

Electrostatic septa with heavy ions: challenges for machine protection

Tuesday, 13 February 2024 15:20 (20 minutes)

The synchrotrons SIS18 and SIS100 at GSI/FAIR uses resonant extraction for slow beam extraction. The electrostatic extraction septa (ES) utilizes thin wire arrays as anode, which are sensitive to beam loss, especially at low beam energies and for heavy ions, where the energy loss dE/dx is high. Beam loss can lead to high temperatures, where the anode wires break due to reduced mechanical strength. As an example, in 2022, about half of the anode wires at SIS18 were broken during beam operation with high intensity uranium beam. To mitigate further damage, a set-up of protective collimators was recently performed in 2023, to prevent dispersive losses at the anode wires. For SIS100, slow extraction at high intensities of heavy ions up to uranium are foreseen. Losses at extraction energy also can lead to high steady-state temperatures, which depends on the slow extraction parameters, most notably the step size at the ES. In this contribution we discuss machine protection of the electrostatic septa at SIS18 and SIS100, and ideas for future improvement.

Primary author: GALNANDER, Björn (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI))

Co-author: ONDREKA, David (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI))

Presenter: GALNANDER, Björn (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI))

Session Classification: Managing Extraction Efficiency