

# Design Of A New Type Of Local Resonator For The Application Of Acoustic/Elastic Metamaterials

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## Abstract

Local resonator is the key element of acoustic/elastic metamaterials. In this paper, we proposed a new type of resonator which works by introducing more than one vibration modes, and thus may provide new approach to formulate acoustic/elastic metamaterial. The concept of this kind of resonator is fundamentally different from traditional translational and rotational resonators. Thanks to the finite element software COMSOL, based on Bloch's theorem, the characterization of wave propagation in the infinite long structure that composed by this type of resonator is achieved by solving the electrostatics on a unit cell. Based on this resonator, a type of wave filter is proposed to achieve the ability of letting the wave at specific frequency pass the material while attenuate other waves. This idea is also validated by using COMSOL, good agreement is achieved between numerical and analytical results.