

Weekly Report for 03/10/2014

Highlights

- Presented a review of a PRST-AB article on THz radiation at the weekly AOP group meeting. (Kathy Harkay)
- Study on H7BA lattice for larger DA. (Yipeng Sun)

APS Renewal and Upgrade

- Reviewed how to post-process synrad3d output for the MBA benchmark case with L. Boon. L. Boon wrote a matlab script to generate photon flux and absorbed power as a function of azimuthal angle. (Kathy Harkay)
- With assistance from L. Boon, who wrote the appropriate matlab scripts, analyzed the synrad3d MBA benchmark case, specifically, the radial photon flux and power in a 6-mm round ID chamber. Synrad3d gives a broader scattered photon distribution, with more absorbed power, than CERN SynRad. We discussed the results in detail with J. Carter and H. Cease, in preparation with discussions with R. Kersevan (CERN) next week. (Kathy Harkay)
- L. Boon re-ran one of the synrad3d benchmark cases in order to save the detailed photon reflection file. I reviewed the photon incident energies and angles in order to better understand the scattering results. (Kathy Harkay)
- Participated in MBA Vacuum Review dry run, providing feedback to the speakers. (Kathy Harkay)
- Study on H7BA lattice for larger DA. (Yipeng Sun)
- Continue working on updated injection line design. (Aimin Xiao)
- Updated simulation results to the MBA physics group meeting. (Aimin Xiao)
- Updated timing jitter simulation on the waveform flattop. (Aimin Xiao)
- Generated new injection/extraction layout coordinates and sent them to L. Morrison. (Aimin Xiao)

MCR Operations

Storage Ring Operations

- Assisted MCR with turning beam over to Users after Machine Studies (Karen Schroeder)
- Sent Sereno list of BPMs which were removed during and why so that he could update the BPM status with the pertinent information (Karen Schroeder)
- Investigated report of horizontal beam motion from the MCR. Found that the RF source voltage was fluctuating at the time. This problem will be fixed during machine studies. (Karen Schroeder)
- Re-ran a script to put S28BP0 back into response matrix for orbit correction. (Louis Emery)

Linac Operations

- RG1 thermionic rf gun was replaced during the December/January maintenance period. It was believed that the original rfgun had mysterious VL/Hz beam trajectory changes that resulted in poor topup performance. The transport of RG1 is fair in comparison to RG2, however bunch compressor matching par beam acceptance is very good. We have a backup gun now! (Stan Pasky)
- During the Injector Studies period, rf conditioning continues to be scheduled for Linac sectors L4 and L5. As a result of this conditioning, very good vacuum levels have been noted with the ability of supporting 450MeV operations if needed. However - if something should happen to our SLED's -WE

DO NOT HAVE SPARES, a failure would cripple the linac at different levels. However - We could support 325MeV only in the event L4 or L5 SLED should fail. If L2 SLED should fail we would have to reconfigure bunch compressor to support operations. (Stan Pasky)

ITS Operations

- Coordinated work efforts using the Injector Test Stand Schedule for installing vacuum, diagnostics, water and rf components for commissioning our new Photocathode rf gun. As a result, the PCGun has been successfully rf conditioned to 12MW at 30Hz rep rate with 2.5us pulses width. This effort will support the standard operating conditions of 6Hz, 11MW with a 2.5us as outlined in The Photo-Cathode Gun Commissioning Plan at the Injector Test Stand. APS_1442231 (Stan Pasky)

Training

- Restructured the Linac requalification to support the two year requirement of requalifying operators. The requalifying process is now complete for the linac. (Stan Pasky)

MCR Operations administrative/misc.

- Discussed operators' involvement in sheltering drill and attending the post-drill AES meeting (Karen Schroeder)
- Reviewed and approved non-RSS SR requests for work during run and shutdown. (Karen Schroeder)
- Produced downtime report and either gave it to Flood for presentation or presented it myself at OPS Directorate. (Karen Schroeder)
- Provided Borland with information on the procedure for the MCR determines when beam stability is out of spec and how/when the Users are notified (for ISO audit). (Karen Schroeder)

APS Machine Studies

Storage Ring Studies

- Carried out measurements with J. Dooling of beam dump induced beam losses at SCU0 BLMs after kicking with the IK5 vertical pinger (with and without MPS dump). We do not see the effect of IK5 and suspect a timing issue. Presented results at two weekly machine studies meetings, with J. Dooling. (Kathy Harkay)
- Measured the timing between the MPS and IK5 discharge triggers, with F. Lenkszus, R. Laird, J. Dooling. The issue in studies turned out to be a large unintended delay between the MPS and IK5 triggers. With zero DG535 delay, the relative timing varies about 1-3 usec due to an MPS delay and synchronization with P0. (Kathy Harkay)
- Continuing studies with K. Harkay to see if the SCU0 undulator and cryostat can be protected from beam-loss-induced quenching during beam dumps. (Jeff Dooling)
- Observed that firing IK5 at 7 kV will significantly deplete charges over the period where the pinger magnet is energized (~1/4-1/3 of a turn). (Jeff Dooling)
- Performed gap scans to generate new gap feedforward tables and restored any X-ray BPMs removed because of steering. (Karen Schroeder)
- Assisted Shifu Xu with his studies to upgrade IOCSBPM DP to newer version of epics. (Karen Schroeder)
- Compiled the beam-related portion of the machine studies schedule and updated the non-beam

portion with emergency requests, changes needed, etc. (Karen Schroeder)

- Assisted the MCR during non-beam portion of machine studies when number of available operators was limited. (Karen Schroeder)
- Performed orbit switch from Hybrid to 324, set up UBOP file for user operation. (Aimin Xiao)
- Performed IEX correction table recheck. (Aimin Xiao)
- With on-axis injection set up, the tune separation was varied to the resonance condition. We didn't see a change in efficiency or in beam loss pattern, which is a good thing for MBA lattice. (Louis Emery)

APS Machine Research and Development

Storage Ring Research and Development

- Reviewed a paper on generating THz radiation by Y. Shoji and presented at the weekly AOP group meeting. (Kathy Harkay)
- Met with Yong-Chul Chae to learn how to simulate impedances/wakefields in the APS storage ring. Familiarized myself with the gdfidl simulation code by performing a number of test runs using previous input files as a starting point (Ryan Lindberg)
- Recomputed longitudinal growth rates for MBA lattice with damped 540 MHz mode. Longitudinal plane is just stable against instability. (Louis Emery)
- Replied to B. Berg on ID31 and ID35 status of canting and Decker distortion. (Louis Emery)
- Discussed sextupole pairs with Borland for MBA lattice. (Louis Emery)
- Read the original SLAC note on calculating equilibrium pressure in a long tube. (Louis Emery)
- Gave skew quadrupole project update to R. Torres. (Louis Emery)
- Instructed AES to assemble the ID30 VC to make it look like a aperture of +/- 15 mm along with its tapered transition. (Louis Emery)

Linac Research and Development

- Presented status of the pcgun laser at the PhotoInjector Physics meeting Wednesday. (Jeff Dooling)
- Provided a schedule for completion of the laser work required prior to pcgun commissioning. (Jeff Dooling)
- Continued with conditioning work on the PC Gun with conditioning team. (Jeff Dooling)

ITS Research and Development

- Participated in the commissioning of the new PC gun. Helped condition the gun to 12 MW forward power with solenoid. (Ryan Lindberg)

Other Research and Development

- Cathode R&D: Participated in meeting with IIT scientists to discuss a potential collaboration and LDRD proposal on superconducting photocathodes. (Kathy Harkay)

- Cathode R&D: Assembled the Hg flashlamp components (from 2008 cathode LDRD) and provided them to AWA/HEP for use with the Kelvin Probe chamber. This will allow QE and work function measurements on test photocathodes. The chamber is presently being used primarily by AWA and Euclid scientists. (Kathy Harkay)

APS Machine Software

Injectors

- continue improving AcquireITSWaveform during ITS gun commissioning: 1) modified to acquire ITS gun probe data from coarse waveform since the scope does not work for it yet. 2) fixed a rename bug in converting sdds file for gun probe data. 3) (Hairong Shang)
- fixed a bug processing ITS gun probe data. 4) modified to collect the tekdp05 scope (for ITS waveguide and gun probe) data with getTek5000BScopeData through ethernet instead of EPICS because EPICS soft ioc often freezes, however, the remote control of EPICS has to be put on "Local" mode in order to read data with getTek5000BScopeData. 5) changed the Time units to ms for PMT and removed the scale for multiple PMT plots. 6) rearranged the Acquire and plot buttons to avoid confusion, and added highlight to the buttons to make it look clearer. 7) made the multiple PMT plots work. (Hairong Shang)
- continue improving booster IRamp correction software and continue booster IRamp machine studies with CY. (Hairong Shang)

General

- reorganized the scope setup commands of getTek5000BScopeData, and added waiting 1 second after switching channel. (Hairong Shang)
- debugged and modified threeScreenEmitMeas to pass the values of betax, alphax, betay, and alphax to elegant directly instead of reading it from a file in elegant, which did not work now. (Hairong Shang)

Simulation Software

- modified SRCorrNoiseModel and SRFeedbackSimulation to work with new data collection, and separated the data directory selection list for x/y plane to avoid confusion. And fixed the problem that <matrix>.dat was not updated when <matrix> was changed. (Hairong Shang)

Publications, papers and report

- Published on tech note, 61 pm Six Bend Achromat (6BA) Lattice for APS Upgrade, AOP-TN-2014-015. (Yipeng Sun)

Web Site

- Maintain NGSR wiki site. (Yipeng Sun)

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

- Reviewed one paper for PRST-AB. (Yipeng Sun)
- Attended shutdown planning meeting (Karen Schroeder)
- Attended all-hands meeting (Karen Schroeder)
- Made slides on single bunch current limit and impedance for APS-U Vacuum System Review. (Louis Emery)

- Attended Harkay discussion of a THz generation paper (Louis Emery)
- Attended seminar on impedance of NEG coatings. (Louis Emery)
- Read APS-U MBA review reviewers' report. (Louis Emery)

Safety and Required Training

- Completed three safety trainings: HR720, SEC101, HR498. (Kathy Harkay)
- Reviewed my JHQ, made appropriate changes and sent on for approval (Karen Schroeder)
- Took web class SEC101. Passed with score of 100%. Yes! (Louis Emery)
- Took ethics training HR498. I needed that. (Louis Emery)

Miscellaneous

- Now preparing for the April/May maintenance period with reviewing work request and attending scheduling meetings. Also preparing a Schedule for the April Injector Studies Period.... (Stan Pasky)
- Continuing discussion with elegant users on Touschek simulation. (Aimin Xiao)
- Replied to survey monkey on electronic notebooks. (Louis Emery)
- Scored remaining postdoc applications. (Louis Emery)
- Sent email to APS-U new document consultant on documentation practises of previous APS-U CDR and PDR documentation. (Louis Emery)
- Made a new CVS tree for Decker for a separate set of documentation for APS-U (Louis Emery)
- Explored what freewrl 3d visualizer can do. (Louis Emery)