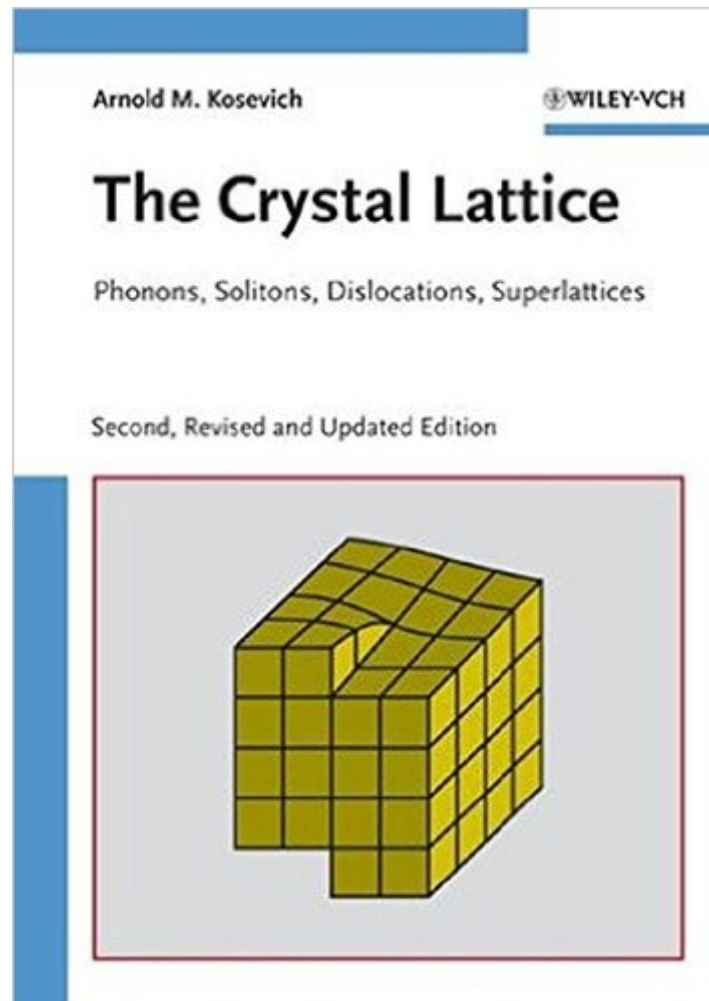


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The Crystal Lattice: Phonons, Solitons, Dislocations, Superlattices



Synopsis

The aim of this successful book is to describe and analyse peculiarities of classical and quantum dynamics of a crystal as a spatially periodic structure. In the second revised and updated edition, the author focuses on low-dimensional models of crystals and on superlattices. Both traditional questions like the spectrum of vibrations, the idea of phonon gas, dislocations etc. and new aspects like the theory of quantum crystals, solitons in 1D crystals, dislocation theory of melting of 2D crystals etc. are discussed. The author gives an explanation of a set of phenomena which entered into solid state physics during the last decades. It is shown that the crystal properties are sensitive to the dimension of the crystal and its defect structure, and depend slightly on whether the periodic structure consists of atoms, or electrical dipoles, or magnetic moments (spins). Considerable attention is devoted to the dislocation mechanisms as a basis of the theory of plasticity and numerous technological applications of crystalline materials.

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