

# Weekly Report for 11/24/2014

## Highlights

- Investigated anomalous heating in SCU0 and reported findings to Y. Ivanyushenkov. Worked with all involved to instruct operators and notify the 6-ID user regarding a He leak issue that developed after He was vented. (Kathy Harkay)
- Wrote an initial version of machine protection section for the APS upgrade CDR. This includes the BPLD system and ray tracing guidelines. (Kathy Harkay)

## APS Renewal and Upgrade

- Did numerous simulations for impedance and the single bunch current limit. I started by redoing simulations for several of the components using a smaller step size, and then did tracking to predict the single bunch current for several chromaticities. Updated CDR to reflect new results. (Ryan Lindberg)
- Continuing injection simulation. (Aimin Xiao)
- Discussed Lambertson magnet design with Melike, updated related CDR report. (Aimin Xiao)
- Wrote an initial version of machine protection section for the APS upgrade CDR. This includes the BPLD system and ray tracing guidelines. (Kathy Harkay)
- MOGA optimization of V6 lattice, with octupoles. (Yipeng Sun)
- APS upgrade CDR: alternate lattice section. (Yipeng Sun)

## MCR Operations

### Storage Ring Operations

- Investigated beam motion/bpm errors/corrector range errors reported by MCR (Karen Schroeder)
- Discussed liquid He pressure for the SCU0 with Harkay and MD group. Assisted them with creating work requests for bleeding off helium and then refilling after a leak was discovered. Passed this information on to SCU0 beamline personnel and explained to him how we would handle the problem if the helium level became too low. Set up a PV monitor and entered an order with instructions for MCR personnel if pressure became too low. (Karen Schroeder)
- Assisted the MCR with turning beam over to Users after machine studies. (Karen Schroeder)
- Worked with K. Schroeder to turn SCU0 off and put it in System Manager mode as long as the LHe tank pressure is above the return pressure. Worked with M. Smith to modify the controls code to do this automatically (it works correctly after a quench). (Kathy Harkay)
- Requested that M. Smith add the time stamp and number of buckets filled to the SCU0/SCU1 temperature screens. (Kathy Harkay)
- Worked with all involved to ensure that SCU0 access (fill LHe and fix leak) gets into the work request system for 12/2 machine intervention. (Kathy Harkay)
- Worked with all involved to notify the 6-ID user and give instructions to the operators regarding the SCU0 He leak issue. (Kathy Harkay)

### ITS Operations

- Operating support and scheduling of the RadiaBeam THz experiment in the Injector Test Stand. (Stan Pasky)

## MCR Operations administrative/misc.

- Prepared downtime report and either presented it myself or gave to Flood for presentation to OPs Directorate. (Karen Schroeder)
- Prepared the draft version of Run 2015-2 schedule and gave to Flood for presentation to OPs Directorate. After Users initial viewing made requested adjustments to accommodate a study period during the July 4th holiday and sent the schedule for distribution to OPS Directorate. (Karen Schroeder)
- Reviewed and approved non-RSS Storage Ring work requests. (Karen Schroeder)
- Led daily 4 o'clock meetings. (Karen Schroeder)
- Prepared the beam-related portion of the machine studies scheduled and updated both non-beam and beam-related portions as needed. (Karen Schroeder)

## APS Machine Studies

### Storage Ring Studies

- Measured RM, inj. efficiency and beam lifetime at different coupling settings. Measurements will be compared with simulation results. (Aimin Xiao)
- Performed gap scans and restored X-ray BPMS which had been removed because of steerings. (Karen Schroeder)
- Assisted the MCR during accesses when personnel was limited. (Karen Schroeder)
- Carried out 6-BM steering over a range of vertical offsets and angles and monitored SCU0 chamber temperatures. (Kathy Harkay)

## APS Machine Research and Development

### Storage Ring Research and Development

- Further investigated anomalous heating in SCU0 and reported findings to Y. Ivanyushenkov. Compared 24-bunch operation this run to last run. Found temperature changes in the 4-K circuit but no evidence of changes in the beam heating (chamber temps and vacuum). Found degradation (i.e. higher rate of pressure increase) in the second week of RHB, as compared to the first. (Kathy Harkay)
- Compared SCU0 cryogenic performance with 100 mA/24 bunches for same main coil current (660-664 A) for two different LHe levels: 17.5 cm (Oct 2013) and 9.9 cm (Feb 2014). The equilibrium pressure after a week of operation was 865 Torr vs 790 Torr, respectively. This implies that the 4-K cryocoolers run better with less LHe in the tank. Reported findings to Quentin Hasse, Yury I., Joel Fuerst and SCU0 Team. (Kathy Harkay)
- Developed strawman SCU1 backup plans for three failure scenarios. Incorporated input from L. Emery on minimum machine setup time and Y. Ivanyushenkov and J. Grimmer on SCU1 warmup and removal. (Kathy Harkay)
- Discussed required thermocouples in 1-ID transitions when SCU1 is installed with J. Grimmer. (Kathy Harkay)
- Participated in a storage ring manager's meeting for the new ID4 vacuum chamber installation. (Kathy Harkay)

- Discussed vertical ray tracing requirement with J. Lerch and provided feedback on his results. Provided him with a vertical size for the radiation fan at the SCU1 chamber SS-AI joint. (Kathy Harkay)

## Linac Research and Development

- Realigned the green alignment laser and then the uv pc gun drive laser back into the tunnel. (Jeff Dooling)
- Working with M. Hahne cleaned optics in Laser Room with SnoGun and HEPA vacuum. (Jeff Dooling)
- Took images of the beam using the Coherent LaserCam HR. Found the beam profile acceptable leaving the transport box in the laser room, but highly distorted in the tunnel. (Jeff Dooling)

## Other Research and Development

- PhD Thesis: Read L. Boon's revised thesis, provided her with final comments and approved it. (Kathy Harkay)

## APS Machine Software

### Storage Ring

- improved SRscanCurrent to work with current MXA-VSA tune measurement system, fixed the Stop button so that it does stop the monitoring process, updated the monitor files for non-existent PVs, and removed S:VID4 image since it no longer exists. Tested and collected data with CY. (Hairong Shang)
- fixed bug in SR chromaticity measurement where the center frequency was not properly defined, and redefined the center frequency units to MHz. (Hairong Shang)
- added libera bpm type to SR orbit correction configuration, and changed the color to violet to distinguish from others. (Hairong Shang)

### Injectors

- worked on updating LTS pems for new installed power supplies: 1) added LTS:Aloha to device list 2) updated the pv table config file /home/helios/oagData/deviceConfig/lts/LTSOps.pvTable to include the new correctors, this config is being called by APSDevSend. 3) updated the degauss config file: /home/helios/oagData/controlFiles/LTS/LTS\_degauss.sdds (Hairong Shang)
- start working on booster FPGA bpm timing control software. (Hairong Shang)

## Publications, papers and report

- Drafted abstract for IPAC15 entitled, "Calibration of Fast Fiber-Optic Beam Loss Monitors for the Advanced Photon Source Storage Ring Superconducting Undulators." (Jeff Dooling)
- Updated Tech Note AOP-TN-2010-009 with previously conducted EGS4 ITS radiation calculation ahead of RadiaBeam work next week. (Jeff Dooling)
- Prepare a note on: Performance evaluations of V6 lattice with canted orbit at 7 IDs. (Yipeng Sun)

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

- Was part of S35 revolver undulator installation readiness review committee. Provided feedback during/after the review. Reviewed the draft report and provided additional feedback/information.

(Karen Schroeder)

- Attended shutdown planning meetings. (Karen Schroeder)
- Reviewed report of the Program Advisory Committee for the BNL Accelerator Test Facility experimental program and provided final edits. (Kathy Harkay)
- Reviewed an SBIR-STTR proposal for DOE/BES and submitted a report. (Kathy Harkay)
- Submitted an abstract to IPAC15 for the abort kicker concept. Collaborated with J. Dooling on an abstract on the BLM calibration. I'm a co-author on an abstract on SCU1. (Kathy Harkay)
- Organized a B&A seminar for K. Hwang, Indiana U, for Dec 4. (Kathy Harkay)

## Education, Mentoring and outreach

- Helped guide Medani through a paper that calculates the longitudinal impedance for a coated pipe. (Ryan Lindberg)

## LCLS

- Prepared and sent a code that calculates the harmonic gain when the gain is small. Collaborated on analysis of the possibility of using the 4 GeV SC LCLS-II to drive an XFEL lasing on the 5th harmonic. (Ryan Lindberg)

## Safety and Required Training

- Successfully passed EM116 Emergency Management and Continuity General Awareness (Karen Schroeder)
- Completed safety training: EM116, LMSPROC109. (Kathy Harkay)

## Miscellaneous

- 2 days thanksgiving holiday. (Aimin Xiao)
- 1.5 vacation days. (Aimin Xiao)
- Provided input on the minimum necessary studies needed if there was a problem with the SCU1 installation. (Karen Schroeder)