

## **ASD Quarterly Bulletin** **January – March 2014**

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Accelerator Systems Division continued providing excellent support for APS operation with 123 hours of the Mean Time Between Faults (MTBF) and 98.7% Machine Availability at the time of writing. Several other developments and events took place in the first quarter of 2014 and are highlighted here.

The diagnostic group had a design review of a new canted undulator x-ray beam position monitor (X-bpm) based on Compton scattering of x-rays off the diamond and a design review for MBA Upgrade diagnostics and controls. During the shutdown, a special system that monitors mechanical movements of beam position monitors (BPMs) caused by small variations in the air and water temperatures was installed in S27. The group also continued development of the Real Time Feedback System with the first test planned for S27 during this year.

The magnetic devices group relocated Insertion Devices (ID's) assembly area from the EAA to Bldg. 314. The first revolver undulator was assembled there. In the MM1 area, the undulator prototype with dynamic force compensation and horizontally adjustable magnetic gap was successfully tested. A work on a new superconducting undulator, SCU-1, has been progressing and a new cryostat has been undergoing various tests. The short magnet prototype for the SCU-1 has been built and successfully tested. The collaborative effort between APS, SLAC and LBNL has started with the goal of designing and building the 1.5-m long SCU prototype for the LCLS. Considerable effort has been made in designing magnets for the MBA upgrade project.

The power systems group has been taking steps to upgrade the quadrupole magnet power converters with a higher performance semiconductor switching device. This upgrade will eliminate the power supply failure during the quadrupole magnetization cycling. The group's staff has been working on a conceptual design of power supplies for the MBA Upgrade. The new storage ring magnets require more than 3000 power supplies.

The accelerator and operations group completed conditioning of the S-band photocathode rf electron gun installed in the Injector Test Stand. Preparation to this effort included significant contributions of personnel from other groups in ASD and AES. Several new machine study programs were initiated with a focus on MBA Upgrade, such as a high intensity beam operation of the Booster synchrotron and operation of the APS storage ring with a full coupling between horizontal and vertical planes in the electron motion. The group's staff continues working on the MBA lattice and successfully presented its conceptual design at the review.

The rf group completed the installation of an output circulator in the harmonic PAR rf systems. A used Philips klystron was successfully retuned and has been installed in the Booster rf system. The PLC control system upgrade of all five UVC high-voltage power supply system was completed. This upgrade replaces obsolete electronics, local computers, and control software with modern equivalents. The group staff has been working on the conceptual design a higher-harmonic superconducting rf cavity for bunch lengthening in storage ring for MBA Upgrade.