

# Weekly Report for 11/16/2015

## Highlights

- Started simulation studies for beam abort system for APS-U, with interesting initial results. (Kathy Harkay)

## APS Renewal and Upgrade

- Began prepping a longitudinal "impedance budget" for the upgrade, since the longitudinal impedance can be usefully (but not completely) described within this framework. (Ryan Lindberg)
- Attended MBA radiation and accelerator physics meetings. (Jeff Dooling)
- Presented calculations of ion instability growth rates for PAR and APS-U, including the frequency spread of the ions. (Joe Calvey)
- Continued investigating different combinations of shaking parameters with FASTION code. Also studied the effect of lowering the pressure on beam size blowup. (Joe Calvey)
- Further increased speed of FASTION code by reducing the amount of output generated and using fewer macroparticles. (Joe Calvey)
- Started simulation studies for beam abort system for APS-U. Using lattice v6 from CVS, which includes apertures (A. Xiao), debugged tune and chromaticity computation for multi-turn simulation. Worked on generating a bunch distribution. Digitized APS abort kicker AK0 waveform at 48-bunch spacing. Using AK0, carried out single-particle, single-bunch and 48-bunch simulations. Updated post-processing and plotting scripts to analyze loss locations. (Kathy Harkay)
- Met with visitor Uli Wienands and discussed APS-U beam physics. (Kathy Harkay)
- Organized an Injector WG meeting for Nov 30. Worked on a presentation on the recent PAR measurements (with C-Y Yao and J. Calvey) suggestive of microwave instability, and potential impact on high-charge operation for APS-U. (Kathy Harkay)
- Spoke with H. Cease about the APS-U Zone F vacuum layout. Told him that we need space for an abort system and longitudinal feedback system. Asked that he keep me in the loop. (Kathy Harkay)
- MOGA optimization for V6 lattice with high beta injection for accumulation. (Yipeng Sun)
- Performed simulation with Xiang on vendor provided HV feedback connector model. Revised the design and communicated to the vendor. Also optimized HV feedthrough model for better impedance matching. (Chih-Yuan Yao)
- Inspected BTX beam line area for installation of the fast kicker. (Chih-Yuan Yao)

## MCR Operations

### Storage Ring Operations

- Investigated a S2 P0 Feedback amplifier failure with Rob Keane and performed amplifier swap and repair. (Chih-Yuan Yao)

### PAR Operations

- Investigated and corrected a PAR tuner current control error, which caused tuner current to stuck, with Eddy Goel. (Chih-Yuan Yao)

### Linac Operations

- Participated in the Linac Structures Straightening meeting led by D. Bromberek, reviewing options

for installation schedule. (Jeff Dooling)

## APS Machine Studies

### Storage Ring Studies

- Worked on calibration analysis script for quartic saturation fit of loss charge versus PMT detector output charge. (Jeff Dooling)
- Continued work on analysis of recent beam dumps to estimate deposited charge for both quench and non-quench cases. (Jeff Dooling)
- Met with Tektronix representative to discuss replacement scopes for the fast BLM diagnostic. (Jeff Dooling)
- MOGA optimizations for new APS optics for small physical aperture at helical SCU at S32. Achieved 15mm to 8mm diameter in optics design. (Yipeng Sun)
- Performed machine studies for 8mm diameter in X. (Yipeng Sun)

### Booster Studies

- Performed booster 1Hz mode study. Achieved inconsistent efficiency and determined the main cause of beam fluctuation is BM ramp error under 1Hz. Will do further study. (Chih-Yuan Yao)
- Analyzed Booster BM ramp baseline shift in 1Hz and 2Hz mode and its relation to ramp errors. (Chih-Yuan Yao)

## APS Machine Research and Development

### Storage Ring Research and Development

- Began looking at the impedance contribution due to the tapers/bellows/etc of the proposed SCU helical device. (Ryan Lindberg)
- Discussed the Sector 39 injection straight vacuum chamber layout with J. Dooling, for his MARS beam loss simulations, using loss distributions I gave him (abort kicker). (Kathy Harkay)
- Reviewed and provided input to a draft technical note on the abort kicker, by V. Sajaev. (Kathy Harkay)
- Participated in a meeting to discuss the helical SCU. Follow-up conversation with J. Fuerst revealed that he assumed a longer small-aperture chamber (1.6 m) than what V. Sajaev and Y. Sun assumed for their RHB studies (1.2 m). Passed the info along. (Kathy Harkay)
- Discussed the HSCU vacuum layout with L. Emery and sent him the ID1 layout as a guide for his wakefield calculations. (Kathy Harkay)

### Linac Research and Development

- Set up and installed stage for astigmatism control in the PC Gun drive laser transport box. (Jeff Dooling)
- Could not get a good profile back on the VC camera--beam appears to be clipping in the transport line. (Jeff Dooling)

## APS Machine Software

## AOP Applications Software

- Asked R. Soliday to sort the search results on the Studies Notebooks page. (Kathy Harkay)

## Storage Ring

- working on new steering software implementation and testing with Louis, successfully finished SRIDSteering implementation and testing, the new steering method does not need to suspend XRDP orbit correction, thus does not disturb the global orbit when steering the local orbit so that other beamlines won't be affected. (Hairong Shang)
- Due the changes of steering which transfers the orbit error to xray bpm setpoints now, modified SR gap scan pems to set the scanned xray bpms' setpoints to zero after new ID feedforward table is being installed, and added installing SR UBOP after single and full gap scans to keep the correct setpoints. (Hairong Shang)
- added abort option to stop ID gap feedforward as stop does. (Hairong Shang)
- modified makeLocalSteeringMatrices so that it generates irm.x and irm.y for new steering method. (Hairong Shang)

## Injectors

- did 1Hz booster machine study with CY. (Hairong Shang)

## General

- added -d option to adt for bringing up difference adt directly. (Hairong Shang)

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

- Re-reviewed a paper for PRST-AB. (Ryan Lindberg)
- Continued search committee work for TRIUMF ALD for Accelerators; participated in a telephone conference. (Kathy Harkay)
- Attended a meeting of the NA-PAC'16 local organizing committee. Reported on the student program update. (Kathy Harkay)
- Reviewed one manuscript for NIM?A. (Yipeng Sun)
- Participated in fast kicker fabrication (proposed by physics dept) review and follow up work. (Chih-Yuan Yao)

## Education, Mentoring and outreach

- Helped Medani Sangroula prepare for his thesis proposal oral exam. (Ryan Lindberg)
- Agreed to serve as mentor for J. Calvey. (Kathy Harkay)
- Wrote a recommendation letter for L. Boon. (Kathy Harkay)
- Submitted final project reports for the NSF grant that supported L. Boon. (Kathy Harkay)

## Safety and Required Training

- Completed EM116 Emergency Management and Continuity General Awareness (Ryan Lindberg)
- Completed ESH376C and 376RF on-line training. (Jeff Dooling)

- Completed safety training EM116. (Kathy Harkay)

## Miscellaneous

- Took 1 week vacation. (Joe Calvey)
- Arranged a Beams and Applications seminar for Uli Wienands. (Kathy Harkay)