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Status of thermomechanical studies of the SIS100 emergency beam dump system

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The heavy ion synchrotron SIS100 is the flagship accelerator of the Facility for Antiproton and Ion Research (FAIR) currently under construction at GSI, Darmstadt. It will provide high intensity beams of particles ranging from protons to uranium ions at beam rigidities up to 100 Tm. Part of the machine protection system is an emergency beam dump that is partly inside the vacuum system and partly outside. The wide range of particles means that all components of the dump system are potentially exposed to high energy deposition densities at short time scales. The resulting shock waves are challenging for the mechanical stability of the components, including the vacuum window between inner and outer part of the dump. In this paper we present the status of thermomechanical simulations regarding the response of dump components to the most challenging beam impact scenarios. A first adaption to the vacuum window is assessed regarding it's potential to mitigate risks of failure.

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Footnotes

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