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Levitation and lateral forces between a small magnet and superconducting sphere and the stability of the magnet H. AL-KHATEEB, M. ALQADI, F. ALZOUBI, B. ALBISS, M. HASAN, N. AYOUB, Department of Physics, Jordan University of Science & Technology — Using the dipole-dipole interaction model, we obtained analytical expressions for the levitation and lateral forces act on a small magnet for anti-symmetric magnet/spherical superconductor system. Breaking the symmetry of the system, allow as to study the lateral force which is important in the stability of the magnet above superconducting sphere in the Meissner state. Our formulas are written in terms of the radius of the superconductor as well as the height, the lateral displacement and the orientation of the magnetic moment of the magnet. We found that the levitation force is linearly dependent on the lateral displacement whereas the lateral force is independent of the lateral displacement. Moreover, the levitation and lateral forces are varying solinoudally with the polar and azimuthal angle of the orientation of the moment of the magnet. The stability of the magnet has been discussed for special orientations of the moment of the magnet.

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