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Photonic density of states of 2D quasicrystals from level set equations and decorated quasiperiodic tiling patterns LIN JIA, ION BITA, EDWIN THOMAS, DMSE Massachusetts Institute of Technology — The TE and TM photonic band gaps (PBG) of 8mm, 10mm, and 12mm rotationally symmetric 2D quasicrystals (QCs) were numerically investigated for families of morphologies generated from level set equations and from quasiperiodic tiling patterns decorated with cylindrical rods, respectively. We discovered a 12mm QC with 56.5% TE PBG, which is the largest reported TE PBG for aperiodic crystals to date. Further, we find that the TM PBG of 2D QC is highly related to the shape of the structural features comprised by the QC morphology. Two physical models are presented to explain the decrease of the center frequency of PBG as dielectric filling ratio increases.

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