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Nota di contenuto	Contents; Preface; 1 Glassy dynamics of liquids-facets of the phenomenon; 1.1 Stretching of the dynamics; 1.2 Power-law relaxation; 1.3 Superposition principles; 1.4 Two-step relaxation through a plateau; 1.5 The cage effect; 1.6 Crossover phenomena; 1.7 Hard-sphere systems: the paradigms; 1.8 Hard-sphere systems with short-range attraction; 2 Correlation functions; 2.1 The evolution of dynamical variables; 2.2 Correlation-function description of the dynamics; 2.3 Spectral representations; 2.4 Memory-kernel descriptions of correlators; 2.4.1 Zwanzig-Mori equations 2.4.2 Models for correlation functions2.5 Linear-response theory; 2.6 The arrested parts of correlation functions; 3 Elements of liquid dynamics; 3.1 Preliminaries; 3.1.1 Homogeneous isotropic systems without chirality; 3.1.2 Densities and density fluctuations; 3.2 Tagged-particle dynamics; 3.2.1 Basic concepts and general equations; 3.2.2

Tagged-particle diffusion; 3.2.3 The friction coefficient; 3.2.4 The cage effect and glassy-dynamics precursors of the velocity correlations; 3.3 Densities and currents in simple liquids; 3.3.1 Definitions and general equations
3.3.2 Transverse-current diffusion3.3.3 The generalized-hydrodynamics description of transverse-current correlations; 3.3.4 Visco-elastic features and glassy-dynamics precursors of the transverse-current correlators; 3.3.5 Representations of the density correlators in terms of relaxation kernels; 3.3.6 Sound waves and heat diffusion; 3.3.7 Visco-elastic features and glassy-dynamics precursors of the density-fluctuation correlators; 4 Foundations of the mode-coupling theory for the evolution of glassy dynamics in liquids; 4.1 Self-consistent-current-relaxation approaches
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4.3.6 Arrest in systems with short-ranged-attraction4.4 Dynamics near glass-transition singularities; 4.4.1 Relaxation through plateaus; 4.4.2 Below-plateau relaxation; 4.4.3 Structure and structure relaxation; 4.4.4 Descriptions of some glassy-dynamics data; 5 Extensions of the mode-coupling theory for the evolution of glassy dynamics of liquids; 5.1 Extensions of the MCT for simple systems; 5.1.1 MCT equations for the glassy shear dynamics; 5.1.2 Glassy-relaxation features of shear correlations; 5.1.3 MCT equations for the tagged-particle dynamics
5.1.4 Idealized transitions from diffusion to localization

Sommario/riassunto

Amorphous condensed matter can exhibit complex motions on time scales which extend up to those relevant for the functioning of biomaterials. The book presents the derivation of a microscopic theory for amorphous matter, which exhibits the evolution of such complex motions as a new paradigm of strongly interacting particle systems. e - ;The book contains the only available complete presentation of the mode-coupling theory (MCT) of complex dynamics of glass-forming liquids, dense polymer melts, and colloidal suspensions. It describes in a self-contained manner the derivation of the MCT equation