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Cryogenic inserts in the room temperature synchrotron SIS18 at GSI

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The existing room temperature heavy ion synchrotron SIS18 at GSI will be used as booster for the future SIS100 at FAIR. One of its features the the generation of high intensity heavy ion beams. In order to create such beams, medium charge states are used, which have a lower space charge limit and can be created with less stripping losses. Unfortunately, such heavy ions have very high ionization cross sections in collisions with residual gas particles, yielding in beam loss and subsequent pressure rises via ion impact stimulated gas desorption. Although an extensive upgrade plan, including NEG-coated magnet chambers and an ion-catcher system, has been realized, the required intesity goals will not yet be reached. Simulations including cryogenic surfaces around the ion catchers show, that their high sticking probability prevents from pressure built-ups during operation. A prototype ion catcher, including such cryogenic surfaces cooled by a commercial cold-head has been developed, built, and tested. It has recently been installed in SIS18 and will undergo further tests, including measurements with heavy ion beams. Findings for the operation and further cryogenic inserts are presented.

Footnotes

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Region represented

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Author: BOZYK, Lars (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

Co-author: SPILLER, Peter (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

Presenter: BOZYK, Lars (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

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