Challenges of the technical layout of the SIS100 extraction system


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Abstract

The FAIR synchrotron SIS100 which is under construction will provide heavy ion and proton beams of high intensity with fast and slow extraction. All extraction devices, including an internal emergency beam dump system, are installed within one straight section. This way, expected systematic beam loss is kept in a relatively small area of the synchrotron. In this area, it is rather challenging to protect components against high radiation fields, to keep XHV conditions, and to allow for maintenance of highly activated components to assure reliable beam operation. In this contribution, the technical measures to fulfil the requirements for the extraction straight section of SIS100 will be presented. These include remote controlled devices to move apart magnet yokes for the purpose of placing beam pipe heater; dedicated star-shaped vacuum chambers with integrated collimators and NEG-panels to reduce pressure bumps due to lost particles behind the electrostatic septa; a high power multi-stage vertical extraction septum including a variable horizontal deflection.

Figure 1: One radiation resistant quadrupole magnet in normal position hold by its adjustment and moving device; heater box on the left hand side in standby position. The vacuum chamber -beam pipe- is located between the coils.