Temperature dependent pinning landscapes in REBCO thin films
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National High Magnetic Field Laboratory, Tallahassee, FL 32310 — The pinning landscapes of REBCO (RE=rare earth elements) thin films have been a topic of study in recent years due to, among other reasons, their high ability to introduce various phases and defects. Pinning mechanisms studies in high temperature superconductors often require detailed knowledge of critical current density as a function of magnetic field orientation as well as field strength and temperature. Since the films can achieve remarkably high critical current, challenges exist in evaluating these low temperature (down to 4.2 K) properties in high magnetic fields up to 30 T. Therefore both conventional transport, and magnetization measurements in a vibrating coil magnetometer equipped with rotating sample platform were used to complement the study. Our results clearly show an evolution of pinning from strongly correlated effects seen at high temperatures to significant contributions from dense but weak pins that thermal fluctuations render ineffective at high temperatures but which become strong at lower temperatures Support for this work is provided by the NHMFL via NSF DRM 1157490

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