable and unstable beam. (Kathy Harkay)

• Continued testing the CollectSRSpectrum script with the MXA, with L. Emery and H. Shang. (Kathy Harkay)

• Checked the skew quadrupole FF table for SCU0, and found it to be valid: the coupling change is less than 0.02% over the full coil current range. Strangly, the result was the same even when FF was turned off. (Kathy Harkay)

• Presented studies summaries at weekly machine studies meetings (10/8 and 10/15). (Kathy Harkay)

• Participated in an Abort Kicker study with K. Harkay, collecting fast BLM data. (Jeff Dooling)

• Also recorded fast BLM data from both beam dumps Thursday; the first dump caused SCU0 to quench, but not SCU1 and the second reversed this. (Jeff Dooling)

• Performed orbit recovery, CPU/IEX check up for machine start up. (Aimin Xiao)

PAR Studies

• Measured beam size vs charge in PTB flag 2 (with repaired camera). Measured beam spectrum in PAR in stored mode up to 23 nC. Studied maximum stored charge vs RF voltage. (Joe Calvey)

Linac Studies

• Worked on the high energy (450 MeV) operations of APS Linac at the request of APS upgrade injector group. Saved system reference file for 450 MeV operations. (Yin-e Sun)

• Worked on PC gun beam operations. Adjusted RF timings to match the PC gun drive-laser timing in order to get PC gun e-beam accelerated out of the gun when the RF is at max. With the help of R. Keane from diagnostics group, adjusted the PC gun current monitor to measure the PC gun charge properly. 220 pC bunch charge was measured. (Yin-e Sun)

• Conducted PC Gun studies with Y. Sun. (Jeff Dooling)

• Found we cannot synchronize the laser to linac beam without adversely affecting charge in the PAR. (Jeff Dooling)

• Needed to change timing of the ICT and L3 rf. (Jeff Dooling)

• Found the PC beam line BPMs would not trigger properly. Asked Controls group for possible solutions. (Jeff Dooling)

• Started beam-based alignment; maximum charge: 225 pC. (Jeff Dooling)

• EM3 is not responding properly; however can use EM2 so that QE can be determined. (Jeff Dooling)

• Submitted WR and non-beam access time to correct EM3. (Jeff Dooling)

• Provided linac rf conditioning data and recommendations for supporting 450MeV operations. (Stan Pasky)

• Recent linac RF conditioning data, klystron operating hours and SLED gain factors, 9/22/2015: (Stan Pasky)

• L1 - A 35MW klystron with ~ 33K operating hours, supports our thermionic rf guns or PCGun output in L1:AS1. Recently rf conditioned to 9.2MW. (Stan Pasky)

• L2 - A 45MW (new 9/22/2015) klystron, a SLED'd sector (SLED Gain factor ~ 4.3) supports four

accelerating structures. L2:AS1, AS2, AS3 and AS4. Recently rf conditioned to 27MW klystron and 117MW SLED. (Stan Pasky)

• L4 - A 45MW klystron with 21k operating hours, a SLED'd sector (SLED Gain factor ~ 5.3) supports four accelerating structures. L4:AS1, AS2, AS3 and AS4. Recently rf conditioned to 29.5MW klystron and 140MW SLED. (Stan Pasky)

• L5 - A 45MW klystron with 54k operating hours, a SLED'd sector (SLED Gain factor ~ 4.5) supports four accelerating structures. L5:AS1, AS2, AS3 and AS4. Recently rf conditioned to 25.3MW klystron and 115MW SLED. This klystron may have to be replace to support 450MeV. (Stan Pasky)

• L3 - A 35MW klystron with 62k operating hours, supports PCGun or Injector Test Stand Studies, it is also used as a back up klystron for L1 and L2 in the even of a failure. Recently rf conditioned to 28.7MW klystron. (However - L3 klystron may not be able to support L2 much longer in the event of a failure). (Stan Pasky)

• Note: We have been operating at 375MeV with little to know failures. To operate at 450MeV or higher will obviously raise the level of stress on all L4 and L5 linac components as well as modulator cables and feed-throughs. It should be noted that in the event of any failures in either sector will create down time until repairs are made. We have know back-up rf system for L4 or L5 at this time. (Stan Pasky)

• Recommended changes to achieve and support 450MeV or greater operations: (Stan Pasky)

- Incorporate L6 klystron S-band switching system to support L4 or L5. (Stan Pasky)

- Replace L5 klystron (Stan Pasky)

- Condition sector L4 and L5, 45MW klystrons to 37MW. (manufacture operating limit and RF group policy) (Stan Pasky)

APS Machine Research and Development

Storage Ring Research and Development

• Prepared a summary of my helical superconducting undulator (HSCU) radiation heat load calculations and provided a simplified ray tracing diagram to Y. Ivanyushenkov, for E. Gluskin. (Kathy Harkay)

• Started thinking about how to automate doing quench statistics for SCU0 and SCU1. Spoke with Marty Smith, who proposed that R. Diviero write a python script that writes the basic data to a file. Provided preliminary specifications. (Kathy Harkay)

• Discussed abort kicker studies result with J. Wang, and he assisted me in measuring the current pulse waveform, so we can see if maybe the pulse tail drooped. (Kathy Harkay)

• Developed a plan to move forward with debugging the abort kicker, stating with measuring the pulse with the beam. Requested assistance from V. Sajaev and L. Emery. (Kathy Harkay)

Linac Research and Development

• Supporting T-Cavity installation request. Providing direction as to machine protection for T-Cavity rf conditioning. (Stan Pasky)

• Assisting with Async request for PCGun bpm's during Normal Mode Operation. (Stan Pasky)

Other Research and Development

• worked on setting up elegant files of the PC gun beam in APS for 5-dipole chicane collaborations with slac. (Yin-e Sun)

APS Machine Software

Storage Ring

• removed S1B:QS from SR skew knob template file and regerenated SR skew knob files, this fixed the "SR Skew Knobs" control application. (Hairong Shang)

• removed ID32ds from FF table beause the xbpm are not in orbit correction now. Scanned ID32us, however, the xbpm seemed to need re-align. No table was generated for ID32us. (Hairong Shang)

• studied MXA scope, saved a configuration for HOM which can be restsored by CollectRFSpectrum. Modified CollectRFSpectrum to restore the save configuration for MXA-HOM setup and added option of chaning resolution bandwidth to each measurement; modified to change the frequency range (start/stop) through changing the center frequency and span of MXA because changing the start/stop frequency takes no effect to MXA. (Hairong Shang)

• added usage message for xP0ReducedGain and yP0ReducedGain options to getxtunes. (Hairong Shang)

• tested and installed SRXrayBPMStatusUpdate for updating the SR xray bpm status when orbit correction status changes, and added output to a text file for each plane to be loaded into web server. (Hairong Shang)

• added setting xray bpm status to "Start" button and added button to start the "xray bpm status update server" to SROrbitControllaw. (Hairong Shang)

Injectors

• improved booster BSP100 response measurement, 1) removed the monitor PV widget, now the monitor pvs are provided by a monitor file, this improves the tcl processing by 2-3 minutes before starting the sddsexperiment because there are over 200 monitor pvs. 2) added checking topup shots before changing the corrector ramp to make sure there is beam so that valid bpm data will be collected. (Hairong Shang)

• Updated PCGun medm displays to make them more user friendly. (Stan Pasky)

Simulation Software

• recomputed beamline station downtime with updated beamline schedules/ (Hairong Shang)

Publications, papers and report

• There is a new edition (2015) of NFPA-70E. The edition contains new requirements regarding shock and flash hazard analysis. In particular, the concept of a Prohibited Approach Boundary has been eliminated. Also, section and table numbers were changed. All this will require the majority of our safety procedures to be revised. The process is started!! (Stan Pasky)

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

• Accepted request to serve on LCLS-II DOE CD-2/3 review. (Kathy Harkay)

• Conducted search committee work for TRIUMF ALD for Accelerators. (Kathy Harkay)

• Contributed text to BNL APAC review report; reviewed draft report and made corrections/comments. (Kathy Harkay)

• Attended Shutdown Close-out Meeting 10/14/2015, 9:00 a.m., 401/B4100. (Stan Pasky)

• Attended a beamline part of the evidence of conformance with the to "APS Configuration Control for Personnel Radiation Protection Shielding" (APS_1192753) for J. Lang's assessment. (Stan Pasky)

Safety and Required Training

• Completed LMSPROC137 REQUIRED READING - Radiation Workers and ESH CoordinatorsThe 5.17 section of the ES&H Manual establishes the criteria and mechanism for releasing items (material, equipment, etc.) from radiological areas and from controlled areas. This course covers the January 2008 updates to the chapter. (Stan Pasky)

Miscellaneous

• Took two vacation days. (Joe Calvey)

• wrote FY2015 appraisal. (Yin-e Sun)

• Completed 2015 Statement of Accomplishments for Performance Appraisal. (Jeff Dooling)

• Made machine start up and study schedule (Aimin Xiao)

• Reviewed email and work did over last year. Finished annual appraisal report. (Aimin Xiao)

• reviewed a paper on "Application of simplex optimization in the development of an on-line preconcentration system for the determination of Cu in human hair samples using FAAS" (Hairong Shang)

• Completed Performance Appraisal (Stan Pasky)