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Thu-Af-Po.08-04: Performance of fiber-reinforced conductors under cyclic loading

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Pulsed magnets in the US National High Magnetic Field Laboratory (MagLab) use rectangular cross-section conductors that reinforced by Nb-fibers. During the manufacture of the conductors, large deformation strain was required, leading to very high internal stresses. The internal stresses affected deformation behavior of the conductors. This special deformation behavior was reflected in stress-strain curves generated in our tests. At cryonic temperatures, thermal expansion difference between the fibers and matrix added to addition internal stress in the conductors. We studied the mechanical deformation behavior of Nb-fiber-strengthened Cu under cyclic loading. We related deformation behavior of such conductors to their microstructure.

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