

Selected Mechanical and Operational Issues of High Field No-Insulation High Temperature Superconductor Magnets

Seungyong Hahn^{a,b*}, Kwanglok Kim^a, Kwangmin Kim^a, Kabindra Bhattarai^a,
Kyle Radcliff^a, Xinbo Hu^a, Thomas Painter^a, Iain Dixon^a, and David Larbalestier^a

^a*National High Magnetic Field Laboratory, Florida State University, Tallahassee, US*

^b*Department of Electrical and Computer Engineering, Seoul National University, Seoul,
South Korea*

**Corresponding author: hahnsy@snu.ac.kr*

Significant progress in the no-insulation (NI) high temperature superconductor (HTS) magnet technology has been made in the past few years, which rapidly broadens its application beyond high field laboratory magnets. Yet, newly identified technical challenges have been also reported with failures of some NI HTS magnets that include: (1) a mechanical damage of an NI REBCO “insert” after a quench when operated in a background magnet due to the unbalanced force and the electromagnetically induced overcurrent; and (2) unexpected REBCO conductor degradation especially when NI REBCO coils were quenched at a high field of >30 T. This paper reports technical details on the selected issues and the latest research efforts to analyze the results and provide potential solutions.

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