Abstracts

Photonic Band Structures for a Class of 2D Periodic Dielectric Materials

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In recent years, there has been extensive interest in the development of artificial electrical or optical materials. By tailoring the material electrical characteristics, one is able to control the flow of electromagnetic waves from microwave to optic frequencies. This paper presents the guided wave properties of a class of two dimensional photonic crystals made of periodic dielectric rods. An efficient finite difference method is developed for the calculation of propagation constants of guided or evanescent waves in an arbitrary direction (in-plane or out-of-plane propagation). The emphasis is on the existence of photonic bandgaps within which the in-plane propagation is prohibited. Possible applications of photonic bandgap materials are also discussed.

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