

Weekly Report for 07/14/2014

APS Renewal and Upgrade

- Reviewed Touschek scattering simulation code and fixed a few description issues inside the code. Added "simpson rule" integration method to touschekLifetime module, so that it use same method as elegant. The original method is still kept, so user can do results comparison. (Aimin Xiao)
- Read Piwinski's paper on beam scattering with linear coupling. (Aimin Xiao)
- Summarize MBA Injection simulation and presented simulation results to the MBA physics group meeting. (Aimin Xiao)
- Performed CST simulation with Xiang on a Kyocera high voltage feedthrough design and communicated our results with the vendor. (Chih-Yuan Yao)

MCR Operations

Storage Ring Operations

- R. Keane and I investigated the exact nature of the S35 ICT signal. It is indeed a Integrating current transformer (ICT) not a "plain" fast current transformer. This was to determine what kind of CT we might order to replace the one that will be removed in May 2015. (Louis Emery)
- Verifying orbit in sector 29 (IEX). Checked differences in various things, nothing seen. (Louis Emery)

Booster Operations

- Inspected booster broken chamber with Marion White. There is a clear crack in the ceramic-to-SS seal. It may be repairable. (Chih-Yuan Yao)
- Investigated and corrected a BM autoRampCorrection error due to file write problem with Hairong, and reorganized the ramp log files so the number of files generated per day is within a few hundred instead of tens of thousands. (Chih-Yuan Yao)
- Investigated and temporarily fixed corrected a booster rf pem problem due to new rf5 ramp waveform with Bob Soliday. (Chih-Yuan Yao)

APS Machine Studies

Booster Studies

- Optimized booster beam in IRamp mode with PTB matching, orbit bump scan and sextupole ramp scan. Achieve much better beam stability and efficiency. (Chih-Yuan Yao)

APS Machine Research and Development

Storage Ring Research and Development

- Performed orbit switch from Hybrid to RHB lattice. (Aimin Xiao)
- Reviewed new S35 stripline installation configuration and its effect on stripline design with Leonard and Bill Berg. (Chih-Yuan Yao)
- Looked into SRTune measurement amplifier options and obtained quotes from vendors. (Chih-Yuan Yao)
- Discussed beam loading with Borland and possible effect of bunch shortening? (Louis Emery)
- Worked with N. DiMonte (AES-CTL) to complete implementation of a script to automatically save

and re-arm the Tektronix scope looking at fast beam loss data in ID6. Once implemented, the script will work for other scopes as well. (Jeff Dooling)

Booster Research and Development

- Changed the delay calculation algorithm of the IRamp to linear-fit so full IRamp mode can be implemented but requires the fit portion of BM reference ramp be linear. (Chih-Yuan Yao)
- Looked into large transverse oscillation of booster injected beam. It may be that the PTB trajectory and booster chamber is not aligned correctly. (Chih-Yuan Yao)
- Optimized the parameters of boost energy saving mode with help from Greg Fystro and Hairong Shang. (Chih-Yuan Yao)
- Worked on a script that processes booster injection x-,y-, s- oscillation real and imag parts with sddsnaff. This is intended to improve the detection accuracy of the booster beam history software. (Chih-Yuan Yao)

Linac Research and Development

- Attended the PCGun meeting and discussed the upcoming pcgun installation into the linac tunnel. Mechanical engineering review is scheduled for Monday 7/21. (Jeff Dooling)

ITS Research and Development

- Completed PCGun commissioning studies. Conducted a second quantum efficiency map measurement with R. Lindberg. (Jeff Dooling)
- Also worked with Y. Sun to obtain the dispersion at the bend line YAG screen. (Jeff Dooling)
- Recorded beam size on the virtual cathode. Working with S. Shoaf (AES-CTL) compared capture on three frame grabbers, MV200, LFG1, and LFG2. (Jeff Dooling)
- Found that while the LFG1 frame grabber is often missing frames when manually trying to capture an image, the LFG2 and MV200 units do not miss frames. Shoaf will investigate this further. (Jeff Dooling)

APS Machine Software

AOP Applications Software

- Discussed with H. Shang how to deal with updating test range for rf frequency controllaw. Checked test range for rf frequency controllaw. It was already implemented in the "calculate" matrix button. (Louis Emery)
- Documented problem with the default algorithm for 2d interpolation. Asked Shang to look into it. For now I use "-algo=nn,linear". (Louis Emery)

Storage Ring

- removed APSPmpSRBTMStaus pem and removed setup cogging for old BTM because the old cogging BTM pvs are retired now. (Hairong Shang)
- updated the information of BpmTime related pems to "obsolete" because these pvs are non-existent now. (Hairong Shang)
- added APSPmpUpdateRFControllawTestLimits for updating the RF frequency controllaw test limits. (Hairong Shang)

- Helped Shifu Xu while he was updating 8 "old" bpm iocs for 16 sectors. I investigated some problems with BPLD tolerances which Shifu fixed. I made a new SBPMs request file and operator file. Directed Hairong to fix some timing-related pem. Learned more about the cron job from J. Anderson that creates the important iocRecNames.sdds file. (Louis Emery)

Injectors

- updated the ioc software for computing BM IRamp gain and delay with linear fit instead of correlation, it turned out to be good and BM IRamp bcontrol works well. (Hairong Shang)
- added logging error message to Booster Ramp correction if correction failed to help debugging. (Hairong Shang)
- added entries for efficiency tolerance and post-process efficiency to Booster4CorrectorBumpScan to be able to change them so that one can load scanned ramps with lower efficiencies. (Hairong Shang)
- fixed the plot button error that it looked for files with wrong rootname in booster ramp energy saver. (Hairong Shang)

General

- continue working on sddscomplexpseudoinverse (Hairong Shang)
- added readme file for people to log the changes made to startup scripts. (Hairong Shang)
- wrote, tested and installed sddsmatrix2column for converting matrix into one column in row/column major order. (Hairong Shang)

Simulation Software

- Read about phase space distribution resulting from trajectories in phase space. Added comments to haissinski code. Replaced terms in code with a potential that needs to be evaluated for a general external rf voltage combination. Goal is to include both harmonic cavity potentials and wake fields in the haissinski "equation". (Louis Emery)

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

- Wrote LDRD subject matter expert report for two proposals. (Louis Emery)
- Finalized my contribution to the HHC APS-U review report. (Louis Emery)

Safety and Required Training

- Performed ESH7000 (radiation worker) training. (Aimin Xiao)

Miscellaneous

- Received and accepted a request to review an article for the Journal of Instrumentation (JINST) electronic journal. (Jeff Dooling)