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Test Results of the MQYYM: a 90 mm NbTi quadrupole magnet option for HL-LHC

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For the HL-LHC project, a 90 mm NbTi cos (2θ) quadrupole magnet with an operating gradient of 120 T/m at 1.9 K is being developed as an option to replace the 70 mm aperture LHC quadrupole MQY. CEA in collaboration with CERN designed and manufactured a single aperture short model magnet with a magnetic length of 1.211 m at 1.9K called MQYYM. The MQYYM cold test occurred at CEA at 4.2 K in a vertical cryogenic station. During the power test, the operating gradient at 1.9 K has been reached at 4.2K after two training quenches. All along the test, magnetic measurements were done using a rotating probe.
This paper describes the performance of the MQYYM and proposes an analysis of the data acquired during the test including training behavior, quench detection, protection and magnetic field quality measurements.

Primary author: SIMON, Damien

Co-authors: PERRAUD, Simon (Université Paris-Saclay (FR)); FELICE, Helene (CERN); GODON, Romain (CEA); RICARDO, Correia-Machado (CEA); GHELLER, jean marc (CEA/IRFU); MADUR, Arnaud (CEA Saclay); SEGRETI, Michel; HERVIEU, Bertrand (CEA Saclay); MOLINIE, frederic (CEA Saclay); GUIHARD, Quentin (CEA); FOUSSAT, Arnaud Pascal (CERN); PEREZ, Juan Carlos (CERN); PETRONE, Carlo (CERN); FISCARELLI, Lucio (CERN); BONORA, Matthias (CERN); TODESCO, Ezio (CERN); Mr BOUZIAT, Denis (CEA-Saclay); Mr STEPANOV, Vadim (CEA-Saclay); Mr DE ANTONI, Philippe (CEA - Saclay); Mr RELLAND, Johan (CEA Saclay)

Presenter: SIMON, Damien

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