Numerical models of the delamination behaviors in the 2G HTS tape under transverse tension and peel

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Introduction
1. 2G HTS tape: has a multi-layers composited construction.
2. Application: magnets and cables, etc.
3. Delamination: with the fragile feature of the superconducting layer, the 2G HTS tape will separate physically under the tensile or shear stress, generated due to fabrication, Lorentz force and thermal mismatch, etc. The delamination will result in serious degradation of the critical current.

Numerical models

Results for the peel model

The mixed-mode traction-separation law

Results for the anvil model

Conclusions

- With considering the mixed-mode traction-separation law, two models are built to investigate the delamination characteristics of the 2G HTS tape.
- The effects of the anvil size on the transverse tensile strength and the stress distribution are analyzed.
- The factors of the peeling angle, the plastic deformation and thermal mismatch, etc. are considered in the peel model.