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Negative refraction and superlens behavior in a two-dimensional photonic crystal LEI ZHANG, RABIA MOUSSA, S. FOTEINOPOULOU, Ames Laboratory, Iowa State University, G. TUTTLE, Iowa State University, K. GUVEN, E. OZBAY, Bilkent University, Turkey, COSTAS SOUKOULIS, Iowa State University — We experimentally and theoretically studied a new left-handed (LH) structure based on a photonic crystal (PC) with a negative refractive index. The structure consists of triangular array of rectangular dielectric bars with dielectric constant 9.61. Experimental and theoretical results demonstrate the negative refraction and the superlensing phenomena in the microwave regime. The results show high transmission for our structure for a wide range of incident angles. Furthermore, surface termination within a specific cut of the structure excite surface waves at the interface between air and PC and allow the reconstruction of evanescent waves for a better focus and better transmission. The normalized average field intensity calculated in both the source and image planes shows almost the same full width at half maximum for the source and the focused beam.

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