Abstracts

Two-dimensional photonic crystal Fabry-Perot resonators with lossy dielectrics

M.M. Beaky, J.B. Burk, H.O. Everitt, M.A. Haider and S. Venakides. "Two-dimensional photonic crystal Fabry-Perot resonators with lossy dielectrics." 1999 Transactions on Microwave Theory and Techniques 47.11 (Nov. 1999 [T-MTT] (Mini-Special Issue on Electromagnetic Crystal Structures, Design, Synthesis, and Applications)): 2085-2091.

Square and triangular lattice two-dimensional (2D) photonic crystals (PCs) composed of lossy dielectric rods in air were constructed with a microwave bandgap between 4-8 GHz. Fabry-Perot resonators of varying length were constructed from two of these PCs of adjustable thickness and reflectivity. The quality factor of cavity modes supported in the resonators was found to increase with increasing PC mirror thickness, but only to a point dictated by the lossiness of the dielectric rods. A 2-D periodic Green's function simulation was found to model the data accurately and quickly using physical parameters obtained in separate measurements. Simple rules are developed for designing optimal resonators in the presence of dielectric loss.

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