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Smectic and Columnar Liquid Crystals: Concepts and Physical Properties Illustrated by Experiments (Liquid Crystals Book Series)

Patrick Oswald, Pawel Pieranski

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Liquid crystals allow us to perform experiments that provide insight into fundamental problems of modern physics, such as phase transitions, frustration, elasticity, hydrodynamics, defects, growth phenomena, and optics.

Smectic and Columnar Liquid Crystals: Concepts and Physical Properties Illustrated by Experiments is a result of personal research and of the graduate lectures given by the authors at the École Normale Supérieure de Lyon and the University of Paris VII, respectively. The book examines lamellar (smectic) and columnar liquid crystals, which, in addition to orientational order, possess 1D, 2D or 3D positional order. This volume illustrates original physical concepts using methodically numerous experiments, theoretical developments, and diagrams. Topics include rheology and plasticity, ferroelectricity, analogies with superconductors, hexatic order and 2D-melting, equilibrium shapes, facetting, and the Mullins-Sekerka instability, as well as phase transitions in free films and membrane vibrations. Nematic and cholesteric liquid crystals are covered by the authors in a separate volume entitled Nematic and Cholesteric Liquid Crystals: Concepts and Physical Properties Illustrated by Experiments.

Smectic and Columnar Liquid Crystals is an ideal introduction and a valuable source of reference for theoretical and experimental studies of advanced students and researchers in liquid crystals, condensed matter physics, and materials science.

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