

Books in this series are written at the final year undergraduate and beginning graduate level, and provide straightforward introductions to key topics in condensed matter physics today. Background material and applications as well as pointers to more advanced work are included, along with ample tutorial material, examples, illustrations, chapter summaries, and graded problem sets (with some answers and hints).

Many materials are neither simple liquids nor crystalline solids of the type studied in other branches of solid state physics, and instead are conveniently classified as 'soft condensed matter'. Examples include glues, paints, soaps, polymer melts and most materials of biological origin. This book offers a coherent and clear introduction to the properties and behaviour of soft matter. It begins with a treatment of the general underlying principles: the relation of the structure and dynamics of solids and liquids to intermolecular forces, the thermodynamics and kinetics of phase transitions, and the principles of self-assembly. Then the specific properties of colloids, polymers, liquid crystals and self-assembling amphiphilic systems are treated within this framework. A concluding chapter illustrates how principles of soft matter physics can be used to understand properties of biological systems. The focus on the essentials and the straightforward approach make the book suitable for students with either a theoretical or an experimental bias. The level is appropriate for final year undergraduates and beginning graduate students in physics, chemistry, materials science, and chemical engineering.

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Cover illustration: Atomic force microscopy image of a thin block copolymer film in the process of ordering. Image courtesy of J. Howse.

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