



Contribution ID: 119

Type: **Contributed Oral**

C3Or4B-02: Upgrade of the CERN cryogenic test facility for the HL-LHC superconducting magnets and superconducting links

Wednesday 21 May 2025 16:30 (15 minutes)

New superconducting magnets, many of them based on Nb₃Sn technology, have been developed for the HL-LHC project, the High-Luminosity upgrade of the LHC (LHC Hadron Collider) at Interaction Points 1 and 5. These magnets require thorough testing in cryogenic conditions at 4.5 and 1.9 K before their installation into the LHC. Additionally, the HL-LHC includes high-current superconducting transmission lines (SC Links) for feeding the magnets of the Inner Triplets and Matching Sections at LHC Point 1 and Point 5, which also require cryogenic testing and validation before installation. The existing test benches built in the early 2000s to test the LHC magnets in SM18 needed to be upgraded because the HL-LHC magnet apertures and internal line routings were not compatible. CERN has upgraded five test benches of the major LHC magnet test facility to perform the cryogenic powering tests and magnetic measurements of the HL-LHC magnets and SC links. The upgrade included additional shuffling modules, anti-cryostats and new current leads. The paper presents the details on the cryogenic characteristics of the upgraded test benches and reports on the first operational results.

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Session Classification: C3Or4B - Large Scale Cryogenic Systems VII: Commissioning