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Tue-Mo-Po2.05-06 [29]: Frictional Force Effects Between Superconducting Tapes on Stress–Strain Characteristics of GdBCO Magnets

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In designing high field magnets, the enormous mechanical stress on the magnets due to the Lorentz force must be considered. However, the common stress–strain calculations with BJR and/or force balance equation barely considered the frictional force between the superconducting tapes. In this study, the effects of frictional force between these tapes on the stress–strain characteristics were investigated using the intentionally scratched HTS tapes. Mechanical stresses of a magnet wound using the intentionally scratched GdBCO tape were empirically and analytically examined on the basis of the external pressure. The necessity of considering the frictional force between the superconducting tapes for the stress–strain analysis will be discussed in detail based on the test results.

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