

Weekly Report for 01/06/2014

Highlights

- Impedance budget for 4.2 mA per bunch was established for H7BA-TwoSector-nux95-nuy36; they were $(\beta X \cdot kX, \beta Y \cdot kY) = (82 \text{ kV/pC}, 61 \text{ kV/pC})$. (Yong Chul Chae)
- The kicktable which lists impedance elements in the MBA lattice based ring was completed for Working Assumptions document. (Yong Chul Chae)
- Summarized High BetaX injection study. Wrote the experiment results to a tech note AOP-TN-2014-004. (Aimin Xiao)
- Worked on the vertical injection design for the APSU MBA lattice. (Aimin Xiao)

APS Renewal and Upgrade

- Impedance budget for 4.2 mA per bunch was established for H7BA-TwoSector-nux95-nuy36; they were $(\beta X \cdot kX, \beta Y \cdot kY) = (82 \text{ kV/pC}, 61 \text{ kV/pC})$. (Yong Chul Chae)
- Computed the impedance of stipline, ante-chamber, feedback-vertical, scraper-vertical (Yong Chul Chae)
- The kicktable which lists impedance elements in the MBA lattice based ring was completed for Working Assumptions document. (Yong Chul Chae)
- Continued to investigate the impedance effect of NEG coated surface (Yong Chul Chae)
- Worked on the vertical injection design for the APSU MBA lattice. (Aimin Xiao)
- Simulated perturbations to the injected and stored beam. (Aimin Xiao)

MCR Operations

Storage Ring Operations

- On 12/10/2013 looked into beam loss through steering of 12/09/2013. Offered a software solution that would prevent this in the future. (Louis Emery)

Linac Operations

- Reviewed linac startup and shutdown in the MCR with Y. Sun and S. Pasky; including rf guns. (Jeff Dooling)

APS Machine Studies

Storage Ring Studies

- On 12/10/2013 measured capture rate as a function of scraper position using S35 FCT signals read on new scope. This produced an accurate value of the offset of the vertical scraper scale relative to the stored beam position. Improved Experiment Designer configuration for this experiment. (Louis Emery)

Linac Studies

- A new thermionic rf gun has been installed in RG1 location. My task was to rf condition and activate the cathode prior to the end of the December/January maintenance period. This effort took a lot of coordination between maintenance groups and operations. i.e. work activities by maintenance groups, alternate LOTO to allow rf system to operate with beam support equipment remaining locked out, ACIS coordination for equipment operation. As a result - RG1 has been RF conditioned to 4MW and the cathode was activated. Beam was detected at the first current monitor in the Linac.

Additional beam studies will be needed and SCR files saved for our next run. File will be created during the first 2014 machinestudies period. (Stan Pasky)

- APS_1429097 - Thermionic RFGun Gen II (AET # MG300) Stress Testing (Stan Pasky)

APS Machine Research and Development

Storage Ring Research and Development

- Continued P1713 (horizontal scraper development) related activities (Yong Chul Chae)
- Summarized High BetaX injection study. Wrote the experiment results to a tech note AOP-TN-2014-004. (Aimin Xiao)
- Separated elegant loss distribution data by Pass number for temporal analysis with MARS and ANSYS. This data will be used to examine temporal temperature profiles in the modified S37 scraper. (Jeff Dooling)
- Separated data for the titanium alloy TiAl6V4 was sent to J. Liu (AES-MED) for input to ANSYS. (Jeff Dooling)
- Met with Scraper Project 1713 group Friday 12/20 to rf heating simulations. (Jeff Dooling)
- Discussed how to model temporal energy deposition with J. Liu and Y.-C. Chae. Use continuous deposition over a turn (defined by Pass no.) rather than deposit in a relatively short period such as 100 ps or 1 ns. (Jeff Dooling)
- Liu was able to confirm the instantaneous temperature rise calculation in the Ti-alloy scraper. (Jeff Dooling)
- Walked through Sector 6 of the SR with C. Doose and K. Harkay to look at candidate locations for the FO BLMs. Will install 2 upstream and 2 downstream of the SCU0 cryostat chamber. (Jeff Dooling)
- Prepared and gave a talk at the AOP Physics meeting entitled, "Fast Pressure Diagnostic for the APS SR." (Jeff Dooling)
- Discussed with Sajaev the assumed noise model of vibration (frequency bands and noise floor) for his beam stability specification. (Louis Emery)
- Met with Penicka on alignment strategy for the MBA lattice WA document. (Louis Emery)
- Gave Reininger (XSD) lattice functions of BM source of APS-U. (Louis Emery)
- Read recent notes on APS-U. (Louis Emery)

Linac Research and Development

- Spoke with A. Grelick (ASD-RF) regarding the use of an optical arc detector for pgun conditioning. (Jeff Dooling)
- Grelick provided a connector that W. Berg will mount in one of the pgun cathode ports. (Jeff Dooling)
- D. Horan (ASD-RF) said he would provide a fiber for the optical arc detector. Note that the optical arc detector is to sense arcs during short pulses when the VSWR arc detector is blind (?blanked?). (Jeff Dooling)

- Presented laser status at the PiP meeting; will add laser positioning to tasks. (Jeff Dooling)
- Used Coherent camera to measure regen profile from leakage light after downstream end mirror (partially reflecting). Transverse profiles are Gaussian and overall pattern is circular. (Jeff Dooling)
- Small oscillations are seen; will discuss the cause of these with S. Edstrom. (Jeff Dooling)

ITS Research and Development

- Coordinating work activities in the Injector Test Stand. This effort is in preparation for rf conditioning and beam operations of the Photocathode rf gun. (Stan Pasky)
- New and update screens have been created for the ITS PCGun. Data loggers have been updated with new pv's to monitor supporting PCGun power supplies. A new cold cathode was installed and has been added to the machine protection system. (Stan Pasky)

APS Machine Software

AOP Applications Software

- Reading about analytic signals and specified algorithm to H. Shang for her to write a SDDS tool to convert a measured signal into an analytic signal (with complex component that is the Hilbert transform of the original). This was an external request, which could have applications at APS. (Louis Emery)

General

- corrected the column names of sddsfft for inverse fft from RealFFT<origname> to Real<origname>, and ImagFFT<origname> to Imag<origname>. (Hairong Shang)
- wrote, tested and installed AcquireITSPCGunConditioningData for manually collecting ITS PC gun conditioning data, which also has the capability to add new log PVs on the fly. (Hairong Shang)
- added "ITS gun conditioning data" menu to OAGapps menu and OAGapps gnome menu. (Hairong Shang)
- checked sddsfft problem reported by Nick Sereno, however, it turned out to be OK, (Hairong Shang)
- helped CY with converting text files into SDDS files, plaindata2sdds works with multiple spaces separation, however, csv2sdds does not -- will check csv2sdds later. (Hairong Shang)
- read hilbert transfer theory online and prepare for sddsanalyticssignal programming. (Hairong Shang)

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

- Prepared the trip to attend TWIICE 2014 workshop, Synchrotron SOLEIL, 16-17 January. (Yong Chul Chae)
- Prepared and gave slides for 12/12/2013 SR studies meeting. (Louis Emery)

Safety and Required Training

- Completed EQO140 Integrated Safety Management Awareness Training. (Jeff Dooling)

Miscellaneous

- Came to understand the longtable environment in Latex which seems to be a hybrid of a float command and a tabular environment. Discovered that somehow the longtable environment is affected when a figure is present on the same page. No fix for this yet. Gave help and also partial tutorial on latex and Unix. (Louis Emery)