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Transport and contact-free investigation of REBCO thin film temperature dependent pinning landscapes JOHN SINCLAIR, JAN JAROSZYNSKI, XINBO HU, MICHAEL SANTOS, National High Magnetic Field Laboratory — Studies of the pinning mechanisms and landscapes of $REBa_2Cu_3O_x$ (RE=rare earth elements) thin films have been a topic of study in recent years due to, among other reasons, their ability to introduce nonsuperconducting phases and defects. Here we will focus on REBCO thin films with $BaZrO_3$ nanocolumns and other isotropic defects. The evolution of the dominant pinning mechanisms seems to change as a function of temperature even to the point that samples with similar critical current density properties at high temperatures can have distinctly different properties at low temperatures. Earlier work focused on the angular selectivity of the current density profile, though other properties (such as alpha values) can evolve as well. Characteristic results accentuating this evolution of current density properties will be presented. Challenges exist in evaluating these low temperature properties in high magnetic fields, therefore both transport and contact-free results were be presented to compliment the work. Support for this work is provided by the NHMFL via NSF DRM 0654118.

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