

Sonic and Photonic Crystals

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Sonic/phononic crystals named acoustic/sonic band gap media are the elastic analogues of photonic crystals and have received renewed attention recently in many acoustic applications. Photonic crystals have a periodic dielectric modulation with a spatial scale on the order of the optical wavelength. Design and optimization of the photonic crystals can be utilized in many applications by combining factors related to the combinations of intermixing materials, lattice symmetry, lattice constant, filling factor, shape of the scattering object, and thickness of a structural layer.

The Special Issue on “Sonic and Photonic Crystals” is focused on broad applications of the results involving characterizations of the sonic and photonic crystal properties.

The applications of photonic crystals were presented in this special issue. The gradient cavity, waveguide, switch, and spatial beam filtering with autocloned photonic crystals were studied and discussed [1–6]. The metamaterial of crystal structure can be found in [7–10], and the negative effects of those star-shaped structures were investigated and the applications in those studies were also discussed.

The elastic wave propagations in the phononic crystals are also interesting topics. The elastic wave propagations in the metamaterials, the elastic piezoelectric phononic crystals, and the energy harvesting phononic devices are listed in [11–13].

More about the photonic crystal applications also can be found in following studies. The deterministic insertion of KTP (KTiOPO₄) nanoparticles into polymeric structures, flexible photonic nanojet by cylindrical graded-index lens, and photonic crystal fiber investigations were presented [14–17]. Design of the polarization splitter and converter based on square lattice photonic crystal fiber were investigated in [18,19], and the polarization characteristics of photonic crystals were discussed in those investigation. Finally, the review paper of recent advances in colloidal photonic crystal-based anti-counterfeiting materials was introduced in [20].

This Special Issue presents and discusses the work of scientists studying a wide range of sonic/photonic crystal applications toward advancing this field.

Through the publications and discussions of the research on sonic/phononic crystals, the researchers can obtain effective and valuable results and improve their future development in related fields. Those devices can be utilized in mechanical and physical applications and also be used in design for novel applications based on investigations in this special issue.

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