

Magnetic Levitation Between a Slab of Soldered HTS Tape and a Cylindrical Permanent Magnet

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Abstract — Stacks of commercial high temperature superconducting tape can be cut and soldered together to form slabs of a large range of shapes and sizes. They are most interesting for magnetic levitation applications due to the flexibility of geometry allowing them to be created in large thin slabs suitable for planar rotary magnetic bearings and linear maglev bearings. In the present study, the axial levitation force was measured between a field cooled slab of 30 mm square and a 25 mm diameter rare-earth permanent magnet which produced a cylindrically symmetric field necessary in the context of rotary bearings. The force results were compared to that achieved between the same permanent magnet and a larger 43 mm diameter bulk MgB₂ disk as well as to FEM modelling using the Perfectly Trapped Flux approximation.

Keywords (Index Terms) — Magnetic levitation, superconducting bearing, stack of HTS tapes, superconducting tapes.