

# Weekly Report for 04/21/2014

## Highlights

- Summarized MBA injection mismatch and jitter error assumption. (Aimin Xiao)
- Posted a new technical note entitled: Maximum beam orbit in MBA and ray tracing guidelines. Presented results at Friday MBA physics meeting. (Kathy Harkay)
- Developed new APS ray tracing guidelines based on local orbit distortion analysis. (Kathy Harkay)

## APS Renewal and Upgrade

- Read Louis tech note on APS booster beam jitter measurement. Estimated injection beam jitter size using BTS BPM data of APS RUN14-II. Simulated optical mismatch by adjusting BTS line Quad strength error level to make a 10% beta function mismatch. Presented the assumption method to MBA physics group meeting. (Aimin Xiao)
- Analyzed the present APS ray tracing guidelines and discovered that (+/-13 mm, +/-4.6 mrad), with x and x' same sign, are consistent with BM dipole exit extreme trajectories using local orbit distortion analysis (1999 lattice and 12-mm ID chambers), but (+/-13 mm, -/+4.6 mrad), with x and x' opposite sign are not on the closed orbit and should not be used (nor should (13 mm, 0 mrad) etc, be used). The extreme trajectories for AM dipole are entirely different (phase space ellipse is tilted the other way). Developed new APS ray tracing guidelines based on the local orbit distortion analysis. (Kathy Harkay)
- In the same spirit as the present ray tracing assuming larger ID apertures, analyzed extreme orbits in MBA using a uniform 22-mm round chamber as a worst case. (Kathy Harkay)
- Writing the Section on "Impedance and Single-Bunch Stability" for CDR. (Ryan Lindberg)
- Work on MOGA optimization of H7BA-90pm lattice, with 16 families of octupoles. Trying to further improve the DA. (Yipeng Sun)

## MCR Operations

### Storage Ring Operations

- Talked to J. Gagliano about the gate valve upstream of SCU0, to confirm that it will be free to move when the SCU0 is warmed up. (Kathy Harkay)
- Talked to R. Soliday to ensure that the data loggers for SCU0 stay up during this shutdown. (Kathy Harkay)
- Monitoring SCU0 PVs during warmup starting 4/22. Followed up with S. Shoaf and M. Smith regarding the loss of some SCU0 PV readbacks that we want to keep monitoring. It turns out one of the PV gateways was down and had to be restarted by B. Robinson. (Kathy Harkay)

### ITS Operations

- Drafted a procedure for making entries into the ITS after beam operations. (Jeff Dooling)

## APS Machine Studies

### Storage Ring Studies

- At the TOM, presented observations of beam loss showing beam striking the wall prior to the triggering of the MPS. L. Emery thought this represented an instability where the beam expands or oscillates in a way that leaves the centroid within limits of the BPLDs. (Jeff Dooling)
- Investigate IEX caused beam motion. It's highly suspected the IEX PS polarity switch was not

working properly when the problem was happen. Discussed with Marty and Boris on plan to fix the problem. (Aimin Xiao)

## ITS Studies

- Supporting PCGun studies in the ITS. Now coordinating a lattice change in the beam line. (Stan Pasky)

## APS Machine Research and Development

### Storage Ring Research and Development

- Met with Misun Min to discuss reviving the wakefield calculation part of their 3D EM solver NekCEM. Put together a plan to test and compare their code against GdfidL. (Ryan Lindberg)

### ITS Research and Development

- Completed initial pcgun studies in the ITS with Y. Sun measuring energy, energy spread, emittance, and quantum efficiency. (Jeff Dooling)

### Other Research and Development

- Electron cloud R&D: Continued working with L. Boon on her QE paper. (Kathy Harkay)

## APS Machine Software

### Storage Ring

- added reduce P0feedback gain before tune measurement and updated the setup for MXA in HPVSATunes.tcl (Hairong Shang)
- added option of using MXA to measurement tunes, and added xTune and yTune arguments to be able to change the center frequency to getxytunes. Tested getxytunes with MAX-VSA, and with VSA only, installed getxytunes after testing. (Hairong Shang)
- added option of MXA instrument for chromaticity measurement to SRDispChromMeas, and removed setup monopulse bpm averaging because they no longer exist. Successfully measured SR x/y chromaticity with MXA-VSA at 324 fill pattern. (Hairong Shang)
- implemented and tested gap feedforward software which works for both ID1 upstream and downstream gaps now, installed APSSRGapBriefScan.tcl and APSSRGapFullScan.tcl. Further improvement will be done for allowing only ID 1 ds or us being selected for gap scan, and set the unselected to 180mm when scanning the selected gap. (Hairong Shang)

### Injectors

- added restoring the QF and QD delay offset from UBOP when resuming injection tune controllaw after generating booster ramp current waveform reference. (Hairong Shang)
- added restoring QF and QD injection tune delay offset from booster UBOP in switching to IRamp PEM. (Hairong Shang)

### Publications, papers and report

- Completed and posted a technical note entitled: Maximum beam orbit in MBA and ray tracing guidelines. Revision 1 re-analyzes the ray tracing numbers and adds a table for new APS guidelines. (Kathy Harkay)
- 90 pm Alternate H7BA Lattice towards off-axis accumulation with 3-section Longitudinal Gradient

Dipoles: simulation with errors, AOP-TN-2014-023, Yipeng Sun and Michael Borland (April 28, 2014). (Yipeng Sun)

## Web Site

- Maintain Next-Generation Storage Ring Meetings wiki web site. (Yipeng Sun)

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

- Coordinate the efforts between operations and staff for installing the PC Gun and the beam line components in the linac tunnel in August 2014.. (Stan Pasky)
- Read and commented on the SAD for the AWA Linac Upgrade for ASRC. (Jeff Dooling)
- Met with APS Colloquium committee to set talks for next year. Sent out an invitation for July. (Ryan Lindberg)

## Safety and Required Training

- Completed the following required training - (Stan Pasky)
- ASD115 ACIS Controlled Access (Stan Pasky)
- ASD102 Tunnel Safety Training (Stan Pasky)
- ESH108400 Building/Facilities Safety Orientation (Stan Pasky)
- Performed operator field testing described as Walkthrough Testing - operator must pass a walk-through test on the accelerator with one or more qualified individuals. This test will typically take about one day, and will involve all aspects of operation. A standardized set of manipulations will be developed and used in these tests to ensure continuity to all individuals taking the test. Safety issues will be emphasized as well as tune-up and diagnosis of problems. (Stan Pasky)
- Finished Rad Worker I practical. (Ryan Lindberg)
- Completed training for LOTO (ESH114) and PPE (ESH195). (Ryan Lindberg)

## Miscellaneous

- Assisting with a Accountable Inventory for 2014. (Stan Pasky)
- Met with A. Zholent for one-on-one meeting. (Jeff Dooling)
- Half-day AL Friday. (Jeff Dooling)
- Took 2 days off vacation. (Aimin Xiao)