

Accelerators and Superconductivity: LHC and Near Future in Europe

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Abstract— Superconductivity and accelerators have mutually benefited of tight liaisons for more than 30 years. For the Large Hadron Collider, whose construction is finished and that is under commissioning at CERN in the Geneva area, some 1750 main superconducting magnets and about 8000 superconducting corrector magnets have been manufactured, cold tested and installed in the underground tunnel. Also, the giant superconducting magnets for the LHC experiments, ATLAS and CMS, have been manufactured and tested in the final assembly. The paper reviews the goal of particle accelerators and the reason of success of superconducting technologies in accelerators. It underlines the main features of accelerator magnets and discusses in detail the characteristics of the LHC magnets. The trends in development of accelerator magnets, both for applications (medicine) and for future research projects (FAIR, CERN injector upgrade) are presented.

Index Terms— Accelerators and detector magnets, accelerators, large-scale superconductivity, LHC, Nb-Ti superconductors

Manuscript received June 4, 2007, revised and accepted July 3, 2007. Reference No. CR2, Category 6