The NSLS-II facility operates in top-off mode where charge is transferred into the storage ring for one minute intervals while beamline safety shutters are open in order to maintain a relatively constant neutrino flux. PUE is a multiple level template designed to ensure that top-off operations at NSLS-II are executed correctly. The layout of the TOSS is that there be at least 90% of beam in the ring. The detection of beam stored indicates correct operation of the RF and magnet power supplies, and working correctly. The TOSS is a sub-system of the T0SS that performs the stored current measurement.

An absolute value is averaged over about 750 ring revolutions to minimize nonlinearities below 1%. Different fill patterns will have slightly different properties and the SBCM displays this as a fill pattern dependency. The SBCM is as accurate as the DCCT. In fact the SBCM was used to diagnose a previously undetected fill pattern dependency of the DCCT itself.

Top-off operations are vital to fulfilling the mission of the NSLS-II facility. It can be very difficult to meet all the requirements for a safety rated system when a complex measurement must be made. The SBCM duals the current measurement down to a small number of reliable analog components while maintaining the accuracy and reliability required for the safety system. Although the SBCM displays a fill pattern dependency it was found to be within 10% for all fill patterns between 20% and 100%.

The SBCM is calibrated against a Bunch DCCT current reading using an 80% fill pattern. While operating with this fill pattern the SBCM is as accurate as the DCCT. In fact the SBCM was used to diagnose a previously undetected fill pattern dependency of the DCCT itself. The SBCM is calibrated against a Beam DCCT current reading using an 80% fill pattern. While operating with this fill pattern the SBCM is as accurate as the DCCT. In fact the SBCM was used to diagnose a previously undetected fill pattern dependency of the DCCT itself.

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