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Optomechanical synchronization phenomena in the presence of (quantum) noise TALITHA WEISS, ANDREAS KRONWALD, STEFAN WALTER, FLORIAN MARQUARDT, Institute for Theoretical Physics, FAU Erlangen-Nuremberg — Synchronization is a phenomenon that appears in various natural and man-made systems. Optomechanical limit-cycle oscillators can synchronize when they are coupled to each other or to an external periodic force. Classically, in the absence of noise, different synchronization regimes can be identified. Notably, optomechanical systems tend to synchronize either in-phase or anti-phase. We investigate how the synchronization behaviour is affected in the presence of the fundamental quantum noise (arXiv:1507.06190). We find a regime where fluctuations drive transitions between the classical synchronization states and explore the quantum-to-classical crossover. Finally, we compare the effects of quantum noise to the effects of thermal noise.

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