FAIR synchrotron operation with low charge state heavy ions

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Abstract

Beam loss caused by charge changing processes in connection with dynamic vacuum effects may limit the maximum number of accelerated heavy ions with low charge states in the existing synchrotron SIS18 and the planned SIS100/SIS300 of the FAIR project. With the aim to stabilize the vacuum dynamics and to control ionization beam loss, a substantial upgrade program has been defined for SIS18 and is presently realized. For SIS100, a new lattice design concept has been developed, where each lattice cell acts as a charge seperator and thereby enables the local control of beam loss. Simulation, conducted with the code STRAHLSIM, of the time dependent evolution of beam loss, dynamic residual gas pressure and the effect of the proposed dedicated ion catcher systems will be presented.

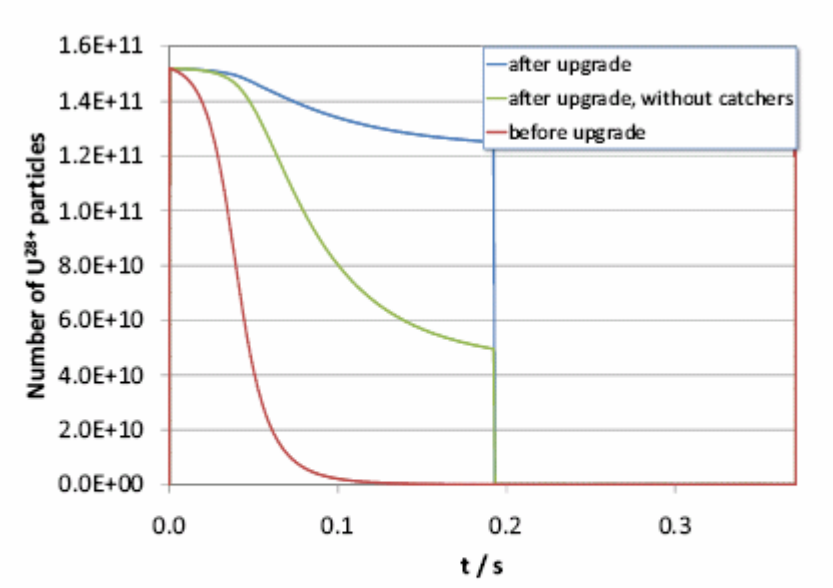

Figure 5: Evolution of U^{28+} beam intensity before and after the SIS18 upgrade program.