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Effect of Transport Current on Magnetization of an IBAD Coated Conductor

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In this work susceptometry was used to measure the magnetization, as a function of transverse applied magnetic field, sample temperature, and transport current of an IBAD coated conductor. The M-H loops of four samples of the conductor which had different lengths (from 12-4 mm), and which were approximately 3 cm in length and approximately 100 μm in thickness, were measured. The widths were modified so that the the M-H loops could be measured at different I/I_c ratios (from 0.1-1). The susceptometry setup was constructed by modifying a transport current probe with the addition of a rectangular pickup coil and a Bucking coil to its end. The region of the probe containing the sample was placed into the center of a 12 T max field cryogen-free magnet, which was the source of the applied magnetic field. Two different techniques were used to measure the M-H: (1) The transport current was applied and then the magnetic field was increased and (2) the field and current were increased at the same time with a given proportionality constant between the current and field. M-H was measured in applied transverse magnetic fields of 0-12 T, sample temperatures of 4.2 K and 77 K, and transport currents of 0-100 A. The results of the measurements are presented.

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