

Development of Superconducting Links for the LHC Machine

Amalia Ballarino

CERN, European Organization for Nuclear Research, 1211 Geneva 23, Switzerland

Email: amalia.ballarino@cern.ch

Abstract - In the framework of the upgrade of the LHC machine, new superconducting lines are being developed for the feeding of the LHC magnets. The proposed electrical layout envisages the location of the power converters in surface buildings, and the transfer of the current from the surface to the LHC tunnel, where the magnets are located, via superconducting links containing tens of cables feeding different circuits and transferring all together more than 150 kA. Depending on the location, the links will have a length ranging from 300 m to 500 m, and they will span a vertical distance of about 80 m. An overview of the R&D program that has been launched by CERN is presented, with a special attention to the development of novel types of cables made from MgB₂ and High Temperature Superconductors (Bi-2223 and REBCO) and to the results of the tests performed on prototype links. Plans for future activities are presented, together with a timeline for a potential future integration in the LHC machine.

Keywords - Large Hadron Collider (LHC), LHC upgrade, superconducting line, superconducting cable, LHC magnet, high-current supply.

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