

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

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[Acoustic Metamaterials And Wave Control](#)

Acoustic metamaterials: Metamaterials for wave control and ...

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 In the linear dynamic regime, metamaterials have

Controlling sound with acoustic metamaterials

Abstract | 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 new possibilities for acoustic imaging and for the control of sound at subwavelength scales

Acoustic Metamaterials

Acoustic Metamaterials Our objective is to demonstrate the broad range of AMMs in terms of some seemingly “unnatural” effects such as negative density and compressibility, nonreciprocal wave transmission, and acoustic cloaking The interested reader can delve further into ...

Pentamode metamaterials for acoustic wave control

Pentamode metamaterials for acoustic wave control Zhaohong Wang*, Chengxin Cai, Yangyang Chu and Guangshun Liu Key Laboratory for Physical

Electronics and Devices of the Ministry of Education & Department of Electronic Science and Technology, Xi'an Jiaotong University, Xi'an 710049, China

Enabling a new degree of wave control with metamaterials ...

the field of artificial materials and metamaterials spans over many years, and has brought us through an exciting adventure in the theoretical understanding of wave interactions with materials, with several implications for new devices and components for radio-wave, infrared, optical and acoustic technology

Acoustic wave science realized by metamaterials

Acoustic wave science realized by metamaterials Dongwoo Lee^{1,2}, Duc Minh Nguyen² and Junsuk Rho^{2,3*} Abstract Artificially structured materials with unit cells at sub-wavelength scale, known as metamaterials, have been widely used to precisely control and manipulate waves thanks to their unconventional properties which cannot be found in nature

3D PRINTED MEMBRANE-TYPE ACOUSTIC METAMATERIALS ...

3D PRINTED MEMBRANE-TYPE ACOUSTIC METAMATERIALS FOR SMALL-SCALE APPLICATIONS BACKGROUND AND MOTIVATIONS •

Lightweight, small scale • There is a large range of materials to choose from with different properties • It is possible to change the resonance frequency by modifying the design (DMM, active membranes, etc)

Development of an Acoustic Metamaterials for Aero Acoustic ...

S Rezaei et al/ JAFM, Vol 10, No 2, pp 569-579, 2017 570 acoustic energy is approximately concentrated in the frequency range up to 2000Hz that makes it quite annoying as the human ear is

Nonlinear Acoustic Metamaterials for Sound Attenuation ...

Nonlinear Acoustic Metamaterials for Sound Attenuation Applications does not display a currently valid OMB control number 1 REPORT DATE We found that the acoustic wave propagation can be

Review on acoustic metamaterials - ESA

Review on acoustic metamaterials José Sánchez-Dehesa Wave Phenomena Group , Universitat Politècnica de València, Control of the radiation pattern Review on Acoustic Metamaterials Acoustic waves propagate with the wave vector reversed to the energy flow, and the refractive index n

Active acoustic metamaterials reconfigurable in real time

Active acoustic metamaterials reconfigurable in real time that control the metamaterial acoustic properties We demonstrate this approach experimentally by designing delay of the acoustic wave as it propagates through various parts of a flat lens [20-22,27,28] We employ here the latter

Tunable acoustic waveguide based on vibro-acoustic ...

acoustic wave can be greatly improved by simply changing the inductance values in the shunt circuit Keywords: piezoelectric, wave control, acoustic metamaterials (Some figures may appear in colour only in the online journal) 1 Introduction Acoustic metamaterials and phononic crystals that consist

An adaptive metamaterial beam with hybrid shunting ...

Keywords: adaptive metamaterials, broadband, guided wave control (Some figures may appear in colour only in the online journal) 1 Introduction Inspired by their electromagnetic counterparts, acoustic metamaterials have recently been developed with various application potentials and have become an active field [1-3]

PHYSICAL REVIEW E99, 052209 (2019)

Nonlinear acoustic metamaterials offer the potential to enhance wave control opportunities beyond those already demonstrated via dispersion engineering in linear metamaterials Managing the nonlinearities of a dynamic elastic system, however, remains a challenge, and the need now exists for new strategies to model and design these wave

DESIGN OPTIMIZATION OF ACOUSTIC METAMATERIALS AND ...

DESIGN OPTIMIZATION OF ACOUSTIC METAMATERIALS AND PHONONIC CRYSTALS WITH A TIME DOMAIN METHOD By The acoustic wave propagation problem is 33 Control grid including the depiction of points on the design grid surface 30 34 An example showing the original (dashed line) and the deformed

ACOUSTIC AND ELASTIC WAVES IN METAMATERIALS FOR ...

Acoustic and Elastic Waves in Metamaterials for Underwater Applications by ALEXEY S TITOVICH Dissertation Director: Professor Andrew N Norris Elastic effects in acoustic metamaterials are investigated Water-based periodic arrays of elastic scatterers, sonic crystals, suffer from low transmission due to the impedance

Non-Hermitian acoustic metamaterial for the complete ...

Non-Hermitian acoustic metamaterial for the complete control of sound by accessing the exceptional points It is undesired for most cases in acoustic wave manipulation, owing to the fact that energy is non-conserved and the information carried by sound signals is lost For example, acoustic metamaterial [1-24], as one kind of artificial

Labyrinthine acoustic metamaterials with space-coiling ...

We numerically analyze the performance of labyrinthine acoustic metamaterials with internal channels folded along a Wunderlich space-filling curve to control low-frequency sound in air In contrast to previous studies, we perform direct modeling of wave propagation through folded channels, not introducing effective theory assumptions

Broadband, Reconfigurable and Multifunctional Elastic Wave ...

passive acoustic/elastic metamaterials [42-45] One of the most pronounced challenges in developing acoustic/elastic metamaterial as practical devices is the ability to tune their wave performance without requiring physical microstructural modifications [45-48]

Wavefront Engineering and Computational Sensing with ...

Acoustic metamaterials are a family of engineered materials that can be designed to possess flexible acoustic properties They are composed of subwavelength periodic structures that can be homogenized as effective materials within the designed frequency bands Acoustic wave controlling devices with spatially inhomogeneous or/and