

Construction Technology for the 10 T HTS Energy Saving Dipole Magnet of the Italian Facility IRIS

The Innovative Research Infrastructure on Applied Superconductivity (IRIS) is a project funded by the Italian Minister for University and Research, with leadership assigned to INFN and LASA laboratory serving as its coordinator. This project, currently in its final phase, involves the design and construction of an Energy Saving, fully high-temperature superconducting dipole Magnet for Accelerators (ESMA). This magnet has been designed by ASG Superconductors S.p.A. with the support of INFN LASA Team. The fabrication will take place in ASG Superconductors S.p.A. Genova.

This contribution covers the final design of the dipole and its construction technology, covering electromagnetic, mechanical, and thermal aspects.

Magnetic wise, 12 racetrack coils will be wound using a metal-as-insulation winding technology. The overall coil stack (6+6) will be nearly 1 meter long and will feature a 70-mm-wide free bore with a maximum central field of 10 T. To wind the coils, a dedicated winding machine have been designed and purchased.

To withstand such a field a mechanical structure made by high-strength alloys is being produced. ESMA will be a conduction cooled cryogen free magnet and will operate at 20 K, significantly reducing costs associated with cryogenics.

Session

Accelerator Applications

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