

Weekly Report for 11/11/2013

Highlights

- Generated 2 optics, with and without gradient dipole, that have longer straight section (>6.8 m) for MBA injection/extraction section. (Aimin Xiao)

APS Renewal and Upgrade

- Generated 2 optics, with and without gradient dipole, that have longer straight section (>6.8 m) for MBA injection/extraction section. (Aimin Xiao)
- Finalized the impedance budget items for APS Upgrade and completed its wake potential computation 80%. (Yong Chul Chae)
- 1. Chamber material: Cu (But I use Al for computational purpose) 2. NEG coating: 1 um (Yong Chul Chae)
- 3. ID chamber: total 35 chambers (Yong Chul Chae)
 - - full gap = 6mm (Yong Chul Chae)
 - - round chamber = 10 (Yong Chul Chae)
 - - elliptic chamber = 25 (Yong Chul Chae)
- 4. Number of vacuum components per sector (Yong Chul Chae)
 - Regular BPM: 12 (Yong Chul Chae)
 - ID chamber BPM (rotated): 2 (Yong Chul Chae)
 - Bellow: 14 (Yong Chul Chae)
 - Flange (gap=0.2mm, rf-shield height=1.0mm): 34 (Yong Chul Chae)
 - Crutch absorber: 2 (Yong Chul Chae)
 - Transition absorber (speed bump): 3 (Yong Chul Chae)
 - Gate valve: 4 (Yong Chul Chae)
- 5. Special vacuum components per ring (Yong Chul Chae)
 - Horizontal scraper: 2 (Yong Chul Chae)
 - Vertical scraper: 2 (Yong Chul Chae)
 - Injection kicker: 4 (Yong Chul Chae)
 - Extraction kicker: 4 (Yong Chul Chae)
 - Feedback: 2 (Yong Chul Chae)
 - Injection aperture: 1 (Yong Chul Chae)
 - Extraction aperture: 1 (Yong Chul Chae)
 - Fundamental cavity: 12 (Yong Chul Chae)

- 3rd harmonic cavity: 1 (Yong Chul Chae)
- Refining information for the injector part of the assumptions document; Submitted contribution to the DOE Monthly report; Debugging why Latex didn't update; new cshrc & login files solved the problem. Started reading elegant manual; (Marion White)
- Completed 2D simulation of egg-shaper outer circular blades and D-shape glades geometries. (Chih-Yuan Yao)
- Researched timing and amplitude specs of the kicker power supplies with Ju Wang and others. (Chih-Yuan Yao)
- Presented transverse feedback and tune measurement system specs to Diag work group. (Chih-Yuan Yao)
- Worked with Chuck Doose to evaluate Booster sextupole magnet thermal and field limitations in order to upgrade its field strength. (Chih-Yuan Yao)

MCR Operations

Storage Ring Operations

- Assisted MCR with turning beam over to Users after machine studies. (Karen Schroeder)
- Investigated a request from the 32-ID to verify we were in the RHB lattice. I verified it and discussed this with the Users as well as with Sajaev and Xiao. 32-ID requested some study time to switch between the two lattices since a User on their beamline could not see the same fine spectra they had during earlier RHB runs and would like to verify the measurements with both lattices. This was put off until a later time when they User had time to prepare the samples. (Karen Schroeder)
- MCR called on Friday night and reported that the S34ID beamline personnel were seeing movement on their beam and earlier had to do a steering when they lost most of their beam. The steering also turned out to be more than they requested. The Users also reported they had plotted BPMs moving in steps which did not seem to be occurring in other beamlines. Discussed the situation with the Users and found they were looking at X-ray BPMs not in orbit control while they were moving their gap. I did restore the S35A:P1 back in orbit control for both hz and vt. and added S35A:V2 in vertical to make the beam more stable. Did check the previous steering and found there was an orbit bump at the time of steering which was reduced when steering orbit control was in effect. This was most likely the cause of the oversteering. (Karen Schroeder)
- With Shang, assisted the MCR with a couple of problems with steering. S35A:P1 needed to be restored to OK for steering to complete a 34IDds. During a steering for 35-ID we found that the steering script was comparing the BPLD limit to the steering setpoint when the correct comparison should have been the BPLD limit to the setpoint+offset. We were able to steer vertically but horizontal steering would not converge. Louis found that 36A:V2 (which had been unusable some time ago) had been replaced with S36A:V4. S36A:V4 is no longer a vertical corrector but has been converted to a skew corrector. Since that time S36A:V2 magnet was repaired, so it was restored back to steering orbit control. (Karen Schroeder)
- Investigated beam losses. (Karen Schroeder)
- Assisted the MCR with multiple small problems, such as orbit bumps, beam motion, etc. (Karen Schroeder)
- Coordinated the repairing of P0 feedback S35 drive amplifier with Chuck Gold and AR. (Chih-Yuan Yao)

PAR Operations

- Updated RF12 tuner FF table after installation of the circulator. (Chih-Yuan Yao)

Training

- Completed a successful SR requalification for Bogdan (Karen Schroeder)

MCR Operations administrative/misc.

- Produced the downtime report and gave to Flood for presentation to OPS Directorate. (Karen Schroeder)
- Sent a list of PVs to be added bunch purity category after Fystro found they were not in the data logger. (Karen Schroeder)
- Continue discussions with M. Smith and Harkay regarding restoring the correct current return value to SCU0. (Karen Schroeder)

APS Machine Studies

Storage Ring Studies

- Tested high coupling optics features by: bring vx/vy together; using harmonic skew knob and using CPU skew correctors. (Aimin Xiao)
- Worked on FPGA based optics corrections: machine study, data analysis, code improvement (Chun-xi Wang)
- Measured short-term tune stability via MIA analysis of FPGA histories (Chun-xi Wang)
- Performed gap scans to update gap feedforward tables and returned X-ray BPMs back to orbit controllaw which had been removed due to steerings. (Karen Schroeder)
- Worked with Hairong to update the Switch to User Mode PEM to include restoring SCU0 current and access mode to what it was before machine studies and tested during studies. (Karen Schroeder)
- Worked with Soliday to update the SR RF up/down/standby PEMs and tested during studies. (Karen Schroeder)
- Assisted Sereno with restoring the P0/P1s from S35 and S36 back to the correct bmp status and restoring the bpps and correctors to control configuration that had been removed due to the cable plugged into the wrong port last week. Also went over the gap scan pem and the appropriate pem to close to User gaps during machine studies with Sereno. (Karen Schroeder)
- Updated the machine studies schedule with emergency requests or needed re-arrangements. (Karen Schroeder)

PAR Studies

- Investigated PAR bucket timing shift problem after the circulator work, and resolved it with RF group. (Chih-Yuan Yao)
- Restore VSA tune measurement on the PAR for high charge study. Got much better quality spectrum and measured shunt impedance of the RF12 cavity. (Chih-Yuan Yao)
- Performed PAR high charge study. Achieved 8.2nC continuous injection with 8 linac pulses.

(Chih-Yuan Yao)

Linac Studies

- RF conditioning linac sector L4 and L5 to 132MW from each SLED to achieve 450MeV operation from the Linac. (Stan Pasky)

APS Machine Research and Development

Storage Ring Research and Development

- Worked on low-emittance lattice: study detuning of TME lattice (Chun-xi Wang)
- Met with S37 Scraper Upgrade group. Will provide J. Lui with dose distribution files for ANSYS calculations. (Jeff Dooling)
- How to incorporate time variation to allow for diffusion effects? Possibly use distribution as a function of Pass number. (Jeff Dooling)
- M. Borland provided a 24-bunch beam loss distribution for S37; will compare temperature excursions with hybrid mode. (Jeff Dooling)
- Met with K. Harkay and C. Doose (ASD-MD) to discuss installation of fast beam loss monitors around the SCU0 vacuum chamber. (Jeff Dooling)

Booster Research and Development

- Reconstructed CAD model of booster cavity and started impedance simulation with Xiang Sun. (Chih-Yuan Yao)

Linac Research and Development

- Now have the regen properly seeded, measuring 4.5 mJ per pulse of cavity output in the IR (27 mW at 6 Hz). Had to do numerous iterations on the PC mounts as well as the cavity mirrors. (Jeff Dooling)
- Met with Controls Group personnel (S. Shoaf and A. Pietryla) and N. Arnold (AES-CS) to discuss laser timing issues. (Jeff Dooling)
- Design the the beamline from the PC gun to the first linac accelerating structure. Numerical studies of feasibility of adding a slit-flag pair for emittance measurement of the electron beam at 6 MeV. (Yin-e Sun)
- Numerical investigation of adding a 45 deg bend spectrometer line after the gun for beam energy and energy spread measurement. Study of the resolution of the system considering the beam imaging system resolution. (Yin-e Sun)
- Met with the visitors from Radiabeam who want to install a THz device in the ITS. (Ryan Lindberg)

ITS Research and Development

- Drafted the PC gun high power RF conditioning and beam commissioning readiness document for reviews. (Yin-e Sun)
- Photocathode gun beam dynamics simulations on different ways to measure the beam emittance : quadrupole scan, solenoid scan. (Yin-e Sun)

Other Research and Development

- Worked on LDRD on graphene window: tested laser monitoring of graphene breakage and preparing for vacuum test (Chun-xi Wang)
- Simulated variations on the mode-locking FEL concept in collaboration with Sasha. We have decided to emphasize its "multi-color" possibilities, and are exploring the trade-offs of using either an initial current modulation or an energy modulation with undulator taper. (Ryan Lindberg)

APS Machine Software

AOP Applications Software

- Updated SCR procedures to work with optional auxiliary subdirectories. This was done to speed up the searching of large directories. (Robert Soliday)

Storage Ring

- Updated APSMpSR_RF_System.tcl by changing the beamVoltageV PVs to beamVoltage because of a units change. (Robert Soliday)
- Updated the makeSRReqFile script so that the ID*CurrentReturn PVs from IDBM.req are included in the SR.req output file. (Robert Soliday)
- Updated SR-DCPS.tcl to run faster when we are not forcing conditioning. Before it would launch cavput for each PS that didn't need a full conditioning cycle to set the final value. Now it launches just one cavput command to set them all at once. (Robert Soliday)
- 1, corrected the order B:P? bpps in FPGABpmWaveformConfig which should be B:P5, B:P4, B:P3, and B:P2 in order. The wrong order created wrong waveforms. (Hairong Shang)
- 2, put S10A and S10B FPGA bpm waveform viewer in the correct order in OAGapps.menu (gnome menu). (Hairong Shang)
- 3, fixed an important bug in SRConfig.tcl that rescan bad device should not be put behind reading config, instead it should be run before doing the selections in reading config, otherwise, the bad device left from previous config will affect the selection. (Hairong Shang)
- 4, added time and channel info parameters to the output file to getHP9000ScopeData. (Hairong Shang)
- 5, added ID06ds (SCU0) to SR switch to user mode pem. (Hairong Shang)

Injectors

- added shift waveform at the end of the delay line scan of PARBunchCleaning if the optimized delay is greater than 10.23 (Hairong Shang)
- Updated the PAR orbit controllaw configuration so the program will not drive the PAR orbit out of range when there is problem in the bunch cleaning system. (Chih-Yuan Yao)

General

- Updated FACL_Management to stop setting the files as executable. (Robert Soliday)
- Wrote isf2sdds to convert Tektronix .ISF files into SDDS files. (Robert Soliday)
- Updated the mailing list used by cppatch. (Robert Soliday)

- Moved all the challenger cronjobs to Linux computers in anticipation of replacing challenger with a linux computer in the future. (Robert Soliday)
- Helped Dooling with an sddssequence question. (Robert Soliday)
- made extensive changes to ExperimentDesigner per Louis Emery's suggestion 1)made the entry widget stretchable so that we can see the hiding text with stretching the GUI. 2) made "Delete Knob Line" button work and added "View" button for displaying knob file contains. 3) added debug option for commandline execution so that user can turn off the debug statements when running from commandline. 4) fixed the problem of re-viewing an execution command which complained that the widget already exists. 5) fixed the bug that the non-existent PV was added to the monitor name list. (Hairong Shang)

IOC/EPICS/Controls/Linux/Solaris/Linux Clusters/Data Loggers/Simulation software

- Removed the 29ID data logger because none of the PVs have been active in over a year. (Robert Soliday)
- Updated linacRF logger because of a PV name change. (Robert Soliday)
- Added PVs to Booster Injection logger for CY. (Robert Soliday)
- Added PVs to rfgun logger per Steve Shoaf's request. (Robert Soliday)
- Changed some of the logging tolerances for the PARRF logger. (Robert Soliday)
- Updated acis alarm logger because of PV name changes. (Robert Soliday)
- Added PVs to the Booster Ramp Parameters logger per Marty Smith's request. (Robert Soliday)
- Added PVs to the PAR alarm logger per Stan Pasky's request. (Robert Soliday)
- Added PVs to the linacRF data logger per Pasky's request. (Robert Soliday)
- Fixed an issue that was causing the liquid nitrogen data logger files to be prematurely purged. (Robert Soliday)
- Helped Dooling with a question about submitting MARS jobs. (Robert Soliday)
- Updated elegant on orthros for Sajaev. (Robert Soliday)
- Informed Ryan Lindberg about how to run memory intensive jobs on the linux cluster. (Robert Soliday)
- Put together a new version of the PSS notification system. This version is still being tested but it has already replaced the previous broken version. (Robert Soliday)
- Restored a directory from backup on the linux cluster for Chae. (Robert Soliday)
- Updated the SCU0 data logger per Kathy Harkay's request. (Robert Soliday)

Web Site

- Fixed an issue with an ASD/RF technical note listing that had a non-ascii character in the title that was causing problems with our web page that lists the tech notes. (Robert Soliday)

- Updated the ASD/RF technical note mailing list per Genfa Wu's request. (Robert Soliday)
- Cleared up space on the epics web server and now will stop copying machine studies files that end in .dat to the web server because this is what filled up the hard drive. (Robert Soliday)

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

- Attended MBA Injection WG and physics WG meeting. (Aimin Xiao)
- Joined the MEDM replacement working group. (Robert Soliday)
- Attended shutdown planning meetings and provided information as needed (Karen Schroeder)
- Prepared and presented a talk on propagation of partially coherent light for the AOP group meeting. Continued writing up the results for publication. (Ryan Lindberg)
- Attended several work group meetings of the MBA project. (Chih-Yuan Yao)

LCLS

- Contacts with H-D Nuhn to determine changes to the physics requirements since October, and with J Welch to understand the basis of the vacuum requirements. The current requirement is for 10^{-9} torr in the undulator sections, meaning that either NEG strips or coating will be required. That would potentially change the chamber material from Al to Cu, and would have other rather invasive ramifications. AES engineers are currently working on a vacuum chamber design that can be integrated into the CD-1 undulator designed by LBNL, with options to integrate into the VPU. Meetings with Pile and Den Hartog. (Marion White)

Safety and Required Training

- Took various training courses. (Robert Soliday)
- Done with required training course (Chun-xi Wang)
- Completed EM116: Emergency Management and Continuity General Awareness. (Ryan Lindberg)

Miscellaneous

- Continue on reading MOGA optimization. (Aimin Xiao)
- Created a new oag@anl.gov email account. (Robert Soliday)
- Helped Xiaofang Zhu (NIU) with a question about installing Elegant and Shower on Windows. (Robert Soliday)
- Helped Mark Woodly (SLAC) with an SDDS installation issue on Windows XP. (Robert Soliday)
- Helped Weiming Guo (BNL) with SDDS installation on OSX. (Robert Soliday)
- Helped Zhirong Huang (SLAC) with an rpn issue when running it inside of a cygwin shell. (Robert Soliday)
- Helped Keith Thorne (LIGO) with building SDDS on Scientific Linux 6. (Robert Soliday)
- Helped Timur Shaftan (BNL) with Elegant installation on Windows. (Robert Soliday)
- Surrendered XP Windows laptop PHYP03 which had been used in the laser room. Need a windows replacement for this laptop to run spectrometer and beam profile monitor software. (Jeff

Dooling)