UNDERSTANDING SOFT CONDENSED MATTER VIA MODELING AND COMPUTATION

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All living organisms consist of soft matter. For this reason alone, it is important to be able to understand and predict the structural and dynamical properties of soft materials such as polymers, surfactants, colloids, granular matter and liquids crystals. To achieve a better understanding of soft matter, three different approaches have to be integrated: experiment, theory and simulation. This book focuses on the third approach — but always in the context of the other two.

Contents:

- Computer Modeling of Liquid Crystals
- Drop Dynamics in Complex Fluids
- Theoretical Modeling of Hydrogen Bonding in Macromolecular Solutions
- The Combination of Quantum Mechanics and Molecular Mechanics
- Dynamic Self-Consistent Field Theory
- Self-Consistent Field Theory of Block Copolymers
- Elucidation of Conformational Behavior of a Giant DNA
- Single Molecular Observation and Theoretical Modeling
- Polymer Phase Separation
- Molecular Dynamics in Crystallization of Helical Polymers
- Crystal Ordering and Chirality Selection
- Interplay of Liquid-Liquid Demixing and Polymer Crystallization in Multi-Component Systems

Readership: Advanced undergraduates, graduate students and researchers in mathematics, physics and chemistry

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