

## Power Hardware-in-the-Loop Testing of a YBCO Coated Conductor Fault Current Limiting Module

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**Abstract** — In recent years, good progress has been made in improving the quality and quantity afforded by the manufacturing process for YBCO coated conductors. As a result, several programs have started to develop electrical power applications like motors, transformers, and fault current limiters (SCFCL) with these conductors. High voltage resistive type SCFCLs may typically be assembled from modules connected in series and parallel to accommodate the required voltage and current levels. The limited length of such a SCFCL module simplifies the configuration, manufacturing, and maintenance. It also allows testing of these modules under laboratory conditions at reduced power levels. In order to test SCFCL modules under conditions they will experience in high voltage electrical networks, advanced test methods such as power hardware-in-the-loop (PHIL) can offer significant advantages. This method allows studying conditions such as voltage stability and severe system perturbations with the actual SCFCL module in the loop. Hence, the quench and recovery behaviour of the SCFCL module can be investigated under conditions characteristic of real electrical power networks without elaborate experimental setups. This paper presents results from PHIL experiments with a SCFCL module consisting of an approx. 10 m coated conductor.

**Index Terms**— Superconducting fault current limiter, Power-Hardware-in-the-Loop, Test method,

Manuscript received August 25, 2008.

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