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Flux Creep in Bi:2212 Rutherford Cables for Particle Accelerator Applications

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Bi:2212 superconducting cables are being considered for use in high field magnets such as those in the next generation of particle accelerators. However, a comprehensive understanding of their behavior is necessary before full-scale magnets can be constructed. The magnetization and flux creep in the superconductor can lead to significant field errors which need to be compensated. To study this, a 28-mm long segment containing two 17-strand cables was extracted from the RC5 racetrack coil made at LBNL. The cable was made from Bruker OST PMM170123 non-twisted Bi:2212 wire. Using a Hall probe calibrated by (a) flux exclusion and (b) Ni replacement, we report on the cable's temporal decay characteristics. In addition, the effect on magnetization and decay of adjusting the cycling of the magnetic field was studied to simulate the preinjection cycles of an accelerator magnet.

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