

Title:

Matching Field Orientation and Mechanical Twist in Superconducting Bending Magnets

Authors:

Marco La China, Boris Bellesia, Walter Scandale (CERN, Geneva)

Abstract :

In superconducting bending magnets such as the LHC main dipoles, the direction of the dipolar field is strictly related to the geometry of the mechanical structure. The angle between the direction of the dipolar field and the geometric mid-plane has to stay inside tight tolerances of ± 1 mrad. Measuring this angle involves geometric and magnetic devices that generally cannot be operated on the same measuring bench. In this paper we give a measuring method that can be applied to future productions and we show its application in the case of the LHC dipole. We present the tests carried out to estimate the method accuracy and we give an account of the results. We also provide an estimation of the LHC dipole torsional stiffness evaluated during the tests.