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Quantum Dynamics of Optomechanical Arrays MAX LUDWIG, University of Erlangen-Nuremberg, FLORIAN MARQUARDT, University of Erlangen-Nuremberg and Max Planck Institute for the Science of Light — Optomechanical system are typically composed of a single mechanical and a single optical mode interacting via radiation pressure. In this talk, we will introduce an array of optomechanical cells, and discuss our theoretical results on the nonlinear quantum dynamics of such a setup. In particular, we have discovered a phase transition between incoherent mechanical oscillations and a collective phase-coherent mechanical state. We describe how quantum fluctuations drive this transition at low temperatures. We will also discuss the prospects of observing these non-equilibrium dynamics in an experimental implementation based on currently available setups.

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