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Thu-Mo-Po4.13-10 [105]: Vertical Dynamic Responses of the HTS Maglev System Under Track Random Irregularity

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High-temperature superconducting (HTS) maglev train, with the advantages of low-energy consumption, simple mechanical structure and environment-friendly, is an ideal high-speed transportation in the future. HTS maglev dynamical characteristics considering track random irregularity is important, because the track random irregularity is ineluctable due to the defects produced in installing permanent magnet guideway. In this paper, normal HTS maglev model and vehicle-bridge coupled model are built based on UM software. In order to study the vertical dynamical response of the system, different track random irregularities and other conditions were adopted in the two models. The Sperling index is used to evaluate the system smooth performance under different working conditions. Besides, this paper compared the HTS maglev dynamical response with other maglev trains. The result shows that HTS maglev can run on lower precision guideway and more flexible bridges. And this study suggests the limit of the speed and the designs of bridges in HTS maglev under track random irregularity, as well as providing references for the engineering.

Key words: High-temperature superconductor, levitation, dynamics, vehicle-bridge coupled system, track random irregularities

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