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Wed-Mo-Po.02-02: Winding Challenges and Solutions in the INFN Falcon Dipole Project

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The Falcon Dipole is a project led by the Italian Institute of Nuclear Physics (INFN) which aims to fabricate a 12 T short model of a Nb3Sn cos-theta accelerator dipole as part of the High Field Magnet (HFM) R&D program at CERN. The status of the project is at the fabrication step of the first dummy coil in the industry and, in this paper, we present the results of the first campaign of winding tests in the industry.
The winding process for the Falcon Dipole is challenging because the size of the Rutherford Cable used for the coils is comparable to the bore radius. This results in high bending and torsion stresses, making the cable structure unstable. To address these challenges, the previous 3D model has been modified to improve the winding feasibility. The setup has been prepared to monitor technical parameters that will help in modeling the coil geometry and identify sources of critical issues. In this paper, we present the results of the winding campaign and discuss the proposed changes to the coil end design to address the issues that arose.

Author: VALENTE, Riccardo Umberto (Università degli Studi e INFN Milano (IT))

Co-authors: PAMPALONI, Alessandra (INFN e Universita Genova (IT)); BERSANI, Andrea (INFN Genova (IT)); GAGNO, Andrea (INFN); CAIFFI, Barbara; SANTINI, Carlo; NOVELLI, Daniel (INFN Genoa and Sapienza University of Rome); BENEDUCE, Enrico (INFN); DE MATTEIS, Ernesto (INFN Milano - LASA); CRESPI, Gabriele (INFN-LASA Milano (IT)); ROSSI, Lucio (Università degli Studi e INFN Milano (IT)); PRIOLI, Marco; Dr STATERA, Marco (INFN Milano - LASA); CANNAVÒ, Massimiliano (Università Statale di Milano); SORBI, Massimo (Università degli Studi e INFN Milano (IT)); BRACCO, Michela; MUSENICH, Riccardo (INFN e Universita Genova (IT)); MARIOTTO, Samuele; BURIOLI, Sergio (INFN e Universita Genova (IT)); DOTTI, Simone (INFN-LASA Milano (IT)); FARINON, Stefania (INFN e Universita Genova (IT)); SORTI, Stefano

Presenter: VALENTE, Riccardo Umberto (Università degli Studi e INFN Milano (IT))

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