MT29 Abstracts and Technical Program



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Sun-Mo-Or2-05: Final design and production of a 10 T HTS energy saving dipole magnet for the Italian facility IRIS

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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). ESMA is intended to be both a technological demonstrator for sustainable, cryogen-free accelerator magnets, and a user magnet for the IRIS cable test facility at Genoa (Italy).

This article describes the final design of the dipole and its fabrication process in ASG Superconductors S.p.A. The electromagnetic design consists of 12 flat racetracks, assembled in a 6+6 configuration. The coil pack is about 0.6 meter long and with a coil-to-coil aperture of 104 mm. The target central field at operation is of 10 T.

To withstand Lorentz forces in operation, a mechanical structure made by high-strength alloys has been designed and produced. The design of the cryogen-free cooling system is also discussed.

Finally, the protection scheme is discussed, together with an introduction to the incoming tests and operations.

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