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Cavity optomechanics: Interaction between localized optical and mechanical modes

I will start by reviewing some recent developments in the theory of cavity optomechanics, a topic that deals with the strong interaction between localized optical and vibrational modes. Both the classical nonlinear dynamics and the quantum effects that may be seen in the future hold great promise on the fundamental level and with regard to applications. Hybrid systems may be constructed, where, for example, the motion of a single atom couples to that of a micromechanical membrane. Novel experimental developments with regard to photonic crystal setups will enable the study of optomechanical circuits and arrays. I will present results on the nonlinear classical collective dynamics in such arrays, leading to synchronization between individual optomechanical oscillators.

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