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Improved Photonic Bandgap Structures via Symmetry Breaking

DAVID MACKIE, Army Research Laboratory — We have previously reported on our efforts to develop a semiconductor based photonic bandgap nano-membrane device with 3D MEMS features which is designed to reconfigure the photonic crystal structure into different types of waveguide devices such as switches, modulators, delay lines, etc.[1] As design and fabrication interact there is tension between what one would like to make and what one can actually make. We have found that in many cases, by breaking some of the symmetry, it is possible to shift gaps around and to introduce new gaps. We discuss various examples of this. As an example with especially good performance, we discuss the case of rotated square holes in a square lattice. 1. "Design and Fabrication of a Reconfigurable Photonic Bandgap Waveguide Device with MEMS Features," Weimin Zhou, Monica Taysing-Lara, Gerard Dang, Lorna Harrison, David Mackie, Matthew Ervin, and Peter Newman, presented at CLEO 2004.

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