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## Levitation characteristics of high-temperature superconducting bulks under different orientations and arrays

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High-temperature superconducting (HTS) maglev has good application prospects due to its passive stability. There are many researches on the levitation characteristics of a single bulk HTS in applied magnetic field. However, the bulks are usually arranged in an array in practical applications. In addition, experiments proved that levitation force and guidance force of the system with two bulks is not simply equal to that of the linear superposition of those two bulks. Therefore, it is interesting to further study the law of interaction between bulks with simulation methods quantitatively. In this paper, firstly, a three-dimensional (3D) model of the HTS maglev system with a square bulk HTS is established to simulate levitation characteristics based on COMSOL Multiphysics. Secondly, the influences of the seed-face orientation and the placement direction on the levitation characteristics of the maglev system are simulated and analyzed based on the 3D model. Finally, the interaction law between multiple bulks in a combination is studied. The simulation results are in good agreement with the experiments, which have reference value for the design and prediction on the levitation and guidance performance of the HTS maglev system with a combination of multiple HTS bulks.

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