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Tunable acoustic metamaterials SAHAB BABAEE, PhD Student, SEAS,Harvad university, NICOLAS VIARD, Post doctorate fellow, Massachusetts Institute of Technology , NICHOLAS FANG, Associate professor, Massachusetts Institute of Technology , KATIA BERTOLDI, Associate professor, SEAS, Harvad university — We report a new class of active and switchable acoustic metamaterials composed of three-dimensional stretchable chiral helices arranged on a two-dimensional square lattice. We investigate the propagation of sounds through the proposed structure both numerically and experimentally and find that the deformation of the helices can be exploited as a novel and effective approach to control the propagation of acoustic waves. The proposed concept expands the ability of existing acoustic metamaterials since we demonstrate that the deformation can be exploited to turn on or off the band gap, opening avenues for the design of adaptive noise-cancelling devices.

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