AMT - Beam generated heat deposition and quench levels for LHC magnets



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Thermal Modelling of IR Quadrupoles

Abstract -In this talk is presented the work carried out at LASA Laboratory in the years 1995 - 1999, related to the design of a new type of quadrupoles for the LHC low-beta insertion based on Nb3Sn technology. The work deals of the power generated into the insertion quads from the reaction products of the 7TeV p-p collision in the high luminosity interaction point of LHC. The simulation starts from the DTUJET event generator; the reaction products are then tracked along the magnetic structure of the insertions; the interaction with the accelerator beam pipe and the magnets is treated by the FLUKA code. The keypoint of this work is the thermal analysis of the magnet under such energy deposition conditions. The simple evaluation of the energy deposed in the magnet cannot give any indication of the behaviour of the magnet in this operating conditions, what is really important is the thermal "response" of the magnet. A 2 dimension finite elements thermal analysis (ANSYS) evaluate the temperature increase in the coils and the stability margin, considering the energy deposed inside the magnets

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