

Acoustic Metamaterials And Wave Control Frontier Research In Computation And Mechanics Of Materials

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Acoustic Metamaterials And Wave Control

The book starts with a simple mass-in-mass chain model to illustrate the concept of negative mass due to internal resonance and its impact on wave transmission. The practical transformation theory for controlling acoustic waves is explained. Pentamode acoustic metamaterials and related cloaking design are also included.

Acoustic Metamaterials and Wave Control (Frontier Research ...

Acoustic metamaterials can manipulate and control sound waves in ways that are not possible in conventional materials. Metamaterials with zero, or even negative, refractive index for sound offer...

Controlling sound with acoustic metamaterials

An acoustic metamaterial, sonic crystal, or phononic crystal, is a material designed to control, direct, and manipulate sound waves or phonons in gases, liquids, and solids (crystal lattices). Sound wave control is accomplished through manipulating parameters such as the bulk modulus β , density ρ , and chirality.

Acoustic metamaterial

Acoustic metamaterials: Metamaterials for wave control and manipulation by exploring nonlinearity The development of metamaterials enables to engineer materials with extraordinary features, beyond the traditional limits.

Acoustic metamaterials: Metamaterials for wave control and ...

Comparing to phononic crystals which are designed to control wave through Bragg scattering ,, acoustics can also generate local resonance properties to control and guide wave propagation . For local resonance of acoustic metamaterials, the unique properties are not dependent on design periodicity.

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Active control for acoustic wave propagation in nonlinear ...

Description The purpose of this dissertation is to model, simulate and design metamaterials for underwater sound and elastic wave control. Water-based acoustic metamaterials usually suffer from low transmission due to the impedance mismatch with water; elastic metamaterials also suffer from this issue not only because of the impedance mismatch to the host medium, but also due to the multiple wave types existing simultaneously at the interface between the inclusions and the background matrix.

Controlling acoustic and elastic waves with metamaterials

The fine manipulation of sound fields is critical in acoustics yet is restricted by the coupled amplitude and phase modulations in existing wave-steering metamaterials. Commonly, unavoidable losses...

Fine manipulation of sound via lossy metamaterials with ...

Attenuating low-frequency sound remains a challenge, despite many advances in this field. Recently-developed acoustic metamaterials are characterized by unusual wave manipulation abilities that make them ideal candidates for efficient subwavelength sound control.

Spider web-structured labyrinthine acoustic metamaterials ...

The explosion of interest in metamaterials is due to the dramatically increased manipulation ability over light as well as sound waves. This material research was stimulated by the opportunity to develop an artificial media with negative refractive index and the application in superlens which allows super-resolution imaging.

ACOUSTIC METAMATERIAL DESIGN AND APPLICATIONS BY SHU ZHANG ...

Wave Dynamics and Composite Mechanics for Microstructured Materials and Metamaterials pp 19-33 | Cite as On the Theory of Acoustic Metamaterials with a Triple-Periodic System of Interior Obstacles Authors

On the Theory of Acoustic Metamaterials with a Triple ...

System Upgrade on Fri, Jun 26th, 2020 at 5pm (ET) During this period, our website will be offline for less than an hour but the E-commerce and registration of new users may not be available for up to 4 hours.

Acoustic Metamaterials and Wave Control | Frontier ...

MAT. Metamaterial Absorption Technology. Metamaterials are already being deployed by engineers working in optics and electromagnetism. Soon they will enter the hi-fi world. A two-year collaboration between GP Acoustics and Hong Kong neighbour Acoustic Metamaterials Group (AMG) will soon see KEF specify a metamaterial as a sound absorber in a (forthcoming model's) loudspeaker cabinet.

KEF to put Metamaterial Absorption Technology into ...

The development of acoustic, phononic, and mechanical materials and the resulted control of wave propagation at will has been a fast-developing research field in the past decades. Negative mass density was first realized in sonic crystals near dipolar resonance of the unit cells in 2000.

Developments in Acoustic, Phononic, and Mechanical ...

While the theoretical underpinning is universal and applicable to acoustic and electromagnetic waves, the experimental validation is conducted using spoof surface acoustic waves. The proposed...

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Routing Acoustic Waves via a Metamaterial with Extreme ...

In this paper, we investigate numerically the coupling of the Rayleigh mode with the micro-wall resonance modes in inter-digital transducers (IDTs) electrodes of surface acoustic

Electrical Performances of a Surface Acoustic Wave Device ...

Invisibility cloaking has been investigated in order to achieve efficient control over acoustic, electromagnetic, and flexural waves. 1-4 1. A. Colombi, P. Roux, S. Guenneau, and M. Rupin, " Directional cloaking of flexural waves in a plate with a locally resonant metamaterial," J. Acoust. Soc. Am.

Flexural wave cloaking via embedded cylinders with ...

Acoustic Metamaterials Company (AMC) is a smart materials and acoustic company that is changing the way we interact with sound. Coupling applied physics with intelligent design and manufacturing, we are pioneering a new class of multifunctional materials - called metamaterials. We are the pioneers

ACOUSTIC METAMATERIALS GROUP

Participate in leading-edge research involving multi-physical dynamic simulation and control theory of active metamaterials and topological metamaterials or metastructures for elastic/acoustic wave steering and control. Study reconfigurable acoustic metamaterials for noise control and mitigation.

Postdoc opening in active acoustic metamaterials at ...

Moreover, the membrane type acoustic metamaterial generally has poor durability. Similarly, plate-type acoustic metamaterials can have extraordinary attenuation properties at selective resonance frequencies without any ventilation, which has been experimentally confirmed. 28 28. M.

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