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Beam loss simulations with space charge and octupoles for the SIS100 magnet quality assessment

Wednesday 4 June 2025 16:00 (2 hours)

The components of the SIS100 synchrotron (FAIR facility) are presently under installation in the accelerator tunnel. The superconducting dipole magnets have been produced and the magnet field errors up to 7th order have been measured for all magnets. The superconducting quadrupole magnets are under production, the field error data for a part of the magnets is available. As a part of the magnet quality assessment, the particle tracking simulations are used to study the beam losses during the 1 sec beam accumulation at the injection energy. The tune settings for the slow extraction operation are considered. Direct space-charge effects and the Landau damping octupole magnets, which dominate the incoherent tune distribution, are included. In order to reduce the computational load and to increase the parameter resolution, a machine learning based optimizer is used in the accelerator and beam parameter studies.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

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