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Analysis of the Cryogenic Operating Scheme for SIS100

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The upcoming Facility for Antiproton and Ion Research (FAIR) in Darmstadt, Germany will provide high current anti proton, heavy ion and rare isotopic beams using an accelerator system of synchrotrons, production targets and storage rings.

The first machine in the chain after the booster is the synchrotron SIS100 which will be equipped with superconducting iron dominated magnets. Always one sixth of the ring will be supplied by one common header with all magnets in parallel operation. The helium flow in this common supply header has to be subcooled with a pressure below 2 bar. As there are no active control elements foreseen to adjust the requested helium mass flows through the parallel supplied magnets, the hydraulic adjustment between the different components for all possible operating points has to be invested. The results of the numerical analysis of this system are presented and the results for the design parameters in the cryogenic infrastructure such as subcoolers and phase separators are given.

Primary author: Dr KAUSCHKE, Marion (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

Presenter: Dr KAUSCHKE, Marion (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

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