Contribution ID: **221** Type: **Poster**

ALTERNATIVE CONFIGURATION AND TIMING CONTROL FOR BEAM CHOPPING SYSTEM AT THE SNS LINAC

Tuesday 20 June 2017 13:30 (1h 30m)

The Spallation Neutron Source (SNS) beam chopping system uses a segmented electrostatic lens in the Low Energy Beam Transport (LEBT) to deflect the beam out of the RFQ input aperture to create gaps in the 1ms beam macro-pulse for extraction from the Ring, or fully displace the beam. The lens is split azimuthally into four quadrants which are pulsed independently by four bipolar high voltage pulse generators. The chopper timing control system creates trigger pulses to the pulse generators which deflect the beam sequentially to four positions on the diagnostic plate. In the present chopper configuration, all four segments are powered simultaneously with a 1MHz burst repetition rate within the macro-pulse. To improve chopping performance, faster switches and higher voltages are required. An alternative chopping system configuration which can meet this request has been proposed, where only two opposite segments are used at a time. This will facilitate pulse generator performance by reducing switching frequency and power dissipation in high voltage switches while operating at increased voltages, and make beam deflection more effective, stable and reliable. The new chopping configuration requires changes in the LEBT timing control patterns, upgrading the pulse generator, and changing the azimuthal position of the lens segments in the LEBT structure.
This paper will review the timing control patterns for present and suggested configurations, compare the pulse generator performance for both cases, and show the advantages of new chopping modes. The results of the simulation of the phase-space distribution of the beam at the RFQ input at different deflecting voltages also will be presented.
strong text

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Session Classification: Poster session II - Particle Beam and Accelerator Technologies

Track Classification: Particle Beam and Accelerator Technologies