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## AC losses of high temperature superconducting magnet under the external magnetic fields generated by the ground coils of electrodynamic suspension train

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The onboard high temperature superconducting (HTS) magnet of electrodynamic suspension (EDS) train suffers from the external magnetic fields generated by the ground coils including the suspension coils, propulsion coils and even generator coils. In such case, the ac losses will be produced in the HTS magnet and lead to a rise in temperature, possibly affecting the operation stability of the EDS train. Hence, it is necessary to estimate the ac losses in onboard HTS magnet. The goal of this paper is to present a finite element method (FEM) model to calculate the ac losses of onboard HTS magnet under the magnetic excitation of the ground coils. The FEM model, based on the vector magnetic potential method, includes the HTS magnet composed of the HTS coil and its cryogenic vessel, suspension coils, and propulsion coils. Taking advantage of the magnetic potential boundary condition, the moving mesh of the onboard HTS magnet is not required, therefore significantly reducing the computing time. An experimental platform is established to measure the temperature rise and ac losses of HTS magnet subjected to the travelling magnetic field from propulsion coils, and the calculated results are compared with the measured ones to validate the FEM model. The ac losses of the onboard HTS magnet under the external magnetic field from the ground coils of EDS train will be studied with the validated FEM model.

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