
Programmable band-gaps in periodic structures

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Abstract

Using the periodicity of a mechanical structure to control its vibratory behavior is known for years. The periodicity creates a frequency range in which the energy cannot propagate. The periodicity is usually obtained through spatial repetition of a given shape and the corresponding band gaps are directly related to this shape and to the mechanical properties of the base cell. In this talk, a periodic structure with tunable band gaps is presented: shunted piezoelectric patches are embedded in the unit cells. A specific digital shunt circuit has been developed: it is used to program the local behavior law and updatable in real time. The obtained experimental results outperform the classical performance of passive material in terms of inertia loss and isolation.

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