

Heat transport in tilted stacks of HTS tapes at temperatures above 20K

Tilted stacks of HTS tapes show favorable properties in terms of magnetization uniformity [1]. Magnetized stacks can be applied in superconducting rotating machines. In such case they will be subjected to varying magnetic fields and heat generation will occur. Therefore, it is important to understand heat transfer in anisotropic structure of a stack to avoid overheating and optimize the trapped flux density profile.

To analyze the heat transfer an experimental setup is build and a numerical model is developed. A localized heat source is assumed. The thermal behavior of the stacks with different angles of tilt is investigated. Results show that geometry of the stack significantly affects heat transfer. Anisotropy of the structure of the HTS tapes plays crucial role in definition of the thermal behavior of the investigated elements.

[1] T. B. Mitchell-Williams et al., "Toward Uniform Trapped Field Magnets Using a Stack of Roebel Cable Offcuts,"IEEE Trans. Appl. Supercond., vol. 26, no. 3, pp. 3–7, 2016.

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