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Numerical and Experimental Investigation of the Electromechanical Behavior of REBCO Tapes and Cables

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The Twisted Stacked-Tape Cable (TSTC) is one method for cabling flat REBCO tapes and may be a viable option for implementing high temperature superconductors in various applications including power transmission, fusion and high-energy physics. To fully characterize the electromechanical behavior TSTCs it is important to understand the performance of single REBCO tapes under various loading conditions. Tension and combined tension-torsion experiments on single REBCO tapes have been continued, from prior preliminary studies, to characterize three commercially available tapes of SuperPower, SuNAM and American Superconductor. To better understand how these loads affect the critical current of REBCO tapes a structural numerical finite element analysis was performed for single tapes and compared to the experimental data. In addition finite element analysis was also used to determine characteristic of a full scale TSTC after cabling.

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