

Weekly Report for 11/04/2013

Highlights

- Optimized MBA Injection at different kick strength and configurations. Summarized main parameters and beam envelopes at key locations. Made a new layout plot. (Aimin Xiao)
- This is a one-week report. (Kathy Harkay)
- Posted talk on Preliminary analysis of SCU0 quenches in ICMS (presented 9/19/2013 at APS-U accelerator systems meeting). (Kathy Harkay)
- Investigated the SCU0 operation recovery issue with M. Smith, M. Kasa, and K. Schroeder. Carried out machine studies and implemented action items. (Kathy Harkay)

APS Renewal and Upgrade

- Discussed with Decker and Chae impedance issues with MBA lattice, in particular uncertainty of NEG coating smoothness. (Louis Emery)
- Attend weekly "Controls for MBA lattice" meeting, for one of which I made slides on what high-level applications AOP has that uses timing and synchronization of data. At MBA LDRD meeting spoke briefly on references on invariant conservation in storage rings. (Louis Emery)
- Prepared a talk on MBA lattice tolerances that covered above 1 Hz beam motion, quadrupole noise and calibration, and maximum corrector strength. Gave this talk at the group meeting and at the one of MBA meetings. (Vadim Sajaev)
- Continued running simulations of orbit correction for H7BA lattice to obtain the maximum required corrector strengths. (Vadim Sajaev)
- Worked on MBA injection section optimization: with and without last kicker being inserted into Q1 magnet, with assumed kicker strength at 100% (1 mrad/m) and 85% (0.85 mrad/m). Summarized main parameters and beam envelopes at key locations. Made a new layout plot. (Aimin Xiao)
- Responded to questions from B.X. Yang and G. Decker relating to the potential for photoelectron heat load in the MBA machine. (Kathy Harkay)
- Participated in the weekly NGSR meeting. Supported Yipeng Sun's 7MBA "hybrid" lattice in which he added 4 m of free space and extended the straight section length. (Kathy Harkay)
- Wrote/updated the injector portion of the assumptions document, read relevant tech notes, still working on the list of which injector upgrades are necessary for the MBA machine. (Marion White)
- Did all required EVMS activities for the RIXS insertion devices. (Marion White)

MCR Operations

Storage Ring Operations

- Investigated single bunch beam loss in hybrid mode. With Borland found that they occurred at top-up injection, and is due to some instability at around 16.3 mA. With Borland decided to reduce target of single bunch till the problem is resolved at the next studies. (Louis Emery)
- Investigated how to compensate the lifetime loss due to a S3 sextupole failing in the SR. I ended up partially compensating y-chromaticity, and then requesting Sajaev to re-optimize nearby sextupoles for better lifetime. Since one sextupole converter failed during the run, I gave operations a written procedure to recover the proper sextupole configuration after the bad sextupole would be replaced. (Louis Emery)
- Reported on problem with s35das ioc communicating with S35fb ioc making S35 S36 P1s not

usable for datapool. Temporarily removed the S35 S36 P1s from orbit correction. (Louis Emery)

- Assisted MCR with turning over beam to Users after machine studies (Karen Schroeder)
- Investigated a problem which started during machine studies when the P1 bpms in S35 and S36 difference between waveform and scalar values were too large to start orbit control. Attempted to reboot the ioc but this did not resolve the problem. Louis removed these from datapool orbit correction until the problem could be resolved next machine studies. Wrote a procedure for operators to follow when doing steering for 34-ID which uses one of the bad bpms and briefly explained the reason for needing to follow the procedure. (Karen Schroeder)
- Discussed ways to make sure the SCU0 would have the correct access security mode and setpoint after switch to User Operations and after a beam loss with Harkay and M. Smith. Asked Shang to make changes to the switch to User Operations PEM and will test on next machine studies. (Karen Schroeder)
- Discussed the consequences of closing the dampers in the storage ring eliminating the outside air. There is a possibility that ozone could be created in the tunnel, but at the present there are no ozone monitors so we don't know if any ozone is being created To be on the safe side, we will open the dampers one hour before anyone enters the tunnel if an emergency access is needed during this one week test with the dampers closed. (Karen Schroeder)
- Set up hybrid lattice with 5-mm horizontal bump in ID 28. Corrected beta functions, adjusted P0 feedback. Due to unclear reasons, the hybrid lattice didn't allow storing 16 mA single bunch during operations (lowered that to 15.4mA). Next week, just recovered all settings (magnets, P0 feedback), and everything was just fine. (Vadim Sajaev)
- Sextupole S13B:S3 failed, but the beam was not dumped. Lifetime dropped from 6-7 hours to 4 hours. Ran lattice optimizer to adjust sextupoles around the failed one. The optimization process was very slow due to some initial mistakes and long single case evaluation. After several days, applied sextupole correction, which increased lifetime from 4 to 5 hours. (Vadim Sajaev)
- Discussed beam loss monitoring at SCU0 with J. Dooling, who indicated that he has four fibers that we could use. The goal would be to install these so that we can quantify local beam losses that may be responsible for quenches with beam dumps. Made a plan to talk with C. Doose and M. Kasa on what would be needed to implement this in the Dec/Jan shutdown. (Kathy Harkay)
- Followed up with K. Schroeder and M. Smith on resolving SCU0 operation recovery issues following a beam fault. Requested further details from the beamline scientist D. Robinson, and focused our efforts on the events of Oct 8-9. Made a list of action items: Implemented additional PV logging in an effort to reconstruct SCU0 recovery error in case it occurs again. Karen and Marty followed up reviewing the pem IDRestoreUserGaps with H. Shang and having her add the appropriate SCU0 commands. (Kathy Harkay)

PAR Operations

- PAR Alarm Logger was updated with new Vacuum MPC controllers alarm pv's. (Stan Pasky)

Linac Operations

- Linac Arc Detector Monitor Function and Description - Updating this document to include requested changes by the RF Group. Basically it describes how this software tool will avoid or substantially reduce the possibility of catastrophic window or waveguide failure. When the document and tool is completed all MCR operators will be required to read and sign -off that they understand the purpose of the tool. (Stan Pasky)

MCR Operations administrative/misc.

- Conducted interviews of candidates for the operator position. (Randy Flood)
- Worked on getting an offer submitted for one of the operator positions. (Randy Flood)
- Reviewed operators' daily effort confirmation sheets (Randy Flood)
- Approved operators' time cards (Randy Flood)
- Approved vacation requests, set up coverage and updated the online schedule (Randy Flood)
- Approve CTLs, IT and Other work requests (Randy Flood)
- Review and clean the asdops mail account at least twice (Randy Flood)
- Check the status of open RMD's (Randy Flood)
- Prepared the Downtime report and gave to Flood for presentation to OPS Directorate (Karen Schroeder)
- Interviewed 6 operator candidates and provided Flood with rankings of those candidates. (Karen Schroeder)

APS Machine Studies

Storage Ring Studies

- Finalized (with Lindberg) the study of single bunch limit study of reference lattice. The limit was 18 mA. Not more than regular hybrid mode under the equivalent conditions (except for the reference orbit of course). (Louis Emery)
- Trained Y. Sun in on-axis injection tools. Collected loss pattern while injecting into low aperture. Requested B. Yang to make sure the beam loss monitors set-up for the whole ring is correct. (Louis Emery)
- Scraper scan of injection efficiency. We see a decrease in efficiency in a range of 1.5 mm of scraper position. (Louis Emery)
- Performed gap scans to update feedforward tables and restored X-ray bpms removed due to steerings (Karen Schroeder)
- Completed the accumulation limit on reference orbit study with L. Emery. We were not able to significantly improve the accumulation limit by going to the reference orbit, but I did learn a lot. (Ryan Lindberg)
- Participated in machine studies to test SCU0 controls, with M. Smith and M. Kasa, to mimic whether SCU0 operations is recovered properly after a beam dump. Unfortunately, we were unable to reproduce the issues the user has experienced. Reported investigation in progress at the weekly TOM. (Kathy Harkay)
- Collected injection beam loss data with hybrid fill pattern. (Jeff Dooling)

Linac Studies

- Temporary thermocouples have been installed in the RG1 & 2 kicker box on the beam dumps. This study was performed to measure the dump temperature at rf rep rate of 6,10,16, 20, 24 and 28Hz 10 minutes apart. The thermionic rf gun will be at 300ma during this test. (Stan Pasky)

- On Oct.28th the rep rate experiment performed concluded that dump temperatures increased by one degree F from 6Hz to 28Hz. (Stan Pasky)
- On Nov. 5th At normal charge and rep rate (1 nC, 4 Hz) and beam energy of 375 MeV. With beam at the L5 beam dump we slowly raised the repetition rate to 30 Hz while monitor all linac diagnostics using sddssynchlog to monitor linac current monitors and bpm at L5 beam dump to get estimate of energy jitter. In parallel, health physics took radiation measurements in the linac gallery. Nothing out of the ordinary was found. (Stan Pasky)

APS Machine Research and Development

Storage Ring Research and Development

- Discussed beam motion requirement for MBA with Sajaev. (Louis Emery)
- Discussed budget data with Sajaev, attended a group meeting of 4-year plan of projects. (Louis Emery)
- Presented my results on the effects of diffusion for scraper heating at Y.C. Chae's Friday meeting: heat diffusion during a beam loss event may reduce peak temperatures by as much as 50%, but should not be counted on to "save" the scraper (Ryan Lindberg)
- Participated in weekly ASD/MD SCU0 team meeting, led by Y. Ivanyushenkov. Reported on SCU0 operations, implementation of ID28 beam bump, and machine studies plan. (Kathy Harkay)
- Participated in a meeting on the new S37 horizontal scraper design, led by Y.-C. Chae. (Kathy Harkay)
- Analyzed SCU0 data relating to LHe pressure rise and thermosyphon heater frequency under different beam current, fill pattern, and SCU0 main coil current. My goal is to discuss these with J. Kaluzny and C. Doose, who have models relating these quantities to heat loads on the 4K circuit. (Kathy Harkay)
- Ran MARS scraper simulations with tilted geometry. Presented temperature rise results at scraper upgrade meeting Friday. (Jeff Dooling)
- Discussed installation of fast beam loss monitors around the SCU0 chamber with K. Harkay. (Jeff Dooling)

Linac Research and Development

- Communicating with SLAC to support a bake-out of two Chinese SLEDS to remove all internal contamination. (Stan Pasky)
- Made good progress with alignment of the pc gun laser. Set TEM00 in the regen cavity using mode selecting iris tool. (Jeff Dooling)
- Peak PIN diode leakage detector signals are now up to 1.5 V. Ran into trouble with alignment of PC1; will investigate further next week. (Jeff Dooling)
- Attended Photoinjector Physics and TCAV/PCGun meetings. Discussed COTR bunching gain with A. Lumpkin (FNAL) and R. Lindberg. (Jeff Dooling)

Other Research and Development

- Continuing simulation/theory work into compact mode representations of partially coherent undulator radiation. Began the process of writing it up for publication. (Ryan Lindberg)

APS Machine Software

AOP Applications Software

- Helped Shang test a web client and server webPDA for viewing EPICS PVs as part of her conference report. (Louis Emery)
- Request to Shang an easy update process for the Redhat custom applications menu (Louis Emery)
- for OAGapps. This will make OAGapps available to all. (Louis Emery)
- Gave list of issues with ExperimentDesigner to Shang. (Louis Emery)

Storage Ring

- Updated the baseline algorithm of the Bunch Current Monitor to handle the double-banded baseline. Ignoring the two baseline made the estimate of the single bunch current in hybrid mode inaccurate by 1 or 2 mA. (Louis Emery)

Injectors

- added APSPmpDoHP9000ScopeMeas procedure to collect HP9000 scope data to APSPmpHP54542AScope.tcl, tested and installed. (Hairong Shang)
- Modified par scope waveform archive tool to use the new HP9000 scope, created the configs and archive directory for PAR HP9000 scope. (Hairong Shang)

General

- With assistance from V. Sajaev wrote scripts to automate MARS analysis process and generate combined output files for elegant. (Jeff Dooling)
- spent a lot of time working on OAGapps gnome menu, finally I was able to name the menu files with meaningful names, and got it work for system wide. Created the menu files in /home/helios/oagData/oagAppsMenus and svn version OAGapps.menu file. Start writing a tech note for it. (Hairong Shang)

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

- Worked John Hammonds to set up caQTdm in the MCR for operators to start testing (Randy Flood)
- Administer the EPICS CVS repository to ensure current versions are installed and conflicts are tracked down and eliminated. (Randy Flood)

Publications, papers and report

- Provided edits to a draft SCU0 article for Synchrotron Radiation News. (Kathy Harkay)

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

- Tcavity / SPCGun meeting 10-23-2013 - Tasked with coordinating all activities in the Injector Test Stand. The main effort will be to install and start rf conditioning of a new Photo cathode rf gun by mid November and be completed for the start of studies by Dec. 13th. (Stan Pasky)
- Attended MBA Injection WG and physics WG meeting. (Aimin Xiao)

LCLS

- Populated SharePoint site for ANL-LCLS-II, planning meeting to decide how to get a vacuum

chamber conceptual design in time for the CD-1 SLAC-Director's review in a month, attended engineering peer review of the magnetic design for the 26-mm-period prototype device; strategy sessions with Pile and Den Hartog, making materials for Brian Stephenson to prepare him for the LCLS-II Director's meeting. Catching up with the status. (Marion White)

Safety and Required Training

- Took required ESH training. (Aimin Xiao)
- Completed EQO140 and ESH196A safety training. (Kathy Harkay)

Miscellaneous

- POC-HP meeting. ANL Named Postdoc evaluations. Gave information to O. Singh of NSLS-II on canted undulator magnets. Gave cvs and latex help. (Louis Emery)
- Generated several brightness plots for G. Decker for MBA lattice presentation. (Vadim Sajaev)
- Participated in interviewing candidates for the operator position. (Vadim Sajaev)
- Read papers on MOGA optimization. (Aimin Xiao)
- Participated in interviewing candidates for Tech I (Operator). (Kathy Harkay)
- Continued to review an NSF CAREER proposal. (Kathy Harkay)
- Writing performance appraisals for APS-U as required (Marion White)
- Surrendered XP laptop, LOANERLT-8. (Jeff Dooling)