

Modeling and Controlling Nonlinear Dynamical Effects in Non-Contact Superconducting and Diamagnetic Suspensions

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Abstract : We present an approach to investigate non-linear dynamical effects occurring in the noncontact superconducting and diamagnetic suspensions, when levitated body has finite size. This approach is based on the calculation of interaction energy between spherical finite size superconducting or diamagnetic body with external magnetic field. Effects of small deviations from spherical shape may be also taken into account by introducing small corrections to the energy. This model allows investigating dynamical effects important for practical applications, such as nonlinear resonances, change of vibration plane, coupling of rotational and translational motions etc. We also show how the geometry of suspension affects various dynamical effects and how an inverse problem may be formulated to enforce or diminish various dynamical effects.

Keywords : levitation, non-linear dynamics, superconducting, diamagnetic stability

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