

Defect Modes in Multilayered Piezoelectric Structures

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Abstract : Propagation of electro-elastic waves in a piezoelectric waveguide with finite stacks and a defect layer is studied using a modified transfer matrix method. The dispersion equation for a periodic structure consisting of unit cells made up from two piezoelectric materials with metallized interfaces is obtained. An analytical expression, for the transmission coefficient for a waveguide with finite stacks and a defect layer, that is found can be used to accurately detect and control the position of the passband within a stopband. The result can be instrumental in constructing a tunable waveguide made of layers of different or identical piezoelectric crystals and separated by metallized interfaces.

Keywords : piezoelectric layered structure, periodic phononic crystal, bandgap, bloch waves

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