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Magnetic Imaging of Transport Current Distributions in Coated Conductors Using an Improved Inversion Algorithm HOLGER GRUBE, GEOFFREY W. BROWN, MARILYN E. HAWLEY, FRED M. MUELLER, Los Alamos National Laboratory — Magnetic imaging may be used to study and optimize transport current in superconducting $YBa_2Cu_3O_{7-\delta}$ coated conductors. We magnetically image transport currents in order to identify regions of good and poor superconductor. The internal current distribution can be derived from the external magnetic fields using the Biot-Savart law. The fastest method, especially for dense images, has the limitation of introducing errors on the order of 20% when the imaging area is only little larger than the conductor, a common experimental constraint, and when transport currents enter and exit the imaging area. We have developed a fast inversion procedure that works on tape samples under transport current with an accuracy of 1% or better. The algorithm is ideally suited for high resolution and high throughput characterizations. In addition, we will discuss a variation of this technique, which serves to reduce the effects of measurement errors in the computed current distributions due to imperfections of magnetoresistive sensors. Through this technique the source of the reduced critical current in a commercially manufactured tape was deduced.

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