

Weekly Report for 10/20/2014

Highlights

- This is a four-week report. (Kathy Harkay)
- Wrote first draft of SCU1 Physics Requirements Document. (Kathy Harkay)
- Collected single-bunch calibration data for the ID1 BLM with J. Dooling. (Kathy Harkay)
- Participated in a review of the BNL Accelerator Test Facility (ATF) experimental program. (Kathy Harkay)

APS Renewal and Upgrade

- Participated in meetings of the Upgrade Radiation Shielding group (Nancy Grossman, Glenn Decker, Jeff Dooling et al). (Kathy Harkay)
- Started data mining to look for correlations of beam current, beam lifetime, and beam losses. Found a very interesting example during the April 2013 high-current studies. The S36 Cernekov detector showed a significant rise in the beam losses that turns out to be correlated with the S36 scraper temperature and local vacuum pressure rise. Presented this at the Upgrade Physics meeting. (Kathy Harkay)
- Started injection simulation with new MBA optics. Added and rechecked injection/extraction line design. Generated optical errors which gives 100% coupling. Submitted simulation jobs. (Aimin Xiao)
- Attended MBA Radiation meeting. Spoke to V. Sajaev regarding my role in this meeting. (Jeff Dooling)

MCR Operations

Storage Ring Operations

- Requested that the ID1 BLM fiber be moved from the upstream ID to the downstream ID. Coordinated with K. Schroeder, J. Dooling, and J. Grimmer. (Kathy Harkay)
- Participated in a discussion of flange cooling at the center of the ID1/SCU1 layout, at the bellows/gate valve flange. (Kathy Harkay)
- Discovered that the 2012 S36 scraper temperature data had been deleted from the data logger since the PV is obsolete and it was on a 1-year automatic delete schedule (this policy should be reviewed). Asked R. Soliday to have the data recovered from backup and now we will keep it for 10 yrs. (Kathy Harkay)
- Fixed issues IEX user has with PS ramping (present and past energy settings need to be different). (Aimin Xiao)
- Investigated behavior of S1ID:P1 over the last week and found that it can be put back into orbit correction by Schroeder. (Louis Emery)
- Discussed with beamline scientist in ID21 the possibility of beam motion (which we do not see with the electron beam.) (Louis Emery)
- Investigate what causes the timing bunch beam loss during studies. I think the beam loss occurred because of a glitch in S14A:Q5, causing a tune change of -0.005 in x and 0.004 in y, which P0 feedback couldn't handle? This is improbable. (Later studies by Schroeder showed that it does not dump the beam.) (Louis Emery)
- Found reason for repeated loss of bucket 0 bunch: must be P0 feedback. Yao found the timing error. (Louis Emery)

Linac Operations

- Worked to align transport line optics from the laser room into the linac tunnel during beam studies. Because of a Controls/SI logic issue, was unable to open the ACIS shutter (a gate valve). Found that SI personnel had renamed the PV used in the Boolean expression mention last week's report. (Jeff Dooling)
- Did locate camera cables and hooked them up as well as connecting switchable power to a low-level alignment laser on the optics table. (Jeff Dooling)

APS Machine Studies

Storage Ring Studies

- With J. Dooling, carried out two studies with the ID1 BLM. Acquired calibration data in its initial location at the upstream ID, and repeated this after it was moved to the downstream ID. Acquired the data kicking a variable-current single bunch into ID1 using IK1, after finding the bunch timing for maximum signal. Prepared slides for two weekly machine studies meetings that J. Dooling presented. (Kathy Harkay)
- Participated in preparing for the SCU0 quench test, but the studies were canceled due to a network problem. (Kathy Harkay)
- Performed orbit switch from 24 to hybrid. Investigated problem with low injection efficiency, coupling variation, etc. (Aimin Xiao)
- Run round beam operation with higher skew quad strength, observed dropped injection efficiency when bring tune closer to the coupling resonance. (Aimin Xiao)
- Planned a study for taking quench orbit with RTFB running. (Louis Emery)
- With help of several studiers, and through the process of elimination, found the cause of the instability at injection. [P0 feedback running incompletely during injection.] (Louis Emery)
- Held machine studies meetings. (Louis Emery)
- Did studies for hybrid mode. CY has set up P0 feedback for high charge. We measured bunch limits for several chromaticities close in value. (Louis Emery)
- With Sajaev set up hybrid mode to check that everything worked. We noticed a too high of a lifetime, indicating some underlying difference in optics. Having a high lifetime is good in general. However we had no explanation for it. We couldn't determine what the change was. After standardizing the lifetime was restored to the lower value of hybrid-mode, July 2014. (Louis Emery)
- Conducted ID1 BLM calibration study with K. Harkay. Took data with the BLM mounted on the downstream ID. Presented upstream and downstream data and analysis with the saturation model at the Studies meeting. (Jeff Dooling)

APS Machine Research and Development

Storage Ring Research and Development

- Wrote first draft of SCU1 Physics Requirements Document and circulated it for comments. Previous version (Nov 2012) needed to be completely rewritten (initially planned for a canted long straight section). Now it is more like SC0 PRD. Added a section comparing it with SCU0 PRD and the old SCU1/2 PRD. (Kathy Harkay)
- Found a proper reference for ID1 operation of either one or the other device, but not both at the

same time, due to front end thermal limitation (S. Davey). We discussed that the BDSRC should revisit the requirement for SCU1 operation in ID1. (Kathy Harkay)

- Examined the ID1/SCU1 layout and discovered that the transition is 40 mm shorter than in ID6/SCU0 since the half-ID chamber is longer. Requested that X. Sun and L. Emery compute the wakefield power for ID1/SCU1. (Kathy Harkay)
- Discussed APS single bunch studies with R. Lindberg and Alexei Blednykh (BNL). (Kathy Harkay)
- Found references to APS injection simulations by Yong-chul Chae for Yipeng Sun. (Kathy Harkay)
- Produced final spreadsheet for skew quadrupole project for AES. (Louis Emery)
- Asked X. Sun to make some rf heating calculations for SCU bellow liner. Encouraged him to find out from people the actual geometry, as there seems to be some confusion in assembly direction of bellow liners and cross-section steps. (Louis Emery)
- Learned more about gate valves from vacuum group in order to make a statement about MPS requirements of gate valve for SCU1. Read the SCU Physics Requirements Document. (Louis Emery)

ITS Research and Development

- Worked with M. Westbrook (AES-IT) to get the fast Tektronix oscilloscope DPO71254 (CSI P072902) on-line for use with the RadiaBeam THz experiment in the ITS. The scope name is TEK-12GHZ. (Jeff Dooling)

Other Research and Development

- Discussed L. Boon's progress on her thesis and material she should include for completion. (Kathy Harkay)
- Discussed how to compute a multibunch spectrum with L. Boon for calculating the anomalous skin effect in resistive wall power. (Kathy Harkay)
- Discussed L. Boon's QE paper, especially her calculations assuming reflectivity with an aluminum oxide thin layer. We discussed that near the K-edge absorption lines, she should compute the reflectivity curves with higher resolution (smaller photon energy step sizes), so as to avoid unphysical results in the calculation. (Kathy Harkay)
- We fixed a date for L. Boon's PhD thesis defense at Purdue: Nov 17. (Kathy Harkay)

APS Machine Software

Storage Ring

- continue implementing SRGridXBPMCalibration, finished vertical and horizontal beam scan implementation, ready for test. (Hairong Shang)
- added updating FF vector adjust in SRIDSteering for unified steering, ready for test. (Hairong Shang)
- continue improving measuring SR tune with MXA-VSA: added changing the tune mux to NASA to both normal and abnormal (errors) exit to turn off the source and avoid driving the beam; tried different MXA commands combination to find out what commands caused the "NO DATA" case; added waiting after MXA setup to make sure that all commands are executed before taking data. (Hairong Shang)

Publications, papers and report

- Continued working on draft SCU0 journal paper with Y. Ivanyushenkov and A. Zholents. Incorporated comments from M. Borland. Added new figures and updated several figures and wrote/updated accompanying text. (Kathy Harkay)
- Provided several comments to M. Penicka on the IWAA2014 paper (SCU0 alignment) and provided several slides for the oral presentation. (Kathy Harkay)

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

- Participated in a review of the BNL Accelerator Test Facility experimental program -- on-going projects and new proposals -- as a member of the Program Advisory Committee. (Kathy Harkay)
- Reviewed SAREC committee report and provided numerous comments for final version (9 new proposals and 17 ongoing experiments). (Kathy Harkay)
- Participated in Diffraction Limited Storage Rings workshop organizing committee meetings. (Kathy Harkay)
- Organized a B&A seminar for J. Calvey, Cornell. (Kathy Harkay)
- Prepared for ISO9000 surveillance to be done in MCR. Re-created a machine studies work-flow for the ISO audit. We have to show that we have a system in place to make us realize we have some deficiencies and we know how to rectify them through reports, meetings and feedback from peers. Though auditor doesn't want a presentation, I created a presentation for everybody to read in advance so that we are on the same page for the audit. (Louis Emery)

Safety and Required Training

- Completed safety training: ASD 102, 115, 125. (Kathy Harkay)
- RSSC meeting about increasing the PAR/booster operating envelope. (Louis Emery)

Miscellaneous

- Wrote three letters of recommendation. (Kathy Harkay)
- Gave tour of control room software to EPICS programmer Lyncean. (Louis Emery)
- Six POC-HP cases. (Louis Emery)
- Read an NIM-A article for refereeing. (Louis Emery)
- Annual leave on Friday 10/24. (Jeff Dooling)
- attended EPICS training courses. (Hairong Shang)