

# SIS100 extraction layout: Influence of non-linear beam dynamics

*Tuesday, 13 February 2024 12:00 (20 minutes)*

The synchrotron SIS100 has been optimized for operation with the partially stripped ion U28+, resulting in a number of unique challenges: transverse emittances are comparatively large; the beam has high damage potential due to the high dE/dx; the lattice must provide efficient collimation of ions losing electrons in collisions with residual gas to prevent vacuum instabilities. Resulting in strong focusing, slow extraction requires correction of the large horizontal chromaticity to ensure high extraction efficiency while satisfying the tight geometrical constraints. Amplitude dependent tune-shift by chromaticity sextupoles then causes a bending of the separatrix which needs to be compensated by octupoles. Additional higher-order effects arise from field errors of main dipoles and quadrupoles, which were measured to have unexpectedly large systematic multipoles, significantly changing the geometry of the separatrix. We discuss possible ways of mitigating the effect of those nonlinearities using the available corrector magnets as well as consequences for the choice of slow extraction scheme and commissioning strategy.

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**Session Classification:** Managing Extraction Efficiency