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Comparative Study of HTS linear synchronous motor with different core and winding structures for electromagnetic launching

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The electrically excited high temperature superconducting (HTS) coils can replace the mover of the linear synchronous motor (LSM) for electromagnetic launching with an expectation of improving the motor's efficiency. In this paper, three stators with different core and winding structures are designed for the LSMs with the movers made by HTS coils. The electromagnetic parameters of these three types of stators are evaluated and optimized respectively with finite element method to obtain the same electromagnetic thrust. Then both the AC loss of the HTS coils and the economy of designing stators are analyzed. Based on the research above, the most suitable stator design of HTS-LSMs for electromagnetic launching is proposed. The research of this paper can provide some reference for developing HTS-LSMs in future studies.

Primary authors: Mr MA, Yuanzheng (Naval University of Engineering); Dr SHEN, Shifeng (Naval University of Engineering); Prof. ZHAO, Jinghong (Naval University of Engineering)

Presenter: Mr MA, Yuanzheng (Naval University of Engineering)

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