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In-field Characterization of Local Ic and n-indices as a Function of Longitudinal Coordinate in a Long-length GdBCO Coated Conductor

Tuesday, August 29, 2017 3:15 PM (15 minutes)

We have succeeded in evaluating local critical current (*Ic*) and *n*-indices in a long-length GdBCO coated conductor as a function of longitudinal coordinate with a spatial resolution of 1 mm under external magnetic fields up to 5 T at both temperatures of 77 K and 65 K. While the sample was carried in reel-to-reel manner in a liquid nitrogen bath with an external magnetic field, we measured magnetization of the tape continuously. The temperature was varied down to 65 K by using a subcooled liquid nitrogen circulation system. This allows us to evaluate spatially-resolved in-field *Ic* distribution in the long-length tape. A method to evaluate position dependent *n*-indices based on the magnetization measurements was also proposed. We've confirmed the validity of the analyses by comparing the results with site-specified transport measurements by the four-probe method using the same sample. These characterizations are very useful to understand the current transport properties in the full-length of the coated conductors including the influence of localized flux flow dissipation originating from the positional variation of *Ic* in the tape strand under practical operation conditions not only 77 K, self-field. Namely, this method has a strong impact on the characterization of long-length coated conductors for magnet applications.
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