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Safety aspects of superconducting magnets for Super-FRS

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The Super Fragment Separator (Super FRS) is a two-stage in flight separator to be built next to the site of GSI, Darmstadt, Germany as part of FAIR (Facility for Anti-proton and Ion Research). Its purpose is to create and separate rare isotope beams and to enable the mass measurement also for very short lived nuclei. A superferric design with superconducting coils and standard iron yoke shaping the magnetic field was chosen for the magnets. The cooling will be by a liquid Helium bath. For the main dipoles only the coil is at cold for the multiplets (assemblies of quadrupoles and higher order correctors) also the iron yoke will be in the bath.

From a safety point of view the large He-volumes of more than 1000 l of the multiplets, the high design pressure of 20 bar, as well as the high inductances of the magnets up to 30 H are challenges to be considered in the design and definition of the testing procedures.

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