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The focusing effect of electromagnetic waves in two-dimensional photonic crystals with gradually varying lattice constant

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Abstract

In this paper we studied the focusing effect of electromagnetic wave in the two-dimensional graded photonic crystal consisting of Silicon rods in the air background with gradually varying lattice constant. The results showed that graded photonic crystal can focus wide beams on a narrow area at frequencies near the lower edge of the band gap, where equal frequency contours are not concave. For calculation of photonic band structure and equal frequency contours, we have used plane wave expansion method and revised plane wave expansion method, respectively. The calculation of the electric and magnetic fields was performed by finite difference time domain method.

Keywords: graded photonic crystal, lattice constant, photonic band gap, refractive index

For full article, refer to the Persian section