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Anisotropy-induced wave steering in periodic linear and nonlinear lattices FILIPPO CASADEI, JULIAN RIMOLI, MASSIMO RUZZENE, Georgia Institute of Technology — Structural lattice configurations can be designed with tailored topologies which provide them with unusual behaviors, such as negative bulk modulus, negative Poisson's ratios, or extreme anisotropy[1]. The latter is of particular relevance to explore the inherent anisotropic behavior of periodic lattices as a design paradigm for wave guiding and steering applications. The equivalent material anisotropy of square and skew periodic lattices is investigated through the application of Bloch's theorem[2] to the finite element discretization of the representative unit cell. The in-plane directions of wave propagation are determined through detailed analysis of the longitudinal and shear wave velocities, and verified through full-field wave propagation simulations. Similar wave behaviors are investigated analytically and experimentally for multilayer composite panels with anisotropic lay-ups in order to demonstrate the feasibility of micro structural design as an effective approach for wave management.

[1]M. Ruzzene et al. Phisica Status Solidi B, **242**, 665 (2005)
[2]Bloch F., Z. Physik **52**, 555 (1928)

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