# Design of ReBaCuO-Coated Conductors for FCL

P. Tixador, N.T. Nguyen

Institut Néel / G2Elab,Grenoble-INP - CNRS
bât. E, BP 166, F-38042 Grenoble Cedex 09, France
e-mail: pascal.tixador@grenoble.cnrs.fr

***Abstract*** - The superconducting (SC) fault current limiter (FCL) can improve the security and the power quality of electric networks; these are the two essential requirements of today. The device must fulfil several requirements in normal and fault operations, and must operate under a variety of conditions. Impedance short-circuits represent the most severe conditions. Proper design of the ReBaCuO coated conductor is essential for safe and optimized operation. The design of the superconducting element is mainly based on thermal criteria. The minimum superconducting element volume is given by its enthalpy and the limiting current through the SC element. The superconducting quantities play only a small role in the design. High resistivity conductor reduces the ReBaCuO volume. Of other considerations to be taken into account, the quench homogeneity is one of the most important for resistive FCLs. The coated conductor architecture and design can help to reduce the consequences of quench inhomogeneity along the conductor. The presented arguments, for a high limiting current forcing the conductor to quench uniformly and for a moderate conductor resistivity to reduce the temperature differences, are supported by experiments carried out utilizing two rather different coated conductors in various limiting conditions.

***Keywords*** – coated conductor, tape conductor, conductor design, resistive fault current limiter, conductor quench

Submitted May 27, 2010; accepted July 19, 2010.
Reference No. ST189; Category 5, 6.
Accepted by SuST (2012)