

Abstract Submitted  
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**Collective dynamics in optomechanical arrays** FLORIAN MARQUARDT, University of Erlangen-Nuremberg and Max-Planck Institute for the Science of Light, GEORG HEINRICH, MAX LUDWIG, University of Erlangen-Nuremberg, JIANG QIAN, University of Munich, BJÖRN KUBALA, University of Erlangen-Nuremberg — Photonic crystals can support both localized optical and vibrational modes that couple to each other, leading to a very strong optomechanical interaction. These so-called “optomechanical crystals” have been demonstrated experimentally recently. Here we explore the dynamics that results in an array of many coupled optomechanical cells, when these are driven into a regime of self-sustained oscillations. We find synchronization of these oscillations beyond a certain coupling strength. We show that the slow phase dynamics can be efficiently described by an effective Kuramoto model. Other dynamical regimes like chaos will also be accessible in these novel systems.

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