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Improving the beam extraction efficiency from SPS to the North Area at CERN using octupole phase space folding technique

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The High Intensity ECN3 (HI-ECN3) project aims to increase the number of protons per pulse delivered to a new experimental facility in CERN's North Area up to $\sim 4 \cdot 10^{19}$ per year. Such an upgrade requires the reduction of the beam loss at SPS electrostatic septum (ZS) by at least a factor of four, since the activation of this device is the main factor constraining transition to the higher beam intensity. In this work we demonstrate one of the possible solutions to this problem that relies on octupole assisted folding of the beam in phase space. Implementation of this technique allowed to significantly reduce the losses at the ZS whilst transferring the beam through the LSS2 line, which connects the SPS and the transfer lines in the North Area, without deteriorating the transmission.

Footnotes

Paper preparation format

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Europe

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