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Wave Manipulation in Metamaterials: A LEGO® Bricks Enabled Platform[1] PAOLO CELLI, STEFANO GONELLA, University of Minnesota
— In this work, we show how simple, reconfigurable arrangements of LEGO® bricks can be turned into the building blocks of an experimental platform for the investigation of wave phenomena in metamaterial architectures. The approach involves the assembly of reconfigurable specimens consisting of patterns of bricks on a baseplate and the use of a 3D laser vibrometer to reconstruct global and local wave features. The ability to seamlessly transition between different topologies makes this an effective approach for rapid experimental verification and proof of concept in the arena of mechanical metamaterials engineering. The intuitive nature of the brick-and-baseplate assembly paradigm can also be leveraged to implement families of intuitive lab demonstrations with significant didactic and scientific outreach potential. The versatility of the platform is tested through a series of experiments that illustrate a variety of wave manipulation effects, such as waveguiding and seismic isolation, both in periodic and disordered topologies.

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