

Weekly Report for 01/20/2014

Highlights

- Developing APS upgrade lattice with off-axis injection (accumulation) (Yipeng Sun)
- scheme. (Yipeng Sun)
- Preparing presentation for APS upgrade physics review in Feb.. (Yipeng Sun)
- Wrote down the APS MBA work assumption document with all new figures and parameters list for the vertical injection. (Aimin Xiao)
- Performed orbit recovery, SCU bump study, high coupling study and CPU/IEX check up during the machine start up week. (Aimin Xiao)

APS Renewal and Upgrade

- Developing APS upgrade lattice with off-axis injection (accumulation) (Yipeng Sun)
- scheme. (Yipeng Sun)
- Preparing presentation for APS upgrade physics review in Feb.. (Yipeng Sun)
- Update the impedance budget for the upgrade and presented the progress at 1/24/Friday. (Yong Chul Chae)
- Summarize vertical injection design with all new figures and parameter tables. (Aimin Xiao)
- Rewrote the APS MBA work assumption document with vertical injection configuration. (Aimin Xiao)

MCR Operations

Storage Ring Operations

- Discussed with L. Erwin his proposed changes to some of the SR tunnel temperature setpoints. (Louis Emery)
- Assisted Sereno in setting up BPMs and orbit correction during start-up. Fixed a :DacAI.AOFF issue for correctors no longer in the ring. (Louis Emery)
- Vertical orbit 2.6 kHz noise investigation. Source was attributed to S11BV4 through DspScope data analysis. Explained to others where to find the 100Hz-sampled PS DAC data and the RTFB corrector error averaged data. (Louis Emery)

Linac Operations

- Worked with Y. Sun and S. Pasky on switch over from RG2 to RG1 and tune up of RG1. Had trouble reaching our goal of 1 nC at L3:CM1. (Jeff Dooling)
- Continued this work on Saturday (2/25). S. Pasky was able to bring the charge to the 1 nC level then allowed the generic optimizer to further improve the charge. (Jeff Dooling)
- Still see significant fluctuations in charge out of this gun (1.4 -1.8 nC on L1:CM2). Saved files. (Jeff Dooling)
- Met with vacuum and alignment group people to discuss 3G1 (Linac Gun 1 in last APS run) cathode/backplate geometry measurement, and planning for a similar set of LLRF measurement on 3G1 as we last measured for gun 3G2. (Yin-e Sun)

ITS Operations

- With assistance from W. Berg and L. Erwin was able to rough-align the uv beam through the transport line into the ITS gun room. Measured transport efficiency of 81 percent. (Jeff Dooling)
- With S. Shoaf and R. Diviero (AES-CTL), verified operation of four cameras in the ITS. One labeled CCD1 does not appear to be present. (Jeff Dooling)
- Recovered operation of RF Test Stand triggering. (Jeff Dooling)
- Updating screens for PCGun rf conditioning. (Stan Pasky)

Procedures

- Generating a guide for operator on how to use the AcquiredLinacWaveforms Tool found in OAG. (Stan Pasky)

Training

- Attended all three types of sessions for the new Dayforce reporting system. (Randy Flood)
- Trained new operators on use of alarm handlers (Randy Flood)

MCR Operations administrative/misc.

- 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)

APS Machine Studies

Storage Ring Studies

- Recorded the first signals from the fast ID6 BLM prior to SR conditioning on Monday. (Jeff Dooling)
- Conducted study with K. Harkay using new installed FO fast beam loss monitors in sector 6 near the SCU0 cryomodule. Observed a clear reduction in integrated loss from beam dumps as the beam was bumped in S28 from -3.3 mm to -9 mm. (Jeff Dooling)
- Will operate with a -7 mm bump to see if this can reduce the occurrence of SCU0 quenches from beam dumps. (Jeff Dooling)
- Meet with a few people on machine studies on APS in support of MBA upgrade. Discussed with group a list of start-up studies. (Louis Emery)
- Arranged for B. Yang to set up the visible light beamline (spherical mirror) to measure larger vertical beamsizes. (Louis Emery)
- Made vertical beam size measurements as a function of coupling and tune separation with B. Yang, A. Xiao and V. Sajaev. (Louis Emery)
- Assisted Harkay in checking out the FF correction of SCU0. (Louis Emery)

- Performed orbit recovery, then double checked it with tweaked up faster correctors. (Aimin Xiao)
- Performed SCU0 beam loss study with Jeff and Kathy. Obtained good and repeatable results on beam loss vs ID28 bump size. Set bump value to -7 mm. (Aimin Xiao)
- Performed high coupling study with Vadim and Louis. Obtained consistent results for different kappa value. Maximum coupling was reached at the same tune settings (resonance line). The resonance line width increased with kappa value. (Aimin Xiao)
- Checked CPU. The CPU corrector crater was changed during shutdown. So made a new correction table. (Aimin Xiao)
- Checked IEX. Found out an error with PS polarity switch. Asked Boris and Marty to solve it. Made a new correction table. (Aimin Xiao)

Linac Studies

- RG1 tune-up. Files available under "Sys. Ref. High Charge RG1->PAR->BS 375MeV" (Stan Pasky)
- Participated machine studies for linac lattice files set up for the newly installed RF Gun 1. 1.5 nC per pulse was transported to PAR but with gun current at 300mA. Further studies to reduce gun current yet still keep the charge/pulse is needed. (Yin-e Sun)

ITS Studies

- Clean-up and equipment readiness for rf conditioning of new PCGun. (Stan Pasky)

APS Machine Research and Development

Storage Ring Research and Development

- Presented the result on undulator chamber optimization at the workshop TWIICE2014 at SOLEIL, France (Yong Chul Chae)
- Presented the workshop report on TWIICE2014 at the AOP group meeting (Yong Chul Chae)
- Lead the meeting on the thermal diffusion effect during the beam dump for the scraper upgrade project (J. Dooling, J. Liu) (Yong Chul Chae)
- Lead the meeting on the HOM heating with the thermal analysis for the scraper upgrade project (G. Waldschmidt, K. Suthar) (Yong Chul Chae)
- Lead the meeting on the vacuum analysis by using MolFlow simulation for the scraper upgrade project (J. Carter, L. Morrison) (Yong Chul Chae)
- Lead the scraper upgrade meeting on January 24. (Yong Chul Chae)
- Presented summary of ANSYS estimates of maximum scraper temperatures allowing for diffusion during the beam dump. ANSYS shows little change from the instantaneous temperature rise case. (Jeff Dooling)
- This result differs from the analytical result of R. Lindberg. (Jeff Dooling)
- Nevertheless, both Ti-alloy and aluminum are capable of withstanding beam dumps up to and including 100 mA. Beam dumps from 150 mA will exceed the melting temperatures however. (Jeff Dooling)

- Requested from C. Steier (LBL) updates on their own upgrade efforts. (Louis Emery)
- Looking at ID device field quality for MBA lattice. (Louis Emery)
- Verified that Yipeng was using the correct APS lattice. (Louis Emery)

Linac Research and Development

- Simulations of a compressed 20 pC photoelectron bunch from the PC gun through the APS linac; generated a set of beam parameters as a starting point for possible applications of the beam in FELs, provided a table of slice beam energy spread and peak current to collaborators. (Yin-e Sun)
- Continued studies on the linac lattice optics setup using established ELEGANT template. Build new sections of beamline to enable low energy beam (up to the entrance of the chicane) using ASTA including the effects of cathode mirror charge, space charge and wakefield through the linac, then feed the ASTRA simulated beam into ELEGANT and utilize the existing beamline transportation lattice set up tools. (Yin-e Sun)

ITS Research and Development

- continued to work with different groups on getting ready for the PC gun conditioning. Items checked/discussed/provided guidance including the PC gun alignment after an extra RF window installed in the waveguide, diagnostics on imaging and charge measurement. Discussed with mechanical support and RF group to get proper PC gun ion pump support. A PMS borrowed from AWA/ANL is installed at the beamline and testing is planned. Drafted items need to be complete prior to PC gun RF conditioning. (Yin-e Sun)

APS Machine Software

AOP Applications Software

- Instructed Shang on analytic signals, for which she will write a SDDS tool.; discussed an additional option of unwrapping of angles (Louis Emery)
- Suggested that Soliday could write an arbitrary waveform editor for CY, since he had already done something similar. (Louis Emery)

Storage Ring

- Reported or fixed old bpm PV problems as they occurred during startup. (Louis Emery)
- Updated ADT lattices files to show S26BV4 in new position. (Louis Emery)
- debugged set IOC averaging problem when run BPLD verification application, comment out setting ioc averaging for monopulse bps in APSPmSRBPM.tcl since they no longer exist. (Hairong Shang)
- added new FPGA bps to FPGA bpm adt configs. (Hairong Shang)
- investigated problem with SR gap feedforward, found the non-existent pv of ID 30 dual gap difference because it was not in the official ioc database, Marty Smith fixed it. (Hairong Shang)
- investigated SCR restore errors of restoring SR BPLD limits, it because that these pvs did not have written permission, it was fixed after control key changed the write permission. (Hairong Shang)

Injectors

- Updated ITS gun Conditioning Data monitoring file under OAGapps tools as all the water, vacuum, RF, temperature and charge measurement hardwares are installed and PVs become available on the

MEDM screens. (Yin-e Sun)

- spent most of time implementing booster ramp correction with new current regulation algorithm by CY, tested with CY, it worked with SD and SF, had problem with QF, and BM. made further improvement, will test next time. (Hairong Shang)

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

- Created several new ACIS PV's at the request of the SI group. (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 summary of major work in injector during Dec./Jan maintenance period. The summary can be found on the Accelerator Operations & Physics page under " Work summary* Summary of work performed by technical groups that may affect operations". (Stan Pasky)
- Note on SDDS tool that creates analytic signals from real signal. (Louis Emery)

Web Site

- Maintained AOP wiki website, Next-Generation Storage Ring Meetings. (Yipeng Sun)

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

- Reviewed one paper for PRST-AB. (Yipeng Sun)
- Attended Topical Workshop on Instability, Impedance and Collective Effects (TWIICE) held at Synchrotron SOLEIL, France. (Yong Chul Chae)
- Participated in conference calls with APS and CERN personnel discussing SynRad and MOLFLOW simulations for the assessment of gas desorption in the SR. R. Kersevens the MOLFLOW author was one of the CERN participants. (Jeff Dooling)
- Attended internal APS xray bpm design review. (Louis Emery)
- Reviewed a Post-doc application for DEP. (Louis Emery)

Safety and Required Training

- Training for Dayforce. (Yipeng Sun)
- Provided operator training on the Linac. (Stan Pasky)

Miscellaneous

- Read Lindberg's note on coupling. (Louis Emery)
- Read chapters in time-frequency analysis. (Louis Emery)
- Provided a list of activities over the last 3 years to Sajaev. (Louis Emery)
- Reviewed MBA-related Internal Notes. (Louis Emery)
- Wrote reference letter for POC-HP case. (Louis Emery)

- took vacation on 1/20 (Monday) (Hairong Shang)