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Structure Optimization of Linear Generator Coil in No-contact On-board Power Source for EDS Maglev

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For the electrodynamic suspension (EDS) system that uses superconducting magnets, the transmission efficiency of no-contact on-board power source will be affected by the eddy current loss generated on the outer wall of the cryostat. To address this issue, improving the structure of the generator coils is an effective approach. In this work, we have carried out the optimization of the structure of generator coils numerically. Firstly, we used an analytical model to estimate the harmonic components of the magnetic field generated by the ground coils .then, and applied the field on the boundary of a 3-D finite element model, in which, the cryostat and generator coils have been considered. Based on the model, the transmission efficiency for different strictures of the generator coils have been investigated. The results show that the optimized coil structure can reduce the eddy current loss of the vessel wall while maintaining a certain output power. This work can promote the development of no-contact on-board power source for EDS system.

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