Simulation of the magnetic stiffness of PM-HTS levitation system

†Yong Yang[1] *

School of Mechano-Electronic Engineering, Xidian University, Xi'an 710071, People's Republic of China.

*Presenting author: yangyong@xidian.edu.cn
†Corresponding author: yangyong@xidian.edu.cn

Abstract

When a rectangular permanent magnet (PM) above a cylindrical high temperature superconductor (HTS) moves vertically and horizontally, the vertical and lateral forces with different sizes of minor loop are simulated in zero field cooling (ZFC) and field cooling (FC) conditions based upon the method of current vector potential and the critical state model of Bean. The average magnetic stiffness obtained by the minor loop which size is varying from 0.1 mm to 2 mm. The results show that most of average magnetic stiffness are remarkably influenced by the size of minor loop. The magnetic stiffness with zero traverse is obtained by using the method of linear extrapolation. The approximate value of the magnetic stiffness with zero traverse is considered as the exact value of magnetic stiffness at one certain position. In addition, the effects of the parameters about PM-HTS levitation system on the magnetic stiffness has also been investigated.