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Fri-Mo-Po.09-05: Development of a New-type HTS Linear Synchronous Motor for Long-distance Acceleration Applications

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For long-distance acceleration applications such as electromagnetic catapults and high-speed maglev trains, usually, multiple short linear motors are joined together into longer linear motors as needed. In this paper, a new type high temperature superconducting-linear motor (HTS-LM) for long-distance acceleration applications is designed. The stator winding of the HTS-LM is a ring winding structure, and the moving winding is wound with HTS tapes. The HTS winding achieve an approximately constant DC current flowing through its interior through pre-excitation. The HTS-LM was tested, and the results indicate that the motor has the characteristics of low thrust harmonic content, stable electromagnetic thrust, and slow current attenuation in the HTS winding. The research in this paper can provide reference for future high-efficiency and high-power-density linear motor development.

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