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Calculating Band structure, absorption and transmission coefficient of one- and two-dimensional phononic crystals

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Abstract

In this paper**,** we have investigated the propagation of sound waves into one- and two- dimensional phononic crystals. The phonon crystals constituted of square rows consist of metal filled cylinders in epoxy and air background. The metals are of the third group of periodic table, for instance Aluminum and Nickel. Frist, we calculated the band structure by using the plane wave expansion method (PWE). Then, we determined the absorption and transmission coefficient, and Pressure distribution. The crystal sizes of the crystals are directly proportional to the wave length, therefore making it possible to create crystals which vary from macrometers to nanometers and with frequencies which vary from Hz to THz. The results of the numerical simulation for absorption and transmission coefficient and pressure distribution for five metals are presented.

Keywords: Phononic crystals, Phononic band structure, Absorption coefficient, Transmission coefficient, Plane wave expansion method.

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