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Photonic Quasicrystals for Nonlinear Quantum Optics SUSANNA THON, Physics Department, University of California Santa Barbara, WILLIAM IRVINE, Physics Department, New York University, DIRK BOUWMEESTER, Physics Department, University of California Santa Barbara and Huygens Laboratory, Leiden University, the Netherlands — Certain semiconductors, such as GaAs and GaP, have very high values for the second order optical nonlinear susceptibility. This makes them promising materials for applications in nonlinear (quantum) optics. However, phase matching conditions must be achieved through microstructuring of the materials or in cavities because they possess no intrinsic birefringence which is the conventional method for achieving phase matching. It has been reported that photonic crystal lattices based on quasicrystal geometries can support multiple photonic bandgaps at widely spaced frequencies. We report on the results of simulations to identify suitable semiconductor quasicrystal structures for nonlinear optics applications such as frequency conversion and the observation of novel cavity QED effects.

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