

# Weekly Report for 07/21/2014

## APS Renewal and Upgrade

- Worked with Xiang Sun to simulate a Kyocera designed feedthrough model which includes dual-dielectric-material coax structure and communicated with the vendor. (Chih-Yuan Yao)
- Met with Alexei Blednykh (BNL) for two days to discuss impedance modeling at the APS. Began work on the cylindrically symmetric ID transition and RW modeling to begin better understanding of the impedance limits at APSU. (Ryan Lindberg)
- Took a look on Michael's high coupling optics. Prepared Touschek simulation script. (Aimin Xiao)

## MCR Operations

### Storage Ring Operations

- Investigated beam losses (Karen Schroeder)
- Assisted MCR with turning beam over to Users after machine studies (Karen Schroeder)
- Investigated RTFB loop trip and beam motion. When no cause could be found with the BPMs and correctors, set up PV monitor to get timing of the P0 sync errors in several sectors. Operators confirmed that timing coincided with the loop trips. Over the weekend, there were multiple trips. I spoke to Borland to determine if beam should be dumped and the repair undertaken. He asked that the floor coordinator poll the users and I sent out a request for opinions from the Users. The majority did not want the beam dumped so I sent out that information to the Users who responded and then a general one to all resident users. Continued to monitor the situation throughout the weekend. (Karen Schroeder)
- Investigated a complaint from the 22-ID beamline personnel who had trouble locating their beam. Unfortunately, he was doing some of the troubleshooting during the time we were having beam motion due to the P0 sync errors. Did not find any accelerator cause for the motion he was experiencing during the "quiet" times and reported that back to him. (Karen Schroeder)
- Assisted MCR with recovery from beam losses. (Karen Schroeder)
- Clay White asked that we monitor any beam motion closely during the first shots at 35-ID, so I set up strip charts to monitor the beam motion PVs in 30HZ, 100Hz and Full Bandwidth and provided him with the information. No motion was seen in any bandwidth. (Karen Schroeder)
- Investigated alarms on S31 bplds, but no accompanying beam losses. Found the alarms were caused from glitched on the a PV which monitors the tolerance. Fystro set up a data logger to monitor the number of glitches and any bplds which did so. He sent the information to Tony Pietryla, who in turn passed it on to Hahn Bui. The glitches were only occurring on the tolerances for the BPLDs on iocs29bpm. (Karen Schroeder)

### Booster Operations

- Investigated and fixed an RF5 pem error due to RF AFG waveform change with Bob Soliday. (Chih-Yuan Yao)
- Reorganized ramp correction directory with Hairong Shang to reduce number of log files accumulated every day. (Chih-Yuan Yao)

### Training

- Assisted with SR training when ACO was unavailable during studies. (Karen Schroeder)
- Providing training instructions to new operator. (Stan Pasky)

## MCR Operations administrative/misc.

- Prepared downtime report and either presented it myself gave it Flood for presentation to the OPS Directorate. (Karen Schroeder)
- Discussed the option of changing what the current long-range schedule displays when the files are generated from the APS beamline scheduling tool with John Hammonds. At present we display the schedule by FY. OPS Directorate asked if the upcoming runs could easily be displayed with the current. John said the tool would have to be reprogrammed if we wanted to combine runs of different FYs and to do so would require an official request for their programming time. Will pass this on to Flood for the next OPs directorate along with the suggestion that we change the link labels to include the words fiscal year to lessen the confusion. (Karen Schroeder)

## APS Machine Studies

### Storage Ring Studies

- Join machine studies, learn control software. (Yipeng Sun)
- Performed gap scans to update the ID gap feedforward tables so X-ray BPMs removed because of steering could be restored. (Karen Schroeder)
- Performed orbit response measurement (Karen Schroeder)
- Prepared non-beam portion of the machine studies schedule when Flood was on vacation. Updated the schedule with late emergency requests. (Karen Schroeder)
- Summarized BPM P1 offset measurement results. Remeasured BPMs which has questionable measurement data. Then installed all new P1 offsets to the machine. (Aimin Xiao)

### Booster Studies

- Planned for BM pulse width study during coming injection study period with Shifu, Frank and B. Laird. (Chih-Yuan Yao)
- Tested a fixed a problem with experimentDesigner because of new oagwish version. (Chih-Yuan Yao)

### Linac Studies

- Finished low-level rf measurements of generation III thermionic gun 3G1 in the Vacuum Lab. (Jeff Dooling)
- Preparing Injector Studies Schedule for August. (Stan Pasky)

### ITS Studies

- Completed dispersion calculation in the ITS bend line using image data recorded on the YAG-bend screen. (Jeff Dooling)
- Coordinating all work effort in the ITS. (Stan Pasky)
- Moving PCGun from ITS to 400A3. (Stan Pasky)
- Setting up for thermionic rf gun 3G2 stress testing. (Stan Pasky)
- Validating machine protection, rf condition, beam operations. (Stan Pasky)

# APS Machine Research and Development

## Storage Ring Research and Development

- Tested scope interface in order to test stripline-based sr beam current monitor. (Chih-Yuan Yao)
- Contacted vendors on SR tune measurement amplifier options. (Chih-Yuan Yao)
- Redid the APS resistive wall impedance. Continued work on reviving Y.-C. Chae's simulation work predicting the single bunch current limit. (Ryan Lindberg)

## Booster Research and Development

- Developed a NAFF based booster injection control law PVs, includes tune, real and imag part of x,y and s planes with Hairong Shang. This is intended to improve detection accuracy of booster injection beam oscillations. (Chih-Yuan Yao)
- Modified booster ramp correction bcontrol configuration to minimize unnecessary corrections with Hairong Shang. (Chih-Yuan Yao)
- Implemented a cos-like weight function for booster current error. This is to reduce the ramp error at injection time. (Chih-Yuan Yao)

## Linac Research and Development

- Attended mechanical engineering review for pc gun installation in the linac tunnel. (Jeff Dooling)
- Met with P. Dombrowski, M. Hahne, W. Berg (ASD-DIA) to discuss modifications to the optics table shroud. (Jeff Dooling)

## Other Research and Development

- Prepared simulation of harmonic x-ray FEL oscillator operating at the 5th harmonic that may be suitable for the planned LCLS-II superconducting rf accelerator. (Ryan Lindberg)

# APS Machine Software

## AOP Applications Software

- Reviewed chbook module inside elegant. Found a bug in filling a ntuple table and fixed. (Aimin Xiao)
- Reviewed ibs\_tracking module inside elegant, start modifying it so it can take arbitrary beam profile (for operation with harmonic cavity). (Aimin Xiao)
- Continue reading Piwinski's paper. (Aimin Xiao)

## Storage Ring

- added "Clear FF BPM setpoints" button to SROrbitControlLaw to set the SR FF BPM setpoints to zero, ready for test. (Hairong Shang)

## Injectors

- added PTB:CM:measCurrentCM.VAL to booster injection data logger (BInjection.mon), Current.mon and ChargeFast.mon (Hairong Shang)
- modified booster energy save to suspend all 5 ramp corrections when BM is turned off because other magnets correct many times during BM off period. (Hairong Shang)

- added catch statement for making new booster ramp log file directory to avoid "creating existing directory" error when other magnet already created the directory. (Hairong Shang)
- Improved logging booster ramp correction to save disk space because it generates a lot of log files every day and caused computer slow down: 1) removed the less necessary columns of current log file and changed the data type from double to float to reduce the log file size for saving disk spaces. 2) wrote combineBRampLogFiles to combine every 20 Booster ramp log files into one file with 20 pages to reduce the number of files and speed up listing process. 3) setup a cronjob to combine the booster ramp log files every hour. Thus reduced the number of log files by 20 times. (Hairong Shang)
- reorganized booster ramp correction directory, separate it by IRamp and VRamp, updated the ramp correction procedures for VRamp due to booster ramp directory changes for VRamp correction. And updated the safety directory of RampTest when select IRamp/VRamp. (Hairong Shang)
- update dl/I and dl button in BRampControl to put the log files in IRamp or VRamp directory based the selection. (Hairong Shang)

## General

- added corrector weight option to sddspseudoinverse, and moved adding weights to Rlnvt outside the if (!multiplyFile) statement, which was done inside its else statement (this was a bug). (Hairong Shang)

## Publications, papers and report

- MOGA optimization with only sextupoles of 90 pm Alternate H7BA Lattice, AOP-TN-2014-036, Yipeng Sun. (Yipeng Sun)

## Web Site

- Maintain APS-U accelerator physics Meetings BOX web site. (Yipeng Sun)

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

- Reviewed two proposals for ANL LDRD program. (Yipeng Sun)
- Attended shutdown planning meeting. (Karen Schroeder)
- Attending Tcavity / PCGun meeting and Coordinating the efforts between operations and staff for installing the PC Gun and the beam line components in the linac tunnel. (Stan Pasky)
- Reviewed paper for PRSTAB. (Ryan Lindberg)

## Safety and Required Training

- Successfully completed EM182 Evacuation Drill Overview. (Karen Schroeder)

## Miscellaneous

- Submitted comments on JINST paper I was asked to review. (Jeff Dooling)
- Spoke to Chuck Doose regarding which electrical distribution panel the SCU1 power supplies were going to get power from. Originally the plan was to put them on the S40/S1 power supply distribution panel. Asked that it be moved to the S2/S3 electrical distributional panel because the SCU1 is actually in Zone A, not F and it would complicate LOTO for an access into Zone F. Verified with Ju Wang that he had no other pressing reason for SCU1 power to be on the S40/S1 panel. Doose has made the arrangements with the contractors. (Karen Schroeder)