Casimir torques and lateral forces: influence of optical properties and surface morphology

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Propositions

Accompanying the PhD thesis

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1. The experimental verification for a bizarre quantum effect — the Casimir force — reveals its importance not only for fundamental physics but also for nanotechnology.

2. In order to bridge the gap between the results in reality and theoretical analysis, it is required to consider the vital factors of the operating environment.

3. Surface morphology is a crucial factor to study the dynamical behavior of MEMS, since it can strongly influence the dynamical behavior of microsystems (chapters 3, 4).

4. Phase portrait analysis can clarify how MEMS actuation strongly depends on the optical properties of materials (chapter 5).

5. Understanding the chaotic behavior, as an unavoidable feature in microsystems, is crucial to reduce the possibility of device malfunction (chapter 6).

6. Poincare maps reveal how chaotic behavior causes unpredictable situations in microsystems. Surprisingly, this can be controlled by proper choice of materials and suitable level of electrostatics (chapter 7).