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Preliminary design of the FAIR Super FRS superferric branched dipoles

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CEA has the responsibility of the design studies for the superferric 1.6 T dipole magnets of the Superconducting FRagment Separator (SuperFRS) which is part of the Facility for Antiproton and Ion Research (FAIR) in Darmstadt, Germany. After completing the study for the 21 superferric SuperFRS standard dipole magnets, CEA is currently analysing conceptual solutions for the 3 superferric branched dipole magnets. Branched dipole magnets are necessary to allow the separated particles to be directed along each of the three branches of the separator. The branched dipoles will keep most of the features incorporated in the standard dipole magnet design but they will have increased complexity to make them compatible with the vacuum chamber layout at the branches locations (Y-shape). The magnetic design of the yoke will be slightly modified whereas a new cryogenic design is required. We present in this paper the design concepts envisioned for the FAIR SFRS branched dipole magnets along with preliminary design simulation results (magnetic, cryogenic and mechanical analyses).

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