

ACOUSTICS2008/2399
Numerical and experimental results on sonic band gaps in 1-D
phononic crystals with a symmetric stub

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The wave propagation in periodic systems has received a great deal of attention during the last years. By analogy with the studies driven on photonic crystals, many works were conducted on phononic crystals. In this paper the propagation of elastic waves through a one dimensional chain of beads with grafted stubs is experimentally as well as numerically investigated. The results obtained by both approaches are well correlated and show that the stub introduces a dip in the spectral response of the chain. The numerical analysis shows that this dip is due to the excitation of a stub mode that cancels the transmission from one extremity of the chain to the other. The position and the shape of the dip in the response are related to the geometry and nature of the stub. The results show that it is possible to adjust the position of the dip and open potential applications of these structures for filtering or demultiplexing. Finally first results on periodically grafted stubs in the chain are presented.