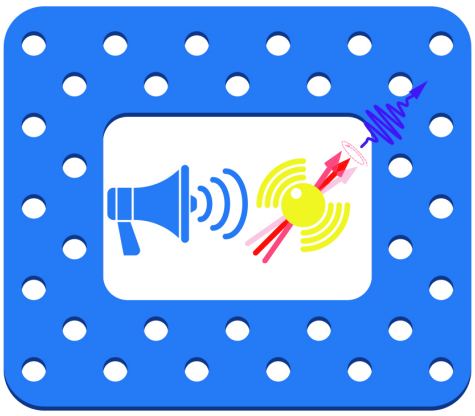
Microscale magnetic resonance technology using phononic crystals



Background

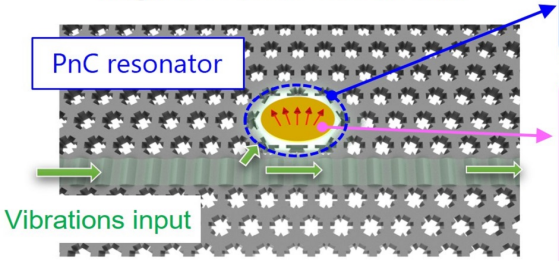
There has been a growing need for smaller magnetic sensors and antennas with higher performance, but there are limits to what can be achieved using conventional operations using current or radio waves. We aim to realize them by using the interaction between minute magnetic materials and ultrasound.

Summary

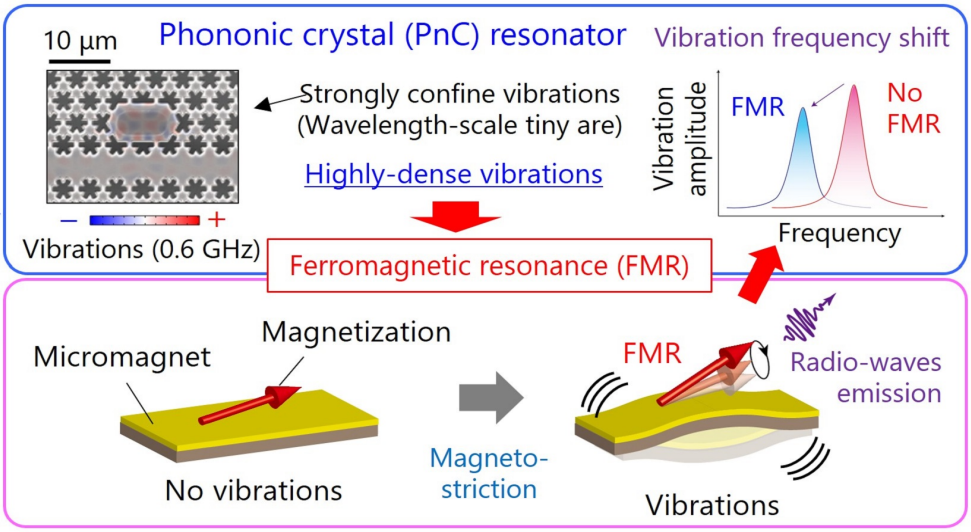
Phononic crystals are elastic artificial structures and strongly confine ultrasound in tiny spatial regions. This enhances interaction between vibrations and magnetization, enabling successful excitation of microscale ferromagnetic resonance using ultrasound.

Points
- Miniaturize a magnet (~1/100,000)
- Improve excitation efficiency (x10)
- Detect magnetic resonance with vibrations

➢ Developing ultrasmall and sensitive magnetic sensors and antenna



Phononic crystal (PnC)



Features

- Phononic crystals enabling miniaturization of magnetic resonant structures to 1/100,000
- 10-fold enhancement of excitation efficiency of ferromagnetic resonances by phononic crystal resonators
- Sensitive detection of ferromagnetic resonances in micro-magnets through high-quality phononic crystal resonances

Future_benefits

Development of ultrasmall and sensitive magnetic sensors and antenna will realize compact and high-performance devices for wireless communications and medical imaging applications.

Exhibiting Company

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