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Optical Characterization of 3D Photonic Crystals Fabricated by Holographic Lithography¹ YING-CHIEH CHEN, JOSEPH B. GEDDES III, PAUL V. BRAUN, PIERRE WILTZIUS, Department of Materials Science and Engineering, Beckman Institute, University of Illinois at Urbana Champaign — Holographic lithography is a promising technique for fabricating photonic crystals. Due to the large area, defect-free nature of the crystals created, they are expected to be good model systems for the study of their optical properties. However, the crystals created experimentally do not always meet theoretical expectations. We will present our current understanding of the optical response by comparing the experimental and simulated optical spectra. These spectra were taken from holographically fabricated crystals having FCC geometry. Optical spectra were simulated using a frequency domain algorithm for both the ideal photonic crystal and cross-sectional SEM images from the fabricated crystals as inputs to the simulation. Experimental issues associated with inconsistencies between measured and predicted results of the optical response will be discussed.

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