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Challenges with the beam destinations for the ESS linac

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For the ESS linac commissioning, twelve extremely compact beam destinations were designed in place of bulky and expensive beam dumps, in order to dump [0.075, 250] MeV protons. The beam destinations were either Faraday Cups (FC) for the NCL commissioning or Insertable Beam Stops (IBS) for the SCL commissioning. Both FC and IBS are beam-intercepting devices, operated under vacuum, water cooled and movable by means of a pneumatic actuator. The **manufacturing** of FC and IBS relied on high-precision machining. The limited installation space and vacuum requirements required strict tolerances, complex welding of small components and vacuum brazing of compact cooling pipes. The **installation** of the devices themselves, their radiation shielding and portable cleanrooms were particularly challenging due to the limited space not only outside but also inside the beamline.

The main challenge during the **operation** was posed by the beam power density. Radiation transport calculations allowed to minimize residual dose rates. Thermo-mechanical simulations allowed to define the operational limits thus avoiding damage to the beam destinations themselves and linac components nearby.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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