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Acoustic defect mode in a finite 1-dimension lattice

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If there is a defect in a periodic lattice, then the defect modes are expected. The wave localization can be one of representative examples of defect modes applications. However, it is not likely possible to deal with an infinite-periods lattice in practice, and this implies that it is impossible to obtain a perfect wave localization. This motivates us to study a lattice with a finite period which allows the wave tunneling through it. Therefore, the behavior of the acoustic wave in a 1-dimension periodic lattice containing a defect with a finite period has been studied. For simplicity, we considered the lattice composed of 2 kinds of media with different characteristic impedance in the repeating order with finite periods and the defect with arbitrary size and characteristic impedance Finally, the limitation of wave localization in the real world application is discussed.