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Electromagnetic Design of a Novel HTS Linear Synchronous Motor for Electromagnetic Launching

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As the efficiency of ordinary linear motors for electromagnetic launching is not high enough, the high temperature superconducting linear synchronous motor (HTS-LSM) is proposed with an expectation to improve the efficiency. This research focuses on a unilateral type HTS-LSM which mover is made up of closing coils pre-excited. In the research, the motor's electromagnetic thrust characteristics and mover coil's critical current characteristics, which are influenced by the parameters of the stator, such as slot type, slot full rate and winding structure, are studied respectively. Based on the research above, Both the electromagnetic design process and the method of parameter optimization for this type of HTS-LSMs are proposed. Then, a prototype of the HTS-LSM is developed. The test of the prototype verifies the validation of the researches in this paper.

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