Abstract Submitted
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Theory of Band Structure of Thin Photonic Crystals[1] JEFFREY SOKOLOFF, Northeastern University — There exist several highly successful methods for calculating the band structure of thick photonic crystals (PC's), constructed from parallel dielectric rods, which are long compared to their diameters and spacings. None of these methods, however, can accurately calculate the band structure of the technologically important case of thin PC's (i.e., PC's consisting of a periodic array of dielectric rods or holes in a dielectric material of length comparable to or smaller than the hole or rod diameter and spacing). Methods analogous to approximate methods traditionally used to calculate the band structure of crystalline solids, such as the tight binding method (where the rods or holes which are resonant cavities play the role of atoms) or the augmented plane wave method will be applied to this problem. The resulting band structure for thin PC's is much different from that of thick PC's. For example, there exist lower/higher frequency flat bands, resulting from the tight binding functions constructed from linear combinations of the resonant modes of the rods/holes.

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