27th International Conference on Magnet Technology (MT27)

Fukuoka, Japan / 2021

Contribution ID: **608** Contribution code: **THU-PO3-112-01**   Type: **Poster**

An examination of the mechanical performance of the 4.5 m long MQXFA Pre-Series magnets for the Hi-Lumi LHC Upgrade

Thursday 18 November 2021 10:00 (20 minutes)

The U.S. High-Luminosity LHC Accelerator Upgrade Project (HL-LHC AUP) team is fabricating the 4.5 m long MQXFA magnets, a 150 mm aperture high-field Nb3Sn low-β quadrupole magnet, in the context of the CERN Hi-Luminosity LHC (HL-LHC) upgrade. To date, two prototype magnets and five Pre-Series magnets have been assembled and tested. The first two prototypes did not achieve full performance requirements, but the lessons learned from them were fed back into the assembly and testing of the subsequent pre-series magnets, MQXFA03 thru MQXFA07. As the project is now transitioning to Series magnet production the data obtained from the as-built Pre-Series structures is instrumental to understanding the various build parameters and how they might explain or predict the mechanical performance of the structure. This paper summarizes the available strain gauge data from these structures as it relates to the FEA models and actual CMM measurements from the structural components. We also report on the fiducialization measurements performed with the warm magnetic measurements.

Primary author: CHENG, Daniel

Co-authors: AMBROSIO, Giorgio (Fermilab); DIMARCO, Joseph (Fermilab); FERRACIN, Paolo; Dr MURATORE, Joseph F (Brookhaven National Laboratory); PAN, Heng (LBNL); PRESTEMON, Soren; RAY, Katherine (Lawrence Berkeley National Laboratory); SABBI, GianLuca (LBNL); SOLIS, Michael (Lawrence Berkeley National Lab); VALLONE, Giorgio (Lawrence Berkeley National Lab. (US)); WANG, Xiaorong (Lawrence Berkeley National Laboratory)

Presenter: CHENG, Daniel

Session Classification: THU-PO3-112 HL-LHC Accelerator Magnets II: Nb3Sn