Abstract Submitted
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Photonic Crystal Defect Mode Analysis Using Discretized Vector Wannier Functions[1] J.D. ALBRECHT, Air Force Research Laboratory, P. SOTIRELIS, High Performance Technologies, Inc., The Advanced Computational Analysis Directorate, Wright-Patterson Air Force Base, Ohio — We present a theoretical approach for calculating the photonic structure of defects in 2D photonic crystals. The central feature of our approach is the basis construction of local vector Wannier functions from the perfect crystal eigenstates. It has been proposed[a] that this basis be used to expand photonic crystal defect states analogous to the expansion in linear combinations of atomic orbitals of electronic structure of the ideal silicon vacancy.[b] These approaches rely on a small number of basis states local to the defect region. In this work, we replace the fourier expansion of the perfect crystal by a real-space description in vector finite-elements. This method allows the computation of the basis on the same grid as the perfect structure and a simpler defect eigenvalue problem. We present results that verify the eigenmodes of the crystal and examine defect modes.

[a]K.M. Leung, J. Opt. Soc. Am. B **10, 303 (1993).**

[b]**G.A. Baraff and M. Schluter, PRL 41, 892 (1978); J. Bernholc, N.O. Lipari, and S.T. Pantelides, PRL 41, 895 (1978).**

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