



Contribution ID: 1296 Contribution code: WEPB034

Type: Poster Presentation

Beam impact experiment to qualify the damage limits of Nb₃Sn sample coils pre-irradiated in an X-ray field

Wednesday 4 June 2025 16:00 (2 hours)

A series of experiments has been carried out at CERN to derive the damage limits of superconductor strands and sample coils. The latest experiment was designed to characterize the limits of Nb₃Sn racetrack sample coils impacted by a 440 GeV/c proton beam at cryogenic temperature. The effect of a beam impact on superconducting coils aged by long-term radiation exposure, however, is currently unknown. This paper outlines the preparation of an experiment to be performed at the HiRadMat facility to investigate the damage on coils which have been aged with X-rays to simulate the anticipated integral dose levels reached by the HL-LHC final focusing magnets during their operational lifetime, of 25 to 30 MGy. The damage limits for these coils will be derived and compared with the results previously obtained for non-aged coils. The design and fabrication of these sample coils, the details of the X-ray irradiation and the results from their qualification tests before beam impact is discussed. The results of energy deposition simulations that define the optimal parameters for the proton beam to be used are presented. The experimental setup and procedure are discussed.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

Funding Agency

Author: GANCARCIK, David (European Organization for Nuclear Research)

Co-authors: MUELLER, Anke-Susanne (Karlsruhe Institute of Technology); BERNHARD, Axel (Karlsruhe Institute of Technology); SENATORE, Carmine (University of Geneva); HERNALSTEENS, Cédric (European Organization for Nuclear Research); Dr WOLLMANN, Daniel (European Organization for Nuclear Research); DOMANGE, Delphine (European Organization for Nuclear Research; Université Libre de Bruxelles); BONURA, Marco (University of Geneva); BABOUCHE, Romain (University of Geneva)

Presenter: Dr WOLLMANN, Daniel (European Organization for Nuclear Research)

Session Classification: Wednesday Poster Session

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T10 Superconducting Magnets