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Influence of disorder on the band structure of a photonic crystal ILYA PONOMAREV, T.L. REINECKE, Naval Research Laboratory, Washington DC, M. BAYER, Experimentelle Physik 2, Universitaet Dortmund, Germany, A. FORCHEL, Technische Physik, Universitaet Wuerzburg, Germany — We investigate both theoretically and experimentally the influence of disorder on the optical mode spectra of chains of coupled micropillar cavities (photonic dot resonators - PDR). These quasi one-dimensional structures were fabricated by lateral patterning of planar Bragg microcavities. Maxwell equations were solved by finite elements methods. The disorder is introduced by systematic variation of the cavity sizes. For periodic chains without disorder (equal PDRs) angle-resolved photoluminescence shows well-pronounced photonic band gaps. We show that even small disorder drastically modifies the properties of the optical modes and their spectra. Instead of set of propagating energy bands with Bloch states, impurity bands with Anderson-like localized states appear. The dependences of the energy bands and their intensities on cavities sizes are investigated and explained.

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