Dimensional photonic crystal as reflecting or dielectric waveguide structure

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Two-dimension boundary value problem of E. M. wave passage through periodic layered media (one-dimensional photonic crystal) is considered. The structure has finite number of plainly parallel layers each periodicity cell of which consists of two such homogeneous layers with different data of real valued dielectric permeability and different thicknesses. It is shown that if an auxiliary condition connecting the value of the incident angle and permeability of the layers is fulfilled, the problem has evident solution that gives simple expressions for reflected and passed fields. Besides, if the relation of layers thicknesses is less than unit, the performance of the structure is close to perfect mirror. Otherwise, it provides the performance of wave guide without losses that soaks in the incident field, that is suppresses both the reflected and passed fields.

Keywords: *photonic crystal, plainly parallel layers, homogeneous dielectric, plane wave, perfect reflector, waveguide without losses.*

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