

Feasibility of crystal shadowing for SX at 8 GeV

In the accelerator applications of slow extraction for High Energy Physics (HEP), one of the prime challenges is the mitigation of beam losses, which is becoming increasingly critical with the continuous rise in beam power. One of the very effective methods to mitigate proton beam losses in Slow Extraction is crystal channeling. After successful implementation of this method at CERN with 400GeV beams, a crucial question remains whether this approach is still effective at lower and medium proton beam energies, where increased beam emittance poses a significant concern. In this paper, we present the encouraging results of the computer simulation studies of the septum shadowing at 8GeV for the Mu2e project slow extraction at Fermilab. Across the wide range of beam parameters, the beam loss reduction is shown to range between 40% and 66%. Optimal crystal geometry is also discussed.

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