

Weekly Report for 12/02/2013

Highlights

- Discovered and fixed a bug relating to SCU0 recovery of the user main coil current after a beam dump (with M. Smith). (Kathy Harkay)
- Contributed to revised ARPES paper, which was resubmitted to PRL (with PNNL/IIT). (Kathy Harkay)

APS Renewal and Upgrade

- Discussed using synrad3d to compute synchrotron radiation heat loads and scattering in the MBA Upgrade with H. Cease. It turns out there are two codes with similar names that do similar calculations: SynRad developed at CERN and synrad and synrad3d developed at Cornell. We agreed to benchmark the two codes using a simple geometry. Organized a student (A. Vella) to carry out these calculations, with L. Boon to train her. (Kathy Harkay)
- Participated in 4GSR physics meeting (chaired by M. Borland). (Kathy Harkay)
- Started to analyze BM heat loads for an SCU in the MBA ring. (Kathy Harkay)
- Linear optics optimization on Hybrid-7BA lattice without longitudinal gradient dipoles. Makes all quadrupole strength under the limit from magnets design group. (Yipeng Sun)
- Running MOGA optimization to improve dynamic aperture and local momentum aperture of APS upgrade candidate lattices. (Yipeng Sun)
- Evaluate the performance of APS upgrade candidate lattices. (Yipeng Sun)
- Analyzed new lattice options for the booster. (Chih-Yuan Yao)
- Worked on specs for the FID pulser with Ju and Lawrence Donley. (Chih-Yuan Yao)
- Performed impedance simulation of booster chambers, including the cavity and bellows with Xiang Sun. (Chih-Yuan Yao)
- Continued to work with Chuck Doose to evaluate booster sextupole spare magnet for feasibility of a current upgrade. (Chih-Yuan Yao)

MCR Operations

Storage Ring Operations

- Helped operators diagnose problem with Xray bpm's. Helped Sereno setup the Dsp Scope for catching bpm "errors" after loop trip. (Louis Emery)
- Helped setup new RTFB and datapool configurations which don't use P0 and P1 in sectors 1 and 2. There were intermittent problems with the DSPs there. (Louis Emery)
- Helped Clay White (floor coordinator) look at some SR logged data to look for evidence of SR beam motion reported by ID10. (Louis Emery)
- Analyzed recent beam dumps and SCU0 recovery for operations (user main coil current setpoint) with Marty Smith. Discovered a bug after we reviewed the SCU0 activity logs, which M. Smith fixed. Checked SCU0 recovery after two subsequent machine studies periods (including beam dumps and switch from/to User mode, and it appeared to be normal. (Kathy Harkay)
- Investigated storage ring data relating to the Nov 4 quarry blast, at the request of D. Mills through V. Sajaev. Reported findings. Discovered that unfortunately, the storage ring vibration data acquisition was off-line at the time. (Kathy Harkay)

Booster Operations

- Fixed the booster BPM history configuration script that is linked on the injection control screen with Hairong. (Chih-Yuan Yao)
- Proposed a booster current monitor scope signal solution to retire the old HP scope. (Chih-Yuan Yao)
- Investigated and resolved a BM DC standby pem error with Bob Soliday and Hairong. (Chih-Yuan Yao)

PAR Operations

- Investigated PAR scope restore problem with Hairong. The work is still on going. (Chih-Yuan Yao)

APS Machine Studies

Storage Ring Studies

- Worked on FPGA based optics corrections: did a successful correction test again that confirmed with response matrix measurement by Vadim (Chun-xi Wang)
- Modified SR workspace configuration. Modified hp9000 scope waveform acquisition script to write data to a multi-page file with min/max column using scope's ability to capture in segmented mode with or without peak detect. (Louis Emery)
- Participated in S37 scraper design meeting (chaired by Y.-C. Chae). (Kathy Harkay)
- Learn online control software in the control room during the machine study time. (Yipeng Sun)

Booster Studies

- Measured tune shift verses beam charge of booster 132 nm lattice, which agree with that of 92-nm lattice data. (Chih-Yuan Yao)
- Performed high charge booster beam study. Achieved 7 nC to BTS with 132nm lattice and 6 nC with 92-nm lattice. (Chih-Yuan Yao)

APS Machine Research and Development

Storage Ring Research and Development

- Worked on low-emittance lattice: study detuning of TME lattice, reviewing coupling theory (Chun-xi Wang)
- Gave Xiao and Sajaev data on skew quadrupole strength limits to make sure that the correct values of the two types of quadrupoles are used in simulation. Reported to R. Torres the progress of the skew quadrupole conversion for (Louis Emery)
- the month of Nov. (Louis Emery)
- Met with R. Lindberg and J. Liu to discuss scraper temperature rise modeling. (Jeff Dooling)
- I will break up the input elegant distribution by Pass (turn) number for temporal variation. (Jeff Dooling)
- Attended a larger scraper meeting called by Y.-C. Chae and discussed several different simulations including MicroWaveStudio. (Jeff Dooling)

- Added and tested phase shift feature to P0 feedback filter generation with help from Hairong. (Chih-Yuan Yao)

Linac Research and Development

- Reduced regen diode pump current to 180 A while maintaining 4.5-5.0 mJ/pulse out of the regen and 140-145 microJoules in the uv (old EM2 scaling would be 242-251 microJoules). (Jeff Dooling)
- Aligned IR beam from the pc gun drive laser into the Positive Light single-shot autocorrelator (SSA) next to the transport box. Measured IR pulsewidth of 1.3 ps, rms. (Jeff Dooling)
- Provided result to Y. Sun who will incorporate the pw measurement into ASTRA modeling, assuming the UV pw is roughly the same. (Jeff Dooling)
- Gave laser status report at the PIP meeting. (Jeff Dooling)
- Contacted G. Travish (UCLA) regarding UV pw made previously in the ITS using a streak camera. Travish provided streak camera results and a table of laser parameters. (Jeff Dooling)

ITS Research and Development

- Attended the TCAV/PCGun meeting and reported on laser status. (Jeff Dooling)
- The schedule for PC gun commissioning in the ITS was modified to try and accomplish all vacuum work prior to shutdown and Winter break. (Jeff Dooling)
- No rf conditioning work will take place until after start up in January. (Jeff Dooling)
- The PC Gun was installed in the ITS on Thursday. (Jeff Dooling)

Other Research and Development

- Worked on LDRD on graphene window: started vacuum test, demonstrated that the vacuum system, laser/detector monitoring, data acquisition all worked well. Initial tests confirmed that graphene can support large pressure differential and not too delicate to handle. (Chun-xi Wang)
- Prepared text and figures on APS upgrade lattice design for summary of LDRD, describing the work I completed during FY13. (Yipeng Sun)

APS Machine Software

AOP Applications Software

- Attended talk by Andrew Johnson on EPICS4. Pointed out to him that many of the useful features added to EPICS4 were effectively implemented at higher levels by tcl/tk scripting by AOP. (Louis Emery)

Storage Ring

- added phase shift feature to FIR filter of P0FeedbackControl. (Hairong Shang)

Injectors

- renamed the variable xoffset and yoffset in BBPMHistWaveformSetup by xTuneOffset and yTuneOffset because they overwrite the actual sample processing offset which has the same variable names, and corrected the units of tune offsetment which should be kHz. (Hairong Shang)

- added AFG and Bcontrol category to restore booster parameters in switching booster lattice pem, and added reading the energy from selected SCR to link the controllaw directory to the corresponding directory, for example, BOOSTER -> BOOSTER-92nm-375MeV for 92nm and 375MeV energy lattice. (Hairong Shang)

General

- Discussed with T. Fors (PS group) on how to benchmark programs that use Lapack SVD. I noticed that Fors was using a new lapack call to do SVD, which is about 2x faster than the original simpler one. Asked Shang to implement this available library into sddspseudoinverse. (Louis Emery)
- modified sddspseudoinverse regression test to compare the absolute values of U and V matrices of sddspseudoinverse because different SVD methods give different sign of U and V, only the absolute values are meaningful. (Hairong Shang)
- added option of lapackMethod to sddspseudoinverse to choose simple (dgesvd) or divideAndConquer (dgesdd) SVD routine, default is divideAndConquer (dgesdd). dgesdd was proved to have better performance tested with square matrices. (Hairong Shang)
- improved ADT tool through adding ADTZoomInterval parameter to config file to be able to change the zoom interval with config file. (Hairong Shang)

Publications, papers and report

- Made substantial contributions to our response to the PRL referee report for PNNL/ANL/IIT ARPES photocathode paper. Discussed response with IIT co-authors. Revised paper was resubmitted. (Kathy Harkay)

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

- hosted Chris Quigg for APS colloquium committee (Chun-xi Wang)
- Second round of ANL fellowship application evaluations plus final selection after oral presentations of sponsors (Louis Emery)
- Submitted an abstract to IPAC14 entitled, ?A Modified Scrapper Design for the Advanced Photon Source Storage Ring.? (Jeff Dooling)
- Prepared for SLLP management class at the U Chicago Booth School of Business (pre-course reading). (Kathy Harkay)

Education, Mentoring and outreach

- study python. (Hairong Shang)

LCLS

- Coordinating preparation of materials for the CD-1 review next week; (Marion White)

Safety and Required Training

- Completed EM116 safety training. (Kathy Harkay)

Miscellaneous

- reviewed a paper for PRST-AB referral (Chun-xi Wang)
- Performance appraisals. (Louis Emery)

- Requested that Windows XP PC ?jdooling? be maintained. (Jeff Dooling)
- took various training courses (Hairong Shang)