

Abstract Submitted
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Optomechanical Metamaterials: Dirac polaritons, Gauge fields, and Instabilities¹ VITTORIO PEANO, MICHAEL SCHMIDT, FLORIAN MARQUARDT, University Erlangen-Nuernberg — Freestanding photonic crystals can be used to trap both light and mechanical vibrations. These “optomechanical crystal” structures have already been experimentally demonstrated to yield strong coupling between a photon mode and a phonon mode, co-localized at a single defect site. Future devices may feature a regular superlattice of such defects, turning them into “optomechanical arrays.” We predict that tailoring the optomechanical band structure of such arrays can be used to implement Dirac physics of photons and phonons, to create a photonic gauge field via mechanical vibrations, and to observe a novel optomechanical instability.

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