

11. Metamaterials and Phononic Crystals for Energy Harvesting

Introduction: Metamaterials and phononic crystals are artificially engineered materials that possess unique properties not found in traditional materials. Using metamaterials or phononic crystals, we can control and manipulate sound/elastic/electromagnetic wave propagations, thereby enabling the collection and conversion of wave energy. In the context of energy harvesting, extraordinary phenomena in metamaterials, such as negative refraction-induced wave focusing, the defect state mode, and the topological interface mode, have been utilized to improve energy conversion efficiency. In addition, integrating energy harvester design into metamaterials naturally yields multifunctional systems with both vibration suppression and energy harvesting abilities. Therefore, developing metamaterial-based energy harvesting systems has attracted a lot of research interest in recent years. This special session aims to bring together experts and researchers from different fields to share their latest findings and insights on this topic. We hope this session will foster fruitful discussions and inspire new ideas and collaborations, ultimately driving the advancement of this field. We look forward to a productive session.

Topics:

- Novel energy harvesting mechanisms based on metamaterials and phononic crystals
- Design and fabrication of metamaterials and phononic crystals for energy harvesting applications
- Modeling and simulation of metamaterials and phononic crystals for energy harvesting
- Applications of metamaterial and/or phononic crystal-based energy harvesting for wireless sensor networks, Internet of Things, and other emerging technologies
- Performance evaluation and optimization of metamaterials and phononic crystals
- Commercialization and industrialization of metamaterials and phononic crystals
- Challenges and opportunities in the development of metamaterials and phononic crystals

Session Organizer(s)

- **Chunbo Lan**, Associate Professor
🏠: College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics
✉: chunbolan@nuaa.edu.cn
☎: +86 18068167705
- **Liuxian Zhao**, Associate Professor
🏠: Institute of Sound and Vibration Research, Hefei University of Technology
✉: lxzhao@hfut.edu.cn
☎: +86 13721106841
- **Guobiao Hu**, Assistant Professor
🏠: Internet of Things Thrust, The Hong Kong University of Science and Technology (Guangzhou)
✉: guobiaohu@hkust-gz.edu.cn
☎: +86 15828504827