Photonic Band Gap of Dielectric Spheres in a Diamond Lattice[1]

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The study of photonic crystals bears a striking resemblance to the study of conventional atomic crystals, with photons treated as electron analogues. In particular, there are strong similarities between electronic and photonic band gap calculations. In this project, I duplicate the results of Ho et al. by calculating the photonic band gap of a crystal composed of dielectric spheres in a diamond lattice. This was the first structure, identified in 1990, that was theoretically shown to possess a complete three-dimensional photonic band gap.

References:

K. M. Ho, C. T. Chan, and C. M. Soukoulis. 1990. Existence of a photonic gap in periodic dielectric structures. *Physical Review Letters* 65(25):3152 – 3155. Abstract accessed March 27, 2009 at http://prola.aps.org/abstract/PRL/v65/i25/p3152_1

J. D. Joannopoulos, S. G. Johnson, J. N. Winn, and R. D. Meade. 2008. *Photonic crystals: molding the flow of light*. 2nd Ed. Princeton: Princeton University Press.

[1] MAE715 Final Project, Spring 2009