Maugin, Gérard A.; Rousseau, Martine
Wave momentum and quasi-particles in physical acoustics. (English) Zbl 1347.74004

The work deals with the propagation of elastic waves in deformable solids, looking at them primarily through their character as quasi-particles. After introducing the notions of wave momentum and radiative stress, the book provides a short account of their emergence and investigates their properties on the background of the wave-particle dualism and the Eulerian and Lagrangian description of continuum mechanics. The properties and behavior of waves/quasi-particles are discussed within different set-ups, problems and applications: transmission-reflection, dynamic materials, elastic and electroelastic surface waves, generalized elastic continua and solitonic systems. The approaches used include perturbation theory, Noether’s theorem and Whitham’s modulation theory. The book has an introductory as well as a review character concerning the field of elastic waves as quasi-particles in deformable solids, thus placing it in the framework of configurational mechanics.

Reviewer: Johannes Giannoulis (Ioannina)

MSC:
74-02 Research exposition (monographs, survey articles) pertaining to mechanics of deformable solids
74J10 Bulk waves in solid mechanics
74J15 Surface waves in solid mechanics

Keywords: elastic waves; configurational mechanics; surface waves; perturbation theory; Noether’s theorem; Whitham’s modulation theory

Full Text: DOI