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Cooling the FCC beam screens

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Abstract title

The high-energy hadron beam of FCC-hh will generate up to 28 W/m of synchrotron radiation for the 100-km circumference tunnel and up to 44 W/m for the 80-km circumference option. This specific heat load is more intense with respect to the LHC by more than 2 orders of magnitude. Therefore, beam screens are definitely mandatory to absorb the synchrotron radiation at higher temperature than that of the superconducting magnets and thus reduce the entropic load on the refrigeration system. After explaining the main cooling constraints of the beam screens, this presentation will give a preliminary design of the beam-screen cooling loop using helium or neon, for different cooling channel geometry with emphasis on cooling length limitations and exergetic efficiency.

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Session Classification: Infrastructure & Operation