Theory of cavity optomechanics

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The interaction between light and massive objects has been an object of research since the 17th century when Kepler noted that a comet's tail always points away from the sun. Nowadays, it is possible to engineer the interaction between light and mechanical motion in cavity optomechanical systems with remarkable experimental control which has given rise to a plethora of applications. In this lecture, I will discuss the optomechanical coupling, it's Hamiltonian formulation and the optomechanical equations of motion. Since optomechanical systems are typically driven-dissipative quantum systems, which are conveniently described in terms of quantum Langevin equations, I will furthermore give an introduction to input-output theory.