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Load characteristics of contactless bearing based on HTSC tape

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By now there are many studies aimed to finding of possibility for using of novel superconducting flexible tapes in magneto-levitation systems instead bulk high temperature superconducting materials. In this report we present design and results of investigations of superconducting magnetic bearing on the base of HTSC flexible tapes. The bearing consists of a cooled by liquid nitrogen cylindrical stator and concentrically placed rotor. The HTSC tape with 12 mm width and 150 cm length is wound on the cooling stator in a few layers as a pancake. The rotor consists of a simple set of permanent magnets. The magnetizations of adjacent layers have opposite directions. We tested the bearings with various configurations of superconducting windings which differ in numbers of pancakes and number of tape layers in one pancake. The loading characteristics, i.e. dependencies of axial and radial levitation force components on displacements were measured. We compared the obtained dependencies with the values of the levitation force for stacks of HTSC tapes in a similar configuration of permanent magnets and found a good agreement for both cases.

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