

Table of Contents

1. Introduction

Introduction to particle electromechanics and the physical phenomena considered in the book.

2. Fundamentals ★ ★ ★ ★ ★

- Electric and magnetic dipoles
- Polarization of particles
- Effective dipole moments
- Electric and magnetic forces
- Electric and magnetic torques
- Multipole theory
- Conducting and dielectric particles

3. Dielectrophoresis and Magnetophoresis ★ ★ ★ ★ ★

- Dielectrophoretic forces
- Magnetophoretic forces
- Particle motion in non-uniform fields
- Interaction between particles and electromagnetic fields
- Manipulation of particles using electric and magnetic fields

4. Particle Rotation ★ ★ ★ ★ ★

- Electromagnetic torque
- Particle rotation
- Electroration
- Rotation under AC electric fields
- Dynamic response of particles

5. Orientation of Nonspherical Particles ★ ★ ★ ★ ★

- Effect of particle shape
- Electric and magnetic polarization
- Torque and equilibrium orientation
- Alignment of nonspherical particles in electromagnetic fields

6. Theory of Particle Chains ★ ★ ★ ★ ★

- Dipole–dipole interactions
- Formation of particle chains
- Collective particle behavior
- Field-induced structures

7. Force Interactions between Particles ★ ★ ★ ★ ★

- Interparticle forces
- Dipole–dipole interactions
- Multiple-particle interactions
- Stability of particle configurations
- Collective electromagnetic effects