Contribution ID: **458** Type: **Poster**

Mechanical validation of the support structure of the eRMC and RMM, the 16-T R&D magnets for the FCC

Tuesday, June 25, 2019 3:53 PM (1 minute)

High field superconducting magnets are of the essence to further increase the energy of particle colliders beyond their current state-of-the-art. A magnet technology development program is being carried out at CERN to explore the Nb3Sn performance limits at dipole field levels of 16—18 T. Both the enhanced Racetrack Model Coil (eRMC) and the Racetrack Model Magnet (RMM) aim to develop these fields, respectively, in the magnet horizontal mid-plane, and in a closed 50-mm bore. These magnets, mechanically preloaded using the method of bladders and keys, will feature the same support structure featuring an aluminum alloy shrinking shell.

To verify the assembly and loading process, the structure was mounted using aluminum blocks in lieu of actual Nb3Sn coils. The mechanical assembly was instrumented with strain gauges on the external shell, tie-rods and dummy coils. Two thermal cycles to 80K were performed with different preload levels. This paper compares the tests results to the finite-element (FE) mechanical model for validation. The results imply that the low-yield aluminum alloy has plastified during the first thermal cycle. Both the strain measurements and the final deformed coil shape match, within reasonably margins, the FE predictions.

Primary author: GARCIA PEREZ, Manuel Francisco (CERN)

Co-authors: IZQUIERDO BERMUDEZ, Susana (CERN); PEREZ, Juan Carlos (CERN); EMAMI NAINI, Sohrab (U); GROSCLAUDE, Philippe; TOMMASINI, Davide (CERN); FERRADAS TROITINO, Salvador (Centro de Investigaciones Energéti cas Medioambientales y Tecno); GUINCHARD, Michael (CERN); BOURCEY, Nicolas (CERN)

Presenter: GARCIA PEREZ, Manuel Francisco (CERN)

Session Classification: Poster session

Track Classification: Superconducting magnets & associated technologies