

Tune Measurement and Gap Cleaning in the SNS Ring

P. Cameron, P. Cerniglia, R. Connolly, J. Cupolo, W. Dawson, C. Degen, A. DellaPenna,
A. Fedotov, A. Huhn, M. Kesselman, N. Malitsky, and R. Sikora
Brookhaven National Laboratory, Upton, NY 11973, USA

Minimization of beam loss and activation in the Spallation Neutron Source Ring is highly dependent on proper control of the tune footprint. The major contributors to tune spread are space charge, chromaticity, and uncompensated fringe fields. Accurate measurement of the tune footprint of this high-intensity fast-cycling accumulator ring will be accomplished with a variety of tune measurement systems. We present details of the overall system design and its implementation. In addition to minimizing activation by control of the tune footprint, activation in the extraction region can be minimized by cleaning[1] the 300ns kicker rise-time extraction gap between the tail and head of the 600ns single bunch. A variety of methods have been proposed [2] to measure beam-in-gap in the Ring. A particularly useful approach is to use resonant excitation of betatron oscillations to kick the gap beam into a collimator, where it could be observed with a fast gated loss monitor. This method yields the dual benefits of measuring and cleaning the gap beam.

[1] P. Cameron et al, "SNS Beam-in-Gap Measurements" EPAC2001, Vienna.

[2] Witkover, R., "Considerations in Designing a "Beam-In-Gap" Monitor for the Spallation Neutron Source", BNL/SNS Technical Note 049, Sept. 1998. (available at <http://server.ags.bnl.gov/bnlags/bnlsns/sns.html>)