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Nota di contenuto	front cover; copyright; front matter; Preface to the Third Edition; Preface to the Second Edition; Preface to the First Edition; Contents; Introduction; The liquid state; Intermolecular forces and model potentials; Experimental methods; Notes and References; body; Statistical Mechanics; Time evolution and kinetic equations; Time averages and ensemble averages; Canonical and isothermal-isobaric ensembles; The grand canonical ensemble; Particle densities and distribution functions; Particle densities in the grand canonical ensemble; Computer simulation: molecular dynamics and Monte Carlo Notes and ReferencesStatic Properties of Liquids: Thermodynamics and Structure; A fluid in an external field; Functionals and functional differentiation; Functional derivatives of the grand potential; Density-functional theory; Direct correlation functions; The density response function; Diagrammatic methods; Diagrammatic expansions of the direct correlation functions; Virial expansion of the equation of state; Notes and References; Distribution-function Theories; The static structure factor; The YBG hierarchy and the Born-Green equation; Functional expansions and integral equations The Percus-Yevick equationThe mean spherical approximation;

Diagrammatic expansions of the pair functions; Extensions of integral equations; Notes and References; Perturbation Theory; Introduction: the van der Waals model; The lambda-expansion; Soft-core reference systems; An example: the Lennard-Jones fluid; Treatment of attractive forces; Mean-field theory of liquid-vapour coexistence; Scaling concepts and hierarchical reference theory; Notes and References; Inhomogeneous Fluids; Liquids at interfaces; Approximate free-energy functionals; The liquid-vapour interface

Fundamental-measure theory Confined fluids; Density-functional theory of freezing; Notes and References; Time-dependent Correlation and Response Functions; General properties of time-correlation functions; The velocity autocorrelation function and self-diffusion; Brownian motion and the generalised Langevin equation; Correlations in space and time; Inelastic neutron scattering; Linear-response theory; Applications of the linear-response formalism; Notes and References; Hydrodynamics and Transport Coefficients; Thermal fluctuations at long wavelengths and low frequencies

Space-dependent self motion The Navier-Stokes equation and hydrodynamic collective modes; Transverse-current correlations; Longitudinal collective modes; Generalised hydrodynamics; Long-time tails in time-correlation functions; Dynamics of supercooled liquids; Notes and References; Theories of Time-correlation Functions; The projection-operator formalism; Self correlation functions; Transverse collective modes; Density fluctuations; Mode-coupling theory I. the velocity autocorrelation function; Mode-coupling theory II. the kinetic glass transition; Notes and References; Ionic Liquids

Classes and models of ionic liquids

Sommario/riassunto

The third edition of Theory of Simple Liquids is an updated, advanced, but self-contained introduction to the principles of liquid-state theory. It presents the modern, molecular theory of the structural, thermodynamic interfacial and dynamical properties of the liquid phase of materials constituted of atoms, small molecules or ions. This book leans on concepts and methods from classical Statistical Mechanics in which theoretical predictions are systematically compared with experimental data and results from numerical simulations. The overall layout of the book is similar to
