

Abstract Submitted
for the TSF06 Meeting of
The American Physical Society

Three-dimensional photonic crystals formed through a single diffractive optical element¹ YUANKUN LIN, Department of Physics and Geology, University of Texas-Pan American, Edinburg, TX 78541, DAVID RIVERA — Photonic crystals are microstructured materials in which the dielectric constant is periodically modulated on a length scale comparable to the desired electromagnetic wavelength of operation. They hold the promise of numerous applications in integrated optical circuits such as enhancing the performance of semiconductor lasers, waveguides, and all on chip optical transistor. We simulate the photonic band structure in woodpile-type photonic crystals and show the fabrication feasibility of these crystals with phase mask based holographic lithography. The experimental demonstration on SU-8 photoresist indicates that a single optical element can replace a complex optical setup for the holographic fabrication of woodpile-type photonic crystals. Photonic band gap calculation predicts the existence of full band gap in these crystals.

¹We thank National Science Foundation and Air Force for financial support.

Yuankun Lin
Department of Physics and Geology,
University of Texas-Pan American, Edinburg, TX 78541

Date submitted: 08 Sep 2006

Electronic form version 1.4