



## Modeling and Simulation for Electromagnetic Emission of Maglev Train

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As a new type of rail vehicle, magnetic levitation (maglev) train has received extensive attention due to its non-contact operation and low running resistance [1]. The maglev system is a complex system integrating high-power electrical equipment and low-power control and signal equipment. Since the maglev train adopts the linear synchronous motor traction power supply mode, the linear current motor with large working current and open space forms electromagnetic field leakage, which is the dominated electromagnetic emission source within the maglev system [2]. With the rapid development and increasing applications of maglev rail technology, it attracts more and more attention on the mechanism how the maglev system will influence on the electromagnetic environment [3].

At present, the maglev rail system has formed three relatively mature technical modes, namely the HSST medium and low speed maglev railway technology in Japan, the ML superconducting high speed maglev railway technology and the normalconducting high speed maglev railway technology guided by German TR. The electromagnetic emission characteristics of the dominated electromagnetic emission source existed in maglev trains, are very different from those of the traditional wheel-rail trains. Therefore, determining the main electromagnetic emission source of the maglev train and analyzing its electromagnetic emission characteristics is of great significance for studying the electromagnetic environment characteristics of the maglev rail system and improving the electromagnetic compatibility of the system.

Based on the structure of the maglev train and the traction power supply parameters, we set up the electromagnetic emission simulation prediction model of the maglev train. Firstly, the linear motor is modeled, and the overall simulation model of the vehicle body and the track is established in CST EM Studio. Then the electromagnetic field emission of the long stator is simulated under different working conditions of the linear motor. The electromagnetic shielding performance of the maglev train body is simulated and analyzed. Finally, based on the simulation results of the electromagnetic emission of the maglev train, the limits of the electromagnetic radiation of the train are compared, and the influence of the electromagnetic emission of the maglev train on the electromagnetic environment around the system is analyzed and evaluated.

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