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Cryogenic infrastructure supplied by Linde Kryotechnik AG for the Series Magnet Test Facility for FAIR

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In order to test the fast-ramped superconducting magnets for FAIR (Facility for Antiproton and Ion Research), a cryogenic test facility with an equivalent overall capacity of 1.5 kW at 4.4 Kelvin was designed and commissioned at GSI Helmholtzzentrum für Schwerionenforschung GmbH.

For efficient testing of the 108 dipole magnets the cryogenic infrastructure consists of a refrigeration system and four main test benches. Due to the different operating modes and load fluctuations a dedicated process and control concept was developed which allows an independent operation of each test bench and ensures highest efficiency over the whole operating range. The system is designed in a way that one magnet can be cooled down to its operating temperature while simultaneously another magnet is kept at cold state for the measurements. The third and fourth test benches serve for warming up and exchanging the magnets respectively.

The high flexibility of the set-up moreover allows the testing of other FAIR magnets like the SIS100 quadrupole modules or the operation of a string configuration.

The project was executed in a close collaboration between GSI and Linde Kryotechnik AG. The presentation will show the key solutions of the refrigeration system and the test benches and highlight some commissioning results.

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